SHARED GUIDELINES
FOR OPEN SCIENCE

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Circle U.
European University Alliance

FOREWORD

This document is a result of the Working Group Open Science and Open Education in the Circle U. Erasmus+ project. The members of this Working Group are

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INTRODUCTION (ENGLISH)

Open Science can shortly be described as the movement to make scientific research, data and dissemination accessible to all levels of an inquiring society [Foster]. It covers all academic disciplines. Much has been written about Open Science and its aims and a number of handbooks are available. When the Working Group on Open Science of Circle U. discovered the guide called "Passport for Open Science"   (https://www.ouvrirlascience.fr/passport-for-open-science-a-practical-guide-for-phd-students) available with a Creative Commons license, it caught its interest, for its simple and compact format.

"Passport for Open Science" has been designed to accompany researchers at every step, from developing the scientific approach to the dissemination of research results. It provides a set of tools and best practices that can be directly implemented and is aimed at researchers from all disciplines. But it has been written specifically for the French research and Open Science context.

This report presents a decontextualized adaptation of the booklet "Passport for Open Science" which aims to provide researchers from Circle U. institutions with a set of general but also practical guidelines to adopt Open Science. In a first part, one finds a generic version of the guide, independent of any national or institutional context. Then, elements specific to Circle U. partners are summarized, institution by institution. Thanks to this format and structure, Guidelines for Open Science provide researchers with a self-paced courseware for discovering Open Science and exploiting facilities provided by each partner institution.

In doing so, we share and pursue the objectives of the authors of the original guide: to motivate and empower researchers to achieve the ambitions of open science by sharing research results and data with as many people as possible.

INTRODUCTION (FRANÇAIS)

La science ouverte peut être décrite brièvement comme le mouvement visant à rendre la recherche, les données et la diffusion scientifiques accessibles à tous les niveaux d'une société en quête de connaissances [Foster]. Elle couvre toutes les disciplines universitaires. Beaucoup a été écrit sur la science ouverte et ses objectifs et un certain nombre de manuels sont disponibles. Lorsque le groupe de travail sur la science ouverte de Circle U. a découvert le guide intitulé "Passport for Open Science" (https://www.ouvrirlascience.fr/passport-for-open-science-a-practical-guide-for-phd-students) disponible avec une licence Creative Commons, il a saisi son intérêt pour son format simple et compact. "Passport for Open Science" a été conçu pour accompagner les chercheurs à chaque étape, depuis l'élaboration de la démarche scientifique jusqu'à la diffusion des résultats de la recherche. Il fournit un ensemble d'outils et de bonnes pratiques qui peuvent être directement mis en œuvre et s'adresse aux chercheurs de toutes les disciplines. Mais il a été rédigé spécifiquement pour le contexte français de la recherche et de l'Open Science.

Ce rapport présente une adaptation décontextualisée du livret " Passport for Open Science " qui vise à fournir aux chercheurs des institutions du Circle U. un ensemble de lignes directrices générales mais aussi pratiques pour adopter la Science Ouverte. Dans une première partie, on trouve une version générique du guide, indépendante de tout contexte national ou institutionnel. Ensuite, les éléments spécifiques aux partenaires du Circle U. sont résumés, institution par institution. Grâce à ce format et à cette structure, les Guidelines for Open Science offrent aux chercheurs un cours autodidacte pour découvrir la Science Ouverte et exploiter les facilités offertes par chaque institution partenaire.

Ce faisant, nous partageons et poursuivons les objectifs des auteurs du guide original : motiver les chercheurs et leur donner les moyens de réaliser les ambitions de la Science Ouverte en partageant les résultats et les données de la recherche avec le plus grand nombre.

INDLEDNING (DANSK)

Open Science kan kort beskrives som en bevægelse, der har til formål at gøre videnskabelig forskning, data og formidling tilgængelig for alle samfundsniveauer [Foster]. Den dækker alle akademiske discipliner. Der er blevet skrevet meget om Open Science og dens mål, og der findes en lang række håndbøger. Arbejdsgruppen om Open Science i Circle U. opdagede vejledningen "Passport for Open Science" (https://www.ouvrirlascience.fr/passport-for-open-science-a-practical-guide-for-phd-students) , der er tilgængelig med en Creative Commons-licens, og blev interesseret i den på grund af dens er enkle og kompakte format. "Passport for Open Science" er designet til at ledsage forskere på alle trin, fra udvikling af den videnskabelige metode til formidling af forskningsresultater. Den indeholder et sæt af værktøjer og bedst praksis eksempler, der kan anvendes direkte, og den henvender sig til forskere fra alle fagområder. Man skal dog huske, at udgangspunktet, den franske vejledning, er skrevet specifikt til den franske forsknings- og Open Science-kontekst.

Denne rapport er en tilpasning af vejledningen "Passport for Open Science", som har til formål at give forskere fra Circle U.-institutioner et sæt generelle, men også praktiske retningslinjer for at indføre Open Science. I første del findes en generisk udgave af vejledningen, som er uafhængig af national eller institutionel kontekst. Derefter opsummeres de elementer, der er specifikke for Circle U.-partnerne, institution for institution. Takket være dette format og denne struktur giver Guidelines for Open Science forskerne et kursusmateriale til selv at opdage Open Science og udnytte de faciliteter, som de enkelte partnerinstitutioner stiller til rådighed.

Hermed deler vi og forfølger vi de mål, som forfatterne af den oprindelige vejledning havde: at motivere og give forskere mulighed for at opfylde ambitionerne for Open Science ved at dele forskningsresultater og data med så mange mennesker som muligt.

EINLEITUNG (DEUTSCH)

Open Science kann kurz als die Bewegung beschrieben werden, die wissenschaftliche Forschung, Daten und deren Verbreitung für alle Ebenen einer forschenden Gesellschaft zugänglich machen will [Foster]. Sie umfasst alle Wissenschaftsdisziplinen. Über Open Science und seine Ziele ist viel geschrieben worden, es gibt eine Reihe von Handbüchern. Als die Arbeitsgruppe „Open Science" von Circle U. den Leitfaden „Passport for Open Science" (https://www.ouvrirlascience.fr/passport-for-open-science-a-practical-guide-for-phd-student) entdeckte, der unter einer Creative Commons-Lizenz erhältlich ist, wurde er wegen seines einfachen und kompakten Formats als sehr interessant eingestuft. „Passport for Open Science" wurde entwickelt, um Forschende bei jedem Schritt zu begleiten, von der Entwicklung des eines Forschungsprojektes bis hin zur Verbreitung der Forschungsergebnisse. Er bietet eine Reihe von Instrumenten und bewährten Verfahren, die direkt umgesetzt werden können, und richtet sich an Forschende aller Fachrichtungen. Er wurde jedoch speziell für den französischen Forschungs- und Open-Science-Kontext verfasst.

Dieser Bericht stellt eine Anpassung der Broschüre „Passport for Open Science" dar, die Forschenden von Circle U.-Einrichtungen eine Reihe allgemeiner, aber auch praktischer Leitlinien für die Einführung von Open Science bieten soll. In einem ersten Teil findet man eine generische Version des Leitfadens, unabhängig von einem nationalen oder institutionellen Kontext. Anschließend werden die für die Partner von Circle U. spezifischen Elemente Institution für Institution zusammengefasst. Dank dieses Formats und dieser Struktur bieten die „Guidelines for Open Science" den Forschenden ein Kursmaterial zum Selbststudium, um Open Science zu entdecken und die von jeder Partnerinstitution bereitgestellten Möglichkeiten zu nutzen.

Dabei teilen und verfolgen wir die Ziele des ursprünglichen Leitfadens: Forschende zu motivieren und zu befähigen, die Ziele von Open Science zu erreichen, indem sie Forschungsergebnisse und Daten mit so vielen Menschen wie möglich teilen.

UVOD (SERBIAN)

Otvorena nauka se ukratko može opisati kao skup aktivnsti s ciljem da naučna istraživanja i podaci, kao i njihova disemincija budu dostupni svim nivoima društva [Foster]. Pokriva sve naučne i akademske discipline. Mnogo toga je napisano o Otvorenoj nauci i njenim ciljevima, a dostupan je veliki broj priručnika. Radna grupa za otvorenu nauku Circle U. je ustanovila da je vodič pod nazivom "Passport for Open Science" (https://www.ouvrirlascience.fr/passport-for-open-science-a-practical-guide-for-phd-student) dostupan pod Creative Commons licencom, a i da na veoma jednostavan i kompaktan način pojašnjava osnovne principe. "Passport for Open Science " je osmišljen tako da prati istraživače na svakom koraku, od razvoja naučnog pristupa do diseminacije rezultata istraživanja. On pruža skup alata i najboljih praksi koje se mogu direktno sprovesti i usmerene su na istraživače iz svih disciplina. Napisan je specijalno za francuski kontekst istraživanja i otvorene nauke.

Ovaj izveštaj predstavlja adaptaciju vodiča "Passport for Open Science " koji ima za cilj da istraživačima sa univerziteta članica Circle U. obezbedi niz opštih, ali i praktičnih smernica za usvajanje Otvorene nauke. U prvom delu se nalazi generička verzija vodiča, nezavisno od bilo kog nacionalnog ili institucionalnog konteksta. Nakon toga su rezimirani elementi specifični za pojedinačnog "Circle U" partnera, institucija po institucija. Zahvaljujući ovom formatu i strukturi, Smernice za otvorenu nauku pružaju istraživačima samostalni kurs za upoznavanje Otvorene nauke i korišćenje servisa koje obezbeđuje svaka partnerska institucija.

Na ovaj način, delimo i težimo ciljevima autora originalnog vodiča : da motivišemo i osnažimo istraživače da ostvare ciljeve Otvorene nauke tako što dele rezultate istraživanja i podataka sa što više ljudi.

INNLEDNING (NORSK)

Åpen vitenskap kan kort beskrives som en bevegelse for å gjøre vitenskapelig forskning, data og formidling tilgjengelig for alle nivåer i et utforskende samfunn [Foster]. Vitenskap dekker her alle akademiske disipliner. Det er skrevet mye om åpen vitenskap og dens mål, og det finnes en rekke håndbøker. Da arbeidsgruppen for åpen vitenskap i Circle U. ble kjent med veiledningen "Passport for Open Science" (https://www.ouvrirlascience.fr/passport-for-open-science-a-practical-guide-for-phd-students), som er tilgjengelig med en Creative Commons-lisens, fattet den interesse for det enkle og kompakte formatet. "Passport for Open Science" er utformet for å følge forskere på hvert trinn, fra utvikling av den vitenskapelige tilnærmingen til formidling av forskningsresultater. Det gir et sett med verktøy og beste praksis som kan implementeres direkte, og er rettet mot forskere fra alle fagområder. Men den er skrevet spesielt for den franske konteksten for forskning og åpen forskning.

Denne rapporten presenterer en tilpasning av heftet "Passport for Open Science" som tar sikte på å gi forskere fra Circle U.-institusjoner et sett med generelle, men også praktiske retningslinjer for å ta i bruk åpen vitenskap. Tilpasningen består i at første del av veiledningen er generell, uavhengig av nasjonal eller institusjonell kontekst. Deretter oppsummeres elementer som er spesifikke for Circle U.-partnerne, institusjon for

instiusjon. Guidelines for Open Science gir dermed forskere et kursopplegg der de i eget tempo kan oppdage åpen vitenskap og utnytte fasilitetene som tilbys av hver partnerinstitusjon.

På denne måten deler og forfølger vi målene til forfatterne av den opprinnelige veiledningen: å motivere og styrke forskere til å nå ambisjonene om åpen forskning ved å dele forskningsresultater og data med så mange som mulig.

INTRODUZIONE (ITALIANO)

L'Open Science può essere brevemente descritta come il movimento per rendere la ricerca scientifica, i dati e la divulgazione accessibili a tutti i livelli di una società curiosa [Foster]. Copre tutte le discipline accademiche. E' stato scritto molto sull'Open Science e sui suoi obiettivi ed esistono diversi diversi manuali. Quando il Working Group sull'Open Science di Circle U. ha scoperto la guida "Passport for Open Science" (https://www.ouvrirlascience.fr/passport-for-open-science-a-practical-guide-for-phd-students) disponibile con licenza Creative Commons, questa ha attirato il suo interesse, per il suo formato semplice e compatto. "Passport for Open Science" è stata progettata per accompagnare i ricercatori in ogni fase, dallo sviluppo dell'approccio scientifico alla diffusione dei risultati della ricerca. Fornisce una serie di strumenti e di buone pratiche che possono essere implementate direttamente ed è rivolto ai ricercatori di tutte le discipline. Ma è stato scritto specificamente per il contesto francese della ricerca e dell'Open Science.

Questo documento presenta un adattamento decontestualizzato dell'opuscolo "Passport for Open Science", che ha lo scopo di fornire ai ricercatori delle istituzioni Circle U. una serie di linee guida generali ma anche pratiche per adottare la Open Science. Nella prima parte, si trova una versione generica della guida, indipendente da qualsiasi contesto nazionale o istituzionale. Successivamente, vengono riassunti gli elementi specifici dei partner di Circle U., istituzione per istituzione. Grazie a questo formato e a questa struttura, le Linee Guida per la Open Science forniscono ai ricercatori un percorso autogestito per scoprire la Open Science e sfruttare le strutture messe a disposizione da ogni istituzione partner.

In questo modo, condividiamo e perseguiamo gli obiettivi degli autori della guida originale: motivare e mettere i ricercatori in condizione di realizzare le ambizioni della Open Science condividendo i risultati e i dati della ricerca con il maggior numero di persone possibile.

ORIGIN AND REFERENCE

The original versions of Passport for Open Science are available as follows:

- French version :
  Passeport pour la Science Ouverte | Guide pratique à l'usage des doctorantes et des doctorants, Ministère de l'Enseignement supérieur et de la Recherche, Septembre 2022 [1ère édition : juillet 2020]
  Editorial coordination: Université de Lille
  https://www.ouvrirlascience.fr/passeport-pour-la-science-ouverte-guide-pratique-a-lusage-des-doctorants/ (last visited 2023/03/29)

- English version :
  Passport for Open Science – A Practical Guide for PhD Students, Ministère de l'Enseignement supérieur et de la Recherche, Septembre 2022 [1st edition : July 2020]
  Editorial coordination: Universiy of Lille
  https://www.ouvrirlascience.fr/passport-for-open-science-a-practical-guide-for-phd-students/ (last visited 2023/03/29)
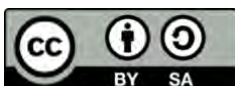
PASSPORT FOR
OPEN SCIENCE

An adapted version for Circle U. researchers

Guidelines
FOR
RESEARCHERS

Index

Legend
▼ refers to tools which are given as examples or references.

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Digital version of the original version of Passport for Open Science available online:
www.ouvrirlascience.fr

Preamble

Open science was born out of the new opportunities the digital revolution offered for sharing and disseminating scientific content. It essentially consists of making research results accessible for all by removing any technical or financial barriers which may hinder access to scientific publications. It also involves opening researchers' 'black boxes' containing the data and methods used for publications to share these as much as possible.

Choosing open science first of all means affirming that research which is mainly financed by public funds must report its results back to the public in as much detail as possible. It is also based on the observation that openness guarantees better documented and more substantiated research and that sharing strengthens the cumulative nature of science thus encouraging its progress.

Open transparent science also helps enhance research's credibility in society and the health crisis of 2020 has indeed reminded us how important this issue is. Finally, open science is the bearer of a profound movement towards democratising knowledge to benefit organisations, companies, citizens and particularly students for whom easy access to knowledge is a condition for success.

Open science policies now have support at the highest level from the European Union which has made open publication a condition for its support for scientific research since 2012 and by major research organisations around the world such as the National Institutes of Health in the United States. Open Science is also a political priority for the European Commission and the standard method of working in its research and innovation funding programmes, as it improves the quality, efficiency and responsiveness of research. Circle U. has also incorporated Open Science into its objectives.

Ultimately, it is researchers whose commitments and practices embody and bring open science to life. As you begin to prepare your doctorate – the last stage of your education and the first stage of your professional life – use this guide to start a conversation within your research team.

This set of Guidelines is derived from *"The Passport for Open Science".* This guide is designed to accompany you in any field of study, at every step of your research, from developing your scientific approach to the dissemination of your research results. It provides a set of tools and best practices that can be directly implemented and is aimed at researchers from all disciplines. At the end of this guide, a section called "Act Now" is dedicated to resources specific to your own research environment, within your own Circle U. institution.

We hope this adapted guide will motivate you and provide the means for you to realise the ambitions of open science by sharing your research results and data with as many people as possible.

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# Planning an open approach to scientific work

Using freely accessible resources

You are beginning work on your thesis or research.
You need access to the publications, articles and data already produced
in your field. This is the beginning of your obstacle course...

Access and reuse

The open science movement's aims
are to **facilitate access to scientific
content and encourage its reuse**.
Often we speak of:

• Open-access resources: thanks to
their author and/or publisher, these
resources can be freely accessed
without researchers or their
institutions having to pay.

• Free resources: as well as being
in open access these are reusable
depending on the distribution
license involved. For example,
Creative Commons licenses allow
reuse as long as conditions set by the author are respected.
For more information, please see ▼**creativecommons.org**.
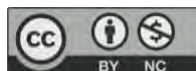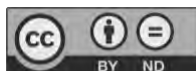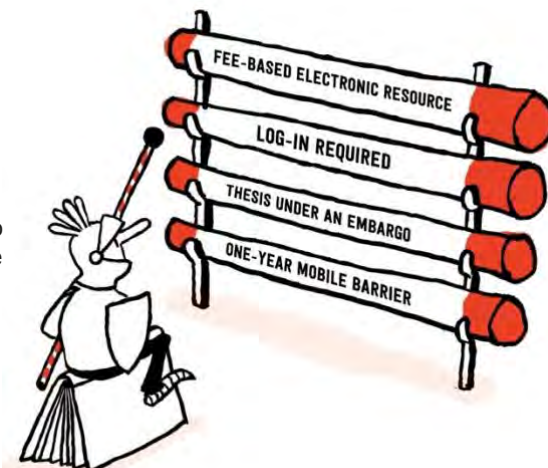
WORTH KNOWING

The fact that a resource is in open access is not a guarantee of quality
in itself. It needs to be critically evaluated before being used like all
documentary resources.

Where should you look for resources?

Open access journal platforms: Open access journals can have diverse business and editorial models.
▼**OpenEdition Journals** offers 450 online publications in the humanities and social sciences.
▼ **DOAJ** is an online directory that indexes and provides access to high quality, open access, peer-reviewed journals**.**

Platforms for preprints or working papers: The availability of these unpublished articles means researchers can quickly discover the latest research approaches. Discover ▼**arXiv**, an archive for preprints in mathematics, physics and astronomy.

Data warehouses: These may be multidisciplinary or specialised. Searches can be run for different types of data and they enable the deposit, conservation and sharing of research data. ▼**FAIRsharing.org** lists available data warehouses.

Open archives: These may be institutional or thematic, and scientific productions are deposited in the archives by researchers themselves for free consultation. Explore for instance ▼**CORE,** ▼**SSRN** or ▼**PMC**.

Databases for theses or academic works: These databases aggregate the digital thesis collections of universities and research centres. Visit ▼**Dart-Europe** or ▼**Open Access Thesis and Dissertation (OATD)**.

Specialist search engines: These aggregate open access content to make them easier to discover.
▼**Core (core.ac.uk)** is a search engine specialising in open access academic publications (books, articles, theses, etc.).
▼**Unpaywall** can be installed as a browser extension and offers free access versions of all the articles available in its database

Planning data management

WHAT ARE RESEARCH DATA?

"Research data are defined as factual records (numerical scores, textual records, images and sounds) used as primary sources for scientific research, and that are commonly accepted in the scientific community as necessary to validate research findings." (source: Organisation for Economic Co-operation and Development - OECD)

Why manage research data?

From the very start of your research, you will collect, produce and use data. Research Data Management (RDM) contributes to the research process. It covers all activities involved in **collecting, describing, storing, processing, analysing, archiving and accessing data**.

How to manage research data?

Data management needs to be anticipated at the very beginning of a project by creating a Data Management Plan (DMP). A DMP helps you think about how to organise your data, files and other supporting documents during and after the project. Many research funding agencies now require you to provide a DMP.

A DMP is an ongoing document which needs to be created before data collection begins and updated throughout your research project.

Collection

Description

Storage

Processing
and analysis

Archiving

Making data available
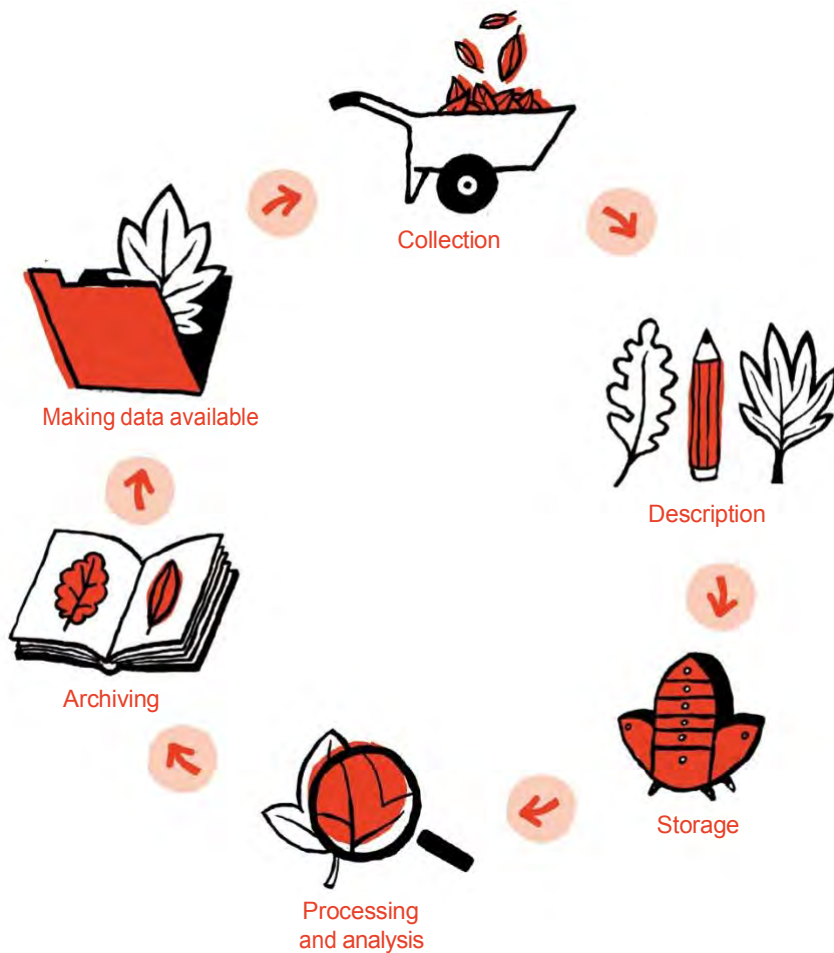
**Good data management is useful for you and for others.
It makes it easy to find your data and make them accessible and
reusable by others. At the end of the project, it facilitates the
archiving and dissemination of datasets.**

What should a Data Management Plan contain?

Collection and documentation: the objective of this is to describe the type, format and volume of the data you will be collecting. The format of the data produced is usually related to the software you use and has consequences for the possibilities of sharing and long-term archiving. This initial description enables the creation of documentation (metadata) that is useful for understanding your data and that you will continue enriching during the production phase.

Backup and storage: how will the data be stored and saved during your research? Who will be responsible for data recovery if there is an incident?

Legal and security issues: what are the protection rules which apply to your data? What methods will you be using to ensure the protection of personal data or other sensitive data? You should particularly find out about the General Data Protection Regulation (GDPR) and read the legal guide on open data that offers you an analysis of the legal framework in France.

For sharing data at and medium- and long-term preservation, please think about:
- which people might wish to use your data,
- the criteria for choosing the data to be shared,
- the duration of the data's preservation,
- the data warehouse in which you could deposit the data,
- the way to identify your data (persistent identifier/DOI),
- the way to identify the various contributors to the dataset (personal persistent identifier/ORCID).

Responsibilities and resources: specify the roles and responsibilities of the people working on the project especially in the case of collaborative projects involving many researchers, institutions and groups with different working methods.

▼"Writing a data management plan in itself will cost you about two hours to two days, depending on the complexity of your project. It is time well-spent because early planning of data management (especially when preparing for a funding application) can significantly reduce the costs." **(**source : **https://www.uu.nl/en/research/research-data-management/guides/costs-of-data-management)**

Also see "Making research data open"

Working in a reproducible way: for yourself, for others
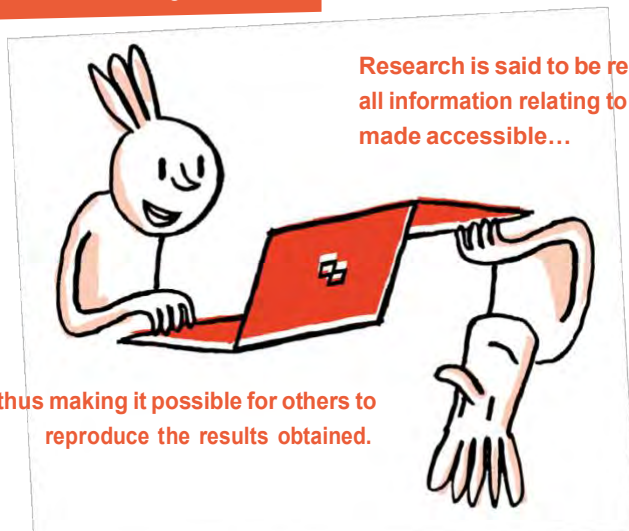
Research is said to be reproducible if all information relating to the project is made accessible…

... thus making it possible for others to reproduce the results obtained.

Reproducibility varies according to disciplines and the methods used. It enables an experimental protocol to be run identically, the reproduction of statistical processing of quantitative data, the reconstruction of the stages of analysis of a corpus of images or texts and so forth.

Carrying out reproducible research means you need to guarantee the accuracy of the methods used and to document all stages of the scientific process to ensure its transparency and traceability.

WORTH KNOWING

Reproducibility of research does not on its own guarantee the quality of research work. Methods are a core issue in the debate about reproducibility. It is important that researchers come to an agreement on common data analysis methods which go further than explanations provided in the methodological sections of articles.

The advantages of a reproducible approach

Errors are easier to identify and correct. You trace and record how your data and/or code evolves from the very start of the project and with each modification. It is much harder and less safe if you have to reconstruct these developments *a posteriori*.

The results you obtain can be more easily explained and justified to peers.
When submitting an article for publication, it will be easier for you to respond to any requests from your reviewers.

Future work is made less uncertain. You give yourself the possibility of reusing data, code, documents, etc. in the future.

How to put this approach into practice

Manage your bibliographical references by using a management tool like ▼**Zotero**. Working according to a reliable bibliographic standard is a common requirement in all disciplines.

Organise data, files and folders: apply file naming conventions, construct folder trees with a consistent, scalable structure, separate raw data from analysed data, etc.

Learn the basics of version control even if your actual research does not require coding skills. Being able to restore a particular version of a document written over a period of several years can be highly valuable.

Automate certain recurring tasks. You will be able to increase the reliability of your results and make writing scientific articles easier because you can vary parameters more easily.

Do you have limited resources? **Think about using collective approaches!** Train yourself in collaborative working methods; use public datasets if these exist.

Do you do data analysis?
Automate your processing and workflows: design scripts to process your data and manage your workflow steps. For example, avoid using spreadsheets for large datasets.

Document your code and data: what is clear when working may be less clear two months later even when you are the author. This is more a question of explaining the end-use of your functionalities rather than describing how they work.

Opt for open-source solutions for greater transparency and guaranteed access.

To learn more about the methdological principles for open, transparent science, go to the MOOC ▼**Reproducible research: methodological principles for transparent science** (French MOOC with English subtitles: https://www.fun-mooc.fr/en/courses/reproducible-research-methodological-principles-transparent-scie/)

In the field

Sacha H., PhD student in electrical engineering,
G2Elab, Grenoble

Before my PhD, I worked as a research engineer on the development of OMEGAlpes, an open source tool for the optimisation of energy systems.
This tool can be used to model and explore different energy scenarios to determine the best solution for a chosen objective.

I had the chance to work on a residency with an artists' collective called Organic Orchestra which was trying to find technological solutions to achieve energy self-sufficiency while reducing the environmental impact of their digital performing arts show. We worked together to identify the constraints and objectives and then propose energy scenarios.

Now I am doing transdisciplinary research on models, methods and tools for a collaborative and open approach to the design of energy components and systems to facilitate the energy transition.

The open aspect of OMEGAlpes was an attractive point for them. They used an open tool to generate knowledge which could be useful to others.

I am convinced of the interest and necessity of open science in facing up to climate change. Where possible, researchers need to open up their articles, data, methods and tools to work effectively together and also in collaboration with citizens, collectives and public authorities.

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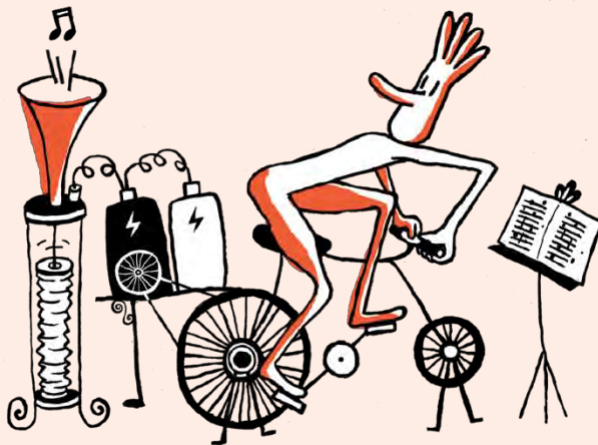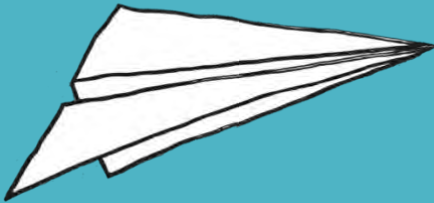
Disseminating research

Disseminating your publications in open access

Open access dissemination involves the **immediate, free and permanent availability of scientific publications on the Internet**. You have several options to disseminate your work in open access - you can publish in an open access journal or deposit your work in an open archive.

These are not mutually exclusive practices and you can combine them to ensure the maximum dissemination of your work while respecting intellectual property regulations.

Publishing in an open access journal

In the traditional scientific journal business model, access to articles is reserved for individuals or institutions who have taken out paid subscriptions. Conversely, publishing in an open access scientific journal gives everyone free and immediate access to your article. Different funding models exist to cover publication costs. There are two main categories of such models which are constantly evolving:

- **With costs :** publication costs, often called Article Processing Charges (APCs), are billed. These costs may be paid by your laboratory or home organisation.

HOW MUCH DOES THIS COST?

The cost of an article varies from several hundred to several thousand euros according to the journal. The ▼**Directory of Open Access Journals (DOAJ)** is a worldwide directory which indicates whether a journal requires APCs to be paid and, if so, how much.

- **With no costs:** there are no charges for the author to pay. The journal costs are financed in advance by the organisation that publishes or distributes the publication on the basis of various funding mechanisms (institutional financing, freemium, subscription, etc.).

///////////////// **Watch out!** //////////////////

HYBRID JOURNALS

To increase their revenues, some publishers are retaining the traditional subscription access model while offering the paid option of publishing the article in open access. This amounts to charging an institution twice - once for access to the journal and once for publication of the article.
This controversial business model is often used by major commercial publishers. **It is not advisable to pay these additional costs** especially because you can distribute your article *via* an open archive.

PREDATORY PUBLISHERS: BEWARE OF APPEARANCES

The development of digital technology has led to the emergence of publishers with dubious practices who contact you to promise your work will be rapidly published. These publishers do not guarantee editorial quality and an effective peer review process but they may charge a fee for publication. As well as the financial costs, your scientific credibility will also be damaged. It is sometimes difficult to spot a predatory journal but certain tools can help you to do so. There are also predatory conferences organised in a similar fashion.

▼**Think. Check. Submit.:** This website gives access to a set of checklists to help you assess the reliability of the journal in which you plan to publish your work.

Depositing in an open archive

An open archive allows you to disseminate your scientific work whether it has been published or not. Depositing in an open archive repository is not a substitute for the process of publication in a journal. An open archive guarantees permanent preservation and broad accessibility which is not the case with academic social networks like ResearchGate or Academia.

This is not limited to articles alone – you can also submit a thesis, book chapter, poster, dataset, report, lecture, conference paper, an HDR dissertation or a report.

Open archives can be disciplinary, institutional or national. If you have not been given specific guidelines, you can ask your organisation's library for advice on choosing the most appropriate repository.

▼ **Zenodo** is a general purpose open repository developed under the OpenAire European Program and operated by the CERN
▼ **OpenDOAR** lists open archives worldwide
▼ **Dryad** is a curated, general-purpose data repository built on open-source software that is intended for sharing and facilitating citation of research data underlying peer-reviewed publications in the basic sciences and medicine.

WORTH KNOWING

Open archives generally provide help for those depositing work in the form of online guides or video tutorials.

You can deposit different versions of an article:

- The preprint or author's version (the version submitted for publication): the version sent to a journal by the authors prior to the peer review process.

- The author accepted manuscript (AAM): the version including revisions resulting from the peer-reviewing process but without the publisher's final layout.

- The version of record (final published version, publisher's PDF): the article with the final layout of the editor as published in the journal. The publisher may have exclusive rights to the distribution of this version, depending on the terms of the publishing contract you signed.

What are my rights?

Whichever distribution method you choose, open-access publication stipulates that intellectual property rules must be respected.

- As author, you possess all moral and economic rights to your scientific text until you sign a publishing contract under which you will assign some of these rights to the publisher of your text.

- For scientific articles, check at the end of this guide what your country's law says about disseminating scientific articles in open access and in open repositories. For other forms of publication, the publishing contract or the publisher's policy applies legally. You can use ▼**SHERPA/RoMEO** to find out about publishers' open access policies.

WORTH KNOWING

Would you like to deposit a publication in an open archive or distribute data with a license which allows its reuse? You should talk about this with your co-authors.

In the field

Ségolène V., a young doctor in archaeology,
University of Paris 1

I specialise in geoarchaeology and study the human occupation of caves based on the presence of soot in limestone concretions.

While I was working on my thesis, I developed a pioneering method in my discipline called fuliginochronology which makes it possible to establish very precise records (with an annual resolution) of the occupation of cavities.

I can also archive my work on a permanent basis which also means I can prove the anteriority of my work in this new field if necessary.

Open access dissemination of my thesis means that I can make accessible contents that have not all been published and achieve visibility for this method which remains little-known. I like being able to access other people's theses so I make mine available too.

I'm currently working for my laboratory along with other researchers to develop a collaborative database on the ArchéoScopie platform. In it, I classify my photos taken under a microscope. Sharing this data enhances the visibility of the researchers who produced them, enables everyone to reuse the images (rather than having to endlessly reinvent the wheel!), provides examples for teaching purposes and acts as a platform for scientific exchanges and discussions.
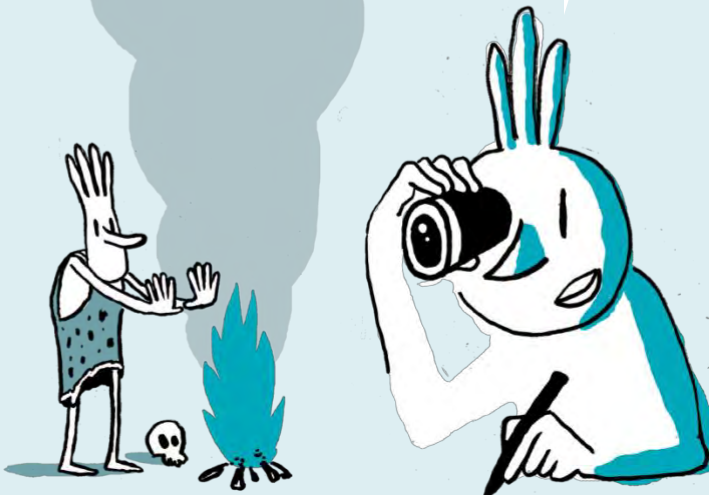
Making your thesis freely accessible

Why choose open access for your thesis?

Wide dissemination of a thesis is considered a best practice today and is very much encouraged.

- Your work will be much more visible and downloaded and cited more by other researchers and students.

- This facilitates your integration into the academic community (consultation by a selection panel).

- A thesis that is more widely disseminated is much better protected against plagiarism than a work with more restricted dissemination.

- Download statistics can encourage publishers to propose publishing projects. You should however be careful with requests from companies that present themselves as publishing houses but do not actually offer any quality editorial work on the text of your thesis.

- Your thesis will have a permanent and validated online consultation address.

CAN I DISSEMINATE MY THESIS IF I HAVE AN OFFER OF PUBLICATION?

Disseminating your defended thesis is not an obstacle to publication. However, you may have objective reasons for temporarily restricting its dissemination particularly if rapid publication is planned for an article. In this case, it advisable to wait for some time before opening access to the thesis. Discuss this with your thesis director or the jury.

Publishing a monograph based on your thesis is a long-term project which requires editorial work, rewriting and adaptation. The original defended version of a thesis is never published as is, which means that disseminating it is not a problem in any way.
Ask your publisher or thesis director for advice.

Making research data open

A key principle to keep in mind is that data should be "as open as possible and as closed as necessary". In other words, data should be widely disseminated but restrictions on access may be justified in certain situations.

Why disseminate research data?

FOR SHARED TRANSPARENT RESEARCH

Making data open at the international level allows all researchers to **re-use datasets produced by others**. The available datasets can also be exploited en masse thanks to data mining technologies (Text & Data Mining, TDM).

The cost of creating, collecting and processing data can be very high. Bad data practices may cost a significant amount, estimated at €10 billion per year in Europe (European Commission, 2018).

Research financed with public funding must be open to all. Opening up data increases citizens' trust and enables them to get involved, especially in participatory science.

Putting your data online helps **increase the visibility of your work and enables you to be cited more often**. According to a study published in the journal PLOS ONE, the dissemination of data linked to a publication increases the citations of the article by 25% (Colavizza, Hrynaszkiewicz, Staden et al., 2020).

Making your data available provides a better guarantee of research transparency and helps you guard against errors and fraud.

TO COMPLY WITH AN OBLIGATION

The funders of your research work and local laws stipulate how your data must be disseminated. Be aware of possible exceptions related to the protection of personal data and privacy (GDPR) or intellectual property rights and also respect industrial and commercial secrets. The Knowledge Transfer Office of your university will help you to deal with these IP rights and collaborations with third parties.

Finally, a publisher may require your data to be deposited in a data warehouse to validate your work and disseminate your article.

RESPECT THE FAIR PRINCIPLES

The aim of the **Findable** principle is to facilitate the discovery of data by humans and computer systems and requires the description and indexing of data and metadata.

The **Accessible** principle encourages the long-term storage of data and metadata and facilitating their access and/or downloading by specifying the conditions of access (open or restricted) and use (license).
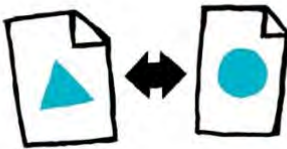
The **Interoperable** principle can be broken down as follows – data should be downloadable, usable, intelligible and combinable with other data by humans and machines.

The **Reusable** principle highlights the characteristics that make data reusable for future research or other purposes (education, innovation, reproduction/transparency of science).

Source: *Produire des données FAIR*. In Dzalé Yeumo, E., L'Hostis, D., Cocaud, S. *Gestion et partage des données scientifiques*. INRA [Internet]. 9/08/2018 [consulted on May 15th 2020]. Available at https://www6.inrae.fr/datapartage/Produire-des-donnees-FAIR

TO CHOOSE THE RIGHT DATA WAREHOUSE YOU SHOULD CHECK:

- the warehouse's conditions of use including licenses,
- the types and formats of data accepted,
- whether it is possible to deposit several versions of a dataset,
- the guarantees offered in terms of archiving and long-term access.

Depositing in a data warehouse can be free or may come at a cost depending on the warehouse's specific business model. In some cases, the operating costs of the warehouse are paid for by institutions.

▼**Zenodo**: generalist warehouse for European research
▼**Dryad**: datadryad.org for life sciences, agronomy, geosciences
▼**re3data.org**: registry of data warehouses in all disciplines

YOU CAN ALSO OPT TO PUBLISH YOUR DATA IN A DATA PAPER

A data paper is a scientific article devoted to the description of a dataset. It can be published in a data journal which only publishes such articles or in a conventional journal. In both cases, it is subject to peer review.

The objective of publishing a data paper is to make the scientific community aware of the existence of an original dataset which can be reused by other researchers and in other scientific contexts.

A data paper generally includes the following elements:

- access to the dataset itself in the form of attached files or a persistent link to a data warehouse;

- a detailed description (metadata) of the dataset (production context, authors, rights attached, etc.).

FINDING REPOSITORIES

▼**EOSC (European Science Cloud)** lists repositories
▼**Mendeley Data search** millions of datasets from domain-specific and cross-domain repositories
▼ **re3data.org** is a registry of research data repositories
▼ **OpenAire** has a browser for all research results and data collected in a research project financed by the European Commission
▼ **Data.europa.eu** is the Official portal for Euopean data, classified by themes.
▼**SoBigData** is a European Research Infrastructure for Big Data and Social Mining maintaining a smart catalogue for finding and accessing the datasets, services, methods and publications on big data and social mining (http://sobigdata.eu)

3

Join the movement

Deeply rooted public policies

Open science arose in the 2000s thanks to an initiative led by committed researchers and is now a firmly rooted component of public policies.

At the European level

Horizon Europe

This funding programme starts on January 1st 2021 and consolidates the open science policy introduced under the Horizon 2020 programme. It includes the obligation to disseminate open access publications and strongly encourages the dissemination of data according to FAIR principles and an associated data management plan.

Plan S

Plan S is a product of the cOAlition S which brings together research funding agencies committed to the development of open science. Its guiding principle is the free and immediate dissemination of publications funded by these agencies in journals, on open access platforms or in open archives.

HRS4R

The HR Excellence in Research (HRS4R) label is awarded by the European Commission to institutions that have signed the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers and is a condition for obtaining European funding. The Charter for Researchers contains a section on "Ethics and good professional practices" which includes open science practices.

Evaluating research differently

Open science represents a profound change in science and research which means it is currently questioning evaluation practices.

Reinventing peer review

Peer review is a prerequisite for any publication and a guarantee of the reliability of scientific results. The process is usually organised by the journal or the publisher who submits the manuscript to other researchers in the same field as the author and who are not known to the author. However, this system is currently having difficulties particularly because reviewers may be competitors of the author. Conversely, some reviewers sometimes work on research themes which are too far removed from the article needing review. Generally speaking, peer review is not an infallible solution – since the 2000s there has been an increase in the publication of fraudulent or questionable articles because of data manipulation or plagiarism (Grieneisen & Zhang, 2012; Fang, Steen & Casadevall, 2013).

Open science has brought about **the emergence of Open Peer Review practices** with two main methods: the names of reviewers are made public and/or the review is carried out on a platform that enables all users to comment on the article. This practice has been made easier by the existence of pre-publication platforms like ▼**arXiv** and ▼**bioRxiv** which journals can use to collect comments.

> **Example**
> The ▼**Peer Community in** platform organises the peer review of pre-publications deposited in an open archive which can lead to the obtention of a certificate of validation. Journals can thus publish articles freely without having to ask for reviewers.

In certain disciplines such as biology-health, the pre-registration of hypotheses and protocols (registered reports) in registers or journals has led to practices changing. Peer review is carried out in two stages which reduces the effect of publication bias (tendency to publish only positive results) and spotlights the research process.

The evaluation of researchers with regard to open science

The desire to modify the evaluation process is particularly based on the Declaration of San Francisco (▼**DORA**) of 2013 and its first recommendation – the use of metrics based on journals, such as impact factor, should be avoided in evaluating researchers.

The new standards for the evaluation of researchers constructed according to the principles of open science must:
- encourage the unhindered dissemination of scientific production,
- take all aspects of research activity into account.

Example

The new ▼**CNRS roadmap** provides for results themselves to be evaluated rather than publications. The data, codes of any software developed and pre-publications must be provided to the reviewers and the productions must be accessible in HAL when possible.

Finally, these new standards must take open science into account by promoting the following new practices:
- the open access dissemination of results including when these are negative,
- the publication of work which consists of reproducing experiments,
- the publication of a research notebook describing the stages in the construction of its scientific approach,
- the online availability of a database of textual or iconographic sources,
- submitting research protocols to peer review prior to experiments, etc.
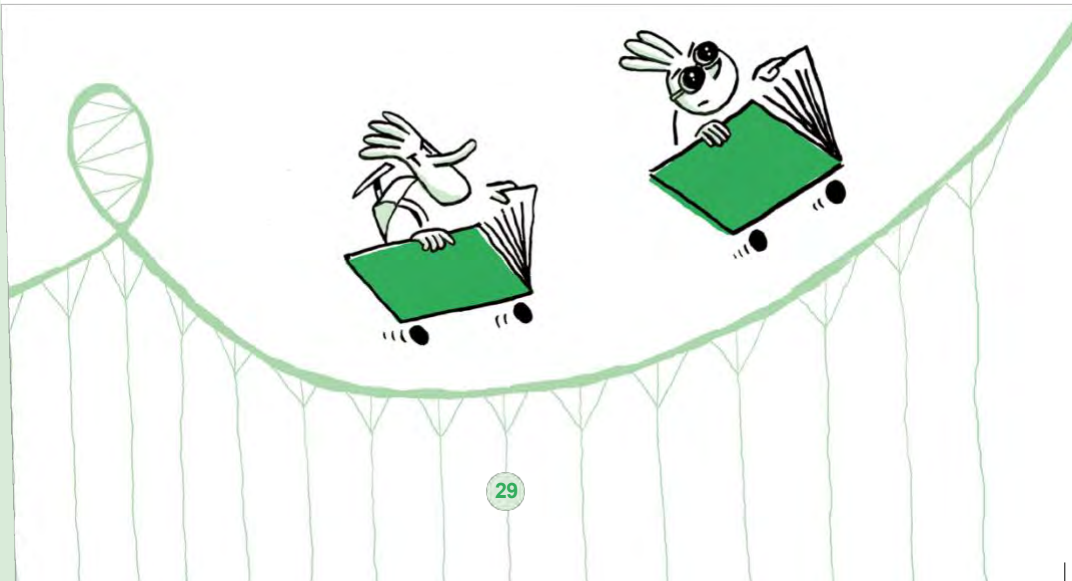
Act now

When you can, submit your publications to open access journals.

Deposit your publications in an open archive:

- Keep the latest version approved by peers but not yet formatted by the publisher.
- Ask your co-authors for approval.
- Deposit the latest version approved by the peer reviewers in an open archive.

Take part in discussions within your disciplinary community about pre-publications deposited in open archives.

Document and share research data and/or the source code you developed:

- Store data using a perennial system or format in compliance with your team or institution's policy.
- Document the data with metadata so that they are reusable.
- Deposit the datasets associated with your publications in an online repository.
- Deposit your codes in a dedicated perennial open archive like ▼**Software Heritage**.

Follow the evolutions of open science and get involved!

Discover what's going on in your own institution and research environment … and get involved:

Act at Aarhus University

Aarhus University supports the idea of Open Science and strives to create free access for all citizens, researchers and companies to results produced as part of research conducted at the university. In 2022 an Open Science Forum with reference to the University Management was established with a mandate to initiate and support activities broadly within the open science agenda. The group is also responsible for the implementation of the "National Strategy for Data Management based on the FAIR principles" (https://doi.org/10.48715/ea59-tp35).

Institutional repository: Researchers at Aarhus University can self-archive an open-access version of their peer-reviewed research publications in the CRIS-system ▼**Pure.** The publication can be included as a link to a publication in a recognized repository as listed in the ▼**OA authority list** or by uploading the file.

Open Journals: ▼**Tidsskrift.dk** is a national journal database run by the Royal Danish Library based on the OJS software. Tidsskrift.dk hosts more than 180 professional, scientific, and cultural journals and yearbooks in digital full text.

Open eBooks: ▼**AU Library Scholarly Publishing Services** is a service where researchers and staff at Aarhus University can publish books, PhD thesis, working papers and more, free of charge.

Open Data: The general recommendation is to use international, discipline-specific repositories if they exist. All other datasets behind publications should be published in a national trusted repository once it is operational. At present researchers are recommended to use international repositories such as ▼**Zenodo**, the ▼**LOAR** Library Open Access Repository or in the CRIS-system ▼**Pure**.

Citizen science: ▼**Citizen Science** is a website supporting knowledge exchange, networking and collaborations in relation to citizen science.

Contacts at Aarhus University: ▼**Research Data Management** offers relevant information as well as links to local support units. General questions can also be mailed to datamanagement@au.dk or AskOS@au.dk.

Act at University of Belgrade

University of Belgrade adopted its ▼**Open Science Platform** in 2019, following its adoption at the ▼**national level** in 2018. The platform was the result of an agreement between stakeholders within the University. Most of the decision-makers at the University and faculty level were educated about the basic principles of open science, and they took significant steps in implementation. At the university level, most work has been done on the openness of doctoral dissertations, both from the time of preparation (▼**UviDok**) and after all completed procedures in ▼ **NaRDuS** (National Repository of Dissertations in Serbia) is a common portal for full-texts of PhD dissertations and thesis evaluation reports from all Serbian universities.

Institutional repository: Most member deposit publications in their institutional repositories. Several advanced institutions (▼Faculty of Chemistry, ▼Institute of Vinca, ▼Institute for Biological Research) also deposit datasets, as well as other forms of scientific output. All repositories maintained by University of Belgrade - Computer Center (RCUB) meet the FAIR principles in terms of licensing, rights, PID (ORCID, handles, etc.), as well as other recommendations from the OpenAIRE guidelines and standards, and are regularly harvested.

Data management plan: In order to help researchers to create a DMP, a platform ▼**ARGOS** has been localized into Serbian. In addition, templates for DMP, according to the requirements of the National Foundation for Science as well as those prescribed by the European Commission, have been provided on the same platform.

Open Journals: As a unique source, on the ▼**ProRef** portal researchers can easily see for which journals the University has agreed a discount, and in what amount. ▼ **DOAJ** indexes more than 17000 journals, including more than 200 Serbian journals. DOAJ portal also clearly displays information about APC.

Open Data: Data can be deposited in the hybrid institutional repositories. Another option is ▼**Zenodo** - an open repository developed under the European OpenAIRE program and operated by CERN. It allows researchers to deposit various types of research outputs and enables them to comply with the FAIR principles.

Training: Training for doctoral students is organized by the ▼**University Library.**

Contacts at University of Belgrade: milos.bojicic@rect.bg.ac.rs , biljana@rcub.bg.ac.rs

Act at Humboldt-Universität zu Berlin

Humboldt-Universität zu Berlin (HU Berlin) has been dedicated to the topics of Open Science, Open Access and Open Data for nearly 25 years. The basis for this was, among other things, the creation of one of the first institutional repositories for theses and dissertation in Germany in 1997. It continued with the signing of the Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities 2006, the Institutional Research Data Policy 2014, one of the first in Germany, and the Open Access Policy 2021, the updated version of the policy published in 2006. In addition, HU Berlin is contributing its many years of comprehensive expertise on research data management within the National Research Data Infrastructure (NFDI) for connection to the European Open Science Cloud as well as internationally within the Research Data Alliance.

Institutional repository: The ▼**edoc-Server** is HU Berlin's institutional open access repository which has been in operation since 1997. It allows researchers to publish dissertation theses, reports and other kinds of publications as well as to the self-archive research articles and publish research data.

Research data management service: University researchers receive comprehensive guidance, training, and information through the RDM initiative. In addition to the central information website (https://hu.berlin/dataman) with contact options, members of the university can find templates, checklists and sample data management plans on it. Furthermore, online video tutorials and a podcast on central topics of research data management are offered.

Sensitive FAIR Data: Humboldt-Universität's ▼**Media Repository** (https://media.hu-berlin.de) can be used to store, document, and make accessible media and research data that cannot be anonymized or that is otherwise sensitive. Furthermore, it offers the possibility to use discipline-specific metadata schemas to describe data in the best possible way.

Open Access services: HU Berlin's library provides its researchers with several services on open access publishing, such as publication funds for covering charges for open access journal articles and open access books, special conditions with publishers and journals for publishing open access, and consultation and workshops on all matters related to open access and openness (e.g. gold and green route, funding, copyright, author rights, licenses, ORCID iD).

Open Software : The Computer and Media Service of HU Berlin offers a central ▼**GitLab** (https://scm.cms.hu-berlin.de) for source code collaboration. Finished software versions can be published at the ▼**edoc-Server.**

Open Data : The catalogue of Humboldt-Universität's library with over 6,5 Million items is part of the joint union catalogue of the Bavarian Library Network (Bibliotheksverbund Bayern - BVB) and the Cooperative Library Network Berlin-Brandenburg (KOBV). It contains more than 27 million bibliographic records from university libraries, academic libraries and many other libraries of Bavaria, Berlin and Brandenburg. This ▼**open data set** is published under the Creative Commons License CC0 in MARCXML data format in compliance with the ▼**conventions** made for Germany.

Training: The University Library and the Computer and Media Service of Humboldt-Universität offer various training formats on Open Science. Within the ▼**UB Coffee Lectures**, Open Science topics are presented in a short and concise way. Further training is available to researchers through the university's professional development program (i.e. on OER creation).

Contacts at HU Berlin: openaccess@ub.hu-berlin.de, researchdata@hu-berlin.de, edoc@hu-berlin.de

Act at King's College London

King's College London is committed to to enabling an Open Research culture and to supporting impact, innovation and excellence in research.

Institutional repository: ▼ **Pure (**http://kclpure.kcl.ac.uk) is the King's institutional repository and enables King's research to be stored centrally. It offers permanent visibility and open access. It is accessible to all via the King's Research Portal (Pure Login: http://kclpure.kcl.ac.uk/admin/). Pure is also the platform through which the King's REF submission will be delivered.

Data management plan: King's subscribe to ▼**DMPOnline** which is a quick and easy online tool created to help researchers write data management plans. If you log on with your King's ID you will have access to customised guidance, examples of answers from real data management plans, and a generic data management plan template specifically created for King's researchers.

DMPonline at King's :

- King's subscription site ▼**https://dmp.kcl.ac.uk/**
- public' version, accessible by anyone ▼**https://dmponline.dcc.ac.uk/**
- King's webpages supporting DMPs - ▼**https://www.kcl.ac.uk/researchsupport/managing/plan** (includes links to funder policies and guidance)

Open Journals: King's Open Research team recommend the following open journal platforms:

- STEM focused publishers (these publishers levy article processing charges to publish a research output)
  ▼**PLOS** King's has a PLOS Read & Publish deal where you King's corresponding authors can publish in PLOS One, PLOS Computational Biology, PLOS Pathogens, PLOS Genetics, PLOS Neglected Tropical Diseases
  ▼**Frontiers**
  ▼**MDPI**
  ▼**BMC**
  ▼**eLife**
  ▼**PeerJ**

- Humanities & Social Sciences:
  ▼**Open Library of Humanities**   There are no article processing charges for researchers, OPH are funded by an international consortium of libraries.

Other useful information :

- List of transformative OA agreements with publishers ▼**here** and in more detail ▼**here**.
- King's Libraries & Collections' Research Support webpages
  ▼**https://www.kcl.ac.uk/researchsupport**
- ▼ **King's Read & Publish Deals**
- King's Research Publications Policy
  https://www.kcl.ac.uk/governancezone/research/research-publications-policy

Open Data: ▼KORDS is the King's research data repository for open data. It provides long-term storage and access for datasets at project-end and supporting publications. KORDS uses the Figshare data repository platform, providing a simple, self-deposit way for researchers to upload and share their data, and a publicly accessible showcase of datasets from King's research. It supports Open Research; enabling researchers to make datasets discoverable, accessible and citeable. All datasets have a DOI and a structured metadata record so that they can be shared and cited when re-used. Depositing meets the policy requirements of funders for data retention and sharing, and the requirements of many publishers for access to datasets supporting publications.

For data, these UK Data Service pages https://ukdataservice.ac.uk/learning-hub/research-data-management/ include a helpful summary of legal and ethical issues, including Data Protection For research governance, ethics and integrity, see these King's pages https://www.kcl.ac.uk/research/support/rgei. King's students will have access to internal pages on these topics too.

Training: Support and training on Open Science are available to King's researchers. Check the available sessions at https://www.kcl.ac.uk/researchsupport/managing/support for help with Open access publishing, depositing in ▼**Pure** and REF eligibility, managing research data, e-theses, research impact, copyright.

Contacts at King's: Alternatively, contact Research Support staff in King's libraries for more information: library@kcl.ac.uk

Open Access UK legislation:
As of 1 April 2022, UKRI's new Open Access Policy applies to all peer-reviewed research papers submitted on or after that date. All original peer-reviewed research articles (including reviews and commissioned reviews) must be made freely available by the final publication date with a Creative Commons Attribution Licence (CC BY).
https://www.ukri.org/publications/ukri-open-access-policy/

Many funders have policies which require papers to be made open access on or soon after publication. More information is available at https://www.kcl.ac.uk/researchsupport/open-access/funder-open-access-policies

REF Open Access Policy
https://www.ref.ac.uk/media/1228/open_access_summary__v1_0.pdf - We are currently awaiting an updated REF OA policy that is due out in early 2023.

Act at UCLouvain

UCLouvain (Université catholique de Louvain) is committed to Open Science and Open Education since 2015. The creation, dissemination and acquisition of knowledge, both in the field of education and scientific research, are at the heart of the Digital Strategic Plans 2015-2020 and 2021-2025 of the UClouvain (seehttp://uclouvain.be/unumerique).

Institutional repository: ▼**Dial.uclouvain.be** offers UCLouvain researchers the possibility to store permanently and centrally all publications and other research documents such as reports, working papers, patents, etc. DIAL.pr offers them permanent visibility and open access.

Data management plan: ▼**DMPOnline.be** hosts several DMP's templates available for every member of UCLouvain. It can be accessed with a UCLouvain ID or ORCid number.

Open Journals: ▼**OJS.uclouvain.be** offers a platform dedicated to open journals, open conference proceedings, and other scientific periodic open publications managed by editorial committees including permanent members of UCLouvain. The platform hosts more than 20 journals.

Open Data: ▼**dataverse.uclouvain.be** is the UCLouvain institutional repository for Open Date. It offers researchers a platform for storing their Open data, especially when there is no international domain specific repository. At a Belgian level, ▼**SODHA** is the Belgian federal data archive for social sciences and the digital humanities. An online ▼**open handbook** of Research Data management has been developed.

Open Educational Resources: ▼**oer.uclouvain.be** offers UCLouvain teachers and researchers a permanent repository to publish Open Educational Resources dedicated to teaching and learning.

Training: several trainings on Open Science are proposed to UCLouvain researchers. Check the available sessions at ▼**https://sites.uclouvain.be/training/biul**

Contacts at UCLouvain: openaccess@uclouvain.be , unumerique@uclouvain.be , Yves.Deville@uclouvain.be , Christine.Jacqmot@uclouvain.be

Open Access Belgium legislation: Since 2018, all research publications (except monographies and books) where one author is member of UCLouvain must be immediately available, in Open Access, in the institutional repository. A possible embargo (maximum 6 months for science, technology and medicine, and 12 months for social sciences and humanities) might be imposed by the editor. When you can, submit your publications to open access journals.

Act at University of Oslo (UiO)

UiO (University of Oslo) The University of Oslo (UiO) promotes Open Science through policy, infrastructure, and training. Since 2011, the ▼**Open Access policy** requires all UiO staff to archive all author accepted manuscripts (AAM) in UiO's institutional repository (DUO) to make articles openly available as soon as possible.

The UiO ▼**policy and guidelines for research data management** was passed in 2017. UiO requires researchers to share data as open as possible, but as closed as necessary. Data should be managed in accordance with the FAIR and CARE principles as well as with research ethical guidelines. UiO is an institutional member of EOSC.

In 2022, the university adopted a ▼**strategy for open access.** The strategy is based on the general research community's demands for quality assurance, academic freedom, and research integrity. UiO's main strategic goal is to secure these values in the further development of open publishing and open access to research results. To help researchers meet guidelines and requirements to publish open access, UiO launched an ▼**Institutional Rights Retentions Policy** with effect from 2023.

Institutional repository: ▼**DUO Research Archive** offers a platform for dissemination and long-term preservation for research publications, master and doctoral theses, research reports and other scientific output from UiO. DUO Research Archive is curated by the university library.

Data management plan: Research projects at UiO are required to have a ▼**data management plan** and researchers are free to choose the DMP template or tool relevant to their research.

Open Journals: ▼**FRITT** is a platform and service for diamond open access journals affiliated with UiO. The technical infrastructure is administered by UiO's IT department and the university library. The editorial processes are largely handled by a journal's own editorial teams.

Open Data: Researchers are encouraged to select domain specific repositories when possible. UiO has a collection in the research data repository ▼**DataverseNO** where research data are curated by the university library.

Training: UiO's ▼**Digital Scholarship Centre** (DSC) organizes courses and workshops in research data management, reproducibility, open science practices, and digital skills. DSC also coordinate activities for community networks including ▼**Carpentry**, ▼**ReproducibiliTea** and the ▼**UiO Data Mangers Network.**

Contacts at UiO: openaccess@ub.uio.no; fritt-info@journals.uio.no; research-data@uio.no; digitalscholarship@ub.uio.no

National Policies and Guidelines for Open Science:

- ▼**National goals and guidelines for open access to research articles** (2017, Ministry of Education and Research)
- ▼**National strategy on access to and sharing of research data** (2017, Ministry of Education and Research)
- ▼**The Research Council Policy for Open Science** (2020, The Research Council of Norway)
- ▼**Long term plan for research and higher education 2023-2032** [in Norwegian] (2022, Ministry of Education and Research)

Act at Université Paris Cité

UPC (Université Paris Cité) is committed to Open Science since 2017. Open access, open data and open source are at the heart of the open science roadmap of the UPC (see ▼**https://u-paris.fr/science-ouverte/feuille-de-route/**). This roadmap is linked to the ▼**second French Open Science Plan**.

Institutional repository: ▼**https://u-paris.fr/bibliotheques/hal/** offers UPC researchers the possibility to store permanently and centrally all publications and other research documents such as reports, working papers, etc. Its content is regularly uploaded to the French national public portal https://hal.archives-ouvertes.fr

Data management plan: ▼**https://dmp.opidor.fr** supports the French research community through the development and implementation of data and software management plans. A ▼**guide** has been written to accompany UPC researchers.

Open Journals: ▼**https://opus.u-paris.fr** offers a platform dedicated to open journals, open conference proceedings, and other scientific periodic open publications managed by editorial committees.

Open Data: ▼**https://recherche.data.gouv.fr/fr,** a national repository is dedicated to open data. It offers researchers a platform for storing their open data, especially when there is no other national or international domain specific repository. Into this repository, An institutional space is reserved for researchers from de UPC.

Open Source: UPC is the first university to sponsor the international software archiving platform, Software heritage (▼**https://www.softwareheritage.org**). This platform provides a safe place to archive the codes of our community and beyond.

Barometer: ▼**https://u-paris.fr/science-ouverte/barometre-science-ouverte-univ-paris/** allows us to rely on reliable indicators in order to assess the impact of the implementation of SO at UPC and to adapt its modalities on an ongoing basis. A national SO metric has been set up since 2019 by the Ministry for higher education and research.

Training: several trainings on Open Science are proposed to the various UPC staff, student researchers and staff. https://u-paris.fr/science-ouverte/formations/

Contacts at Université Paris-Cité: donnees.recherche.dbm@listes.u-paris.fr , hal.dbm@listes.u-paris.fr , recherche.dbm@listes.u-paris.fr.

Open Access French legislation: a national website is dedicated to all publications related to open science: ▼**https://www.ouvrirlascience.fr/accueil/**

Act at Unipi

Unipi (University of Pisa) promotes open access to scientific literature, embracing its underlying principles. In 2004, Unipi adhered to the Messina Declaration 'Italian Universities for Open Access: towards open access to scientific literature', in which Italian universities committed to support the 2003 Berlin Declaration on Open Access to Scientific Literature. In 2014, Unipi also signed the "Road Map 2014-2018", confirming its commitment to implementing institutional policies aimed at developing open access and promoting the international visibility of national research. Adherence to open access policies is reaffirmed in the University Statute and Code of Ethics. The University of Pisa's Guidelines on Open Access and the Regulations for the Promotion of Open Access to the Results of Scientific Research specify the forms in which this commitment can be realised.

Institutional repository: ▼**ARPI (https://arpi.unipi.it)** is the Research Archive of the University of Pisa that collects the publications and documentation on the scientific research products of the university's staff. The archive is managed by IRIS, CINECA's integrated research data management system. ARPI meets all OpenAIRE guidelines. Additionally, ETD is the digital archive of the master, specialization and doctoral theses discussed at the University of Pisa (▼**https://etd.adm.unipi.it/**)

Data management plan: The Data Management Plan is a structured document indicating how data will be managed in a research project, both during the life of the project and after its completion. ▼**Unipi Research Office** links to several DMP's templates available for every member of Unipi.

Open Journals: Unipi Research Office collects information for researchers and staff about open journals and open access publications, linking to ▼**https://doaj.org/** to determine whether a journal is open access and which policy (gold, green) it applies.

Open Data: ▼**Unipi Research Office** recommends publishing Open Data, according to the FAIR principles, onto platforms like ▼**Zenodo,** ▼**Dryad,** or ▼**Figshare.** ▼**SoBigData** is a European Research Infrastructure for Big Data and Social Mining maintaining a smart catalogue for finding and accessing the datasets, services, methods and publications on big data and social mining.

Training: Training on open science is available in the form of ▼**webinars** and a series of short informative texts (▼"**Open Science Pills**") available at the Unipi website.

Contacts at Unipi: arpi@unipi.it ; ricercaeuropea@unipi.it

Open Access Italian legislation: In Italy, law no. 112 of 7 October 2013 guarantees open access to the results of publicly funded scientific research.

Act at University of Vienna

The University of Vienna is committed to the idea of Open Access, as can be read in the ▼**Open Access Policy** of the University of Vienna. The Vienna University Library therefore promotes Open Science with all its ▼**research support services.**

Institutional repository: ▼**PHAIDRA** is the institutional repository for the permanent secure storage of digital assets at the University of Vienna since 2008. PHAIDRA represents the technological basis for the implementation of the Open Access Policy of the University of Vienna, according to the "Berlin Declaration on Open Access to Scientific Knowledge", which was signed in 2010 by Georg Winckler, then rector of the University of Vienna. The repository is used in EU projects, is also used at further universities in Austria and abroad. It is closely linked to the Currrent Research Information System at the University of Vienna and other systems. See also the ▼**Policy of PHAIDRA**. The PHAIDRA department, together with the Central Computer Centre, offers other services such as internal PHAIDRA applications and GitLAB to support the handling of data throughout the research process. The PHAIDRA department is also building digital workflows around the transcription platform Transkribus, which accompanies the data cycle from the digitisation of sources to long-term archiving. Our goal is to make the data available in high quality according to the FAIR criteria for research and teaching at the University of Vienna. ▼**AUSSDA** - The Austrian Social Science Data Archive - provides a national research infrastructure for social sciences data.

Research Data Management service : Information on all services of the University of Vienna related to research data management (RDM) can be found on the central ▼**RDM website**

Open Journals: The University of Vienna offers scientists the possibility to manage and host open access journals via the ▼**Open Journal System.** The Open Access Office offers a wide range of services: The Open Access Office grants ▼**funding** for open access publications. ▼**u:scholar** (a Part of PHAIDRA) enables the publication of academic open access publications. ▼**Open Journal Systems** (OJS) allows Open Access journals to be published at Vienna University. Moreover, information concerning ▼**legal issues of open Access publishing** is available from the Open Access Office.

Open Educational Resources: The University of Vienna is part of ▼**Open Education Austria Advanced,** a project of Austrian universities for the joint development of a national infrastructure for Open Educational Resources (**OER**) For the first time, services from e-learning centres, central IT services and libraries of the partner universities are linked in order to support teaching staff in the creation of OER materials for self-study and teaching. The project aims to gradually improve the quality of teaching and learning and the visibility of good-practice materials within the respective discipline.

Contacts at university of Vienna: AUSSDA: info@aussda.at; Open Access Office: openaccess@univie.ac.at; PHAIDRA: support.phaidra@univie.ac.at; Research Data Management: rdm@univie.ac.at

Open Access Austrian legislation The University of Vienna is guided by the Austrian ▼**Open Science Policy,** which was adopted in 2022 and in addition to the repositories also offers comprehensive ▼**advice and training** on this topic.

Going further

GENERAL RESOURCES

Ouvrir la science : Ressources
Resources, guides and videos distributed by the Committee for Open Science.
https://www.ouvrirlascience.fr/category/ressources/

https://www.ouvrirlascience.fr/series-passport-an-introduction-to-open-science/
National plan for open science
This document presents the French action plan set up by the Ministry
of Higher Education, Research and Innovation.
https://www.ouvrirlascience.fr/plan-national-pour-la-science-ouverte/
FOSTER Open Science
A portal providing online training on open science (in English) created by FOSTER,
a consortium of academic and research institutions in 6 European countries,
funded by the European Union. https://www.fosteropenscience.eu
The Open Science Training Handbook (FOSTER). https://open-science-training-
handbook.github.io/Open-Science-Training-Handbook_EN
CoopIST (Cooperating on scientific and technical information)
A CIRAD website providing many technical fact sheets on different aspects of open science.
https://coop-ist.cirad.fr/
The Couperin site on open science in France
The Couperin consortium provides links and guides concerning several aspects of open
science including the dissemination of open access publications.
https://openaccess.couperin.org
DoRANum (Research data: digital learning)
A set of free reusable resources (fact sheets and videos) which help with research data
management provided by the URFIST network and Inist-CNRS. https://doranum.fr/
UNESCO Recommendation on Open Science, 2021. https://en.unesco.org/science-
sustainable-future/open-science/recommendation
European Commission: Turning FAIR into reality: final report:
https://ec.europa.eu/info/sites/info/files/turning_fair_into_reality_1.pdf
Liber Open Science Roadmap (2018)
https://libereurope.eu/wp-content/uploads/2020/09/LIBER_OSR_A5-ONLINE-HR-1.pdf
CESSDA Data Management Expert Guide https://dmeg.cessda.eu/Data-Management-Expert-
Guide
Fairsharing.org https://fairsharing.org/ - a curated, informative and educational resource on
data and metadata standards, inter-related to databases and data policies
Journal Checker Tool https://journalcheckertool.org/ created by Plan S. Would use with
caution as Plan S is still working out some of the bugs.

Going further

SPECIFIC RESOURCES

Publications and legal issues

Committee for Open Science. *Je publie, quels sont mes droits ?* 2nd edition. 2020. Available at www.ouvrirlascience.fr.

Reproducibility

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Other

Chue Hong et al. (2022): FAIR Principles for Research Software (FAIR4RS Principles) (1.0).
https://doi.org/10.15497/RDA00068

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Smith et al. (2016): Software Citation Principles. PeerJ Computer Science 2:e86. https://doi.org/10.7717/peerj-cs.86

Glossary

APC (article processing charges)
Charges for publishing immediately in open access which may be billed to the author (or his or her institution). See Open access publications.

Article: preprint or author's version
The version of an article sent to a journal by the authors prior to the peer review process.

Article: Accepted author manuscript
The version of an article including revisions resulting from the peer review process but without the publisher's final layout.

Article: version of record
The version of an article with the editor's final layout as published in the journal.

Data Management Plan (DMP)
An ongoing plan written at the start of a research project which sets out how the data will be managed covering its collection, documentation, and storage, as well as managing sensitive data, conditions for opening or sharing data, etc.

Data warehouse
These may be multidisciplinary or thematic in one disciplinary field. In them, datasets are deposited, documented, and disseminated. A warehouse provides better archiving and wider access to data than a laboratory server or other local solutions.

Distribution license
The license defines the conditions for distribution and reuse of any scientific content (example: Creative Commons).

Embargo
Period during which a scientific production cannot be disseminated in open access. In the case of state-funded scientific publications, the French Law for a Digital Republic limits the embargo period after which the written work can be openly disseminated regardless of contracts with publishers (see the French law for a Figital Republic). Authors of theses may define an embargo period during which the thesis is only available within the academic community.

FAIR (principles)
The aim of the FAIR principles is to make data findable, accessible, interoperable and reusable.

French Law for a Digital Republic
This 2016 law provides a legal framework for depositing certain versions of journal articles in open access repositories if at least half of the funding of the research in question came from the public sector.
By putting research data in the category of public data, this law creates a legal obligation for such data to be freely disseminated.

General Data Protection Regulation (GDPR).
The legal framework defined by the European Union for the management of personal data. It may be consulted at: https://www.cnil.fr/fr/comprendre-le-rgpd

Metadata
Information which enables the standardised description of data or digital documents (e.g. a digital photo's date and GPS coordinates). The quality of metadata ensures sharing and the possibility to reuse data.

Open access
Content in open access is accessible to all with no barriers: no authentication requirements, no resources under an embargo, no paid access, etc. This may concern scientific publications, data, code, etc.
There are several ways of disseminating open access publications. For example, self-archiving scientific productions in an open archive (sometimes called green open access) or publishing in an open access journal with or without APCs (sometimes called gold open access).

Open access publication
A journal or book that has been directly disseminated in open access. These books and journals have varied business models such as public subsidies, payments by authors' institutions (see APCs), financial contributions from academic societies or university libraries and so forth. Find out more about the ▼ **Directory of Open Access Journals (DOAJ)** and the ▼ **Directory of Open Access Books (DOAB)**.

Open archive
Researchers deposit their work directly in thematic or institutional archives so that it can be consulted by all with no barriers.

Persistent   identifier   A unique stable reference for a digital object or subject such as a dataset, article or author. For example a digital object identifier (DOI), or an Open Researcher and Contributor ID (ORCID).

Personal data
Data concerning an individual who is identified or identifiable.

Predatory publishers or journals
Publishers or journals with dubious peer reviewing or business practices.

Reproducibility
The capacity of another researcher to obtain the same results using the same methods and data. This highlights the importance of the methods used to produce such results.

Research data
Factual records (numerical scores, textual records, images and sounds) used as primary sources for scientific research, and that are commonly accepted in the scientific community as necessary to validate research findings.

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Credits and Thanks of the original version of
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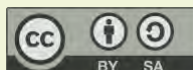Sacha Hodencq, Minh-Châu Nguyên,
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www.ouvrirlascience.fr site

The *Passport For Open Science* is a guide designed to accompany you at every step of your research, from developing your scientific approach to the dissemination of your research results. It provides a set of tools and best practices that can be directly implemented and is aimed at researchers from all disciplines.

This version has been adapted to the Circle U. context

We hope this guide will motivate you and provide the means for you to realise the ambitions of open science by sharing your research results and data with as many people as possible.