

A brief guide to the international research landscape – a toolkit for researchers

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Part 1 - Global journal publishing

Scientific and academic research is becoming increasingly global. The publishing of research papers and data has become increasingly digitised, making it easier to collaborate and share research across borders. For authors, this means more opportunities to become better known, and interact and contribute to the global community. There are also hundreds of free tools and platforms available to help.

However, there are also challenges and dangers, which is why it's important to understand how research publishing works around the world. This guide will hopefully shed light on the important aspects to understand – some of which may seem obvious, such as peer review and accessing online research. Other aspects may not seem so obvious, like DOIs, copyright and business models, but these are important concepts for an ambitious early career researcher to understand, so that he/she can navigate the ever-changing global landscape.

A global overview of journal publishing

There are estimated to be well over 35,000 active academic journals in the world today, a number which continues to grow along with the growth of the global research community. The digital revolution means that academic journals are increasingly easier to access, and also increasingly looking for research from around the globe.

To understand journal publishing it's useful to know who the publishers of the journals are. Most of the 'big' academic publishers are based in the USA and Europe – this is where the majority of the 'traditional' 'high impact' journals are hosted.

Most of these journals are subscription 'paywalled' journals, but over the last decade there has been a move to '**Open Access**' (see below). There are also many new publishers and new initiatives, with innovative business models, open platforms and open peer review. And, of course, journal publishing isn't just confined to the USA and Europe; there has been a big growth in research publishing elsewhere in the world, in Asia, Africa and Latin America. Unfortunately, there has also been a growth in fake, disreputable, or so-called 'predatory' journals, which we shall learn about later. But for now, let's focus on the reputable journal publishers.

There are lots of different types of publishers, from large commercial publishers, society publishers, regional publishing platforms, small university publishers and presses, and most recently the rise of the 'mega journal'.

Journal publishers in the USA and Europe (approx. number of journals): • Springer Nature (3000) • Elsevier (2500) • Wiley Blackwell (2388) • Taylor & Francis (2105) • De Gruyter (950) • Sage Publishing (750+) • Wolters Kluwer (incl. Medknow) (672) • Oxford University Press (362) • Cambridge University Press (380) • Biomed Central (part of Springer Nature) (326) • Emerald (290) • Hindawi (260) • Brill (300+) • MDPI (189) • Thieme (140) • IOS Press (100) • BMJ Publishing Group (60) • Frontiers (62)	Large Society publishers: • American Chemical Society 60+ • IEEE (US) 50+ • Royal Society of Chemistry (UK) 44 • Institute of Physics (UK) 60+ • Institution of Civil Engineers (US) (37) • The Institution of Engineering and Technology (UK) (30) 'Mega journals' and new Open Access initiatives (all free to read) • Plos One • Scientific Reports (Nature) • BMJ Open • Peer J • F1000 Research • Wellcome Open Research • ScienceOpen • Rio (Research Ideas and Outcomes) • The Winnower • Royal Society Open Science • IEEE Access
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Regional initiatives: (Almost all Open Access) Central and Latin America • SciELO – Latin America (& South Africa) 1249 • Redalyc – Latin America 1079 • Central American Journals Online (CAMJOL) 43 Africa • African Journals Online 513 (40% OA) • AAS Open Research (Africa) • AOSIS (South Africa) 38 • Bioline (various developing countries) 36 • Ethiopian Journals Online 22 • Algerian Scientist Journal Platform (ASJP) 384 • IMIST MSJ (Morocco) 100 Middle East: • Directory of Free Arabic Journals (DFAJ) (Arabic language) 250+ • Iraqi Academic Scientific Journals 257 • Iran Scientific Information Database 170	South Asia • Pakmedinet (Pakistan) 79 • India Academy of Sciences 13 • Publishing India (subscription) 43 • IndMed (India) 69 • Sri Lanka Journals Online (76) • Bangladesh Journals Online (142) • Nepal Journals Online (125) South East Asia • Vietnam Journals Online 78 • Philippines e-Journals 166 • Philippines Journals Online 43 • ThaiJO (Thailand) 395 • ISJD (Indonesian scientific journal database) 14,478 • Garuda (Indonesia) 5132 East Asia: • Hanspub (China) 160 • China Open Access Journals (COAJ) 600+ • J-Stage (Japan) 2600+ • KOAJ (Korea) 950 • KoreaScience (Korea) 470 • Science Central (Korea) 220 • KoreaMed 250 • Mongolian Journals Online 5
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Tip: Identifying relevant Open Access journals in your field is a great way to keep up to date with news and developments – as well as the latest research, they may contain news, opinions and editorials of interest. See also ‘International societies and associations’

The importance of peer review

Scholarly peer review is the examination of an author’s work by suitable experts in the relevant field. It is an essential stage of publishing a paper in the journal, and for many early career researchers it is the most frustrating and time-consuming

“Peer review may have its limitations, but it is also a remarkable process which relies on the trust and co-operation of the scientific community and acts as a quality control ensuring that published research is valid, significant and original. The process is essential for the dissemination and advancement of scientific knowledge. Without peer review, how would we weigh up claims and know what to believe?”

From Sense About Science’s ‘Peer review: The Nuts and Bolts’ <http://senseaboutscience.org/activities/peer-review-the-nuts-and-bolts/>

Important notes about peer review

- Sometimes peer review can take a long time (studies suggest around [100 days](#) on average for medical papers, longer for social science) and there can be more than one 'round' of peer review.
- You should be suspicious of journals offering a very quick turnaround (such as a few days or weeks).
- Peer review can take place via email, but the most reputable journals use online systems such as Scholastica, ScholarOne, Open Journal Systems or other secure platforms.
- Peer review comments can be very critical – you should not take the criticism personally. (See [“Dealing with Peer Review”](#) and [“Peer review: What to remember when reading reviewers’ critiques”](#))
- You may be asked to significantly change or completely re-write your article.
- Research has shown that international journals (based in the USA and Europe) can sometimes be biased against researchers in Africa and Asia.
- Sometimes journals can reject your paper without peer-reviewing it – this is called 'desk rejection'. Always check the scope and subject of the journal to make sure your paper is appropriate. You can also ask the editor for a recommendation on a more suitable journal.
- Some authors are tempted to submit to several journals at a time, but this is considered extremely unethical.

Different types of peer review

- Single Blind – The names of the reviewers are hidden from the author (most common).
- Double blind – Both the reviewer and the author are anonymous.
- Open – Reviewers and authors can see each other's names. Some journals also publish the peer reviews online (examples – BMJ Open and F1000).

Questions reviewers ask

This list is taken from Sense About Science's 'Peer review: The Nuts and Bolts', which is an excellent guide to peer review for authors. <http://senseaboutscience.org/activities/peer-review-the-nuts-and-bolts/>

“Aside from assessing the title, abstract, English language of the article and references, reviewers assess the scientific quality of the work.

- Does the paper fit the standards and scope of the journal it is being considered for?
- Is the research question clear?
- Was the approach appropriate?
- Is the study design, methods and analysis appropriate to the question being studied?
- Is the study innovative or original?
- Does the study challenge existing paradigms or add to existing knowledge?
- Does it develop novel concepts?
- Does it matter?
- Are the methods described clearly enough for other researchers to replicate?
- Are the methods of statistical analysis and level of significance appropriate?
- Could presentation of the results be improved and do they answer the question?
- If humans, human tissues or animals are involved, was ethics approval gained and was the study ethical?
- Are the conclusions appropriate?”

What does a peer review look like?

A typical peer review will have detailed, constructive comments and an overall recommendation.

Comments might be structured with headings like this: Merits This is a good paper with interesting results which is a valuable addition to the literature ... Critique There are problems with the methods section – the methodology needs to be properly explained with ... Additional comments for author The author should consider rewriting the introduction and methods, and adding ...	<table><tr><th colspan="2">Revision Recommendations</th></tr><tr><td>Question:</td><td>Accept</td></tr><tr><td>Data:</td><td>Minor</td></tr><tr><td>Methods:</td><td>Major</td></tr><tr><td>Inference:</td><td>Minor</td></tr><tr><td>Writing:</td><td>Minor</td></tr></table>	Revision Recommendations		Question:	Accept	Data:	Minor	Methods:	Major	Inference:	Minor	Writing:	Minor
Revision Recommendations													
Question:	Accept												
Data:	Minor												
Methods:	Major												
Inference:	Minor												
Writing:	Minor												

Examples of good, detailed peer reviews:

- <https://www.peerageofscience.org/review/review-examples/>

Example structure from a social science peer review

Overview:

- Does the manuscript contain new and significant information to justify publication? Y/N
- Does the Abstract (Summary) clearly and accurately describe the content of the article? Y/N
- Is adequate reference made to other work in the field? Y/N
- Is the language acceptable? Y/N
- Accept / minor revision / major revision / reject.

Structure of peer review comments (for detailed comments)

- Is the article well-argued and structured? Are the conclusions supported by the argument and the information presented here?
- Is the subject of this article of interest to our core readership?
- What are the main strengths and weaknesses of the article?
- Do you recommend any changes to the article?

(From *Learned Publishing*)

More information on what makes a good peer review:

<https://editorresources.taylorandfrancisgroup.com/reviewers-guidelines-and-best-practice/>

Also see the COPE (Committee On Publication Ethics) Ethical Guidelines for Peer Reviewers:

https://publicationethics.org/files/Ethical_Guidelines_For_Peer_Reviewers_2.pdf

Indexing and impact factors

Many researchers aim to publish in journals with a 'high impact factor' to gain prestige or promotion points, but there is a lot of confusion about what 'impact factor' is, and some journals misleadingly use 'impact factors' which are false.

The impact factor of a journal is the number of citations received in that year, of articles published in that journal during the two preceding years, divided by the total number of articles published in that journal during the two preceding years.

Journals with high impact factors are therefore considered to be important within their field. However:

- Most legitimate journals around the world do not have an impact factor at all (see below).
- Impact factors vary considerably between fields because of different citation practices – for example, biology journals generally have the highest impact factors (approx. 4+) whilst social science and humanities are much lower (1 or less)
- The impact factor of a journal should be compared to other journals within the same subject category.
- Impact factors are not intended to assess the quality of individual articles.



The only internationally recognised impact factor is recorded and maintained by Clarivate (formerly Thomson Reuters). In order to be eligible for an impact factor, a journal **must** be indexed in Clarivate's Web of Science (also sometimes referred to as 'ISI Web of Knowledge' or 'Journal Citation Reports'(JCR)). You

can check if the journal is indexed in the Web of Science by searching for the name in the Clarivate Master Journal List: <http://mjl.clarivate.com/>. There are approximately 12,000 journals indexed, and the selection criteria are very strict.

[If the journal is not indexed by the Web of Science, then it does not have an impact factor.](#)

Fake or poor-quality 'impact factors'

- Scientific Journal Impact Factor (SJIF)
- Global Impact Factor (GIF)
- Cosmos Impact Factor
- Universal Impact Factor

Other important indexes and metrics:

Scopus®

Scopus is a journal index owned by Elsevier and is generally thought to be a good indicator of a high-quality, credible journal. You can search to check if journals are indexed via this link:

<http://www.scimagojr.com/journalsearch.php>

Scopus also has a rival metric to the Impact Factor, called 'Scopus Cite Factor' which can be found here <https://journalmetrics.scopus.com/>.



Lots of medical journals claim to be indexed in PubMed. You can check the database here:
<https://www.ncbi.nlm.nih.gov/nlmcatalog/>.

Lots of journals are catalogued in PubMed, but not all have passed the quality criteria for indexation, so make sure the information page clearly says "**In:** PubMed" or "**In:** Index medicus" or "**In:** MEDLINE". The best journals will probably have all three (MEDLINE uses the most stringent indexing criteria). Journals that have *not* been officially catalogued will show as: "Collection Status: Not in the NLM Collection".



DOAJ provides a listing of Open Access Journals that have passed its basic entry criteria. It was criticised several years ago for allowing very low quality and 'predatory' journals into the index, but has since re-assessed and removed many journals. Journals that have been re-assessed and are credible have a green tick. Journals that follow best practice have also been awarded a gold seal. <https://doaj.org/search>

Google Scholar indexing

It is very easy to get a journal indexed in Google Scholar, so this shouldn't be seen as a sign of journal credibility. However, some journals mention their Google Scholar H5-index rating. This is similar to an 'impact factor' and is calculated according to the number of citations the journal receives. This may be useful for assessing how popular the journal is. See here for the list of top journals by H5-index:
https://scholar.google.co.uk/citations?view_op=top_venues&hl=en.

Individual and article-level metrics

The **H-Index** is a metric for individual researchers which aims to measure productivity and citation impact. Google Scholar is a good source for this information as it calculates the figure automatically for authors. For example, this researcher has a H-index of 3:
<https://scholar.google.co.uk/citations?user=yVRjrEsAAAAJ&hl=en>.

For more information see the Wikipedia entry on H-Index: <https://en.wikipedia.org/wiki/H-index>.

Altmetrics

Altmetrics is a relatively new term used for article-level metrics that record more than just citations. This utilises digital technology and the interconnectedness of data on the internet to count mentions on social media, blogs, news pages, reference software, Wikipedia and policy documents.

Various organisations and publishers provide these metrics alongside the article. Here is an example:



Researchers can use free tools to calculate the altmetrics of their own research:
<https://www.altmetric.com/products/free-tools/>.

Predatory journals and conferences

'Predatory' journals are an increasingly common problem in the global publishing landscape. This term is used to describe commercial companies who have created fake or very low-quality journals that have poor or non-existent peer review. This is done in order to profit from inexperienced researchers who are willing to pay a fee to get published quickly.

The cost of publishing in these journals is relatively low but doing so may lead to your research never being read or discredited, and may even damage your reputation as a researcher.

What can you do to avoid these journals?

1. **Familiarise yourself with what a good journal looks like.** Follow the references and recommended reading in good articles. Have you done any literature reviews for your research? Go back and check out the journals that were mentioned – these are the journals you should be targeting. Visit their journal homepages to get an idea of their scope and style.
2. **Be suspicious of email invites,** unless you recognise the sender. Visit their website and find out more about the journal.
3. **Check that the indexing status or impact factor is real.**
4. **Be critical of 'international' or 'global' journals** – real 'international' journals will have an impressive editorial board – check their website and their credentials.
5. **Read the 'aims and scope' or 'about' page of the journal:** Does the scope of the journal fit with your research? Be extra careful about journals with a very broad scope. Does the journal seem professional and understand your topic?
6. **Are any credible scholarly organisations involved in publishing the journal?** Find out who the publisher of the journal is:
 - a. Are they a scholarly or scientific organisation?
 - b. Are they a commercial publisher? If so, do they have a link with a scholarly or scientific society? How can you be sure their primary aim is the advancement of science and not a quick profit?

For a more more information see the Think.Check.Submit website: www.thinkchecksubmit.org, the AuthorAID 'beginner's guide to predatory journals' or read this guide by the World Association of Medical Editors: <http://www.wame.org/identifying-predatory-or-pseudo-journals>.

Do I use "Beall's List?"

US Librarian Jeffrey Beall's 'List of potential, possible, or probable predatory publishers' was considered to be a useful source of information on deceptive publishing, but was closed and taken offline in January 2017 due to legal action.

The website is now archived and maintained anonymously at <https://beallslist.weebly.com/>, but it is not believed to be updated on a regular basis. It may be useful to identify some major deceptive publishers, but it should probably not be relied on as an exhaustive resource.

'Predatory' conferences

This is a term used to describe very low quality events set up to make a profit from early career researchers who need to attend an 'international' conference. However, they provide very little value and are poorly attended. The advice for how to spot and avoid these events is similar to 'predatory' journals. Always critically examine their website:

- Look at the programme – does it look interesting? Are the speakers good?

- Is there a report of the previous conference – did it look good? (It's always good to see photos of large groups of people.)
- Identify who the organiser of the event is – see if they have their own webpage. If they are organising multiple events in the same location on the same day this is a **red flag**.
- Have your colleagues heard of this conference? Have they previously been to it?
- Is there a link with a credible scholarly organisation, institution or society, either international or local to the event?

For more information and a longer checklist, see this [AuthorAID](#) blog, or the [Think.Check.Attend](#) website

Part 2 – Open Access and business models in publishing

Accessing the research you need

Accessing quality research is one of the biggest challenges for researchers in developing countries. Often, international publications are hidden behind a paywall, which is expensive to access. Here are some other tips on accessing research literature:

- **Ask your librarian** or check your nearest library. Often, researchers are not aware that their library has access to subscription journal content (often via [INASP](#) or [EIFL](#)) – your librarian may be able to direct you to the correct website, or you may need to be on-campus to access content.
- The **Research4Life** initiative provides free access to many developing countries (check the [HINARI lists here](#)) in health, agriculture, environment and innovation. See <http://www.research4life.org/> and also check with your library to see if you already have access.
- **Ask the author!** Look for the corresponding email address on the abstract and simply email the author. Authors may be willing and happy to hear of interest in their research.
- **Look for Green Open Access or archived copies** – try social networking sites like [Researchgate](#). Or you can search Open Access repositories through the [OpenDOAR](#) website. You can also try [oadoi.org](#) and the [unpaywall.org](#) browser plugin which automatically searches for available free versions of the paper you are looking at.
- **Check pre-print databases** – these are academic papers that are self-archived by the authors either before peer review, or final peer-reviewed copies that are not yet published. Check out servers like [arXiv.org](#), [SSRN.com](#), [PsyArXiv.org](#), or search across multiple servers via <https://osf.io/preprints/>
- Make sure you have searched the **Open Access** literature – [DOAJ.org](#) is a good start. Google Scholar often finds free-access versions, as does [Pubmed](#). Also check commercial publisher websites, for example [T&F Open](#), [Springer Open](#), [Elsevier Open Access](#), and megajournals like [The Public Library of Science \(PLOS\)](#), [Nature Scientific Reports](#) and [F1000](#). Also, don't forget to check more local research literature. [African Journals Online](#) has over 500 African journals that are free to access.

For more information, see the AuthorAID website: <http://www.authoraid.info/en/news/details/1178/>.

Business models in journal publishing

Researchers need to understand the basics of publishing business models as they affect both their access to research literature and their ability to publish in the different types of academic journals.



Subscription journals (paywalled)

This is the most common publishing model and considered the 'traditional' way of publishing. Journals are only available to subscribers – usually purchased via university libraries and accessed through the institution.

Who can access?

Only members of institutions or libraries who have paid subscription fees.

Who pays for publication?

Journals and publishers rely on income from library subscriptions.

What about authors?

It is usually free for authors to submit articles to these journals. There may be some page charges or colour printing charges for some journals.



Open Access journals

Open Access journals are free to read for everyone.

Who can access?

Everybody can access open access literature. Furthermore, open licences (such as Creative Commons) [logo] can allow sharing, copying and reworking the content.

Who pays for publication?

Some journals charge an **Article Processing Charge (APC)** to publish in the journal which the author must pay. This is known as **Gold** Open Access. This charge can vary from \$10 in small journals to \$3000 in 'high-impact' international journals.

Many Open Access journals **DO NOT** charge a fee and are completely free to publish. This is sometimes referred to as '**Diamond**' or '**Platinum**' Open Access). The cost of publishing is covered by an institution or society.

Tip: It's a common myth that authors have to pay to publish their papers in a journal. This is not necessarily true – there are many different options if you 'shop around', even if you want to publish in a Open Access journal.

* There are also so-called '**Hybrid**' journals These are regular 'subscription' journals that provide an open access option so that authors can choose to make their individual paper open access. This is common for US/Europe publishers and, therefore, the APC is usually high.

Most Open Access principles are based on the 2002 Budapest Declaration. Read more here:

<http://www.budapestopenaccessinitiative.org/read>

Article Processing Charges - waivers

Because Article Processing Charges (APCs) can be quite expensive, many publishers offer 'waivers' for authors in developing countries. This can either be a discount or a waiver of the entire fee, depending on which country you are based in. The criteria are based on the [HINARI list of countries](#). For more information, see '[How do I find a suitable journal and how can I afford the publishing fees?](#)'.

Understanding the two main types of Open Access: Gold and Green

As we've already mentioned, **Gold Open Access** is when an author publishes a paper in an Open Access or Hybrid journal, sometimes paying an Article Processing Charge. The paper will usually be published under a Creative Commons Licence (e.g. CC-BY).

Green Open Access is when the author 'self-archives'. This is done in order to share the research findings before the journal issue is published, or share research that would otherwise be hidden behind a paywall (in a subscription journal).

This is completely legal, but there may be certain conditions that must be followed, depending on the journal or publisher.

Green Open Access – How can I make my research open access for free?

If you are unable to share your research due to paywalls or because your research has not been published yet, there are still ways of making your research Open Access to everyone. It is estimated that 70% of subscription journals allow some kind of **self-archiving**. You may be able to:

- Publicly archive the **final paper** in an institutional repository, a subject-based repository, your own personal website, or an 'e-print' server. However, sometimes it cannot be made public for a set period of time (6 to 24 months). This is called an 'embargo period'.
- Publicly archive a 'pre-print' version of the article on an e-print server **before** it has undergone peer review and been published.
- Publicly archive a 'post-print' version of the article, **after** it has undergone peer-review, but **before** it has been published.

The [SHERPA/Romeo website](#) allows you to search a database of publisher policies and will tell you exactly what you are allowed to do to make your work public.

Repositories

Many universities and research institutes have their own Institutional Repository. Check the <http://www.opendoar.org/> website for a full searchable list of IRs.

There are also hundreds of subject-specific repositories which provide a space for you to archive your paper. See the comprehensive Wikipedia list: https://en.wikipedia.org/wiki/Disciplinary_repository.

'e-Print' servers

'e-print' servers also provide a place to archive papers, most commonly for 'pre-prints' – papers that have not been peer-reviewed or published, but that the author wants to make public and shareable. These include arXiv (physics and mathematics), bioRxiv (biological sciences), SSRN (Social Science Research Network) and many more. There are even servers for African research ([AfricArXiv](#)), Arabic-

language research ([ArabiXiv](#)) and French-language research ([FrenXiv](#)). You can also search for over 2 million pre-prints on the [Center For Open Science database](#).



(graphic by Bianca Kramer)

See also: <http://fossilsandshit.com/infographic-make-100-research-open-access-free/>

Part 3 - Understanding digital permissions and tools

Author copyright and licensing

When you publish an article with a journal, you will be required to either transfer copyright or give the journal the right to publish. You may have to complete one of these forms:

Copyright transfer Copyright is transferred to the publisher or journal, and they now have rights over the work. This is standard for subscription journals as the publisher uses copyright to protect their income. You should check the small print, as some contracts give you limited rights to use and share your own work – for example, would you like to share your article with colleagues, or copy and use it in an educational context? Before you sign over your copyright: check your author rights	Licence to publish This is common for Open Access journals. This will usually give the publisher the right to publish your work in their journal (usually with a Creative Commons licence). You retain copyright of the work and can use, share and republish elsewhere, but you should always refer to where the work was published first. Check the licence terms of your paper are you happy with it? Are you happy for it to be reused, adapted, or even used for commercial purposes?
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Creative Commons Licences

Creative Commons licences are a type of licence which makes it simple for the reader to understand what they are allowed to do with the content. They are used for all types of creative works where the author wants

to allow users flexibility to use, share and adapt their work – they are common for open access literature and open researcher data.

The traditional copyright statement is '**All Rights Reserved**'. This is quite restrictive, and means that readers must ask permission to copy, share, or adapt beyond 'fair use'.

Creative Commons licences are different – they are used when the author wants to **allow more freedom** to build on their research. For example, open licences can lead to papers being shared more widely, being used for teaching, and open for 'data mining', whereby computer programmes can analyse and map research across hundreds and thousands of papers and datasets.

The different types of Creative Commons licences

LICENSES	TERMS
	 Attribution BY Others can copy, distribute, display, perform and remix your work if they credit your name as requested by you
	
	 No Derivative Works ND Others can only copy, distribute, display or perform verbatim copies of your work
	 Share Alike SA Others can distribute your work only under a license identical to the one you have chosen for your work
	
	 Non-Commercial NC Others can copy, distribute, display, perform or remix your work but for non-commercial purposes only.

It is standard practice for Open Access journals to publish research papers under a Creative Commons Licence and for the author to retain copyright. A copyright statement on a research paper might look like this:

(c) 2018 Smith and Jones. Published by African Journal of Epidemiology. This article is published under the Creative Commons CC BY Licence (<https://creativecommons.org/licenses/by/4.0/>). This licence permits use, distribution and reproduction in any medium, provided the original work is properly cited.

For more information, please see this free book 'Open Content - A Practical Guide to Using Creative Commons Licences' https://meta.wikimedia.org/wiki/Open_Content_-_A_Practical_Guide_to_Using_Creative_Commons_Licences

What are DOIs?

Digital Object Identifiers (DOIs) are an increasingly important part of digital publishing and should be used to cite or link to articles wherever possible. A DOI is a string of code that acts as a dynamic link to a research object (article, datasets, books, conference papers). If the content moves to a new website, the publisher will update the CrossRef metadata with this information. This means that when a reader clicks on the DOI, they will always be taken to the content, wherever it is.

How do I get a DOI?

Journals and publishers purchase DOIs on behalf of the author, from an organisation called CrossRef. The DOI is then assigned to the article or research object, and usually included as a hyperlink on the first page or in the metadata.

What does a DOI look like?

DOIs are sometimes written as a code, but it is best practice to use the full hyperlink with the address <http://doi.org/> in front of it:

As a number:

DOI: 10.5944/openpraxis.9.1.476

DOI: 10.1037/rmh0000008

DOI: 10.2105/AJPH.2009.160184

As a hyperlink:

<http://doi.org/10.5944/openpraxis.9.1.476>

<http://doi.org/10.1037/rmh0000008>

<http://doi.org/10.2105/AJPH.2009.160184>

It is also good practice to use DOIs in referencing, or in your CV. For example:

Herbst, D. M., Griffith, N. R., & Slama, K. M. (2014). Rodeo cowboys: Conforming to masculine norms and help-seeking behaviors for depression. *Journal of Rural Mental Health*, 38, 20–35.
<http://doi.org/10.1037/rmh0000008>

You can search for DOIs on the [CrossRef website](#). The more researchers who include DOIs in their reference list, the easier it is for CrossRef and other organisations to track citations and provide metrics on impact.

What is an ORCID ID?



ORCID is a unique ID number used to identify researchers and record research outputs associated with individuals. Often, authors can have similar names, or their names can appear differently in different places. Having an ORCID ID can help publishers, funders and service providers quickly identify and record author outputs and impact.

An ORCID ID has 16 digits and is usually shared as a hyperlink like this:

<https://orcid.org/0000-000X-XXXX-XXXX>.

Many journals and funders are now making it mandatory to have an ORCID ID when submitting papers and proposals.

It is totally free to create and maintain an ORCID account. It is also a useful way to create a public profile which lists your institution, education and a list of your publications and other outputs. If you publish your research with a DOI, publications are automatically added to your profile.

<https://orcid.org/register>

Digital tools and platforms for researchers

Research practices have changed rapidly during the past decade. There are a multitude of new tools and platforms for researchers at all stages of the research process. Most of these tools are totally free to use, if you know where to look. These are just a few of the free tools available:

Impact and sharing	Grow Kudos , Impact Story , Altmetrics , Twitter
Academic profile building	ORCID , Google Scholar , Academia.edu , ResearchGate , LinkedIn
Data sharing	Figshare , Dryad , Open Science Framework
Authoring and collaboration	Overleaf , Authorea , Hypothes.is , Paperhive , Google Docs
Referencing	Zotero , Mendeley
Finding journals	JournalGuide , JANE (Journal/Author Name Estimator) , Open Science Database Google Scholar , DOAJ , Dimensions
Peer review	Publons
Content discovery	OpenDOAR unPaywall , DOAJ , Google Scholar , OSF Preprints
Writing	Grammarly (partially free), Penelope
Methodology and reporting	www.protocols.io , Equator Network
Data analysis	R Studio , Orange , Open Office , Libre Office

Open Science and data sharing

Open Science is a movement to make all scientific data and research open and democratic.

“Open Science is about extending the principles of openness to the whole research cycle, fostering sharing and collaboration as early as possible thus entailing a systemic change to the way science and research is done...”

[Gema Bueno de la Fuente, FOSTER Open Science](#)

Open Science covers a wide range of activities:

1. **Open data and data sharing**
2. **Open research practices and collaboration.** Includes open collaboration via tools such as Google Docs, Overleaf, Authorea, and ‘open notebook’ - openness in sharing research development, protocols and notes.
3. **Open access publishing (Green and Gold OA)**
4. **Citizen science** – involves actively involving citizens with a meaningful role and recognition in a research project
5. **Open pedagogy** - Open Educational Resources and Open Educational Practices
6. **Open source software**

Open data sharing

More and more journals are asking authors for their data when they submit to the journal (either to upload or provide links to publicly available data sets). Many funders also require data to be made openly available on publication. Data repositories such as Figshare, Dryad, and other subject-specific repositories exist for researchers to upload and link to their datasets – for example see [The Nature ‘Recommended Data Repositories’ page](#). Most journals allow you to publish datasets before publication - this can allow you to showcase your initial findings before anybody else, increase visibility of research, and lead to more citations

What if I get ‘scooped’?

Some researchers are wary about openly sharing their data, worried that other researchers might use their data to publish research before them and get the credit and glory. However, many data repositories provide a DOI when you deposit the data, so the original researcher should be credited and cited if the data is used, just like with a research paper in a journal. **Here are some reasons for open data sharing, from the Nature Jobs Blog:**

“How you will benefit from openly sharing data:

- Gain the credit you deserve for all your research work
- Increase the ability of editors, reviewers and researchers to understand your research
- Improve the veracity, robustness and reproducibility of your results
- Open up new opportunities for collaboration
- Increase you and your research’s visibility and discoverability
- Potentially improve the citation rate of your published research articles

Two actions to help ensure you best openly share your data:

- Incorporate open data sharing as standard practice in your research cycle
- Deposit data in a repository that provides DOI minting or other persistent identifiers”

From Nature Jobs Blog <http://blogs.nature.com/naturejobs/2017/06/19/ask-not-what-you-can-do-for-open-data-ask-what-open-data-can-do-for-you/>

More information on open data

- It is important to use the correct data standards. The [FAIR principles](#) should be followed make data **Findable, Accessible, Interoperable, and Re-usable**.
- [FAIRsharing](#) is a resource to find data repositories relevant to your subject area
- [The Open Science Framework](#) is a platform for open data sharing and collaboration
- The concept of research reproducibility is at the heart of open data. [This guide to reproducibility](#) has many tools and resources
- The [Open Science Manifesto](#) has more information on Open Science principles.

Part 4 - Useful organisations, networks and databases

National research and education networks

NRENs are specialised internet service providers who support the needs of research and education communities within a country. They promote access to global educational resources and facilitate interaction at both national and regional levels among higher education and research institutions. Many NRENs have also involved in data infrastructure and management, and can assist researchers with data challenges in some circumstances. Find out more about your local NREN:

Major NRENs in Africa and South Asia	
Africa • WACREN - West and Central African Research and Education Network • GARNET - Ghana • NgREN - Nigeria • ENREN - Egypt • SudREN - Sudan • SomaliREN - Somalia • UbuntuNet Alliance for Research and Education Networking - the Alliance of NRENs of East and Southern Africa • EthERNET - Ethiopia • KENET - Kenya	• MAREN - Malawi • RENU - Uganda • RwEdNet - Rwanda • TENET/SANReN - South Africa • TERNET - Tanzania • ZAMREN - Zambia South Asia • BDREN - Bangladesh • ERNET - India • NKN - India • NREN - Nepal • PERN - Pakistan • LEARN - Sri Lanka

For more, see the [Wikipedia page on National Research and Education Networks](#)

Academic support networks - organisations and NGOs

There are many international organisations and NGOs providing support to academics, ranging from free resources and access, training, Networking and subject-specific advice. Some useful organisations are listed below

AuthorAID www.authoraid.info Eifl (Electronic Information for Libraries) www.eifl.net Equator Network www.equator-network.org CoDATA (Committee on Data of the International Council for Science) www.codata.org Global Health Network https://tghn.org/ Global Young Academy https://globalyoungacademy.net/ Healthcare Information for All www.hifa.org	Mendeley network https://www.mendeley.com/research-network/community MedicineAfrica http://medicineafrica.com/ OWSD (Organisation for Women in Science in the Developing World) www.owsd.net Scholars at Risk Network https://www.scholarsatrisk.org/ ResearchGate https://www.researchgate.net/ Research4Life http://www.research4life.org/
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INASP www.inasp.info Indepth Network http://www.indepth-network.org/ International Health Policies http://www.internationalhealthpolicies.org/	TWAS (The World Academy of Sciences for the advancement of science in developing countries) https://twas.org/ Wessex Global Health Network http://www.wessexghnetwork.org.uk/
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Academic support organisations in Africa

- **The African Institute for Mathematical Sciences (AIMS)** - a pan-African network of centres of excellence for postgraduate education, research and outreach in mathematical sciences. <https://www.aims.ac.za/>
- **African Academy of Sciences** a pan African organisation which aims to drive sustainable development in Africa through science technology and innovation. <http://aasciences.ac.ke/>
- **The Partnership for Africa's Next Generation of Academics (PANGeA)**, a network consisting of eight leading African universities focused on strengthening and advancing doctoral training and scholarship in the arts, humanities and social sciences on the continent. <http://www0.sun.ac.za/pangeaonline/>
- **CODESRIA** - The Council for the Development of Social Science Research in Africa. <http://www.codesria.org/>
- **Next Einstein Forum** - a platform that connects science, society and policy in Africa and the rest of the world – with the goal to leverage science for human development globally. <http://nef.org/>
- **African Virtual University** a Pan African Intergovernmental Organization with the mandate of significantly increasing access to quality higher education and training through the innovative use of information communication technologies. <http://www.avu.org>
- **Association of African Universities** – mission is to enhance the quality and relevance of higher education in Africa and strengthen its contribution to Africa's development. <https://www.aau.org/>
- **Africa Evidence Network** - a community of people who work in Africa and have an interest in evidence, its production and use in decision-making <http://www.africaevidencenetwork.org/>

International associations and societies

- Societies and associations can be a great source of information and resources, and a way of keeping up to date with research, opportunities and events.
- Search on Google for organisations in your subject area. Sometimes they offer discounted or free membership for developing country researchers
- Many provide regular free newsletter, even for non-members
- You should also follow these organisations on Facebook and Twitter

Here are some examples:

Education

- American Educational Research Association <http://www.aera.net/>
- American Association of Physics Teachers <http://www.aapt.org/>

- The Association for Science Education <https://www.ase.org.uk/home/>
- Teachers of English to Speakers of Other Languages, <http://www.tesol.org/>
- World Council of Comparative Education Societies (WCCES) <http://wcces-online.org/>

Life Sciences / Health

- National Academy of Medicine <https://nam.edu/>
- Biochemical Society <https://www.biochemistry.org/>
- British Medical Association <https://www.bma.org.uk/>
- Royal Pharmaceutical Society <https://www.rpharms.com/>
- Royal Society of Medicine <https://www.rsm.ac.uk/>
- Council on Health Research for Development (COHRED), <http://www.cohred.org/>
- Royal Society of Tropical Medicine and Hygiene <https://rstmh.org/>
- American Society of Tropical Medicine and Hygiene (ASTMH), <http://www.astmh.org/>
- Federation of European Microbiological Societies <https://fems-microbiology.org/>
- Special Programme for Research and Training in Tropical Diseases (TDR) www.who.int/tdr/
- Universities Allied for Essential Medicines (UAEM) <https://uaem.org/>
- Global Fund <https://www.theglobalfund.org/>
- Friends of the Global Fund Europe www.afmeurope.org/en/

General

- Royal Society <https://royalsociety.org/>
- American Association for the Advancement of Science <https://www.aaas.org/>
- National Academy of Sciences www.nasonline.org/
- The International Development Association (IDA) <http://ida.worldbank.org/>
- International Council for Science (ICSU) <https://www.icsu.org/>

Social Science

- Academy of Social Sciences <http://www.nasonline.org/>
- British Academy of Management <https://www.bam.ac.uk/>
- Social Research Association <http://the-sra.org.uk/>
- Academy of Management (AOM) <http://aom.org/>
- International Social Science Council www.worldsocialscience.org/
- Royal Economic Society www.res.org.uk/
- International Economic Association: IEA www.iea-world.org/
- Business & Economics Society International www.besiweb.com/
- American Economic Association <https://www.aeaweb.org/>
- London School of Economics and Political Science <http://blogs.lse.ac.uk/our-blogs/>

Agriculture

- International Association of Agricultural Economists <http://www.iaae-agecon.org/>
- Tropical Agriculture Association www.taa.org.uk/
- The International Institute of Tropical Agriculture (IITA) <http://www.iita.org/>
- The Royal Agricultural Society of the Commonwealth: The RASC <https://www.therasc.com/>
- Agricultural Economics Society <http://www.aes.ac.uk/>
- Forum for Agricultural Research in Africa (FARA) <http://faraafrica.org/>
- CGIAR <http://www.cgiar.org/>

Other

- American Statistical Association <http://www.amstat.org/>

- British Ecological Society <https://www.britishecologicalsociety.org/>
- Ecological Society of America <https://www.esa.org/esa/>
- Chatham House - International Affairs Think Tank <https://www.chathamhouse.org/>
- Regional Studies Association <http://www.regionalstudies.org/>
- Royal Academy of Engineering <https://www.raeng.org.uk/>
- Royal Statistical Society <https://www.rss.org.uk/>

Research Databases and data sources

There is a wealth of research data in various databases around the world – much of it publicly available. Here are a few examples of where to look:

- Global Partnership for Sustainable Development Data www.data4sdgs.org/
- The Lens - Free & Open Patent and Scholarly Search <https://www.lens.org/>
- World Bank Data Catalogue <https://datacatalog.worldbank.org/>
- Global South eHealth Observatory <https://www.odess.io/home.html>
- OECD iLibrary <https://www.oecd-ilibrary.org/>
- Flowminder: <http://www.flowminder.org/>
- Worldpop: <http://www.worldpop.org.uk/>
- University of Connecticut Research Database Locator: <http://rdl.lib.uconn.edu/byTitle.php>
- Listing of Open Access Databases (LOADB): <http://www.loadb.org/>
- Research4Life programme:
 - **AGORA** - Access to Global Online Research in Agriculture <http://www.fao.org/agora/en/>
 - **HINARI** - Access to Research for Health programme <http://www.who.int/hinari/en/>
 - **OARE** - Online Access to Research in the Environment <http://web.unep.org/oare/>
 - **ARDI** - Access to Research for Development and Innovation <http://www.wipo.int/ardi/en/>

African databases:

- OpenAFRICA: <https://africaopendata.org/>
- African Development Bank Statistical Data Portal <http://dataportal.opendataforafrica.org/>
- Directory of Data Repositories in Africa (DODRIA) <https://researchdatadirectoryonafrica.com/>
- FAO Agricultural databases <http://www.fao.org/statistics/databases/en/>
- African Education Research Database <https://essa-africa.org/AERD>
- Africa Health Atlas <http://africahealthmap.opendataforafrica.org/>

Offline databases:

- TEEAL (The Essential Electronic Agricultural Library) <https://teeal.org/>
- eGranary Digital Library <https://www.widernet.org/eGranary/>
- **Wiki Project Med Foundation** <http://medbox.iib.me/home/>
- See also the [Wikipedia list of academic databases and search engines](#)

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