



University of
Zurich^{UZH}

OPEN

BY

Open Science Policy

DEFAULT

1 Introduction

Table of Contents

1	Introduction	2
1.1	What is Open Science?	2
1.2	Why is Open Science important?	3
1.3	Why do we need a Policy?	3
1.4	What is the framework of the Policy?	4
1.5	What is the focus and scope of the Policy?	4
2	Policy	5
2.1	Open Research Process	5
2.2	Open and FAIR Data	5
2.3	Open Code and Software	6
2.4	Open Access	6
2.5	Open Science Education	7
2.6	Assessments and Incentives	7
3	Implementation	8
4	Approval	8
5	Glossary	9

The University of Zurich (UZH) has a longstanding commitment to the free and open pursuit of scholarship. UZH is dedicated to an open research culture that encompasses open sharing, transparency, reproducibility, and accountability as a means to increase research quality and research impact and to benefit society. To foster an open research culture and to advance Open Science, UZH strives to be Open by Default. This means Open Science is intended to become the guiding principle. For this to happen, Open Science practices and values need to be embedded in the organization of the UZH and its processes. This Policy formulates expectations and recommendations and provides guidance on the implementation of Open Science practices. The Open Science strategy of UZH is two-fold:

Top-down: Open by Design

UZH provides the necessary support and guidelines to foster and establish Open Science.

Bottom-up: Open by Desire

UZH supports initiatives and the engagement of its employees in the area of Open Science.

Words in *italics* can be found in the glossary.

1.1 What is Open Science?

Open Science is an umbrella term for various movements and practices aiming to make any kind of *scholarly output* accessible, be it *data*, publications, methods or tools, at any stage of the research process (Gema Bueno de la Fuente, What is Open Science?). It provides a vision as well as guidelines on how research can be made transparent and accessible for everyone.

1.2 Why is Open Science important?

The goal of Open Science is to improve efficiency (e.g. by avoiding redundancies), research quality and therefore also its effectiveness. Open Science offers substantial benefits including¹:

Public good

The results of research financed wholly or partially by public funds are public property, which should be accessible without restriction, so that they can be reused by third parties.

Knowledge transfer

Open Access publications are globally accessible and considerably increase the transfer of knowledge and the visibility of research results, not only for members of the scientific community but also for industry and the general public.

Knowledge for all

Open Science helps reinforce the democratization of research by making access independent of income and funding opportunities and by encouraging collaboration.

Reuse of scholarly output

Open Science promotes transparency, leading to increased scrutiny and therefore improved accountability of research. It also improves the reuse, *reproducibility* and therefore ultimately the quality of research.

Fact-based decisions

Decision-makers benefit from Open Science because they always have access to the latest scientific insights.

Innovation

Access to cutting-edge research encourages innovation in science, industry, and society.

Efficiency

Text and *data* mining promote more efficient access to ever-growing *data* flows. Open data, methods, and code help to avoid duplication of research and enable efficient and appropriate reuse in projects building on previous results.

1.3 Why do we need a Policy?

The benefits of Open Science can only fully come to fruition when it becomes an integral part of research practice worldwide. UZH will, therefore, continue to advance Open Science and its legal framework on all levels: within the university, nationally and internationally. UZH will use this Policy to underpin its activities. The Policy is based on the Swiss National Strategy on *Open Access*² as well as the Open Science Roadmap of the League of European Research Universities (LERU)³.

This Policy describes a common vision and provides guidance on how to integrate Open Science practices into UZH scholarship.

¹ Partly based on <https://oa100.snf.ch/en/home-en/>

² Swissuniversities/Swiss National Science Foundation, Swiss National Strategy on Open Access, 31 January 2017: <https://perma.cc/U5P4-R7LG>

³ <https://www.leru.org/files/LERU-AP24-Open-Science-full-paper.pdf>

1.4 What is the framework of the Policy?

Numerous national regulations and international initiatives are aimed at making research results publicly available. In Switzerland, federal law requires research funding agencies at national level to ensure that research results are accessible to the public⁴. As a member of swissuniversities, UZH adopted the Swiss National Strategy on *Open Access* on January 31, 2017⁵. As a member of the League of European Research Universities (LERU), UZH signed the LERU Roadmap towards *Open Access* in June 2011⁶, the LERU Roadmap to Open Science in May 2018⁷ and the Sorbonne Declaration on Research Data Rights in January 2020⁸. Furthermore, according to the University Act UZH has an obligation to ensure the quality of research and teaching⁹. Open Science practices contribute to increased transparency, which leads to improved reproducibility and ultimately higher quality in research.

1.5 What is the focus and scope of the Policy?

The Open Science Policy focuses on:

- 1) *scholarly output* including *data* (incl. source materials, records, datasets, etc.), code (incl. source code, build

and run-time environment instructions, etc.), scientific findings, educational material and publications.

- 2) research methods that focus on *reproducibility*, *replicability*, transparency, efficiency and robustness.
- 3) implementation of a culture change in how universities and researchers work, plan and operate.

This Policy addresses the entire UZH community: researchers and all staff, students and visiting and temporary staff executing or supporting research at UZH.

UZH expects the UZH community to follow the Open Science recommendations provided in this policy. Justified exceptions include constraints regarding privacy, political sensitivity, security, technical feasibility, ethics, budget, commercial opportunities (patents, spin-offs etc.) and contract research.

UZH recognizes the requirements and constraints in the various disciplines regarding the application of the Open Science principles.

4 Article 50 of the Federal Act on the Promotion of Research and Innovation (RIPA, SR 420.1): <https://fedlex.data.admin.ch/filestore/fedlex.data.admin.ch/eli/cc/2013/786/20200101/en/pdf-a/fedlex-data-admin-ch-eli-cc-2013-786-20200101-en-pdf-a.pdf>

5 swissuniversities/Swiss National Science Foundation, Swiss National Strategy on Open Access, 31 January 2017: <https://perma.cc/U5P4-R7LG>

6 <https://www.leru.org/files/The-LERU-Roadmap-Towards-Open-Access-Full-paper.pdf>

7 <https://www.leru.org/files/LERU-AP24-Open-Science-full-paper.pdf>

8 <https://sorbonnedatadeclaration.eu/>

9 § 4 of the University Act of 15 March 1998 (UniG, LS 415.11); Article 27 of the Federal Act of 30 September 2011 on Funding and Coordination of the Swiss Higher Education Sector (Higher Education Act, HEEdA, SR 414.20) Article 20 of the Federal Constitution protects the freedom of academic teaching and research (Artikel 20 Bundesverfassung der Schweizerischen Eidgenossenschaft vom 18. April 1999 [Stand am 1. Januar 2021]). This freedom is not unlimited; it is subject to restrictions and specifications. Higher education follows a curriculum and research has financial, legal and logistical

constraints (Andreas Kley, Freie Bahn für Open Access, plädoyer 3/18, S. 36 ff., online: <https://perma.cc/7R6K-7RC2>). In the Canton of Zurich, university employees who "in the exercise of their contractual obligations [create] a copyrighted work ... are entitled to the exploitation rights to that work." (§ 65 der Personalverordnung der Universität Zürich (PVO-UZH) vom 29. September 2014; s.a. §12a Abs. 3 Universitätsgesetz vom 15. März 1998) Thus, authors are usually free to decide how and where to publish their work. On the other hand, UZH has an obligation to ensure the quality of research and teaching (§ 4, UniG, LS 415.11; Article 27, Higher Education Act, HEEdA, SR 414.20). It is thus equally free to promote Open Science by providing information, training opportunities, infrastructure for repositories (Zurich Open Repository and Archive ZORA: <https://www.zora.uzh.ch>), Open Access journals (Hauptbibliothek Open Publishing Environment HOPE: <https://www.hope.uzh.ch>), or financial support (Open Access Publications Funding: <https://www.ub.uzh.ch/en/wissenschaftlich-arbeiten/publizieren/Publikation-finanzieren.html>). UZH is also free to decide where it allocates funds (University Research Priority Programs URPP, Candoc Grants, Competitive Sabbaticals UZH etc.).

2 Policy

UZH expects that all publicly funded *scholarly output* – including, e.g. publications, research data and code – is made openly available.

UZH expects output of all publicly funded research to be made FAIR (Findable, Accessible, Interoperable and Reusable)¹⁰. The FAIR principles apply to *data* and *meta-data* as well as to software, code, algorithms, and workflows/protocols that lead to that *data*¹¹.

UZH expects its researchers to obtain an Open Researcher and Contributor ID (ORCID), use it in relevant scholarly activities (e.g. publishing *preprints*, articles, books, *data*, peer review etc.), and maintain an up-to-date record of their *scholarly output* on orcid.org.

UZH fosters and funds *open educational resources*.

UZH supports participatory research (*Citizen Science*).

2.1 Open Research Process

Access to the research process enhances its transparency and credibility and can also contribute substantially to the efficiency and quality of future processes.

UZH recommends openness in all research phases following the principle «as open as possible, as protected as necessary». This includes all research stages prior to publication (e.g. making data available, publishing data analysis plans, preprints). For confirmatory research, the use of pre-registration servers to help improve quality and accountability is recommended.

UZH strongly encourages the publication of negative and unintended results from original and replication studies. It recognizes such publications as academic output and considers them in research evaluation and when recruiting.

2.2 Open and FAIR¹² Data

Raw and processed *data* are important to be able to verify and reuse research results.

How research data is being managed and shared depends on the kind of *data* and the culture within different disciplines and domains. Open data means making *data* available without restriction¹³. *Data* and *metadata* should therefore be machine-readable and in non-proprietary file formats. Open Data is subject to data protection and must comply with legal requirements (e.g. sensitive data).

UZH expects the entire research community to make research data (incl. source materials, records, datasets, etc.) as openly available as possible and as closed as necessary; concretely, this means:

- *Data* (at least the *metadata*) on which a publication is based should be openly accessible.
- *Data* should be shared as early as possible, at the time of first publication at the latest.
- *Data* should be FAIR and comply with good scientific and legal practice (anonymization etc.).

10 https://www.snf.ch/SiteCollectionDocuments/FAIR_principles_translation_SNSF_logo.pdf

11 Wilkinson, M. D. et al. The FAIR Guiding Principles for scientific data management and stewardship. *Sci. Data* 3:160018 doi: 10.1038/sdata.2016.18 (2016), online: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4792175/pdf/sdata201618.pdf>

12 Findable: metadata has to be machine-readable and have a unique, persistent identifier; Accessible; Interoperable: metadata has to be in open formats; Reusable: metadata indicates the conditions for reuse. Open licenses are preferred. <https://www.hbz.uzh.ch/en/open-access-und-open-science/grundlagen-hintergruende/datenmanagement-grundlagen/fair-und-open-data.html>

13 By means of appropriate public licenses, e.g. CC-BY or other share-alike licenses.

UZH expects its researchers to use existing open data when they are available in high-quality.

UZH provides support for Data Management (incl. planning, collecting, curation, modelling, storage, sharing, reuse) for all types of *data* while taking discipline-specific differences into account. The support includes training and services.

UZH engages on a national and international level to provide a sustainable and suitable infrastructure for data management.

2.3 Open Code and Software

Free and *open-source* software fosters widespread adoption, user contributions and ease of collaboration. In cases where code and/or software is part of the research process and output, sharing is important to make research verifiable, but also to stimulate reuse and collaboration.

UZH expects its researchers to use free¹⁴ and *open source* software when high-quality, interoperable and secure options are available.

UZH expects code and software created by UZH researchers to be shared with an adequate *open source* license.

In empirical, data-based research UZH encourages and promotes practices that ensure *reproducibility* of data analyses, and of all other code- and software-dependent processes.

2.4 Open Access

Publications are considered *Open Access* if they are “digital, online, free of charge, and free of most copyright and licensing restrictions”¹⁵.

UZH expects its researchers and staff to publish all their *scholarly output* Open Access¹⁶. As far as possible, *scholarly output* should be made available immediately, without restriction, under an open license, preferably in the version of record and not subject to an embargo.

Several options to publish Open Access exist. The path chosen depends on various factors and must be determined on a case-by-case basis. The following order of priority focuses primarily on immediate availability and serves as a reference point¹⁷:

- *Platinum/Diamond Open Access*
- Immediate *Green Open Access* - Version of Record (VoR)
- Immediate *Green Open Access* - Author-Accepted Manuscript (AAM)
- *Gold Open Access*
- Embargoed *Green Open Access* - VoR (max. 6 months for articles and 12 months for books and book chapters)
- Embargoed *Green Open Access* - AAM (max. 6 months for articles and 12 months for books and book chapters)

Hybrid Open Access is not recommended.

14 “Users have the freedom to run, copy, distribute, study, change and improve the software” <https://www.gnu.org/philosophy/free-sw.html>

15 P. Suber, *Open Access*, MIT Press Essential Knowledge Series, Cambridge/USA, London/England, 2012, p. 4: <https://perma.cc/YHC3-RAZT>

16 UZH recommends publishing in Open Access journals that conduct rigorous peer review.

17 Information on embargos are indicative and the current positions of swissuniversities and SNSF at the time of writing this policy. Other research funders may have different requirements.

UZH encourages researchers to make their submitted manuscripts available on recognized preprint servers, according to the conventions of their different disciplines.

UZH expects its researchers to deposit all their published scientific works in the Zurich Open *Repository* and Archive (ZORA). The UZH Academic Reports are based on ZORA¹⁸.

UZH supports *Open Access* structurally (operation of repositories, *Open Access* journals, journal flipping, etc.) and individually with financial resources and administrative support (for example Article Processing Charges [APC] / Book Processing Charges [BPC]).

2.5 Open Science Education

Researchers and staff at all career levels need specific skills to apply Open Science practices. Education and training are therefore essential to become Open by Default.

UZH facilitates and funds the education of Open Science practices for all academic career levels and for all staff.

Discipline-specific requirements will be taken into account.

UZH expects all disciplines to integrate Open Science concepts and practices as part of the curriculum.

2.6 Assessments and Incentives

Taking Open Science practices and values into account in human resources (HR) processes is a prerequisite to become an open research organization. This will have consequences for how the scientific community evaluates research content and performance as well as for academic career development.

As a signatory of the Declaration on Research Assessment (DORA), UZH explicitly promotes a comprehensive view on evaluating researchers without using journal-based metrics, such as Journal Impact Factors. This is also reflected in the Guidelines on Selection Procedures for hiring and promoting researchers¹⁹.

UZH includes Open Science skills and engagement as a criterium in recruitment, appointment, and promotion processes.

¹⁸ This paragraph integrates the strategic Open Access goal about the Zurich Open Repository and Archive which has been in place already before this policy.

¹⁹ https://www.prof.uzh.ch/en/welcome/appointment_procedure.html

3 Implementation

The road toward Open Science is characterized by changes in many practices throughout the research workflow, including the way research is evaluated. This policy will be accompanied by an implementation plan. The progress of implementation will be monitored.

UZH provides support on legal questions around Open Science. UZH raises awareness among the UZH community that authors retain the rights to manuscripts (Rights Retention) submitted to publishers (AAM).

The respective research fields can supplement this policy and specify further requirements in their own disciplines where necessary.

4 Approval

This Open Science Policy was ratified by the Executive Board of the University on 28.09.2021.

5 Glossary

Citizen science

Citizen Science enables the involvement of citizens in scientific research projects. The range of projects extends from selective involvement in data collection to the participatory co-creation of projects and knowledge²⁰.

Data

Data in the sense used here are all digitally available information required to validate findings or to reuse research outputs in further projects²¹.

Metadata

Metadata provide a basic description of the data, often including authorship, dates, title, abstract, keywords, coding and license information. They serve the findability of data (e.g. creator, time period, geographic location).

Open Access

Scholarly output is considered Open Access if it is “digital, online, free of charge, and free of most copyright and licensing restrictions”²².

Platinum/Diamond Open Access

Scholarly output is made fully and freely accessible online from the outset. Authors will not be charged article or book processing charges (APC/BPC). Creative Commons (or similar) licenses allow sharing and reuse. In order to ensure quality control and to pay for editing and publishing Platinum/Diamond Open Access journals require funds from public or private institutions.

Gold Open Access

Scholarly output is made fully and freely accessible online from the outset. Article or book processing charges (APC/BPC) are typically imposed on the author. Creative Commons (or similar) licenses allow sharing and reuse. Gold Open Access has been criticized for setting the wrong incentives for publishers, because every accepted manuscript leads to increased revenue through APCs/BPCs²³. Further, the practice of paying APC/BPC to publishers has led to an increase of predatory behavior from publishers²⁴.

Green Open Access

Scholarly output is submitted to a traditional, subscription-based journal or book publisher. After peer review the “author-accepted manuscript” (AAM) can be deposited by the author(s) in an institutional repository (self-archiving). If no embargo is imposed this self-archiving of the AAM is referred to as “Immediate Green Open Access”. After copy-editing, formatting, and typesetting, the “version of record” (VoR) is published in the journal. Publishers usually have copyrights over this published version, which is why some publishers do not allow the VoR to be deposited in self-archiving repositories at all or allow it only after an embargo period.

Hybrid Open Access

Scholarly output is submitted to a traditional, subscription-based journal or book publisher. After peer review, copy-editing, formatting, and typesetting, the “version of record” (VoR) is published in the journal. Publishers

²⁰ <https://www.pwa.uzh.ch/en.html>

²¹ Partly based on https://www.swissuniversities.ch/fileadmin/swissuniversities/Dokumente/Hochschulpolitik/ORD/Swiss_National_ORD_Strategy_en.pdf and <https://www.ukri.org/wp-content/uploads/2020/10/UKRI-020920-ConcordatonOpenResearchData.pdf>

²² P. Suber, *Open Access*, MIT Press Essential Knowledge Series, Cambridge/USA, London/England, 2012, p. 4: <https://perma.cc/YHC3-RAZT>

²³ Aguzzi, Adriano (2019). ‘Broken access’ publishing corrodes quality. *Nature*, 570(7760):139. DOI: <https://doi.org/10.1038/d41586-019-01787-2>

²⁴ Predatory Journals charge “publication fees to authors without checking articles for quality” (https://en.wikipedia.org/wiki/Predatory_publishing, 6 January 2021); <https://thinkchecksubmit.org/>

usually obtain copyrights over this published version. After payment of an Article Processing Charge (APC), the work is made openly accessible. Hybrid Open Access models are widely criticized for involving “double dipping” by publishers (subscription fees and APC)²⁵. During a transitional period, Read and Publish agreements can be an alternative for Open Access publication in subscription-based journals.

Open Educational Resources

Open Educational Resources are teaching, learning and research materials (e.g. text, images and other assets) in any medium – digital or otherwise – that are freely accessible, usable and distributable, and are openly licensed²⁶.

Open Source

Open Source means the availability of source code for a piece of software, along with an open source license permitting reuse, adaptation, and further distribution.

Preprint

A preprint is a manuscript draft that has not yet been subject to formal peer review.

Preregistration

Researchers have the option or are required (e.g. for clinical trials²⁷) to submit important information about their

study (for example: research rationale, hypotheses, design and analytic strategy) to a public registry before beginning the study. Preregistration can help counter reporting and publication bias (e.g. negative results are not published).

Replicability

Replicability means obtaining consistent results across studies aimed at answering the same scientific question using new data or other new computational methods²⁸.

Repository

A repository is defined as the infrastructure and corresponding service that allows for the efficient and sustainable (and ideally persistent) storage of digital objects (such as documents, data and code).

Reproducibility

Reproducibility is defined as obtaining consistent results using the same data and code as the original study (synonymous with computational reproducibility)²⁹.

Scholarly Output

Scholarly output encompasses research output (e.g. data, code, software, journal publications, books, media, exhibitions, reports) as well as educational output (e.g. textbooks, teaching material).

²⁵ https://en.wikipedia.org/wiki/Hybrid_open-access_journal

²⁶ <https://en.unesco.org/themes/building-knowledge-societies/oeer>

²⁷ <https://www.fedlex.admin.ch/eli/cc/2013/643/en>

²⁸ <https://www.nationalacademies.org/news/2019/09/reproducibility-and-replicability-in-research>

²⁹ <https://www.nationalacademies.org/news/2019/09/reproducibility-and-replicability-in-research>

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