

Lecture 1

An Overview of Scientific Writing

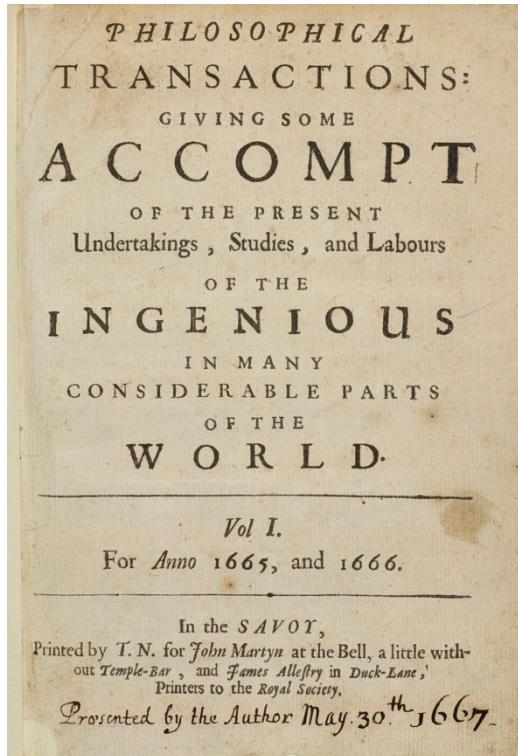
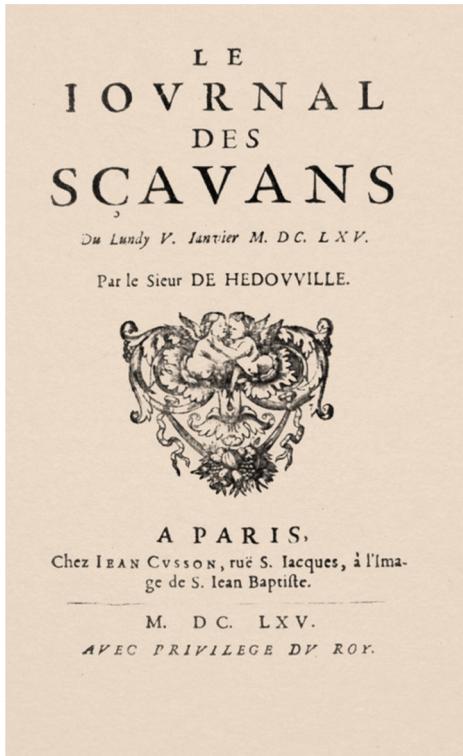
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September 14, 2023

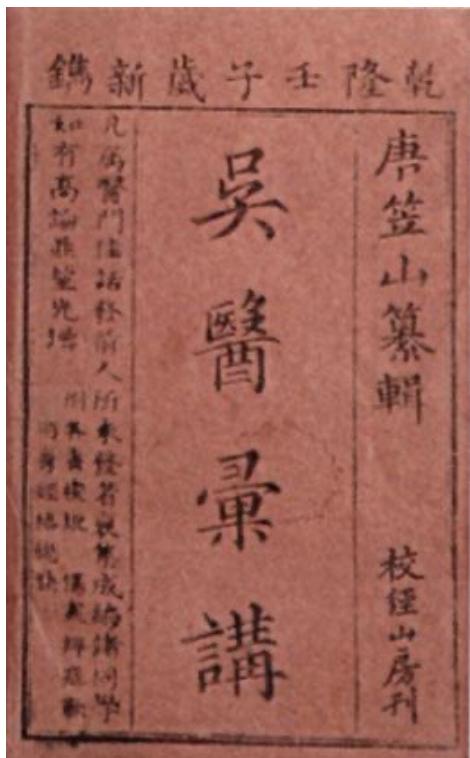
History of scientific publishing

- First scientific journal:
 - Journal des Scavans, January 5, 1665
 - Philosophical Transaction of the Royal Society, March 6, 1665

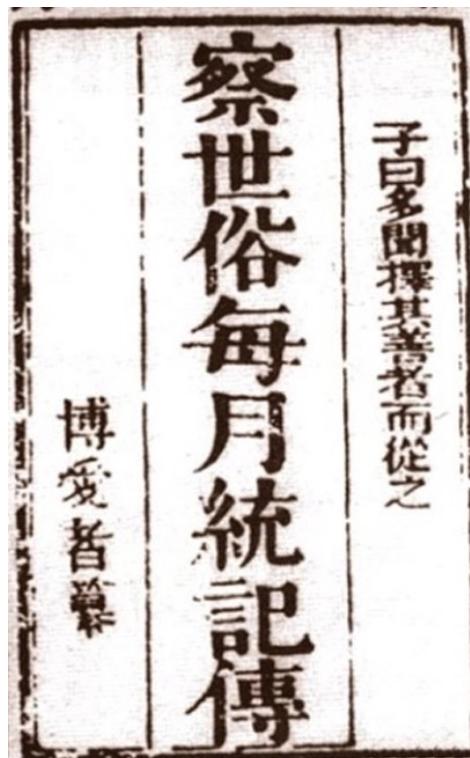


History of scientific publishing

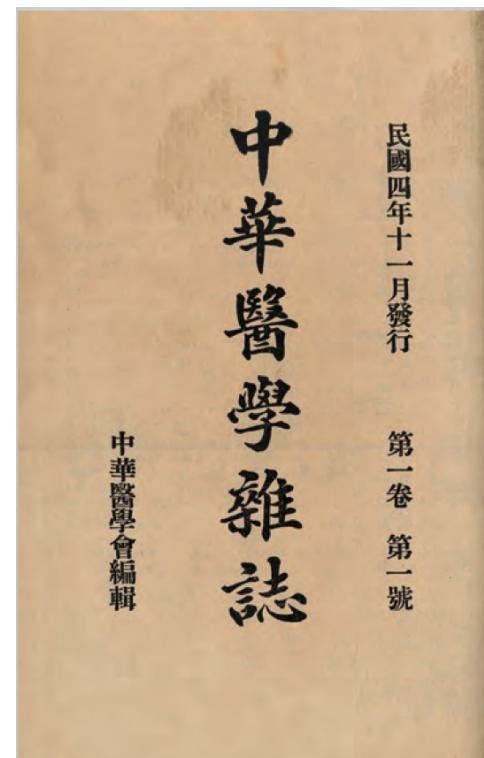
- The National Medical Journal of China is often considered the first scientific journal in China, but there are different opinions.



1792



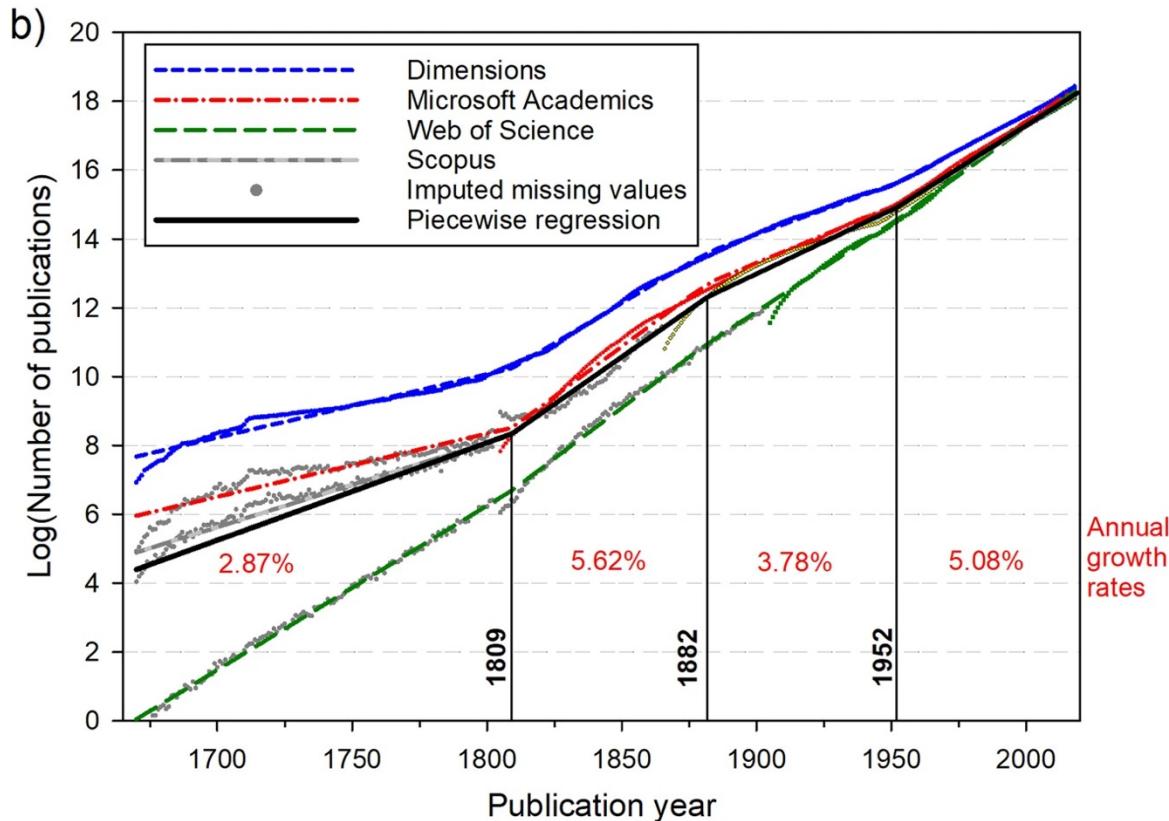
1885



1915

History of scientific publishing

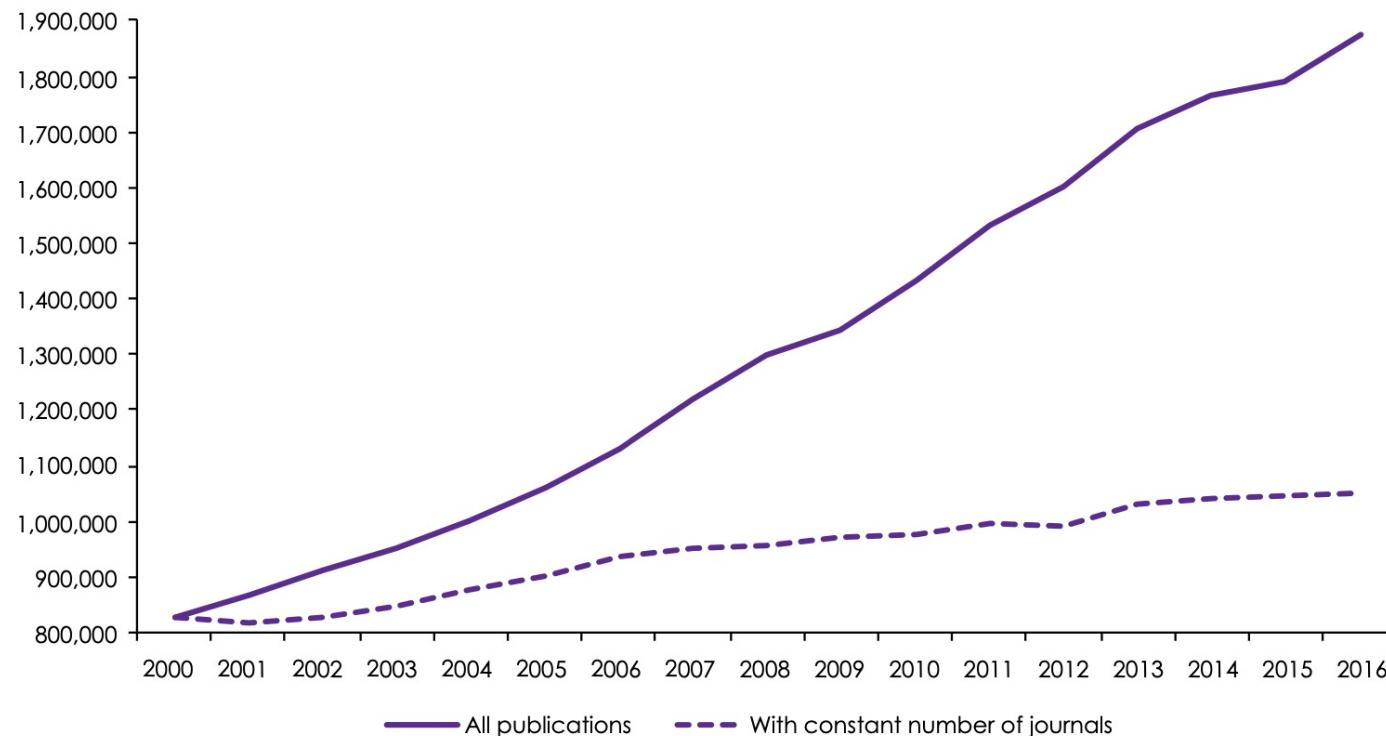
- Number of publications grows exponentially over time;
- Growth rates differ at separate historical epochs.



(Bornnman et al. 2021, Humanities and Social Science Communications)

History of scientific publishing

- Growth in total scientific publication is driven by increase in both the number of journals and the number of publication per journal.

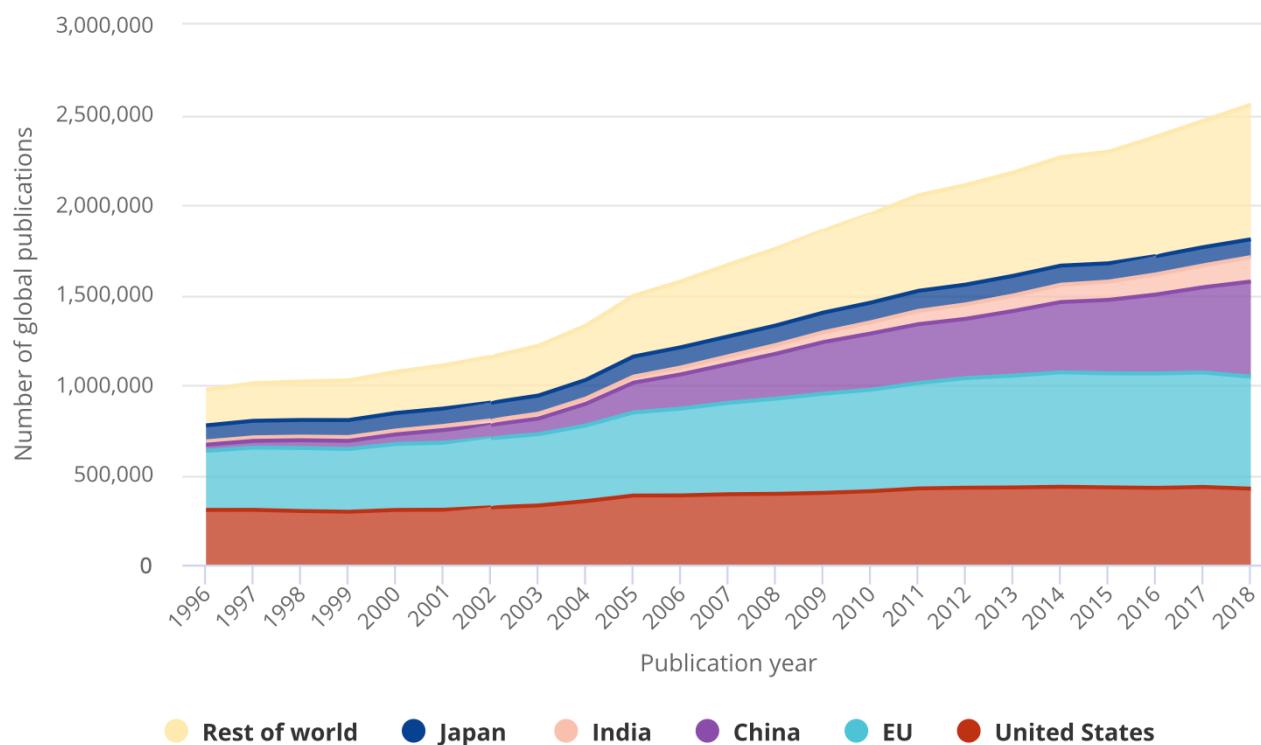


(Science and Technology Observatory 2019, Dynamics of scientific production in the world, in Europe and in France, 2000-2016)

History of scientific publishing

- China produced 5% global scientific output in science and engineering field in 2000 and grew to 21% in 2018.

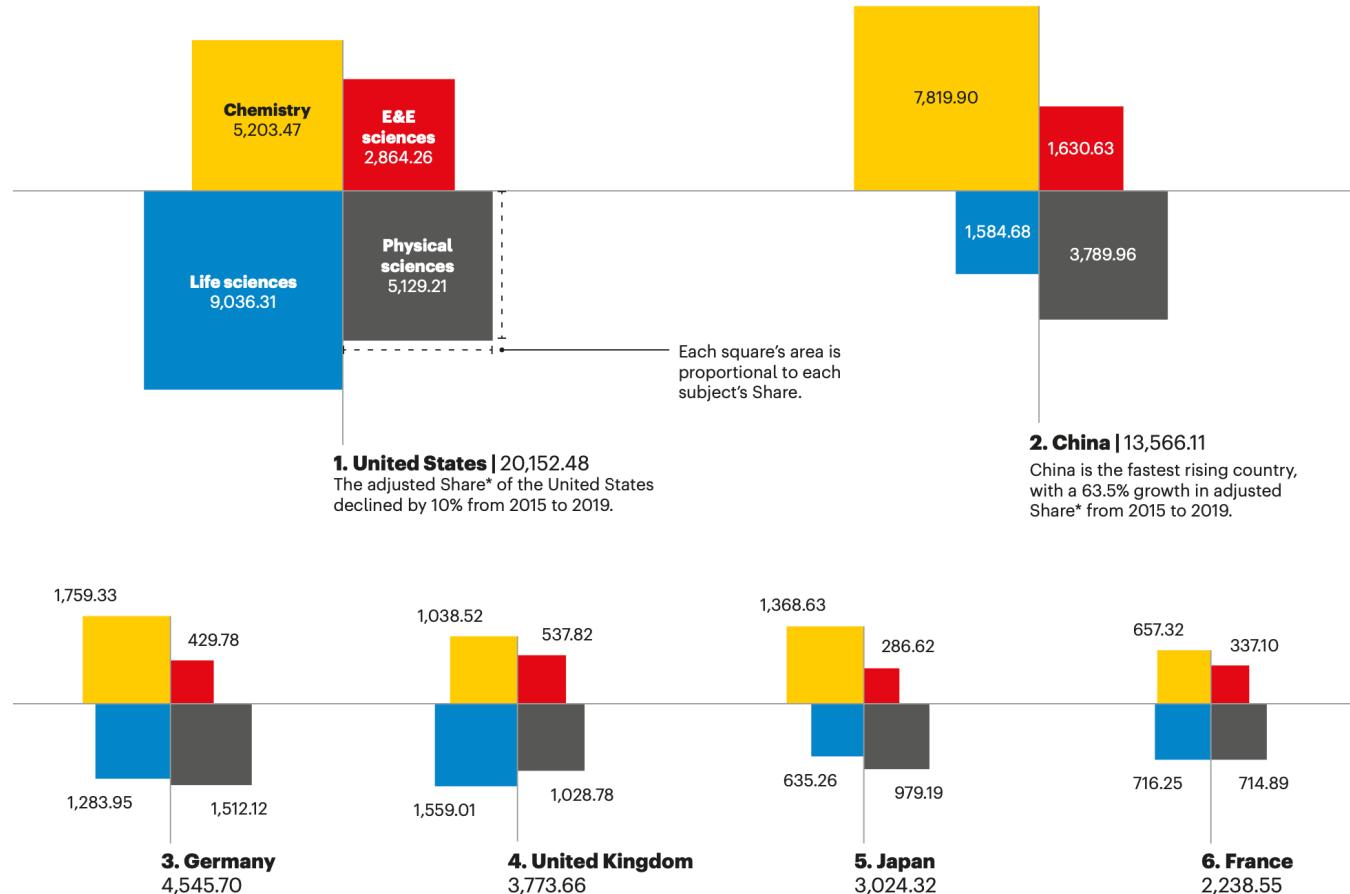
S&E articles in all fields, for selected regions, countries, and economies and rest of world: 1996–2018



(National Science Board 2019, Publication Output: U.S. Trends and International Comparisons)

Subject strength in publishing

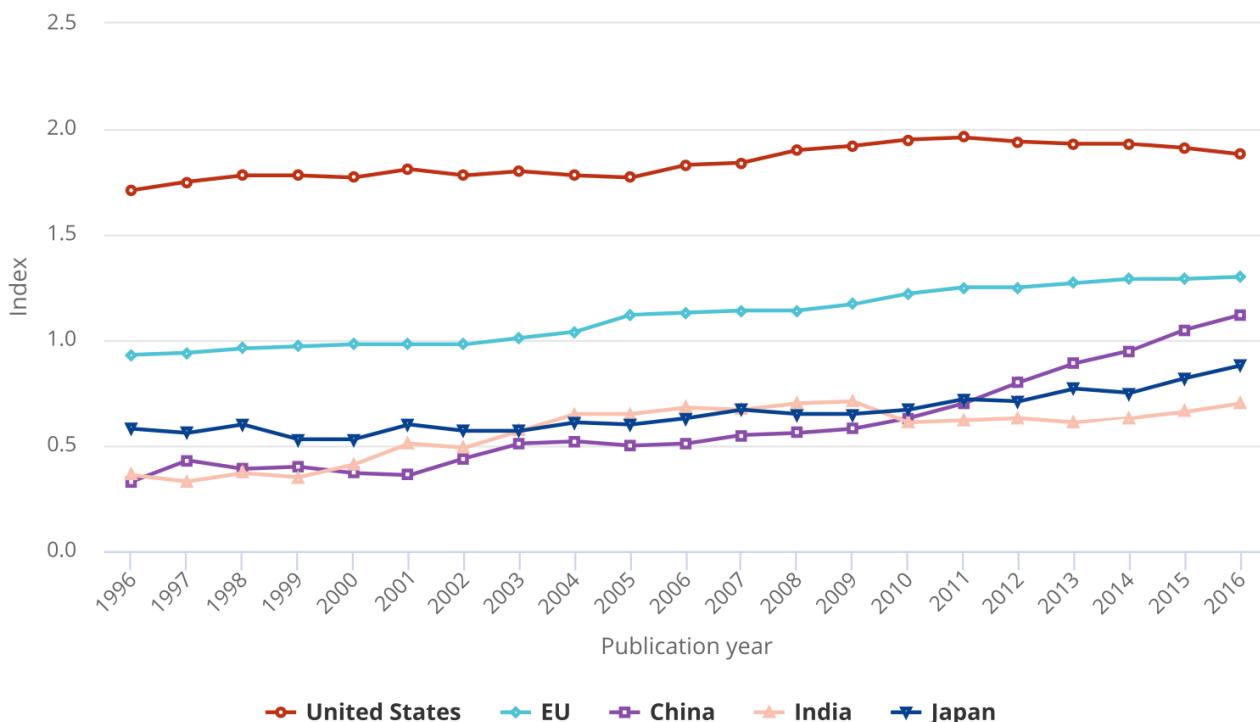
- Countries differ in their subject strength in publishing.



(Nature Index 2020 Annual Table)

Output in top cited publications

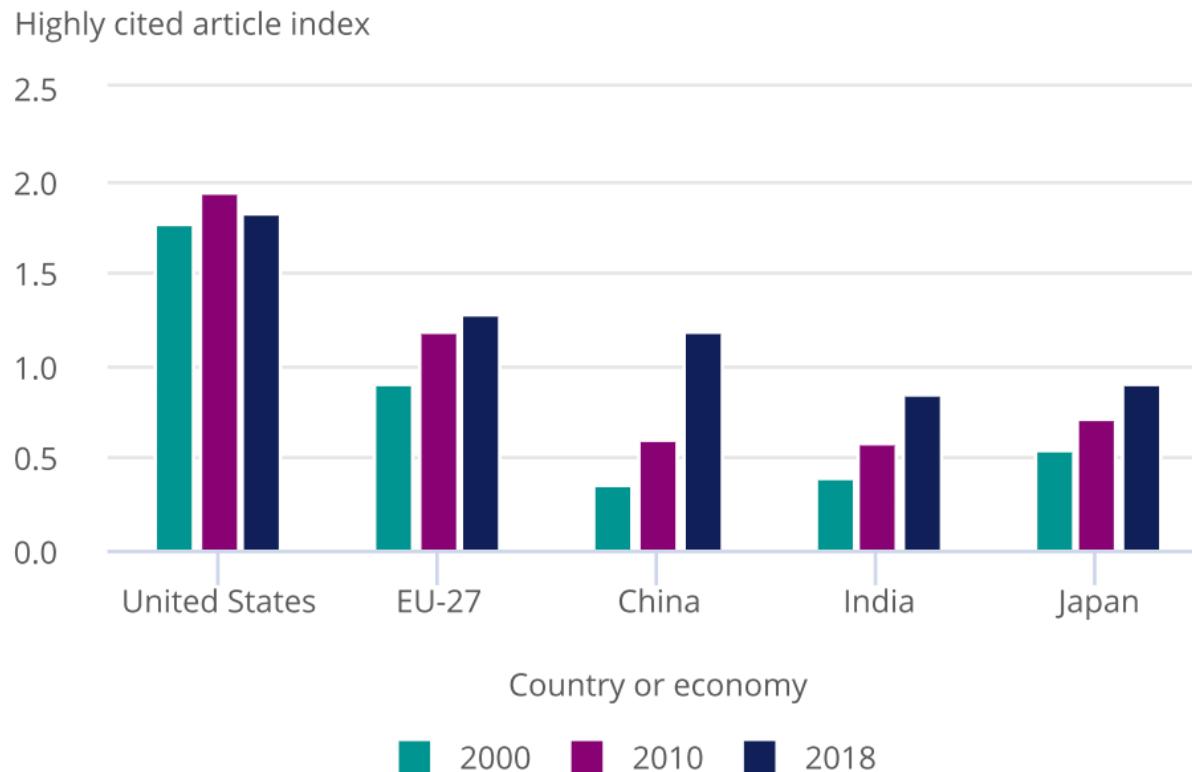
- Output in top 1% cited publications by country.
- Index is calculated as the share in top publications divided by share in total publication.



(National Science Board 2019, Publication Output: U.S. Trends and International Comparisons)

Output in top cited publications

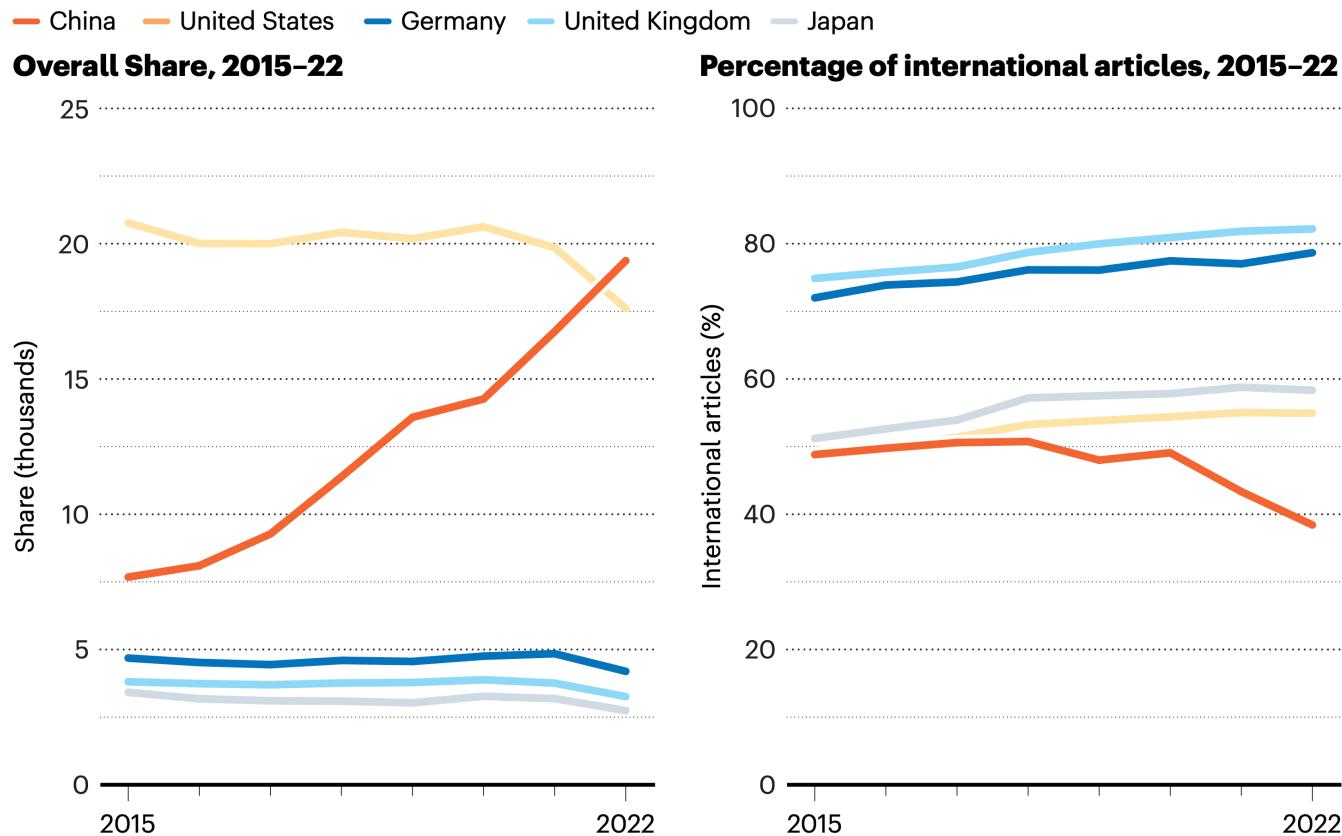
- Share of scientific output in the top 1% cited publications by country changes over time.



(National Science Board 2022, Science and Engineering Indicators
2022: The State of U.S. Science and Engineering)

Output in Nature Index journals

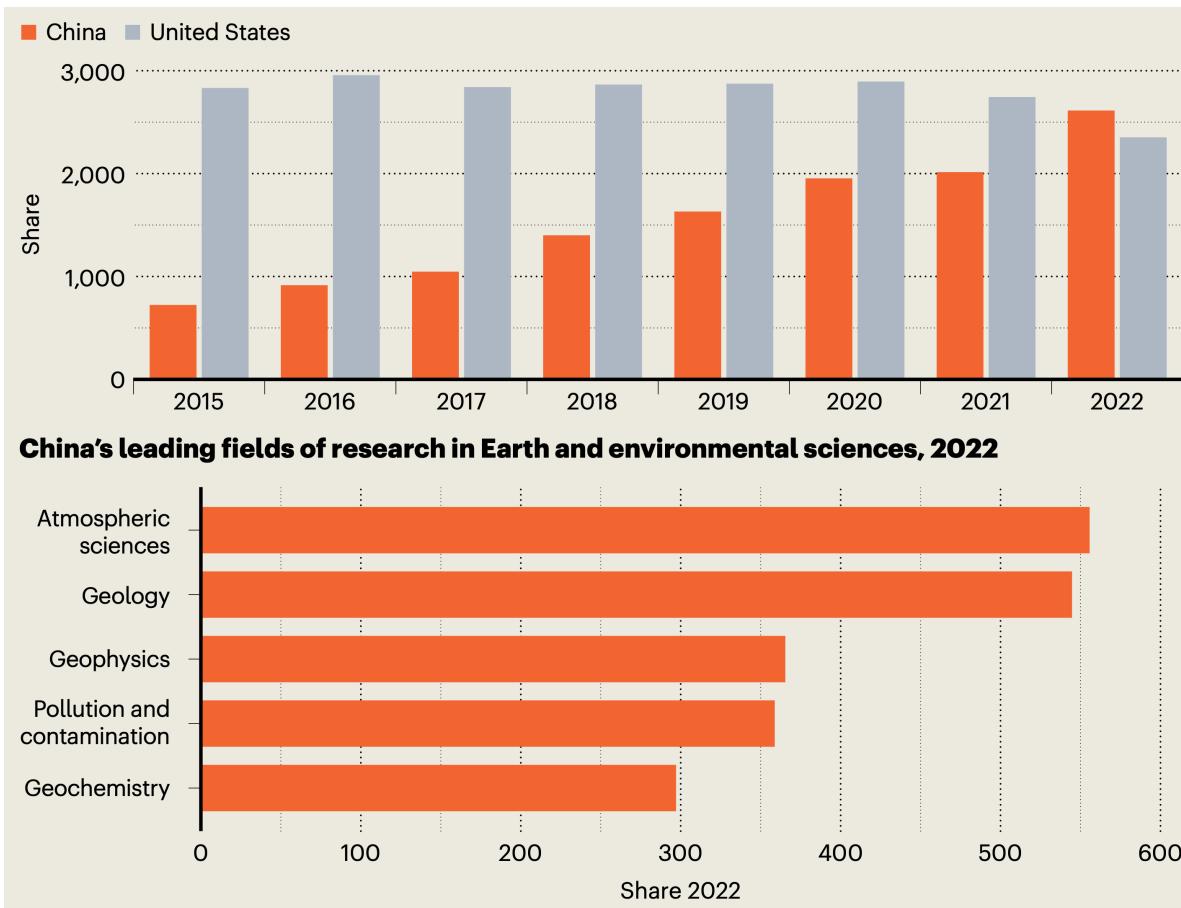
- In 2022, China reaches the top spot in overall share in Nature Index journals.



(Nature Index 2022)

Output in Nature Index journals

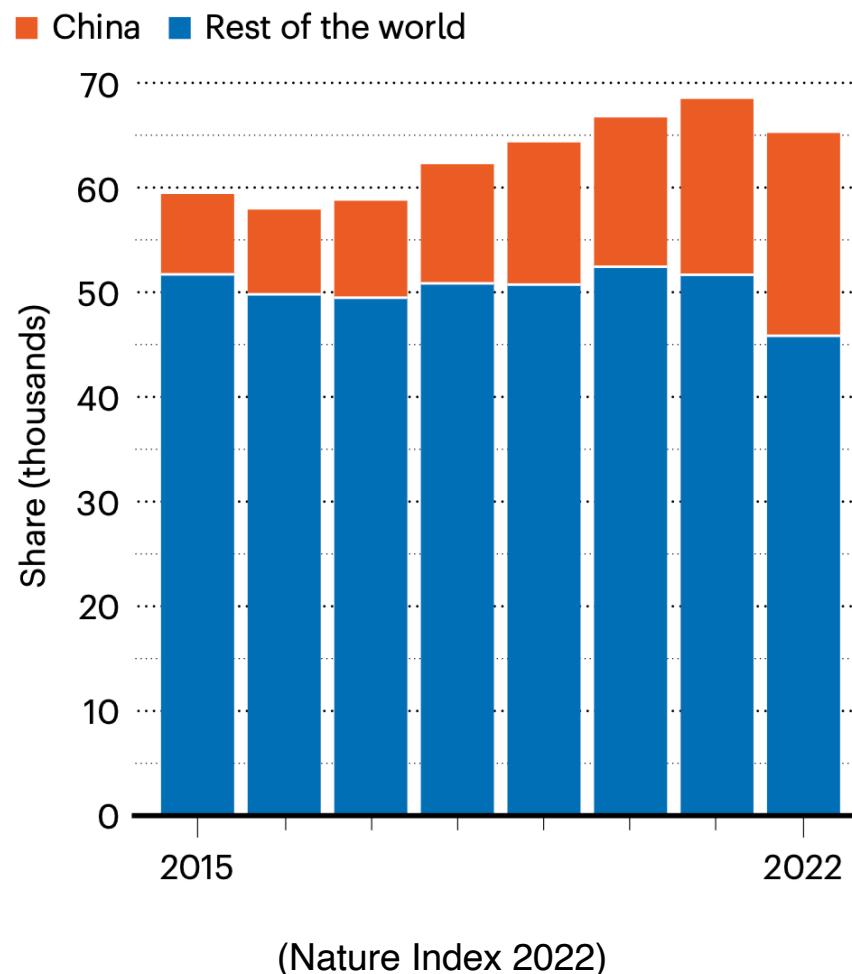
- Research in earth and environmental science saw the most prominent increase.



(Nature Index 2022)

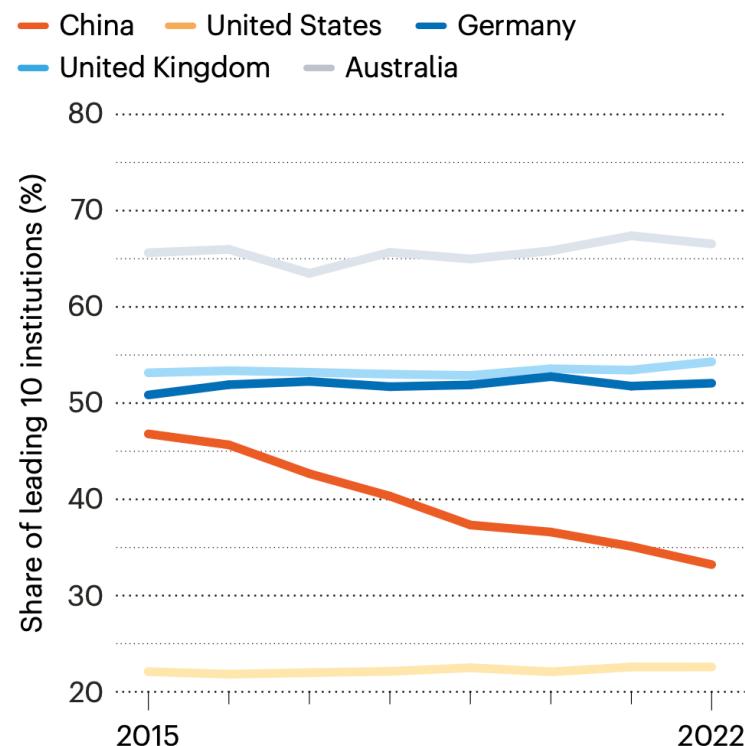
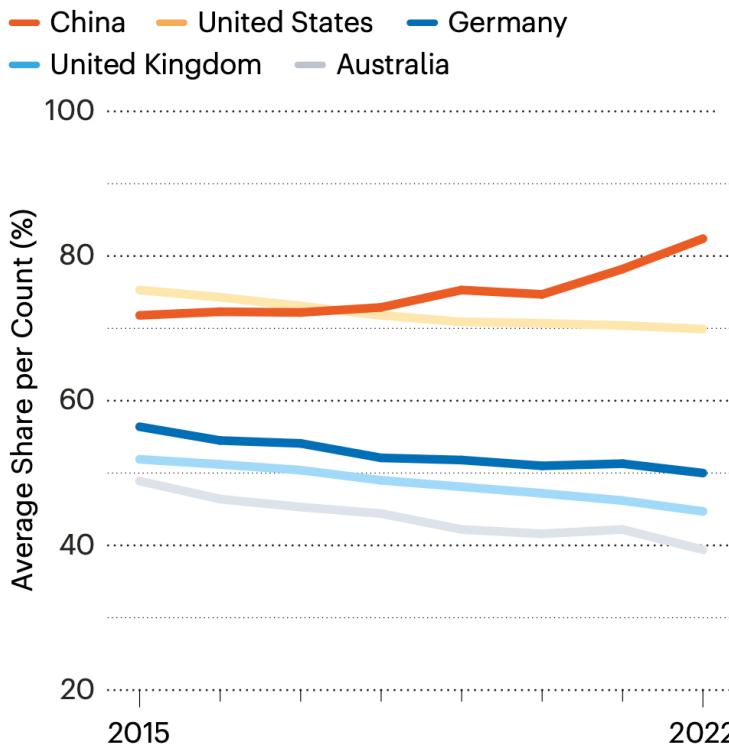
Output in Nature Index journals

- China's proportion of Nature Index share had a notable increase in 2022 compared to the rest of the world.



Output in Nature Index journals

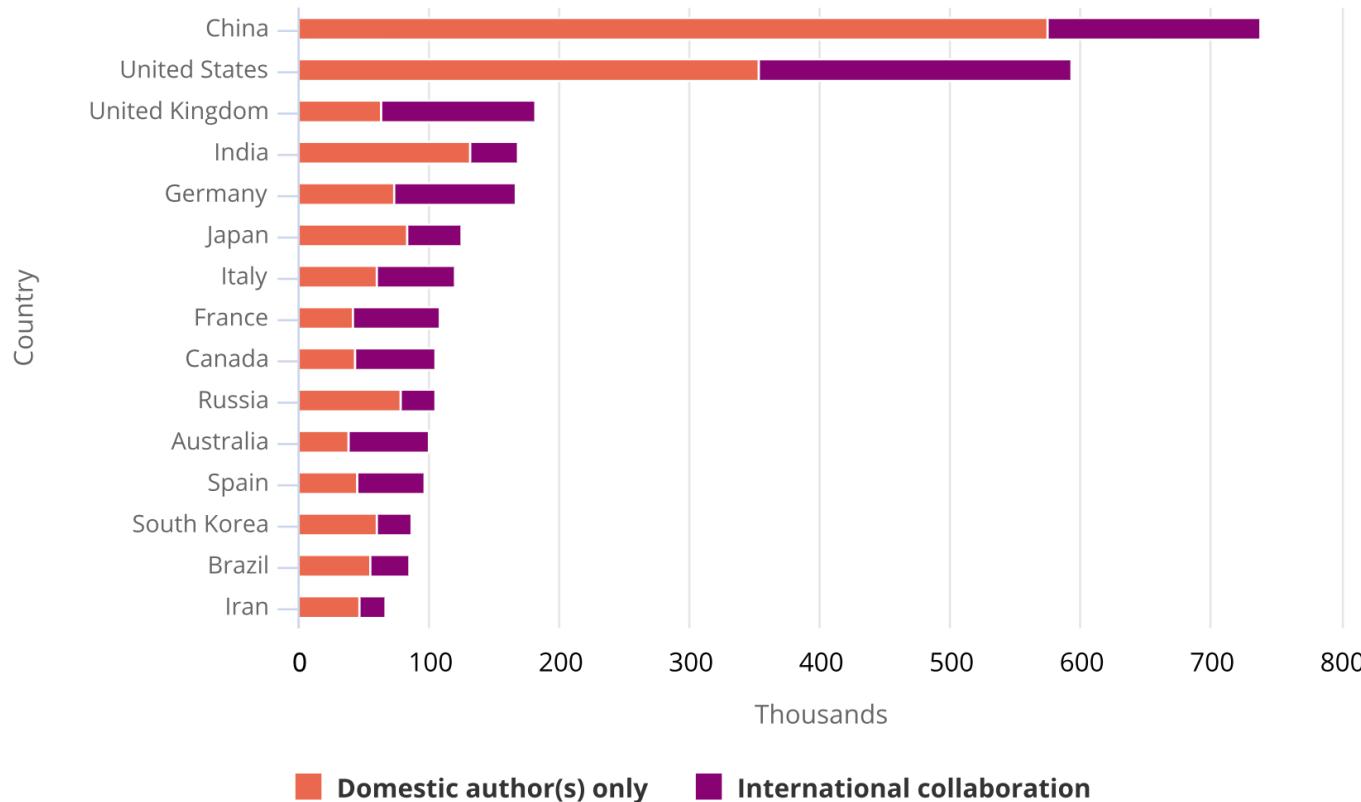
- The increase in Nature Index metric for China is fueled by more local authors in the paper and fewer relative contribution from top 10 leading institutions within the country.



(Nature Index 2022)

Collaboration in scientific publications

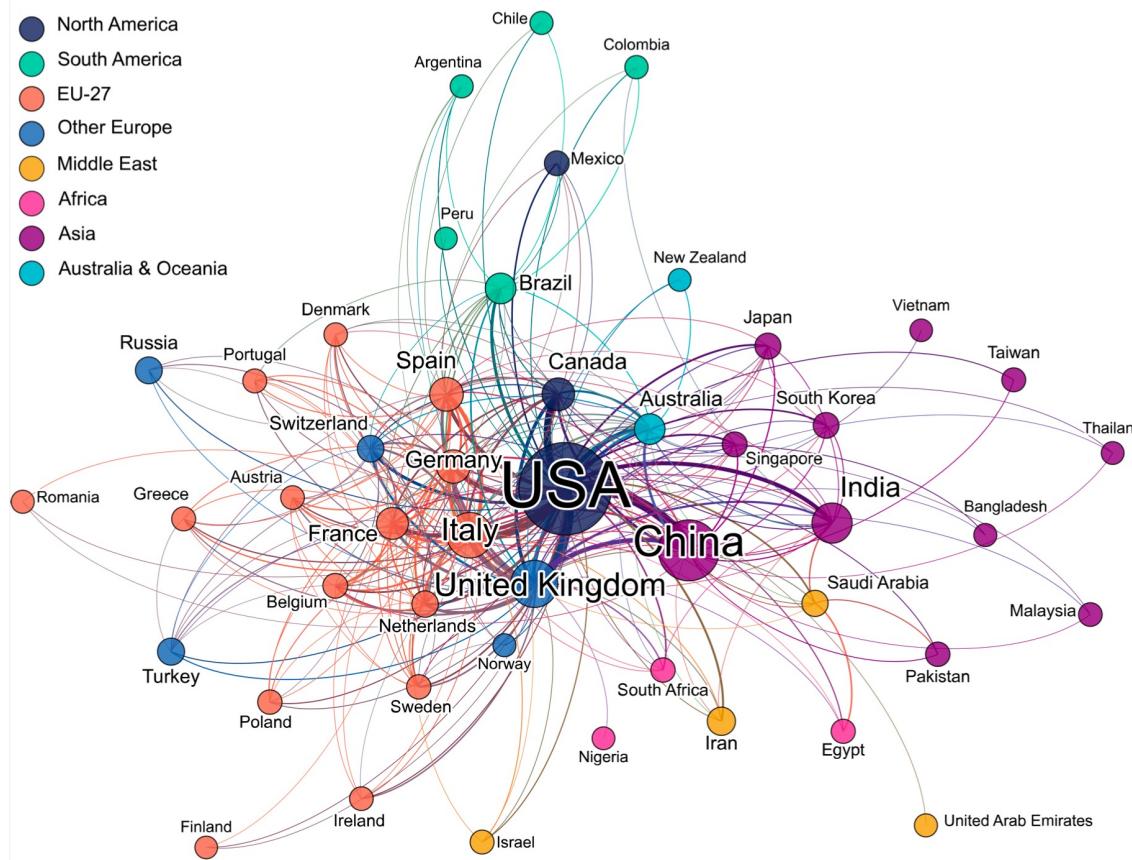
- Scientific research is highly collaborative.



(National Science Board 2022, Science and Engineering Indicators
2022: The State of U.S. Science and Engineering)

Collaboration in scientific publications

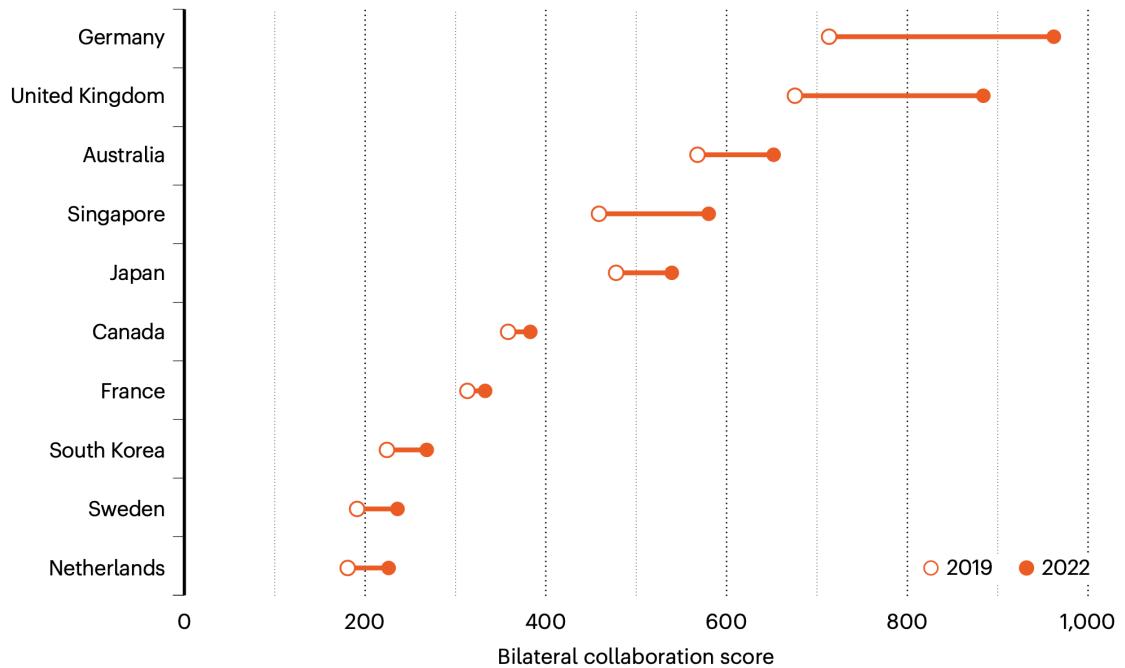
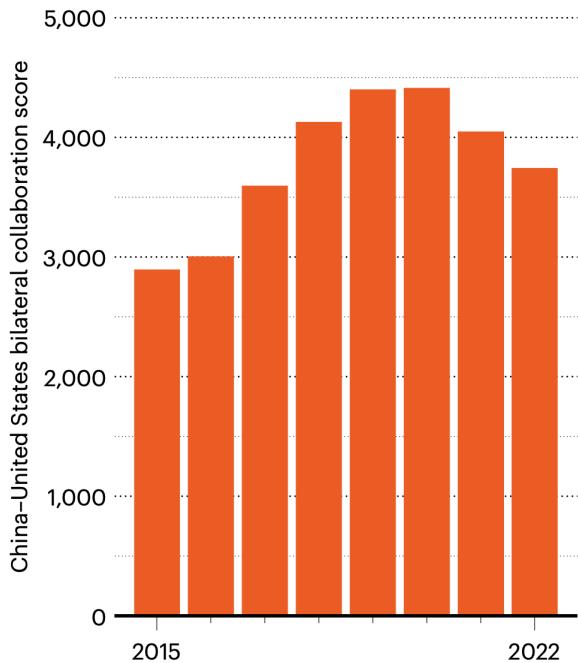
- Intensive collaboration on COVID-19 related research



(National Science Board 2022, Science and Engineering Indicators
2022: The State of U.S. Science and Engineering)

Collaboration in scientific publications

- Collaboration can be influenced by geopolitical factors.



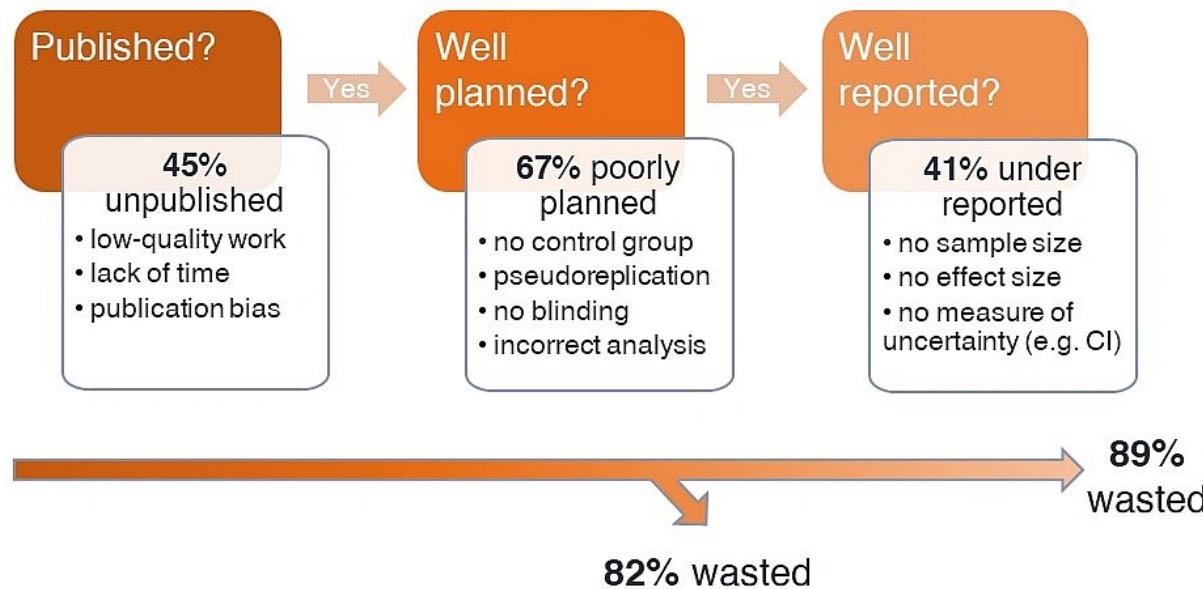
(Nature Index 2022)

What is scientific writing?

- The term scientific writing commonly denotes the reporting of original research in journals, through scientific papers in standard format.
- In its broader sense, scientific writing also includes communication about science through other types of journal articles, such as review papers summarizing and integrating previously published research.
- In a still broader sense, it includes other types of professional communication by scientists—for example, grant proposals, oral presentations, and poster presentations.

Why do we need to write well?

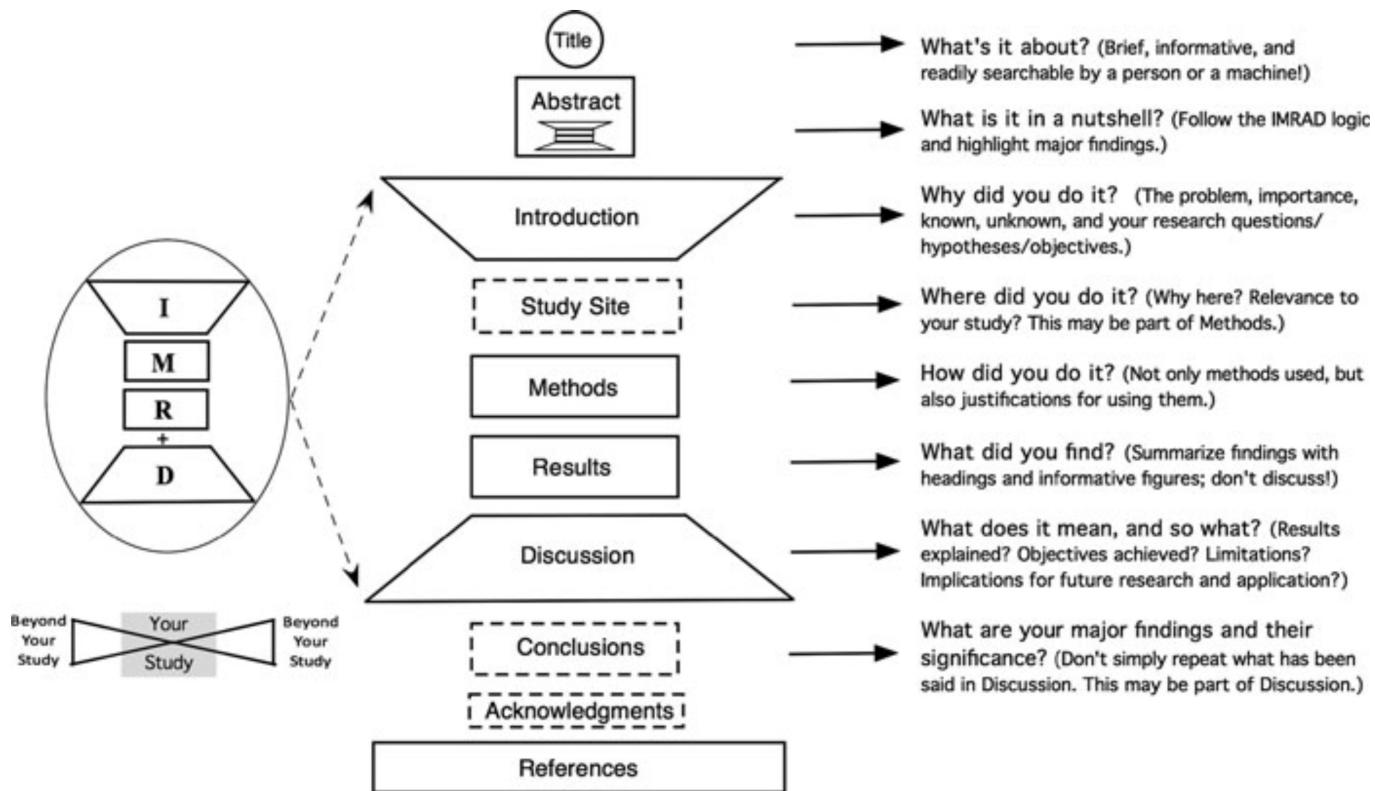
- Articles not well written is a major source of research waste.



(Purgar et al 2022, Nature Ecology and Evolution)

Structure of scientific writing

- **IMRaD** structure: introduction, methods, results, and discussion



(Wu 2011, Landscape Ecology)

Where to submit your manuscript?

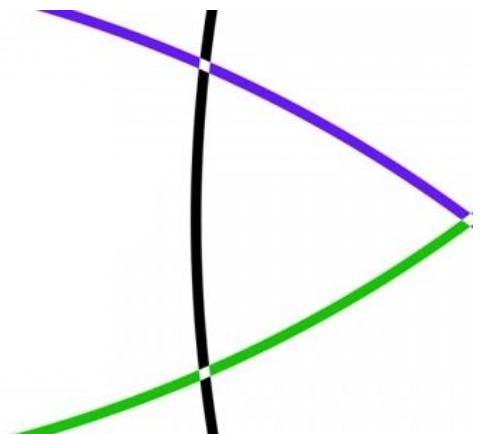
- Decide early, decide well!
- **Scope and audience:** check the journal author guidelines
- **Prestige and impact:** consider measures of journal impact

Impact factor

- IF is devised by Eugene Garfield (1925–2017), the founder of the Institute of Scientific Information (ISI)
- IF of journals has been published in Journal Citation Report (JCR) annually since its inception in 1975;
- ISI was acquired by Thomson Reuters in 1992. In 2016, it was sold and became Clarivate, which publishes JCR now.



Journal Citation Reports



Eugene Garfield

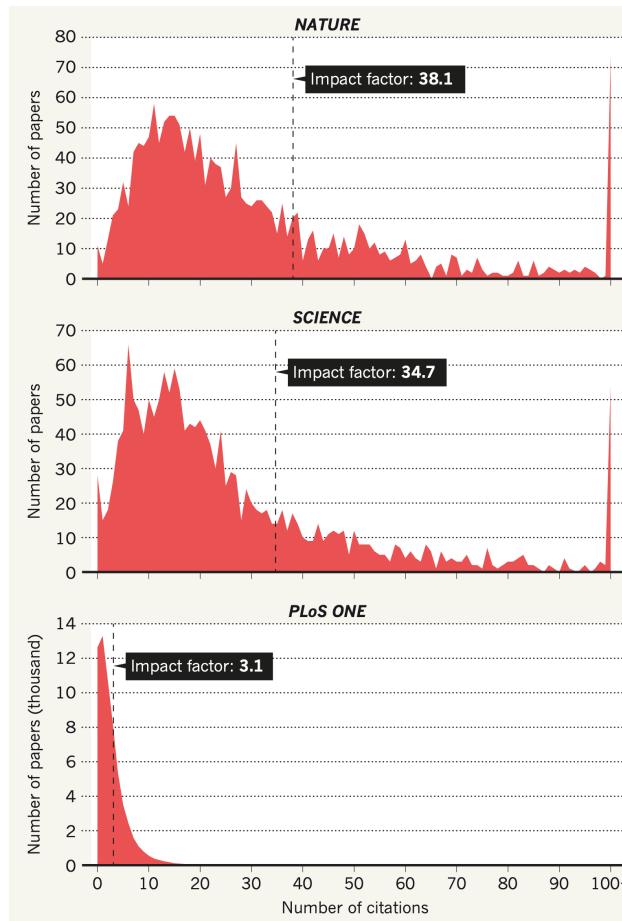
Impact factor

- Impact factor is the ratio between the number of citations received in one year for publications in the two preceding years and the total number of "citable items" published in that journal during the two preceding years
- Two-year Impact factor of a journal is calculated as

$$\text{IF}_y = \frac{\text{Citations}_y}{\text{Publications}_{y-1} + \text{Publications}_{y-2}}.$$

Issues with impact factor

- Impact factor is heavily influenced by a few highly-cited papers. Most papers receive far fewer citations than what the impact factor indicates.



(Callaway 2016, Nature)

Issues with impact factor

- Editorial policy influences impact factor
- Example: *Folia Phoniatrica et Logopaedica* publishes an editorial protesting the abuse of IF. It cites all its articles from 2005 and 2006. IF increased from 0.66 to 1.44.

Reaction of *Folia Phoniatrica et Logopaedica* on the Current Trend of Impact Factor Measures

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^aGroningen Voice Research Lab, University of Groningen, The Netherlands; ^bDepartment of Experimental Physics, Laboratory of Biophysics, Palacky University, Olomouc, Czech Republic; ^cVoice Research Laboratory, Medical Healthcom, Ltd, Prague, Czech Republic

It has become the current trend to measure the status of a scientific journal by its impact factor and to measure a scientist by the impact factor of journals in which he/she publishes. While the underlying idea is good, applying the measure universally leads to highly disturbing trends. Based on country policies, some universities and their departments, especially in Europe, have started to distribute finances based on the average impact factor and average 'relative impact factor' (i.e., journal ranking based on impact factor within a subject category recognized by the Thomson Scientific Institute for Scientific Information, ISI) calculated from all the publications published by the scientific staff. In order to financially survive, the scientific staff should publish in journals with the highest impact factor possible. Any publication in a journal with a low impact factor or low relative impact factor decreases the overall score of the department. Consequently, researchers are strongly recommended to avoid journals with low impact factors.

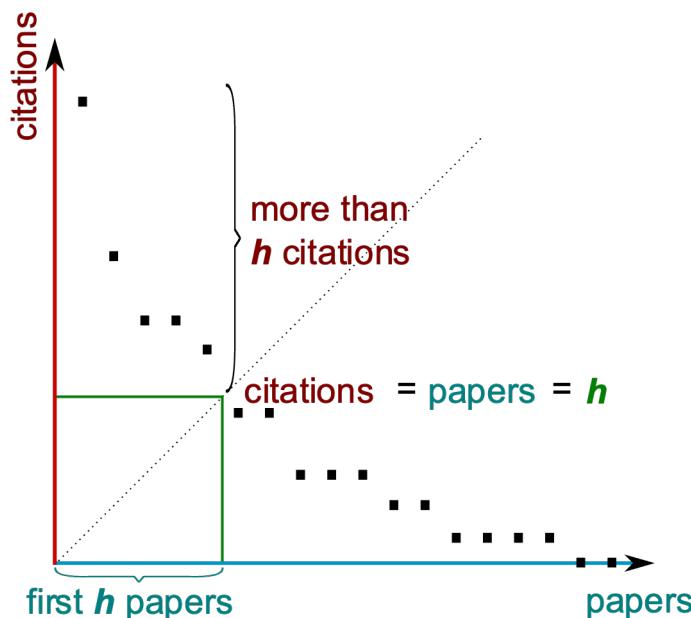
These criteria negatively affect the scientists working in small under-researched and nonlucrative fields [1]. The fields of logopedics and phoniatrics are good examples of such fields. The field of logopedics has been assigned by ISI to the more general category of 'rehabilitation', while phoniatrics belongs to the ISI category of 'otolaryngology'. Both these ISI categories contain other fields which are of larger impact than logopedics

and phoniatrics. For instance, in the ISI category of otolaryngology, the journals devoted to otology have generally a higher impact factor than journals in laryngology and a much higher impact factor than a journal devoted specially to phoniatrics. Based on this, the 'importance' of phonicians is considered to be lower than that of laryngologists and much lower than that of otologists. Consequently, phonicians are judged as less 'scientifically valuable' than otologists and laryngologists. To defend their scientific value, the phonicians are forced to avoid their special journal, i.e., our journal *Folia Phoniatrica and Logopaedica* (FPL), and publish in other, larger and usually more widespread journals. This has a negative effect on our journal.

In the case of logopedics, belonging to the ISI category of 'rehabilitation', the situation is comparable. In this ISI category there are also journals covering, e.g., neurology, sport sciences, cancer rehabilitation, orthopedics or emergency medicine. These are fields which are larger, especially in manpower working in this field, and more lucrative than speech rehabilitation and consequently have a larger impact factor. Specifically, the impact factor of our FPL journal reached the value of 0.655 in 2006, which is the highest in the journal's history. Still, according to the Social Sciences Edition of the ISI Journal Citation Report, this value of the impact factor makes the FPL to rank only at the 33rd place out of 49

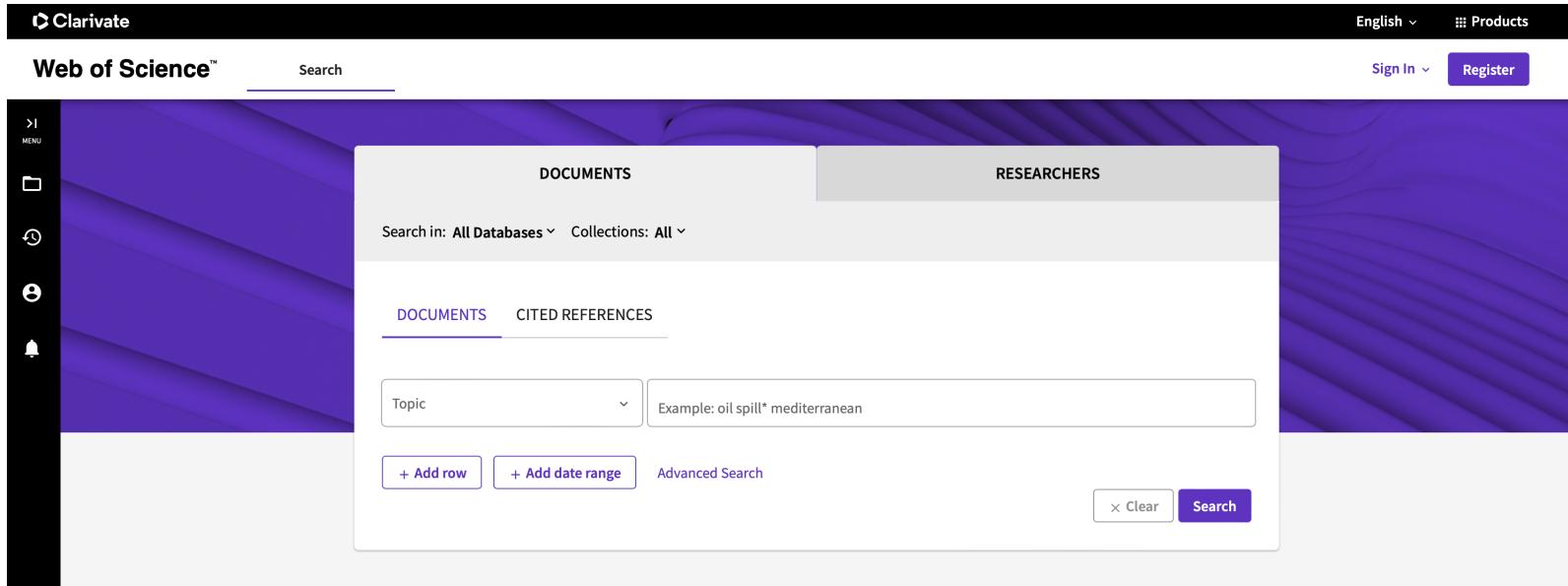
***h*-index**

- h -index is a author-level metric that measures both productivity and citation impact of the publications.
- h -index is defined as the maximum value of h such that the given author has published at least h papers that have each been cited at least h times.



Science Citation Index (SCI)

- SCI, now known as Science Citation Index Expanded, is a science index produced by Institute of Scientific Information.
- The indexing database covers more than 9500 journals across 178 scientific disciplines;



Science Citation Index (SCI)

- Journals indexed in SCI must pass an evaluation process that access its editorial quality and impact quality.

1. Initial triage →	2. Editorial triage →	3. Editorial evaluation →	
Quality Criteria			Impact Criteria
<ul style="list-style-type: none">ISSNJournal titleJournal publisherURL (online journals)Content accessPresence of peer review policyContact details	<ul style="list-style-type: none">Scholarly contentArticle titles and article abstracts in EnglishBibliographic information in Roman scriptClarity of languageTimeliness and / or publication volumeWebsite functionality / Journal formatPresence of ethics statementsEditorial affiliation detailsAuthor affiliation details	<ul style="list-style-type: none">Editorial board compositionValidity of statementsPeer reviewContent relevanceGrant support detailsAdherence to community standardsAuthor distributionAppropriate citations to the literature	<ul style="list-style-type: none">Comparative citation analysisAuthor citation analysisEditorial Board Citation AnalysisContent significance

Successful outcomes →			
Starts editorial triage	Starts editorial evaluation	Enters ESCI and is evaluated for impact	Enters SCIE / SSCI / AHCI

Unsuccessful outcomes →			
Failed initial triage Re-submission welcome as soon as issues have been resolved	Failed editorial triage On first evaluation: Re-submission welcome as soon as issues have been resolved On consecutive evaluations: Re-submission subject to embargo of at least one year	Failed editorial quality evaluation Re-submission subject to embargo of at least two years	Failed editorial impact evaluation Entry / continued coverage in ESCI Citation activity is monitored. Re-evaluation subject to journal performance.

Journal ranking

- Journal Citation Report ranks journals based on its impact factor within a subject category.
- A “Q1 journal” means its impact factor is within the top 25% in its subject category.
- Chinese Academy of Science also publishes its journal ranking based on impact factor within subject category. It put journals into four categories: top 5%, 6-20%, 21%-50%, and the rest.

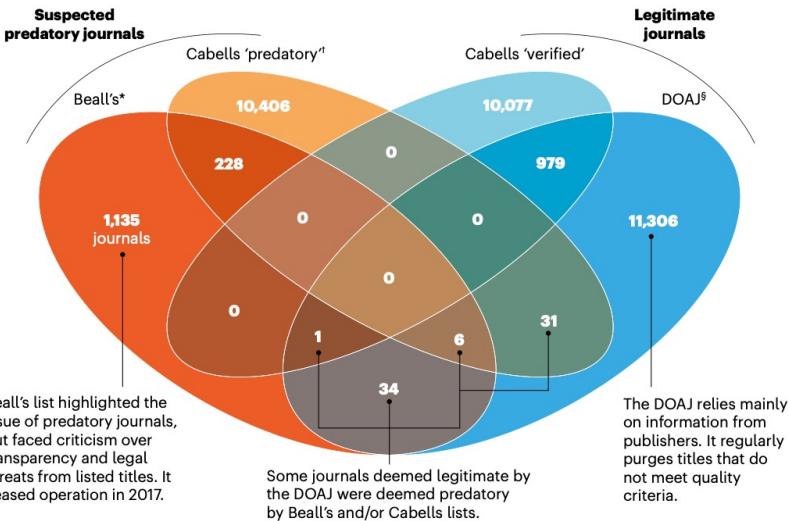
Where to submit your manuscript?

- Decide early, decide well!
- **Scope and audience:** check the journal author guidelines;
- **Prestige and impact:** consider measures of journal impact;
- **Access:** open access may increase your readership; Avoid predatory journal at all cost.



NO LIST TO RULE THEM ALL

Assessments of which journals are likely to be predatory or legitimate do not tally, and titles can appear in both categories. There is no way to know which journals were considered for a list but left off, or which were not considered.



(Grudniewicz et al, 2019, Nature)

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- **Access:** open access may increase your readership; Avoid predatory journal at all cost.
- **Journal affiliation:** Society affiliated or commercial journal
- **Handling time**