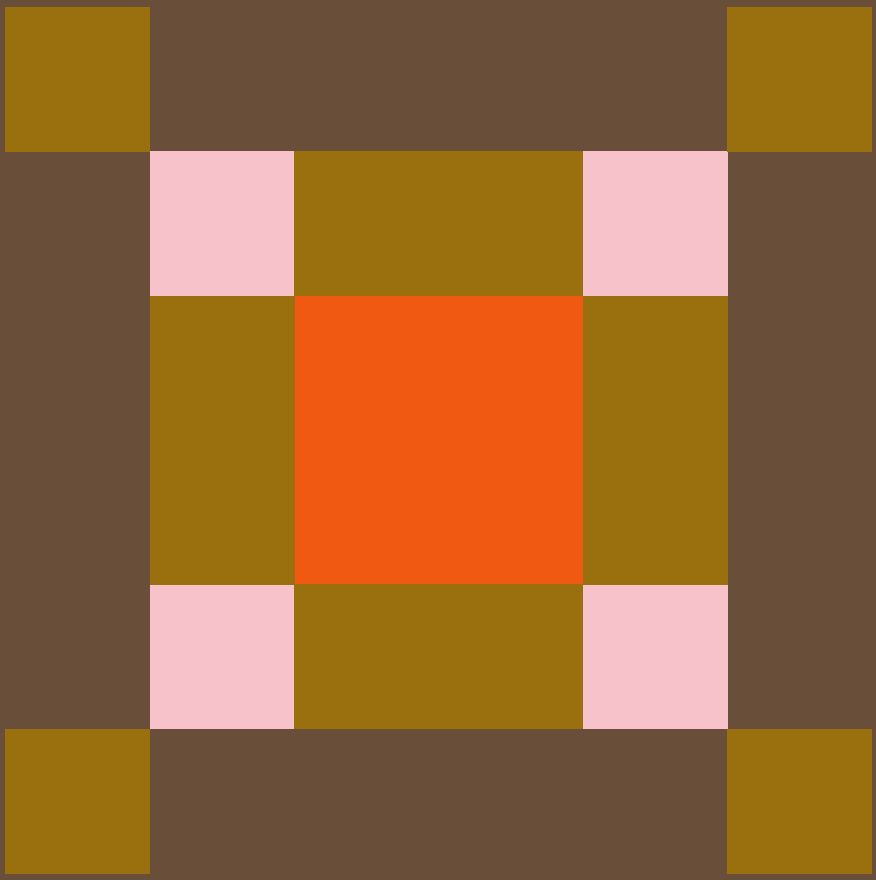
CORA Cork Open Research Archive
Cartlann Taighde Oscailte Chorcaí

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Navigating Open Research

A Guide for Early Career Researchers



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Table of Contents

Introduction 5

Section 1: Search and Prepare 8

- Search for research outputs 9
- Search for data 10
- Prepare to research 11
- Societal engagement 13
- Legal and ethical considerations 15

Section 2: Research Data Management and Reproducible Research 18

- Research data management 22
- Data management planning 23
- Documentation and metadata 25
- Reproducibility strategy 26
- Open research – legal and ethical requirements 28
- Research software 30

Section 3: Write and Publish 34

- Research publications 35
- Making your thesis open access 38
- Open access journal articles 39
- Green open access 40
- Rights retention 40
- Pre-prints 42
- Predatory publishing 43

Section 4: Publishing and Sharing Data 46

- Open and FAIR research data 50
- Choosing a data repository 50
- Data paper 52
- Sharing other research outputs 52

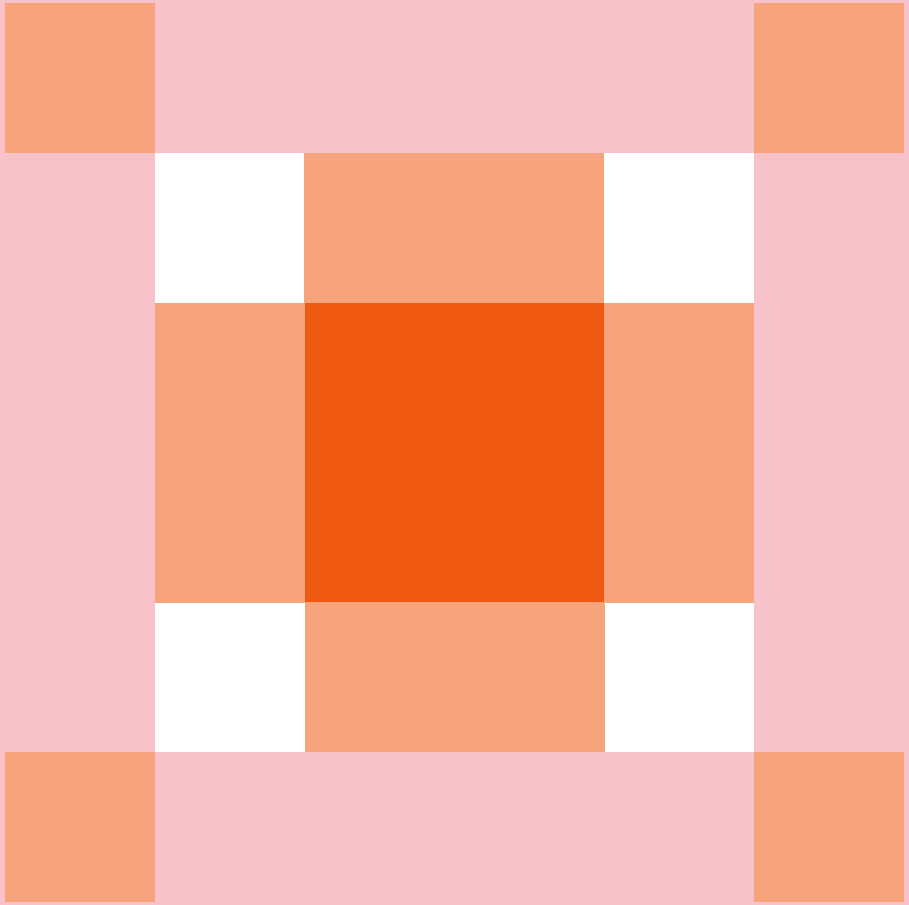
Section 5: Licensing your Work 54

- Choosing a license for publications 55
- Rights retention 57
- Choosing a license for research data 57
- Choosing a license for research software 58

Section 6 Communicating your Research 60

- Types of research impact 61
- Effective research communication 63

Next Steps 66



Introduction

Welcome to Navigating Open Research – A Guide for Early Career Researchers. This guide is designed to help you at each stage of your research journey. From preparing your research project and discovering relevant resources (Section 1) to research data management and reproducibility (Section 2), writing and publishing (Section 3), sharing and publishing data (Section 4), licensing your work (Section 5) and communicating your research (Section 6) every chapter provides you with practical tips that can be implemented immediately.

The focus of this guide is Open Research. Research outputs such as journal articles and book chapters are often locked behind expensive paywalls. Research data, methods, or procedures may not be accessible to others at all. Open Research aims to make scholarly outputs openly available, accessible, and reusable for everyone, and to promote collaboration for the benefit of research and society. Openness guarantees better documented and more substantiated research.

Open Research is also endorsed and promoted by Irish research funders and is embedded in many institutional policies.

The National Open Research Forum has produced a ***National Action Plan for Open Research*** which aims to establish a culture of Open Research and envisages 100% open access to research publications in Ireland by 2030.

As you begin your research, use this guide to start a conversation about Open Research with your supervisor, colleagues and peers. Remember that Open Research is a journey, and you are not alone. There are fellow researchers, colleagues and support staff at your institutional library who will help you out along the way.

The Future is Open!


The Future
is The Free Future
is Open!

Section 1: Search and Prepare

Search for research outputs

Research always starts with evaluating what others have done before. You can use your institution's library to consult resources such as journals, databases and books. Institutional repositories contain the open access research outputs of individual institutions. You can find a list of Irish institutional repositories here. You can find Open Access literature and data via freely accessible search engines, such as Lens.org or OpenAlex.

CORE, is a search engine which specialises in Open Access academic publications (books, articles, theses, etc.). You can check platforms for papers in progress, known as preprints. To learn more about preprints, see the Preprints section on page 42.

Useful resources for finding research outputs:

► **Open Science Framework (OSF)**	Contains more than 30 preprint servers
► **Lens.org**	Scholarly and patent knowledge
► **OpenAlex**	Search and analyse the world's research
► **BASE**	Academic web resources
► **CORE**	Open access research papers
► **Dimensions**	Comprehensive view of the research landscape
► **EuropePMC**	Life-sciences literature
► **Directory of Open Access Journals (DOAJ)**	
► **Directory of Open Access Books (DOAB)**	
► **OAPEN**	Online library of open access books
► **OpenDOAR**	Global directory of open access repositories
► **OpenAIRE**	Open scholarly communication infrastructure
► **Unpaywall**	Open database of 51,713,423 free scholarly articles
► **Open Access Button**	Free, legal research articles
► **Open Access Theses and Dissertations (OATD)**	Open Access Theses and Dissertations

Search for data

Another source of information that you may want to access is data. There are many places where data is stored in a findable and accessible way. Increasingly, data is linked to journal articles. If so, the journal article will specify where you can access the data and under what conditions you are allowed to reuse the data. For more information about licensing, see the section on Licensing Your Work on page 55.

Another way to search for data is through data warehouses: central repositories that combine data from a variety of sources. Data warehouses can either be multidisciplinary or specialized, and allow you to deposit, conserve, and share research data. In some instances, you may not be able to access the data directly from the repository but may need to request access if there is a data sharing agreement in place.

Useful resources for finding data:

► **FAIRsharing.org**	Standards, databases, policies
► **DataverseNL**	Online storage, sharing and publishing of research data
► **Digital Repository of Ireland**	Cultural heritage, and social sciences digital data
► **Irish Social Science Data Archive**	Quantitative Social Science data
► **Europeana**	Europe's digital cultural heritage
► **Data.gov.ie**	Ireland's open data portal
► **Tailte Ireland**	Geospatial data
► **Central Statistics Office**	Ireland's national statistical institute
► **Irish Qualitative Data Archive**	Qualitative social science data
► **4TU.ResearchData**	Science, engineering and design domains
► **Re3data.org**	Registry of Research Data Repositories
► **GitHub**	Software and code
► **Google Dataset Search**	Dataset Search is Google's search engine for datasets
► **Zenodo**	Open repository

Prepare to research

Pre-Registration

An Open Research practice you can implement in the very first stages of your research is sharing and registering your research question, initial ideas, theory, hypotheses and research design, open notebooks, and if applicable, your Systematic Review or Scoping Review protocols. This is called pre-registration.

Pre-registration must be done before the actual research is conducted but is often only made publicly available after completion of the research project. Some researchers go even further and make their pre-registrations available at the outset of their studies, inviting colleagues and stakeholders to discuss their plans and to provide useful comments.

Different platforms are available for pre-registration, including repositories such as Prospero or the Open Science Framework (OSF). Some researchers may submit their research protocol to a journal for publication, examples include JMIR Research Protocols, Nature Protocols, etc.

The prevalence of preregistration varies between disciplines, with some having adopted this practice to a greater extent than others. Therefore you may need to consider how common or appropriate this practice is in your research area.

Registered Report

A special case of pre-registration is the registered report, in which a journal commits – after peer review of the pre-registration/protocol – that they will publish the results of that study in the future, regardless of the study's outcomes and whether these are statistically significant.

consider how common or appropriate this practice is in your research area

Useful resources for registered reports and pre-registration

Registered Reports

- The Centre for Open Science list of participating Journals
- Ten simple rules for writing a Registered Report
- A primer for choosing, designing and evaluating registered reports for qualitative methods
- Registered Reports with Developmental and Secondary Data: Some Brief Observations and Introduction to the Special Issue
- Community Feedback on Registered reports
- Ratings of Registered Reports peer review process

Pre-registration

- Guidelines for creating Open Systematic Reviews can be found on the **OSF** website
- OSF | Non-Interventional, Reproducible, and Open Systematic Review (NIRO-SR) guidelines Wiki
- Systematic Review protocols can be shared via Prospero, or the more general platforms mentioned before.
- Welcome to Registrations & Preregistrations! (Overview) - OSF Support

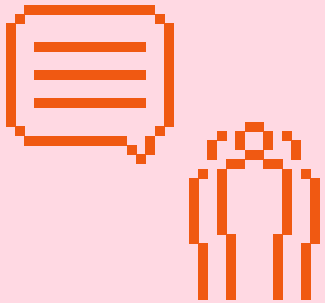
Societal engagement

There are different Open Research approaches to societal engagement; these can include Citizen Science, Engaged Research and Patient and Public Involvement (PPI).

Citizen Science

You may decide to include members of the public or community as part of your research team. We call this Citizen Science.

If you are adopting a Citizen Science approach, you will need to consider the ethical aspects of this approach. For example, will you need participant consent to share the data gathered? For more information, see the Ethics and Data section on page 29.



“Citizen science actively involves the public in scientific research that generates new knowledge or understanding, and thus has the potential to bring together science, policy makers, and society as a whole in an impactful way. Citizen scientists can participate in many stages of the scientific process, from data collection and volunteer mapping, through data interpretation and analysis, to publication and dissemination of results.”

European Citizen Science Platform

Engaged Research

Another way to foster greater societal engagement within your research is to use engaged or participatory research methods.

Societal partners include a range of stakeholders, service users, policymakers, civil and social society organisations, industry representatives and members of the public.

"Engaged research describes a wide range of research approaches and methodologies that share a common interest in collaboration with societal partners. Engaged research aims to improve, understand, or investigate an issue of public interest or concern, including societal challenges and sustainable development goals. It is advanced with societal partners rather than for them."

IUA Engaged Research Framework 2022.

Patient and Public Involvement (PPI) in research

Patient and Public Involvement (PPI) in research involves actively partnering with patients, carers, service users or the public to plan, design, manage, conduct, share and apply research in meaningful ways. Another definition of PPI states that it is *'research carried out 'with' or 'by' members of the public rather than 'to', 'about' or 'for' them'*. Patient and Public Involvement in HSE Research



Useful resources for societal engagement:

- ► Citizen Science Ireland – Citizen Science Ireland
- ► Citizen science | Environmental Protection Agency
- ► A how to guide; Engaged Research Framework 2022
- ► Engaged Research Principles & Good Practices
- ► https://leapireland.eu/
- ► National Biodiversity Data Centre
- ► Star Guide: Showing Citizens the Best View of the Exoplanets Gather and analyze real exoplanet data, contribute your results to a NASA database, and even get recognition for your work in scientific publications!
- ► HSE Guide to PPI
- ► PPI Ignite Network

Legal and ethical considerations

Open Research does not exist in isolation. It must align with national, funder, institutional policies, codes of conduct and the legal and ethical requirements governing research. Ensuring that your research is conducted with integrity and is both ethical and legal should be embedded in every stage of the research process and integral to planning your project.

This includes Open Research activities and can mean considering the ethical implications of Open Research, and obtaining consent for FAIR data archiving, complying with GDPR and the Health Research Regulations, adhering to data-sharing agreements, protecting intellectual property and respecting copyright law. The resources listed below can help in achieving this. For more information see the section: Open Research and managing the legal and ethical requirements of your data on page 28.

Useful resources for responsible engagement with Open:

- ► The intersection of the GDPR and sharing research data as FAIR and Open Data
- ► National Policy Statement on Ensuring Research Integrity In Ireland
- ► Data Protection and Research in Health and Social Care
- ► Irish Copyright Licensing Agency



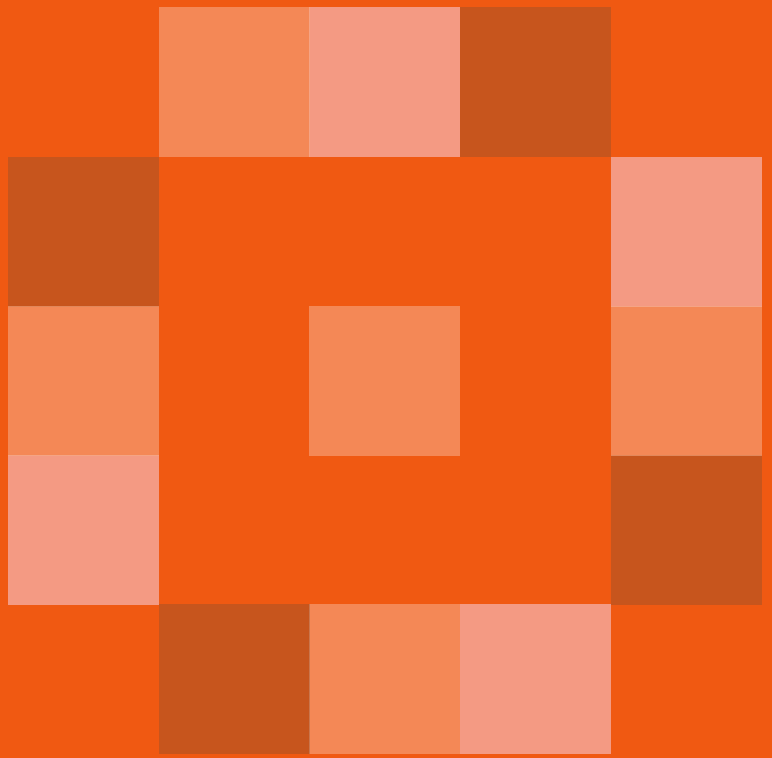
Getting started

1. Consider using openly available resources including publications and data ☐
2. Consider how and where to pre-register your planned study ☐
3. Identify your stakeholders, and plan how to engage them early in the research process ☐
4. Plan for citizen scientist and PPI activities and engagement ☐
5. Include consent for Open Research and societal engagement activities in your ethical application ☐



Notes

Section 2: Research Data Management and Reproducible Research



Research data is the evidence that underpins the answer to the research question and can be used to validate findings. Research data might be quantitative information or qualitative statements collected by researchers in the course of their work. Research data can be gathered through experimentation, observation, modelling, interview or other methods, or data might be information derived from existing evidence. Data may be raw/primary (e.g. direct from measurement or collection) or derived from primary data for subsequent analysis or interpretation (e.g. cleaned up or as an extract from a larger data set), or derived from existing sources where the rights may be held by others.

What is Research Data? (openaire.eu)

To ensure that your outputs are reusable, data must be organised consistently and well-documented. The **FAIR Principles (Findable, Accessible, Interoperable and Reusable)** aim to enhance transparency, value and usability by humans and machines. Findable and Accessible focus on the use of data repositories for storage, while Interoperable and Reusable address data formats, metadata, openness and licensing.

FAIR recognises that not all data can be Open and includes the caveat *'as open as possible, as closed as necessary'*. FAIR data is discussed in more detail in the Publishing and Sharing Data section on page 47. For a more detailed definition, please see page 17 of the National Action Plan for Open Research (2022 - 2030). For compliance with the FAIR Principles and to ensure reusability, and, if appropriate, reproducibility, implementing a data management plan is essential.

Open Research advocates sharing the data underlying your research - including knowledge, results and tools - as early and widely as possible.

'as open as possible, as closed as necessary'.

Examples of research data:

- Statistics
- Results of experiments
- Collections of digital images
- Observations resulting from fieldwork
- Transcripts of interviews
- Tabular data (spreadsheets, statistics, measurements, survey results, database contents)
- Survey data
- Results of experiments
- Fieldwork observations with appropriate annotations
- Observations resulting from fieldwork
- An interpretation
- Recordings (audiotapes, videotapes, music, performance)
- An artwork
- Images/imagery
- Archives
- Models
- Found objects
- Algorithms
- Published texts
- Scripts
- A manuscript
- Software
- Text documents

Research Data Management (RDM)

Research data management is the organisation, documentation, storage, and preservation of the data resulting from the research process. When you practise good research data management from the start of your project, you ensure that your data is well documented, transparent and reusable or reproducible.

Good data management is also central to research integrity and the responsible conduct of research.

Why should all research projects have a data management plan?

- supports research integrity and compliance with legal and ethical requirements
- is an essential part of project management
- allows you to plan and allocate resources and cost
- allows for planning for infrastructure to support data
- ensures that you can find and understand your data when you need to use it
- ensures that there is continuity if project staff leave or new researchers join
- enables reproducibility and validation of findings
- ensures that the data can be a FAIR and/or Open Data output

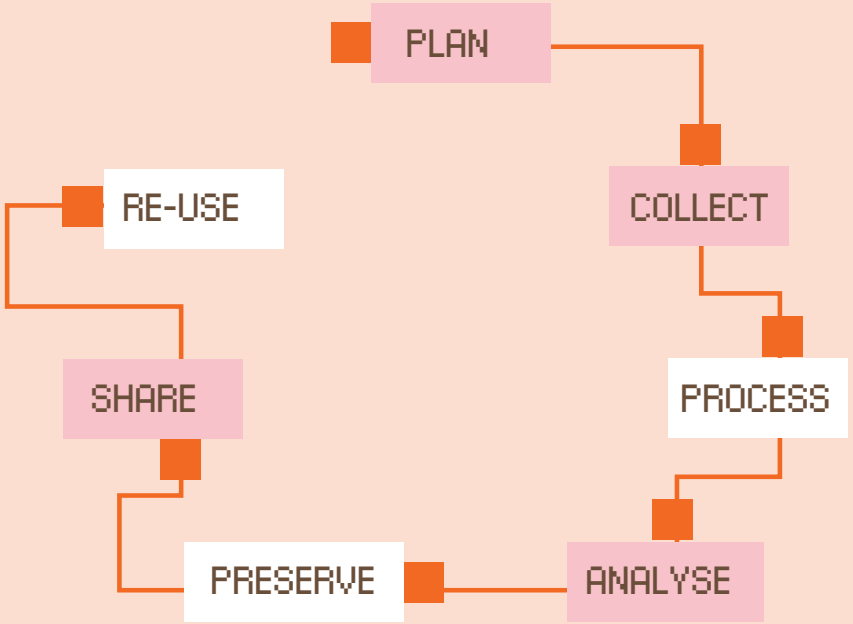
How long should I retain my data for?

A minimum retention period is usually stated in institutional data policies and academic codes, but data can be valuable for longer, whether it be in climate research, sociology, human geography, health sciences, astronomy, or linguistics. Look beyond minimum retention periods where relevant. Select what data you will need and want to retain.

Data Management Planning

Data management needs to be drafted and implemented from the very beginning of a project by creating a Data Management Plan (DMP). A DMP maps out the entire data life cycle.

It helps you think about how the data will be created or gathered and considers the treatment and management of the data throughout the research data lifecycle, including post project archiving.



'Select what data you will need and want to retain.'

Data Management Planning:

1. What data are you collecting, generating, creating or reusing?
2. How will you organise your data, files, and other supporting documents during and after the project? What metadata and documentation will you develop/ create/ generate?
3. Where will the data be stored during active research?
4. What legal and ethical requirements do you need to take into account? How will you protect sensitive data?
5. Will the data be shared? When will it be shared? Where will you archive/share FAIR data outputs? What hardware and software will be needed to use the data?Is the data stored in a proprietary format? Can it be exported to an open format? Can you export the data into a format that can be shared widely?
6. Who is responsible for active data management and the sharing of FAIR data?

A DMP is a living document that needs to be updated throughout your research project. Many research funders, including the European Commission (Horizon Europe programme) and Research Ireland require you to provide a DMP. There are various templates for DMPs. All of our national funders subscribe to the Science Europe template. In addition many universities and institutions have their own templates.

There are several online tools which can help you create a DMP. Before using, check with your funders and institution about which DMP template you should use.

Some institutions may have subscriptions to the tools listed below. Check with your local RDM support unit for more information.

Useful resources for data management:

- ► 23 Things for Researchers and PhD Candidates
- ► ARGOS
- ► DMPonline

Documentation and Metadata

Documentation and metadata are critical to good data management practices. They are also critical enablers of FAIR data.

Documentation consists of documents used to support and give context to your data, and related data processes. Metadata is data about data and can also be documentation.

Some examples of metadata and documentation include:

- metadata standards (Dublin Core, DDI, Darwin Core)
- readme file
- consent and information sheets
- data dictionaries
- code books
- analysis scripts
- protocols, methods and standard operating procedures

Useful resources for developing metadata + documentation

- ► Guide to writing a ‘readme’ style metadata doc
- ► How to make a Data Dictionary
- ► FAIRsharing.org



Reproducibility strategy

Reproducible research is work that can be independently recreated from the same data and the same code that the original team used ~ **Turing Way**

Reproducibility of research is neither a goal in itself, nor an absolute guarantee of quality, as research may be 100% reproducible, while of low inherent value. Nonetheless, there are many good reasons to make your research as reproducible as possible, both for you as a researcher, and for the broader research community.

Reasons to make your research as reproducible as possible

- Reproducible workflows make it easier for others to build on your research. They may reuse your data or the way you collected or analysed your data. It increases the impact of your work.
- When all steps of your research are properly documented and available to others, errors are more easily detected and corrected.
- Reproducible research makes your work more credible and adds to your accountability as a researcher. That is why working in a reproducible manner is part of the European Union's Open Science Policy.
- It can make it easier to write research papers, and help reviewers to see things from your perspective
- Working in a reproducible manner makes it much easier to revisit your data or analysis later on, which saves you precious time. Invest in reproducible workflows now, and your 'future self' will be most grateful!

  It can help build your reputation as a researcher who values rigour

'there are many good reasons to make your research as reproducible as possible.'

Reproducibility can be achieved in different ways, depending on your discipline and the methods used, but always hinges on the availability of the research data and the documentation, metadata, protocols or methods which describe in detail how the data was cleaned, processed and analysed.

Examples of reproducible research are experimental protocols that can be rerun 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. The key thing is to think ahead. Act before and during the process of your research to make sure your work is reproducible afterwards.

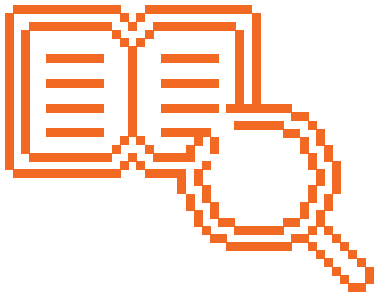
Useful resources for reproducibility:

- ► 'A Workflow for Open Reproducible Code in Science'
- ► Github
- ► Executable Research Articles (ERA) in the journal eLife
- ► Turing Way - Reproducible Research
- ► 10 Things for Curating Reproducible and FAIR Research

Open Research – legal and ethical requirements

Research data is often subject to legal and ethical requirements, which should be carefully addressed in your Data Management Plan. It's important to consider how these requirements influence every stage of the research process, including data collection, processing, handling, and storage. Your DMP should clearly outline the activities and measures needed to ensure compliance with these obligations.

The FAIR Principles also emphasise the balance between openness and restrictions, with the guideline: "as open as possible, as closed as necessary." This acknowledges that not all data can, or should, be shared openly.



Examples of data which require ethical and legal considerations include:

- **personal data:** this is any information that relates to an identified or identifiable individual (name, address, identification number, but also biometric data, genetic data);
- **confidential data:** trade secrets, investigations, data protected by intellectual-property rights
- **biological data:** such as endangered plant or animal species, where their survival is dependent on the protection of their location data
- **data subject** to a data sharing agreement, license or copyright

Principles of Data Minimisation (only take forward what you need to be reproducible)

When dealing with personal information, you should only collect and use the data necessary for your specific purpose(s) [Article 5, EU GDPR]. For instance, some survey-collection software collects dates, IP addresses, and latitudinal and longitudinal coordinates by default. If this does not serve any purpose for your research or if you have no permission to do so, please do not collect such data and adjust the default settings.

Ethics and Data

There are also ethical considerations to take into account in your data management processes. For example, consent for FAIR data sharing and reuse. More information can be found in this CONUL document on the intersection of GDPR, ethics and data sharing. The guide for researchers 'How to deal with sensitive data' gives a clear overview of how to handle sensitive data.

Data Sharing Agreements, Licensing and Copyright

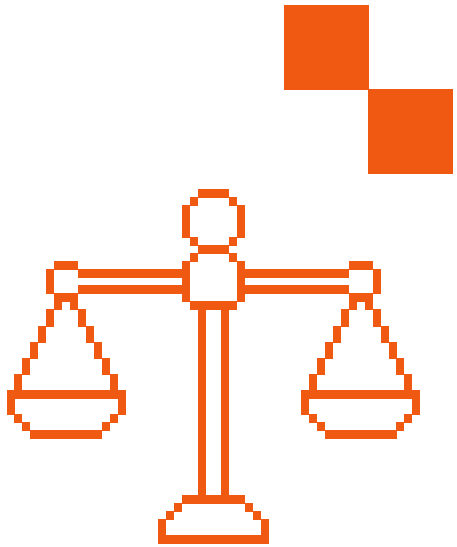
Data sharing agreements set out the purpose of the data sharing, cover what happens to the data at each stage, set standards and help all involved in sharing to be clear about their roles and responsibilities. An example of a clause in a data sharing agreement would be restrictions on who has access to the data or where it is stored during the project or limitations on what can be shared as a FAIR data post project. Data sharing agreements are legal documents and you should consult with your research office or legal office before agreeing to one.

Licensing and Copyright

Researchers often work with secondary data—information owned by others—requiring careful data management and potential limits on sharing as FAIR. Licensed data must follow specific terms; for example, a CC BY-SA license mandates attribution and sharing derived outputs under the same license. More restrictive copyright, like using a song or movie clip in a video, may require explicit creator permission. Always identify license or copyright requirements early and include them in the DMP to ensure proper data handling.

Research software

Will these analyses still work years from now? This is not automatically the case. It is, therefore, important to describe the version numbers of all software used in your analyses. For more information about software and code please go to Publishing and Sharing data.



CARE Principles for Indigenous Data

CARE = Collective benefit. Authority to control. Responsibility. Ethics

C	Collective benefit
A	Authority to Control
R	Responsibility
E	Ethics

The current movement toward open data and open science does not fully engage with Indigenous Peoples' rights and interests. Existing principles within the open data movement (e.g. FAIR: findable, accessible, interoperable, reusable) primarily focus on characteristics of data that will facilitate increased data sharing among entities while ignoring power differentials and historical contexts.

The CARE Principles for Indigenous Data Governance are people and purpose-oriented, reflecting the crucial role of data in advancing Indigenous innovation and self-determination.

These principles complement the existing FAIR principles encouraging open and other data movements to consider both people and purpose in their advocacy and pursuits

Getting started with Research Data Management:

1. Engage with your local data steward ☐
2. Check which data management plan template is required by your funder or institution ☐
3. Check the metadata requirements of your target data repository ☐
4. Draft a Data Management Plan ☐
5. As you plan for data collection ensure that you also capture metadata and documentation ☐
6. Make sure your DMP includes plans for FAIR and Open Data sharing ☐
7. Consider the legal requirements of your data, for example GDPR ☐
8. Consider FAIR data sharing in your ethical approval application ☐
9. Include reproducibility in your Data Management Plan, if relevant ☐
10. Include a ‘readme’ file in your research folder, explaining the context of the research, the file structure, and procedures ☐
11. Include a codebook or data dictionary in your research folder, explaining all variables in your research ☐
12. Make sure your analysis steps or scripts are well described and available to others ☐
13. Make sure your project minimises the effort it takes to reproduce your research ☐

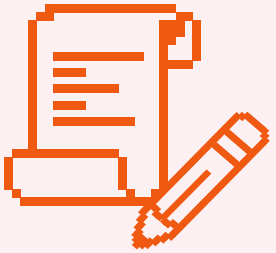
Notes

Section 3: Write and Publish

Research Publications

Types of research publication:

- Preprint
- Protocol
- Data paper
- Journal article
- Conference paper
- Thesis
- Book
- Monograph



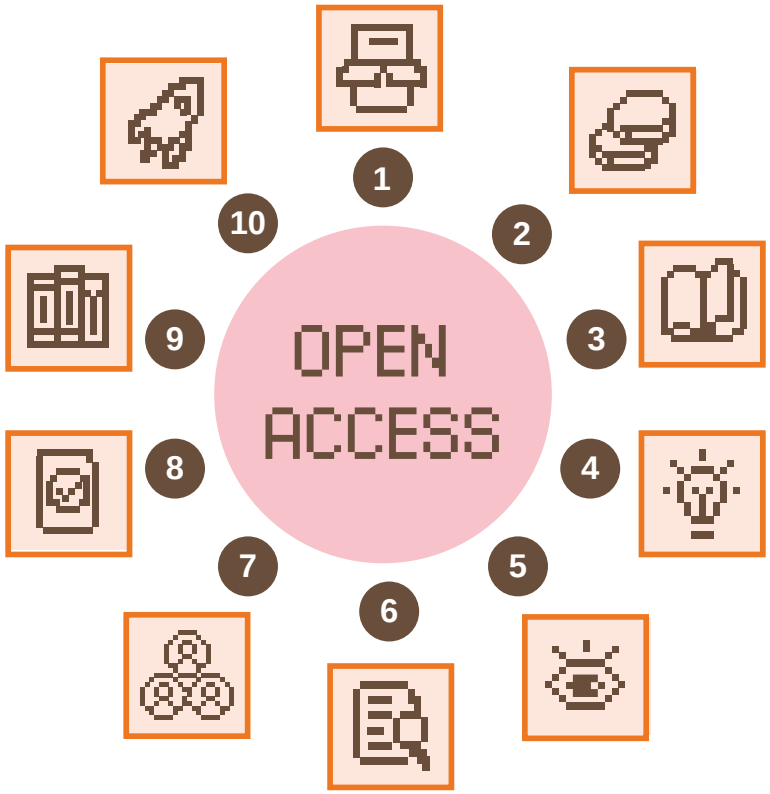
From the perspective of Open Research, the preferred publishing avenue is Open Access. Publishing OA means that anyone in the world can read, share and reuse your work. This increases its potential impact in different ways, such as increased citations or influencing policy and practice. It provides public access to publicly-funded research, increasing value for taxpayers, and opens up access to research publications for researchers in developing countries. Increasingly, immediate open access to research outputs is also a requirement of funding organizations and third-level institutions.

Research Ireland's Open Access Policy states that for all peer-reviewed research publications arising in whole or in part from Research Ireland-funded research:

1. Either the Version of Record (VoR) or the Author Accepted Manuscript (AAM) must be immediately available from the date of publication.
2. Either the VoR or the AAM must be deposited in an open repository. Research publications published in open access venues must also be deposited in a repository.
3. Research publications must be made available under a Creative Commons Attribution (CC BY) licence

Providing open access to peer-reviewed publications is also mandatory in Horizon Europe:

"As set out in the Grant Agreement, beneficiaries must ensure that, at the latest at the time of publication, open access is provided via a trusted repository to the published version or the final peer-reviewed manuscript accepted for publication under the latest available version of the Creative Commons Attribution International Public Licence (CC BY) or a licence with equivalent rights."



Why publish your work open access?

1. Good information supply
2. Fair and transparent use of taxpayer's money
3. Free and fast access to scholarly information
4. New methods, new knowledge
5. High visibility
6. Research funders' and institutions' policies
7. Collaborating & networking
8. Authors free to license their works as they see fit
9. Good findability & long-term access
10. Efficient research & innovation

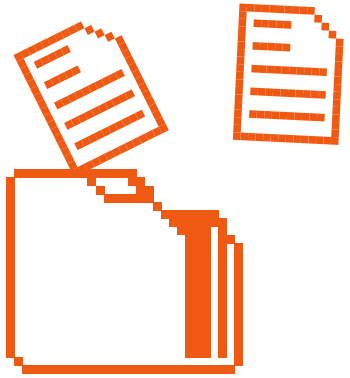
Useful resources for publishing open access:

- ► Research Irelands Interim Open Research Policy
- ► Open access - European Commission (europa.eu)
- ► Open Research Europe | Open Access ... | Open Research Europe (europa.eu)
- ► Open Access obligations in Horizon Europe: what are CC BY licences? - European Commission (europa.eu)
- ► HRB Open Access for Research Publications
- ► Negotiating with a Scholarly Publisher

Making your Thesis Open Access

PhD candidates and Masters by Research students are usually required to deposit a copy of their thesis in their institutional repository. Through this process, they can choose to make some or all of their dissertation or thesis openly available. An embargo, redaction or closed access may be necessary if there is potential for commercialization or if your thesis contains sensitive or copyrighted information.

Disseminating your thesis is generally not an obstacle to publication. Most academic publishers allow you to openly share your dissertation, as it usually requires reworking and editing to convert a dissertation into a publishable and marketable book or a peer-reviewed journal publication. Almost every publisher will allow you to reuse published articles in your dissertation, or to submit new articles that are based on dissertation chapters.



Open Access Journal Articles

If you want to publish in an academic journal, there are different publishing models which provide different routes to OA:

- **Gold Open Access** means publishing in a fully open-access journal on the publisher's platform. An Article Processing Charge (APC) must often be paid.
- **Hybrid Open Access** refers to a publishing model where subscription-based journals allow authors to make individual articles open access. An Article Processing Charge (APC) must be paid
- **Diamond Open Access** journals and platforms do not charge fees to either authors or readers.
- They are 'community-driven, academic-led, and academic-owned publishing initiatives'. Diamond Open Access, Plan S
- **Green Open Access** usually involves depositing the Accepted Manuscript in an Open Access repository. This is referred to as self-archiving.

As an author, you may be charged for OA publishing, in the form of an Article Processing Charge (APC).

You may be able to pay APCs from your research-funding budget. Or you may be able to access an institutional open access agreement. For example, the IReL consortium has negotiated open access agreements with publishers on behalf of its members. IReL open access agreements typically allow corresponding authors who are affiliated with an eligible Irish institution to publish open access immediately at no cost to them. Check the IReL website and your institutional library for the exact details of the publishers included, publications covered, eligibility criteria and which agreements have annual quotas.

Examples of Diamond Open Access journals

- ► Alphaville Journal of Film and Screen Media
- ► Scenario – A Journal for Performative Teaching, Learning, Research
- ► Open Library of Humanities Diamond OA Journals
- ► IOAP
- ► Beilstein Institute Journals

Green Open Access

When an author wants to publish in a journal, and they do not have funds to pay an Article Processing Charge to publish open access, they may have to publish behind a paywall. In this instance, the publisher usually requires authors to complete a Copyright Transfer Agreement (CTA) which assigns copyright to the publisher. As a result, the author is not allowed to immediately share and reuse the published version of their work. However, they can, as part of this agreement, share the accepted manuscript, usually after an embargo period, via their institutional repository. This is Green Open Access, also known as self-archiving, and it ensures that the publication (journal article, book chapter, conference paper) is eventually openly available, without payment of an APC.

The accepted version is the final version of the manuscript, after all peer-review revisions have been made, but before copy-editing, branding and layout have been applied by the publisher.

Rights Retention

Many funders require immediate open access to publications emanating from funded research. This means that publisher embargoes are not permitted. Rights retention can help authors to share their articles without embargo on an institutional repository or elsewhere. The author retains the copyright of the accepted manuscript by including a rights retention statement on the submission, for example. They can then deposit the accepted manuscript in a repository without embargo, under a Creative Commons licence. Please see the Licensing Your Work section on page 55 and Rights Retention section on page 57 for more information and guidance.

'Rights retention can help authors to share their articles without embargo'

Useful Resources for Open Access Publishing:

- ► Jisc's open policy finder contains journal policies for sharing accepted versions of manuscripts through institutional repositories.
- ► The Directory of Open Access Journals (DOAJ) is a unique and extensive index of diverse open access journals from around the world.
- ► The Directory of Open Access Books (DOAB) contains high-quality OA books and can also be used to find a trusted publisher.

Pre-prints

It is often possible to openly share a preliminary version of your article online. These preprints are “[academic] manuscripts that have not been peer-reviewed or published in a traditional publishing venue”. Read more in this article.

Sharing a preprint records your findings immediately and establishes priority. It can also lead to new collaborations and increased engagement with your work. Most journals allow you to submit your article when it has already been posted as a preprint but you should check author guidelines for your selected journal in advance of posting a pre-print. Jisc’s open policy finder contains journal policies for preprints. More detailed information on preprints can be found in this Practical Guide to Preprints.

There are alternatives to the traditional closed system of peer review (single-blind and double-blind models). Open peer review and post-publication peer review are possible options.

Open peer review platforms:

- HRB Open Research | Open Access Publishing Platform | Beyond a Research Journal
- Open Research Europe
- European Geosciences Union
- OpenReview
  medRxiv, bioRxiv and arXiv.
- Octopus | Built for Researchers

Post-publication peer review platforms:

- PubPeer
- Hypothes.is

Open Monographs

Monographs are a common way to publish research results in certain domains, such as Humanities and Law. Publishers often set high Book Processing Charges (BPCs) to make monographs open access, in order to compensate for lost sales. However, there are academic book publishers whose Book Processing Charges are reasonable or who follow a diamond model of publishing, which means they do not charge BPCs at all. Some publishers offer the option of paying to make individual book chapters open access. A good option is to send your book proposal to a university press. These are generally driven by scholars and library staff who can help you publish monographs and other academic content open access, without the need to make a large profit. The Directory of Open Access Books (DOAB) contains high-quality OA books and can also be used to find a trusted publisher.

Predatory Publishing

The drawback of APC-based publishing is that it has given rise to predatory publishers that are more interested in making money than in offering a sound peer-review process. When you consider publishing in an OA journal, always check if it is an authentic outlet for scholarly publishing.

The Directory of Open Access Journals (DOAJ) indexes quality OA journals. Some open access journals do not charge APCs, but some do. If this happens to be the case, make sure your funder or an IReL agreement can fund the APC before you submit your work. To check the trustworthiness of a journal, use the tool

THINK.
CHECK.
SUBMIT.

Sharing a preprint records your findings immediately and establishes priority



Getting started with open access publishing:

1. Check your funder's open access policy ☐
2. Check JISC Open Policy Finder or with the journal to find out if it is possible to publish OA in the journal of your choice ☐
3. Consider including a rights retention statement in your submitted version ☐
4. Check if the journal is covered by an institutional open access agreement ☐
5. If not covered by an open access agreement, make sure your funder, university, faculty or department can cover the cost ☐
6. Consider posting your work as a preprint. Check if your journal of choice allows preprints and if there are suitable preprint servers for your work ☐
7. In the case of an OA journal, check that it is listed in the DOAJ. If not, use the checklist on Think. Check. Submit. to find out if the journal is trustworthy ☐
8. Make sure your publication has a Creative Commons licence. For more information, see the Licensing Your Work section on page 26. ☐
9. Keep your author accepted manuscript ☐
10. Upload your publications to your university's repository. For help and more information, contact your University Library ☐

Notes

Section 4: Publishing and Sharing Data

As well as publishing open access, a key principle of Open Research is to make data 'as open as possible, as closed as necessary'. In practical terms, this means data should be widely disseminated, but there may be restrictions on access, for example, with sensitive data. Whether your data has access restrictions or not, it should be managed and stored in such a way that it is reusable, reproducible and ensures research integrity. Data sharing, reuse and reproducibility are enabled by data management, Open Data and the FAIR principles.

Also see Data Management and Reproducible Research page 19.

Why should you share your research data?

- There is a requirement from your institution or funder to share your data.
- It helps increase the visibility of your work and enables you to be cited more often.
- Recreating, collecting, or processing data is not possible or would be expensive.
- Sharing data allows reuse including comparative research or longitudinal studies.
- Research data financed with public funding should be accessible for reuse.
- Sharing your data enables reproducibility, transparency and research integrity.
- Sharing data can speed up advances and reduce duplication in research.

'It helps increase the visibility of your work and enables you to be cited more often.'



		What does this mean?	How can a researcher comply?
F	FINDABLE	Others can find your data	Provide metadata with your dataset and ensure the dataset has a persistent identifier (permanent link, e.g. DOI)
A	ACCESSIBLE	Your data are available to others (humans and machines)	Make data open if possible. If you cannot share the data for ethical/legal reasons, then provide relevant metadata and access information.
I	INTEROPERABLE	Your data can be integrated with other data, and read by humans and machines	Use common or open (non-proprietary) file formats
R	REUSABLE	Your data can be used by others	Document your data so that it is understandable and choose an appropriate licence

From: https://www.data.cam.ac.uk/data-management-guide/sharing-your-data

Open and FAIR Research Data

Data publishing and sharing as FAIR and Open Data is fast becoming embedded in research practice. It is vitally important to share and/or make your data and other outputs FAIR where possible. The extent and how you do that is dependent on your specific research context including your research area, funding and institution.

From: https://www.data.cam.ac.uk/data-management-guide/sharing-your-data

FAIR Data is not the same as Open Data

Accessible does not imply 'open for everyone'. This is why the FAIR principles include the provision 'As open as possible, as closed as necessary'. Some reasons why it might not be possible to share data openly or at all are:

- **personal data**: this is any information that relates to an identified or identifiable individual (name, address, identification number, but also biometric data, genetic data);
- **confidential data:** trade secrets, investigations, data protected by intellectual property rights
- **biological data**: such as endangered plant or animal species, where their survival is dependent on the protection of their location data
- **data subject** to a data sharing agreement, license or copyright

Choosing a Data Repository

To share your data as FAIR and/or Open data, it needs to be deposited in a data repository.

Disciplinary vs General Repositories

There are different types of repositories that serve different communities. You should aim to choose a repository frequently used by your peers and research community.

You can use an institutional repository, a disciplinary data archive, or a discipline-specific repository to preserve the data according to the recognised standards in your area of study. Alternatively, you can deposit your data in a catch-all repository such as Zenodo (CERN) or Open Science Framework, which accept data from across disciplines.

Examples of data repositories

Discipline Specific

- Irish Social Science Data Archive
- Irish Qualitative Data Archive
- Digital Repository of Ireland
- Pangea
- EMBL-EBI
- NOMAD
- OpenNeuro

Generalist Repositories

- Zenodo
- Harvard Dataverse
- The Open Science Framework (OSF)



Notes

Data Paper

You can also opt to publish your data in a Data Paper

A data paper is an 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. 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 repository;
- a detailed description (metadata) of the dataset (production context, authors, rights attached, etc.).

Useful resources for sharing data:

- ► Guide to Choosing a Data Repository | ARDC
- ► FAIRsharing Collaboration with DataCite and Publishers: Data Repository Selection, Criteria That Matter
- ► Open Data for Humanists: A Pragmatic Guide
- ► Sustainable and FAIR Data Sharing in the Humanities
- ► FAIR-Aware.
- ► ARX – Data Anonymization Tool
- ► Amnesia

Sharing Other Open Research Outputs

Open Research increasingly calls for a broader perspective on project outputs, moving beyond publications as the sole focus. It emphasises that we must consider and value other research outputs such as educational resources, software, protocols, data management plans, documentation, methods, websites and exhibitions, to name but a few.

Open Educational Resources

Open Educational Resources (OERs) produced during your project are also outputs that can be disseminated and published in a repository. Some examples of OERs are: MOOCs, open textbooks, slides, drawings, recordings, assignments, notes, digital resources and so on.

Software and Code

Whenever possible, it is good practice to share your software along with your data and code. There are tools and services available to store all current versions of your software (including your operating system and computing environment) for future use. Software can also be a research output in itself. The FAIR principles that were introduced earlier in the context of research data, also apply to sharing software.

Useful resources for sharing software:

- ► Publishing computational research - a review of infrastructures for reproducible and transparent scholarly communication
- ► Software Heritage

Getting started on sharing your data:

1. Develop a Data Management Plan that includes FAIR and Open data provisions (see page 23 for information on Data management Planning) ☐
2. Use the FAIR Aware tool to ensure your data is FAIR: FAIR-Aware (knaw.nl) ☐
3. Use these recommendations for your research software Five recommendations to make your research software FAIR ☐
4. Think about which repository you will use: Guide to Choosing a Data Repository | ARDC ☐
5. Make your research software available to others by use of a licence ☐
6. See page 55 for information on Choosing a Licence for research software ☐

Section 5: Licensing Your Work

Licensing Your Work

When you make your work open access, you are entitled to determine how your work is reused, and a licence can help you communicate that to potential re-users (which can include yourself in the future). You can use Creative Commons licences for most of your outputs, such as publications, research data, presentations and educational materials. When you reuse works which have Creative Commons licences, you can be confident you are not infringing the creator's rights.

Choosing a Licence for Publications

It is important to familiarise yourself with the different types of licenses when you are publishing to ensure that you do not restrict any future use you might want to make of an output, or inadvertently allow a future use that you did not intend. Be careful of the terms and conditions a publisher might impose on a publication too, as they can restrict reuse of different versions of a publication.

- ► Negotiating & signing a contract with a scholarly publisher
- ► About CC Licenses - Creative Commons

There are six different CC license types. From the perspective of Open Research, the recommended licence for OA publications is CC BY, the most liberal Creative Commons licence.



License designation	License name	What does this mean for you as an author?
CC BY 	**Attribution**	The most liberal of the CC licenses apart from CCO Public Domain Dedication. This licence allows others to distribute, remix. tweak. and build upon a work - also commercially - provided they credit the author for the original creation and clearly indicate that changes were made to the work, if any.
CC BY-SA 	**Attribution ShareAlike**	Similar to CC BY: however, others must licence new creations under identical terms. Therefore, all new works reusing (parts of) such work will need to carry the same licence and any derivatives will also allow commercial use
CC BY-ND 	**Attribution NoDerivatives**	This licence allows for redistribution, commercial and non-com- mercial, provided it is passed along unchanged and in whole, with credit to the author.
CC BY-NC 	**Attribution Non-Commercial**	With this licence others must not remix, tweak, or build upon the original work for commercial purposes. Although new works must also acknowledge the author and be non-commercial, reusers do not have to licence their derivative works on the same terms.
CC BY-NC-SA 	**Attribution Non-Commercial ShareAlike**	This licence lets others remix, tweak, and build upon the author's work non-commercially, provided they credit the author and licence their new creations under the identical terms.
CC BY-NC-ND 	**Attribution Non-Commercial NoDerivatives**	This is the most restrictive of the six licences, only allowing others to download works and share them with others as long as they credit the author, but they cannot change them in any way or use them commercially.

This table is reproduced from Pascal Braak et al., Guide to Creative Commons for Scholarly Publications and Educational Resources https://doi.org/10.5281/zenodo.13691572 with small alterations from Martin Paul Eve, Open Access and the Humanities: Contexts, Controversies and the Future (Cambridge: Cambridge University Press, 2014) http://dx.doi.org/10.1017/CBO9781316161012. Licensed under a CC BY license. Two columns have been merged and the text has been slightly changed.

For practical guidance, see this Guide to Creative Commons for Scholarly Publications and Educational Resources.

Rights retention

cOAlition S has a Rights Retention Strategy, that aims is to empower researchers funded by cOAlition S to retain control over their work. This strategy allows authors to publish in their journal of choice, including subscription journals, while retaining the right to self-archive the author's accepted manuscript of their papers immediately upon publication under a CC BY licence.

Rights Retention is recommended by Research Ireland and other Plan S funders. Grant holders are advised to include a rights retention statement on all submissions of original research to peer reviewed journals.

Choosing a licence for research data

You should also apply a licence to your research data. Some repositories require you to use a specific licence if you want to deposit your data with them. When you plan to reuse someone else's research data, remember that you can only use data when there is a licence or rights waiver attached. Remember that you are always expected to cite data properly, regardless of any licence.

Creative Commons licences can be used when publishing or sharing research data. If your research data is a database or a dataset (unstructured data that does not meet the database definition), the best option may be CC0. Be careful not to apply too restrictive a licence to your data, as this can have unintended consequences. For example, CC BY-ND can restrict reuse as this only allows for the output to be reproduced in full and not changed in any way. For more information about licensing your research data, visit the website of OpenAIRE.

The rights retention statement may be something like:

This publication has emanated from research conducted with the financial support of Research Ireland under Grant number [ ]. For the purpose of Open Access, the author has applied a CC BY public copyright license to any Author Accepted Manuscript version arising from this submission"

Research Ireland Interim Open Research Policy

Choosing a Licence for research software

Similar to publications and research data, when adding a licence to your software, it is best to use a commonly available license.

There are several websites that can help you choose a license specifically suitable for software:

- choosealicense.com: helps to choose an open-source license.
- tldrlegal.com: summarizes what is allowed and not allowed under a given license.

The 3 main rules of choosing a license are:

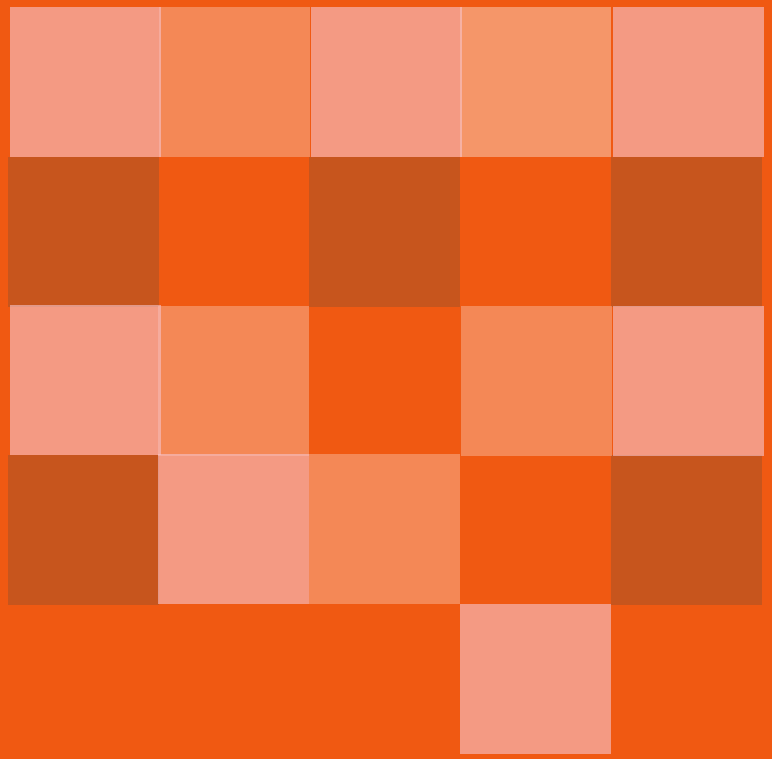
- You have to be the owner of the code or have the owners' approval. Otherwise, you are not authorised to license it.
- Choose a common license. People know those and understand what they mean. Nobody will spend hours on your license to figure out what it means.
- Do not ever modify a license text. A modified license is a new license which means lawyers, time and money.

Getting started on licensing your work:

1. Check if your institution or funder has any licensing requirements ☐
2. Familiarise yourself with Creative Commons licences ☐
3. Use the Creative Commons License Chooser ☐
4. When sharing or publishing any data or software, think about which license would be appropriate and assign it to your work ☐

Notes

Section 6: Communicating your Research



Communicating your Research

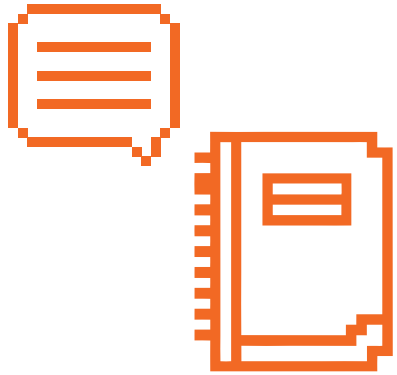
The ultimate goal of Open Research is to increase the scientific and societal impact of research. Communicating your research can help to achieve this goal. Both UKRI and Research Ireland define impact as the *"demonstrable contribution that excellent research makes to society and the economy".*

Types of impact specified by Research Ireland include:

- Economic
- Societal
- International engagement
- Policy & public service
- Health and wellbeing
- Environmental
- Professional services
- Human capacity

Publishing in scientific journals and books has traditionally been the default for communicating with your academic peers. But in many cases, research is also of interest to others outside academia, such as policymakers, clinicians, practitioners, teachers, industry, or citizens. Sometimes alternative outputs are more effective at reaching and engaging these stakeholders. Open Research is therefore also about diversity in the formats of research outputs, such as blog posts, podcasts, videos, newsletter articles, and public speaking in front of non-academic audiences.

'demonstrable contribution that excellent research makes to society and the economy'.



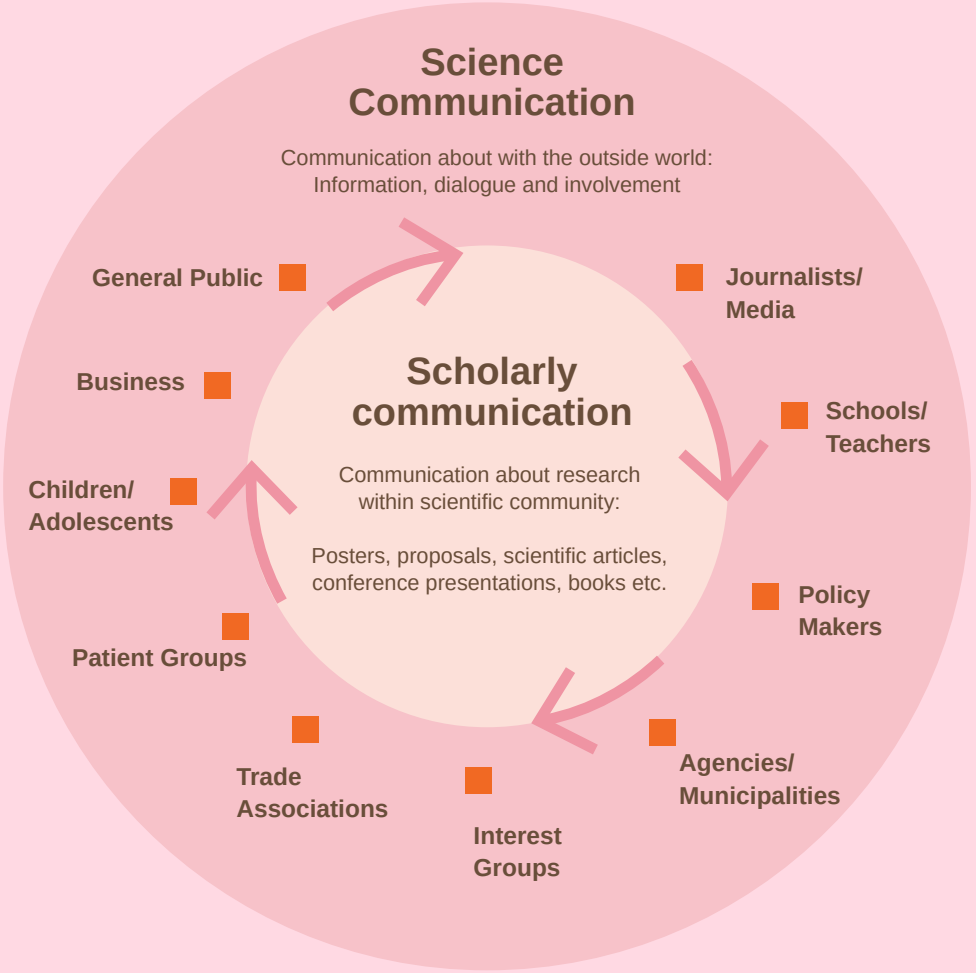


Illustration: Lotta W Tomasson/VA CC BY-NC 2.0

Effective research communication

Key Considerations

- Start planning for research impact early by identifying potential beneficiaries, setting clear goals, and engaging stakeholders.
- Discuss your communication strategies with your academic mentor and supervisor to ensure alignment with your research goals.
- Create a communication plan that defines objectives, maps target audiences, outlines communication strategies and regularly updates them.
- Use the correct university affiliation and email address in all communications.
- Use your ORCID and other academic profiles to ensure your research outputs are correctly attributed and easily discoverable.
- Always acknowledge all funders and all contributors to your research
- Engage with institutional services and supports, such as from the Library for research support, data support, and central marketing and communications, to help with public engagement and communications.
- Consider establishing and maintaining an online presence through personal websites, social media accounts, and academic social networks.
- Look for examples of how peers in your field have successfully made an impact and communicated their findings.
- To reach wider audiences, explore blogs, social media, video abstracts, and public engagement events.
- Consider using alternative mediums such as visual and multimedia elements like infographics, data visualisations, and videos.
- Make your research outputs accessible and reusable through open publications, open data, open notebooks, and similar approaches.

ORCID
ORCID (Open Researcher and Contributor ID) offers a unique and persistent identifier (PID) for individuals to engage in research. ORCID is free of charge to all participants. The PID is a 16-digit number that links your profile to all your research. It also allows trusted organisations to add research information to your ORCID record to facilitate your profile management. ORCID for Researchers.

Useful resources to support dissemination and outreach:

- ► HSE Knowledge Translation, Dissemination, and Impact A Practical Guide for Researchers: Communicating research Findings
- ► IUA Engaged Research & Innovation for Societal Impact How-to-Guides and Training
- ► SFI Impact Webinar
- ► TCD Researcher Impact Framework: Building Audience-Focused Evidence-Based Impact Narratives
- ► UCD Promote your Research
- ► UCD Research Impact Toolkit
- ► Open Research Across Disciplines (Discipline specific examples)

Getting started on communicating your findings:

1. Create and maintain your ORCID profile. Add your outputs and broader activities to your ORCID profile and other research profiles ☐
2. Identify potential audiences and wider stakeholders ☐
3. Write plain language summaries of your research and share them openly ☐
4. Communicate your findings and resources in formats which are appropriate and accessible ☐
5. Keep a record of any Open Research practices and activities you can use to help showcase your impact ☐
6. Utilise professional communications staff, commercialisation/ engagement officers, and impact officers within your institution ☐
7. Attend communications training ☐
8. Submit to RTE Brainstorm or The Conversation ☐
9. Consider Science Communication opportunities such as Pint of Science and 3 Minute Thesis ☐

Notes

Next Steps...

Congratulations! You made it to the end of this guide to Navigating Open Research. We hope that by now, you are ready to put Open Research into practice.

Here is a list of Open Research practices that you can implement, starting today:

- Think of the end users of your research in society. How can you reach them? Can you engage with them early in the process of your research?
- Consider using existing data in your (next) study; it may save you time and is very rewarding for the Open Science enthusiasts who shared this data.
- Specify your hypotheses and study design in a preregistration.
- Write a Data Management Plan (DMP) to describe how you intend to handle your research data during and after your research project.
- Share your articles prior to publication as preprints.
- Submit your articles to Open Access journals registered in the Directory of Open Access Journals (DOAJ).
- Deposit your publications in the Institutional Repository of your university.
- Manage and share your research data and software according to the FAIR principles.
- Submit your research data to a trustworthy repository, but remember: as open as possible, as closed as necessary.
- Use Creative Commons licences when publishing any outputs.

How Open Research can benefit your career

Open Research can help your career development by providing you with tools and skills to support the transparency, reproducibility, dissemination and transfer of new knowledge. By increasing the potential for broader awareness and uptake of your research, you can build wider networks and achieve greater research impact within and beyond the academic community.

Traditionally, publishing in prestigious scientific journals with high Impact Factors, and securing a large citation count, were perceived as the indicators of research quality and impact. But it is increasingly accepted that a broad range of impact measures should be used to evaluate research, including qualitative, narrative indicators of research impact.

The value and impact of all research outputs should also be taken into account, including other publication venues (books, monographs), the reuse of your data, scripts and software.

This has been recognised by universities and research funders. For this reason, a narrative approach to research assessment, in addition to quantitative metrics, is becoming more popular, both for career advancement within universities and for assessment of grant applications.

Narrative CVs

A narrative CV can be an opportunity to demonstrate your proven track record in Open Research practices. In a narrative CV, researchers use a series of structured paragraphs to outline a concise overview of their contributions to the field of knowledge, research area and society as a whole. The objective of a narrative CV is to focus on key achievements and impacts.

Useful resources for narrative CVs

- ► Guidance for Applicants on the SFI Narrative CV
- ► HRB Narrative-like CV
- ► Royal Society's Résumé for Researchers
- ► UKRI's Résumé Resources Library: support for adopting narrative CVs

Access a digital copy of this document with live links by scanning the QR code:

Navigating Open Research: A Guide for Early Career Researchers

► https://doi.org/10.33178/10468/17586

Join the Movement

Join your local Open Research Community. Open Research Communities are local hubs of people interested in Open Research. Here, you can learn from your colleagues how to put Open Research into practice and have some fun while you're at it!

Open Research Communities

- ►Sonraí Irish Data Stewards Network
- ►Research Data Alliance
- ►Irish Reproducibility Network

Some resources to help you on your way:

- ►UKRI Open Research across Disciplines
- ►FOSTER Open Science: A portal providing online training on open science
- ►FORRT Glossary of terms relating to open scholarship
- ►Critical Data Studies

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