

University of Lausanne's Open Science Strategy and Action Plan

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Abstract—Developed in 2019, University of Lausanne (UNIL)'s Open Science Strategy revolves around the free access to scientific publications (Open Access) and the opening of research data (Open research Data) in order to rise up to the challenge of disseminating knowledge. It aligns with several other recent institutional and cantonal policies and strategies. In order to implement it, UNIL has defined an action plan based on 5 priority areas: Governance; Organization; Infrastructures; Training and advice; New culture and communication. Each of these 5 axes is broken down into concrete measures to be carried out by different stakeholders. Completed and ongoing projects include: the creation of a new Open Science web portal; the elaboration of an UNIL Data Management Plan template with the tool DMPonline; the development of a new directive on Open Access and on Research data; the institutional repository for publications (SERVAL); the creation of a custom wizard for Open Access (Papago); the provision of an Open Access editing and publishing portal; the development of support and training for researchers.

Keywords — Open Science, Open Access, Data Curation, Data Management Plan, FAIR Principles, Research Data Lifecycle, Research Data Management, Open Research Data.

I. THE UNIVERSITY OF LAUSANNE IN TODAY'S RESEARCH LANDSCAPE

The University of Lausanne (UNIL) Rectorate's 2017-2021 plan of intent [1] states that:

“UNIL researchers and teachers devote a significant part of their time to their research activities and the funds invested in them are considerable. However, the visibility of the results of this research cannot be taken for granted. It depends essentially on the motivation of their authors to publicize them, beyond their traditional publication in scientific journals, books or conference proceedings. Today's research is open, participatory and transdisciplinary. [...]

The Rectorate of the University of Lausanne intends to adopt a very clear promotion policy in favour of openness, both for publications (Open Access) and for research data (Open Data). This policy of openness must be carried out in collaboration with editorial partners, UNIL researchers, [...] as well as national partners [...], the political world, the research community or the Consortium of Swiss University Libraries.”

The UNIL's Open Science (OS) strategy links to UNIL's 2019 digital strategy [2] as well as the digital strategy of the Canton de Vaud [3] drawn up by the Conseil d'État (executive body). This OS strategy is also intended to respond to the 2017-2022 state legislative program [4], which aims to promote open and participatory science, as well as the University of Lausanne's strategic plan [5] adopted by the Grand Conseil in May 2019.

The new paradigm of Open Science is transforming the research environment and the way researchers do and share science. In an era of digitization, citizen science and “fake news”, Open Science offers an opportunity for a verifiable, reproducible, closer to the citizens, and overall fairer Science.

II. OPEN SCIENCE: AN OPEN AND FREE SCIENCE

A. Accessible and high-quality scientific knowledge

Open Access to scientific knowledge and research results has the potential to improve the quality of science by making it more transparent, more integrated, more responsive to societal challenges, more inclusive and more accessible to new users.

The Amsterdam Call for Action on Open Science [6], based on the reflections of many experts gathered in 2016 by the Dutch Presidency of the EU, defines Open Science as

“Open Science is about the way researchers work, collaborate, interact, share resources and disseminate results. A systemic change towards open science is driven by new technologies and data, the increasing demand in society to address the societal challenges of our times and the readiness of citizens to participate in research.”

Several factors must be considered in order to successfully open up science: integration at all levels and in all aspects of current practices; taking into account the different disciplinary sensitivities to ensure transparency throughout the system; setting up administrative and financial support to minimise the administrative impact on researchers, etc.

B. Binding national and international rules

On a global scale, and particularly on a European scale, it can be observed that transparent research data management – Open Research Data (ORD) – has become a priority for both states and public funding bodies. They require the preparation of Data Management Plans (DMPs), as well as free access to scientific publications and its underlying data. On the other hand, an increasing number of scientific publishers now have data policies which request access to data, metadata, codes, materials, methods and protocols associated with both qualitative and quantitative research results.

In Switzerland, the Swiss National Science Foundation (SNSF) has been committed to opening up science since 2006²⁷. Beneficiaries of SNSF grants are required to submit a DMP with all funding applications since 2017, as well as to open all scientific works resulting from the projects the SNSF funds [7]. Furthermore, swissuniversities aims for 100% open access for all scholarly publications from 2024 onwards, in line with its national Open Access strategy [8].

Since November 2015, UNIL has been a signatory of the LERU Statement on Open Access to Research Publications [9], which aims to promote opening publications, archiving and the availability of scientific data. UNIL also signed in 2018 the Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities (Berlin Declaration) [10] and the San Francisco Declaration on Research Evaluation (DORA) [11], which questions the widespread use of bibliometric rankings as metrics for the evaluation of research and researchers.

C. The benefits of Open Science

Many benefits can be expected when science becomes Open:

- **Transparency and visibility:** Open science is synonymous with honest, accountable, transparent, reproducible, valid and good research. The visibility of researchers and universities is increased as open data and publications are more downloaded, read and shared.
- **Impact and new discoveries:** through its greater visibility, Open Science enables higher impact: many studies show that the citation rate increases when data and publications are open. The circulation of knowledge is also improved, thus fostering innovation and the development of new knowledge.
- **Democratization of knowledge:** access to knowledge is a universal right. Open Science reduces the gaps between states, institutions and citizens. It defends free and open access to knowledge and opposes any discrimination based on financial criteria.
- **Public funding = public good:** most of the research carried out at UNIL is financed by public funds and, consequently, by citizens. The data, publications and research results thus obtained are a public good and must therefore be accessible quickly and freely for the benefit of society.

Open Science is also a way to restore trust between citizens and the science they fund while strengthening its integrity.

D. The two priorities of Open Science for UNIL: Open Access and Open research Data

OS is an umbrella term that includes a wide variety of initiatives and movements. UNIL intends to focus on the challenges of disseminating knowledge by developing its Open Science approach mainly around Open Access to scientific publications and Open research Data, while integrating components from the other pillars of Open Science.

III. OPEN SCIENCE ACTION PLAN 2019-2021

As part of its reflections, its surveys of researchers and faculty and the involvement of stakeholders within faculties and services, UNIL has defined a plan of action in 5 priority areas (“Fig. 1.”) which are broken down into specific objectives, concrete measures to be carried out and expected deliverables:

²⁷ <http://www.snf.ch/fr/pointrecherche/dossiers/open-science/Pages/default.aspx>

1. **Governance:** to develop an Open Science policy, strategy, processes and guidelines to support UNIL's vision.
2. **Organization:** to set up administrative and support structures that ensure a participatory and inclusive approach to researchers.
3. **Infrastructures and tools:** to provide the technical means to manage, store, secure, share and archive scientific information.
4. **Training and advice:** to support, accompany and empower researchers in the management of their projects
5. **A new culture and communication:** to raise awareness in the community and the public about the challenges and opportunities of OS.

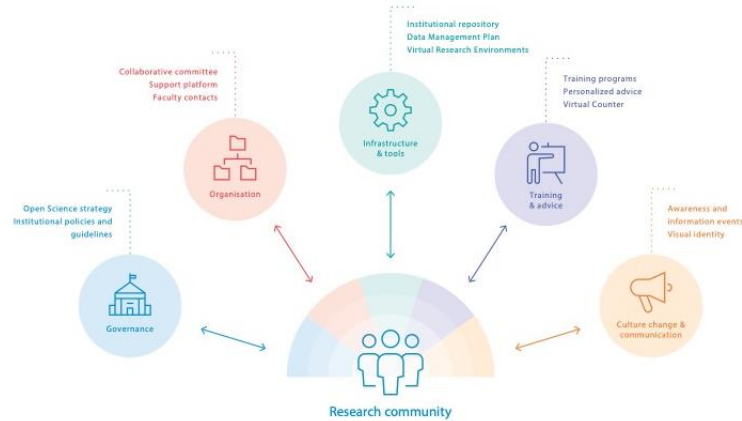


Fig. 1. UNIL's Open Access Strategy and Action plan 2019 – 2021. Five priority axes to support UNIL researchers

IV. OPEN ACCESS - OPEN ACCESS TO SCIENTIFIC PUBLICATIONS

A. An institutional approach that guarantees academic freedom

The results of a survey conducted in 2017 [12] show a good predisposition of the UNIL academic community towards Open Access, highlighting a desire to democratize knowledge and a concern for financial considerations.

Given the richness and variety of UNIL's disciplinary fields, a unique approach to Open Access that favours one path over another could never succeed. UNIL has the academic freedom of its researchers at heart and thus wants to develop a mixed and pragmatic approach where the golden and green roads coexist and complement each other. Researchers will firstly choose the journal or editor best suited to their case based on scientific criteria, and they will then be able to choose which path to follow to make their publication freely accessible.

B. Challenges of Open Access for UNIL

This mixed strategy requires the improvement of SERVAL (**SER**Veur **Acadé**mique **Lausannois**), which is the institutional repository at UNIL and CHUV. Over the past two years, SERVAL has undergone a substantial optimisation to become a tool focused on the needs of researchers and the current challenges of Open Access publication: ease of use, internationalization of Lausanne-based research, visibility of scientific works, citations of UNIL researchers, etc.

As for the publication of monographs, the path is yet to be paved. UNIL will develop its policy in partnership with the research community and stakeholders, including publishers, historical partners in the promotion of scientific research.

Solutions acceptable to all parties will still have to be found, considering the requirements of funding bodies, the national strategy, the needs of researchers and the institutional challenges of a public university, which must reach beyond cantonal and national borders through the quality of its research and teaching.

UNIL therefore gives priority to:

- Enabling its researchers to **focus on their research** and not in their administrative or other obligations;
- **Supporting** its researchers and **communicating** the opportunities offered by Open Access;
- **Training of** the community in new complementary modes of scientific publication (bibliodiversity);
- The **development of** technical **infrastructures** and the provision of **tools for publishing** journals in Open Access;

- The consideration, in the context of the researchers' **evaluations**, of visibility and access to scientific results efforts (SERVAL and Open Access).

This reasonable and thoughtful approach should allow us to meet the challenges of OA and scientific communication landscape of the beginning of the 21st century.

C. Examples of projects and initiatives launched in the field of Open Access

We have launched and completed several Open Access initiatives within each of the five axes of our Open Science strategy (see above):

1. Governance

- Directive 4.6 on Open Access and the use of our institutional repository, SERVAL [13]. The Directive entered into force on 1 July 2020 and a dedicated webpage²⁸ was created to explain in a clear language what is expected from our researchers, especially for our English-speaking community, since there is no official text in English.

2. Organization

- UNIL is a highly decentralised organisation. Disciplinary specificities are abundant and federating all faculties under a purely central organism would prove inefficient. Therefore, central initiatives stemming from the Department of Research, International Relations and Continuing Education are consulted and vetted at each faculty through their research consultants. Research consultants represent an invaluable two-sided communication channel through which institutional initiatives can be distilled to each faculty and through which disciplinary specificities can be filtered.

3. Infrastructure

- A vast project was launched to integrate researcher-centred features in our institutional repository: SERVAL. Giving ownership of the records to researchers was a first step to empower them to take possession of their profiles and to make sure the information is correct. Furthermore, the user interface and workflow were drastically simplified and the visibility of SERVAL's records was greatly improved, with approximately a 230% increase in downloads from January 2018 to December 2020.
- A publication platform project was launched in order to provide internally-edited journals with the infrastructure needed (based on Open Journal Systems open source software²⁹) to streamline publication and increase visibility of their journals, EdiPub. For the time being, three journals started to collaborate in our platform, and an inter-university initiative to extend the scope and create a community around it is being discussed.
- In response to the seemingly infinite number of possible cases with respect to Open Access obligations, rights and financial possibilities, we developed, in collaboration with the University of Fribourg, Papago³⁰, a personal Open Access assistant capable of giving personalised advice on Open Access rights, obligations and financial opportunities based on a few simple questions. The code to Papago is openly available on GitHub³¹ and it can be personalised to include each Swiss higher education institution logo and specific institutional information.

4. Training

- Several schemes, checklist and fact sheets were developed in order to guide and simplify the ever-growing requirements and options concerning Open Access. Some examples are "The roads to Open Access" [14] and "How to make your research available to everyone" [15].

²⁸ <https://www.unil.ch/openscience/en/home/menuinst/open-access/open-access-a-lunil/directive-open-access-unil-serval.html>

²⁹ <https://pkp.sfu.ca/ojs/>

³⁰ <https://www.unil.ch/openscience/en/home/menuinst/open-access/papago---your-open-access-personal-assistant.html>

³¹ <https://github.com/micaelacq/Papago>

- A self-paced course was prepared and launched on Moodle³² in order to introduce the subject of Open Access and its legal implications. A module is also devoted to SERVAL and its use. More than eighty members of UNIL have already enrolled to the course.
- Several short video tutorials³³ are available in French and English to quickly demonstrate how some frequent operations are performed in SERVAL.
- A simplified legal guide [16] was prepared to introduce researchers into copyright and how it applies to scientific publications and Open Access publishing.

5. New research culture and communication

- For the past two years, we prepared and shared an Open Science advent calendar³⁴ showing snippets of Open Access or Open Research Data practices, both general and specific for UNIL. The 2020 advent calendar can be found in our website³⁵.
- We developed a Jeopardy!-style game to introduce the subject of Open Access at one of UNIL's summer schools. The Open Access session, rather than purely passive and academic, was introduced with a very short theoretical introduction, followed by a quiz round where students discovered by themselves the key concepts of OA publishing. The session was very much appreciated and students seemed to have interiorised the concepts thanks to the hands-on experience. The game will be openly shared so that others can build upon it.
- A large and diverse number of events have been organised at UNIL around the theme of Open Access and Open Science, including the first national conference in Open Access in 2018³⁶. Our latest event was the Open Science Tour of UNIL³⁷ which, given the covid circumstances, was held completely online.

V. OPEN RESEARCH DATA - TRANSPARENT AND REASONABLE DATA MANAGEMENT

D. An open and responsible institutional approach

UNIL's research data strategy is defined within a binding international and national framework. It is also based on the needs and expectations of its community as identified in a survey conducted in 2015 [17].

In this context, UNIL advocates honest and responsible research. This approach aims to manage research data in a transparent and open manner, within the limits of the law and scientific requirements in terms of ethics, professional conduct and compliance with standards for the protection of individuals and intellectual property.

E. Challenges of Open research Data for UNIL

Research data derived from scholarly work is a public good whose management – in the short, medium and long term – raises many scientific, ethical, deontological, legal, technical, economic and societal issues. Proper data management is essential and crucial in many respects: it ensures compliance with legal and regulatory frameworks as well as with the requirements of scientific funders and publishers. It also guarantees the authenticity, integrity, reliability and usability of data as well as facilitating its reproducibility, sharing and reuse. Finally, it makes research results more visible [21] and contributes to their quality.

These challenges and their complexity require a high number of skills that must first be identified and then reinforced to assist researchers. Additionally, disciplinary specificities must be carefully considered, as well as a number of obligations that arise from today's research environment.

To meet these multiple challenges, UNIL focuses its interventions and support on the following areas:

- **Awareness and communication** of this "new" scientific culture;
- The support and **training** of its researchers in the face of this evolution;
- The **development** of technical **infrastructure**;

³² <https://moodle.unil.ch/course/view.php?id=14160>

³³ <https://www.unil.ch/openscience/en/home/menuguid/open-access/serval/how-to-use-serval.html>

³⁴ <https://www.unil.ch/openscience/home/menuguid/evenements/decembre-2020---calendrier-de-lavent-open-science-2020.html>

³⁵ <https://www.unil.ch/openscience/en/home/menuguid/evenements/decembre-2020---calendrier-de-lavent-open-science-2020.html>

³⁶ <https://www.unil.ch/openscience/en/home/menuguid/evenements/octobre-2018---conference-nationale-open-access.html>

³⁷ <https://www.unil.ch/openscience/en/home/menuguid/evenements/novembre-2020---le-tour-open-science-de-lunil.html>

- The establishment of a **participatory organization** and **governance** capable of effectively meeting the needs of its community.

This multivariate approach must make it possible to respond to the challenges and issues of OrD so that the management *of* research data becomes a responsible management of data *for* research.

F. Examples of projects and initiatives launched in the field of Open research Data

We have launched and completed several Research Data Management (RDM) and OrD initiatives within each of the five axes of our Open Science strategy:

1. Governance

- Directive 4.5 on Research Data Processing and Management [18]. Adopted on June 11, 2019 (with retroactive effect to January 1, 2019), this Directive regulates the processing, storage, archiving and long-term preservation of research data. It also a) defines the rules for the management of research data; b) sets out the roles and responsibilities of the various stakeholders; c) defines the pricing principles for the use of the resources of the Computing and Research Support Division (DCSR) of IT Service.

2. Organization

- The management of research data raises many issues and requires multiple professional skills. The OrD UNIL team works closely in a participatory manner with all the actors involved, both internal partners – Central Services (e.g. Dep. of Research, IT Service, Ethics team, legal Service) and Faculties (Research consultants and discipline specific research groups) – and external partners (e.g. BiUM³⁸, DaSCH³⁹, dhCenter⁴⁰, FORS⁴¹). The goal of this OrD network is to support UNIL's researchers in managing research data throughout their lifecycle [19] with best practices and implement FAIR Data Principles during research.

3. Infrastructure

- Since 2019, the UNIL IT Service has integrated a new Division, the DCSR⁴² whose mission is to provide UNIL with computing and storage resources, as well as expertise that is transversal to its faculties and institutes. This field of expertise includes high-performance computing (HPC) support, (sensitive or non-sensitive) data storage as well as web and database development mandates.
- To help its community of researchers write their DMPs, UNIRIS has developed a generic template in the tool DMPonline⁴³ which provides help and examples to facilitate the DMP's redaction. In order to help researchers in using the tool, an interactive tutorial has been developed⁴⁴. In the future, different discipline-specific templates can be developed in collaboration with the faculties.
- UNIL, in collaboration with the University of Zurich, is actively participating in the SWISSUbase⁴⁵ project led by FORS, which aims to develop a general, non-commercial, open and sustainable data repository to comply with the *FAIR Data Principles* [20].

4. Training

- In partnership with the Graduate Campus⁴⁶, different workshops on good practices in RDM – RDM's basis; DMPs; Data Organisation; Data Storage & Security; Data Sharing (OrD); Data Archiving, etc. – are offered to PhDs and post-doctoral students during the academic year. In order to broaden the audience and reach all researchers (e.g. seniors), a course catalogue online platform⁴⁷ has been created.

³⁸ <https://www.bium.ch/>

³⁹ <https://dasch.swiss/>

⁴⁰ <https://dhcenter-unil-epfl.com/>

⁴¹ <https://forscenter.ch/>

⁴² <https://unil.ch/ci/dcsr>

⁴³ <https://dmp.unil.ch>

⁴⁴ <https://www.unil.ch/openscience/home/menuinst/formations/dmponline-unil-en.html>

⁴⁵ <https://info.swissubase.ch/>

⁴⁶ <https://www.unil.ch/graduatecampus/fr/home.html>

⁴⁷ <https://conference.unil.ch/cours/openscience>

- In the near future, the OrD website will host online self-study tutorials (like the one on DMPonline) following best practices in research data management and topics – DMP; Organize your Data; Storage & security; Preservation & sharing – provided on the main web page “How to manage your data?”⁴⁸.

5. New research culture and communication

- In collaboration with the OA Team, we co-organise various events and OS awareness campaigns (e.g. OS advent calendar, OS Tour) for the research community.
- For events related to RDM and OrD, we appreciate organising them in collaboration with the OrD UNIL team. We also like to include UNIL’s researchers so that they can share issues they encounter in RDM or OrD with their colleagues.

IV. CONCLUSION

As mentioned before, Open Science offers many opportunities and challenges, not only for the research community but for society in general. In the years to come, UNIL will continue to promote OS and other components of this broad “spectrum of openness” (e.g. Citizen Science, Open educational resources, Open methodologies, etc.) can be integrated into the strategy developed and actions carried out.

A. Abbreviations and Acronyms

Bibliothèque universitaire de médecine (BiUM); Centre hospitalier universitaire vaudois (CHUV); Data and Service Center for the Humanities (DaSCH); Data Management Plan (DMP); Digital studies interface for the arts, humanities and social sciences (dhCenter); Division Calcul et Soutien à la Recherche (DCSR); Findable, Accessible, Interoperable, Accessible (FAIR); Swiss Competence Center for Social Sciences (FORS); High-Performance Computing (HPC); Open Access (OA); Open research Data (OrD); University of Lausanne (UNIL); Service des ressources informationnelles et archives de l’Université de Lausanne (UNIRIS); Serveur Académique Lausannois (SERVAL); Swiss National Science Foundation (SNSF).

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⁴⁸ <https://www.unil.ch/openscience/en/home/menust/open-research-data/gerer-ses-donnees-de-recherche.html>

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