Navigating articles, journals & databases

Research Methodology Course

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A Research Article

01

In this chapter we focus on:

- Definition of a research article.
- A typical structure of original papers.
- “Title & Abstract” as crucial elements of a paper.
- A basic format to reference journal articles.

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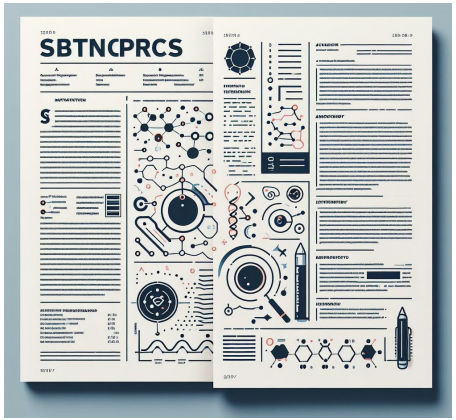
What is a research article?

A research article is a piece of academic writing that contains independent research analysis and argument. It also shows their findings and communicates their contribution. research articles are shorter than books and written about very specific topics.



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Types of Journal Articles

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1. **Original Research:**

This is the most common type of journal manuscript used to publish full reports of data from research. It includes full Introduction, Methods, Results, and Discussion sections.

2. **Methodologies or Methods**

These articles present a new experimental method, test or procedure. The method described may either be completely new, or may be an improvement to another one.

3. **Case Studies:**

These articles report specific instances of interesting phenomena. Case Studies make other researchers aware of the possibility that a specific phenomenon might occur.

Types of Journal Articles

4. Short reports or Letters:

These papers communicate brief reports of data from original research that editors believe will be interesting to many researchers, and that will likely stimulate further researches. They often have strict length limits and are sometimes called “Brief communications”.

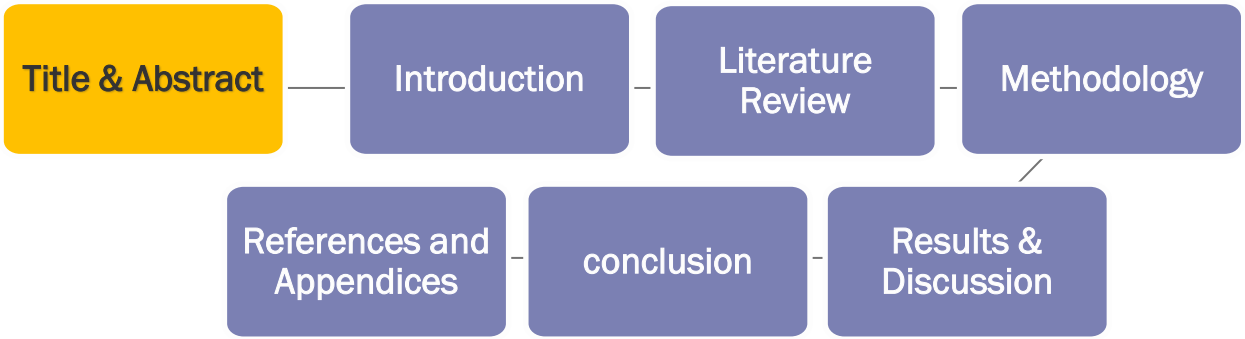
5. Review Articles:

Review Articles provide a comprehensive summary of research on a certain topic, and a perspective on the state of the field and where it is heading. Reviews commonly reveal most of the primary research articles.

An article's Structure

Original research's structure helps the writer organize their ideas.

A well-structured original research has the following format:



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Title & Abstract

- The “Title” and the “Abstract” are the initial impressions or the “face” of a research article
- These two elements are the most important parts of a research paper for both editors and reviewers.
- Most readers will read only the title and the abstract of a published research paper.
- Also, The title and abstracts are the only sections of the research paper that are often freely available to the readers

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Title & Abstract

an example (DOI):

Research Paper

Investigating the dynamic compression response of elastomeric, additively manufactured fluid-filled structures via experimental and finite element analyses

The "Title"

Shwe Soe [a,*], Rhosslyn Adams [b], Mokarram Hossain [c], Peter Theobald [b]

[a] Department of Engineering, Design and Mathematics, University of the West of England, Bristol BS16 1QY, UK
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[c] Zienkiewicz Centre for Computational Engineering, College of Engineering, Swansea University, SA1 8EN, UK

Authors information

ARTICLE INFO

Keywords:
Fluid-filled structure
Additive manufacturing
Dynamic compression
Smooth particle hydrodynamic
Visco-hyperelastic constitutive model

Keywords

ABSTRACT

This study evaluates a fluid-filled, closed-cell lattice as a novel route to reducing peak acceleration in impact environments. A conical structure was designed and built using fused filament fabrication. One structure was manufactured hollow (100% air), another 70% filled with water (50% by height) and a third 100% water-filled. Peak acceleration was evaluated by performing 4.1 kg impacts at 1, 2, 3 m/s. Impacts were then simulated in shell and solid finite element analysis models, employing the smooth particle hydrodynamic method for the water and a surface-based fluid-filled cavity method for air. The air-filled, conventional closed-cell structures achieved the lowest peak accelerations at lower impact energies, however, water infill improved impact performance at higher energies. For low to medium impact energies, shell and solid modelling accurately simulated experimental trends, although the latter is more computationally expensive. Solid modelling is the only viable solution for scenarios achieving structural densification, due to the inaccuracies in shell-based models caused by the inter-surface penetrations. This work has demonstrated that fluid-filled structures provide a promising approach to reduce acceleration and so achieving enhanced protection, whilst also presenting a computational pathway that will enable efficient design of new and novel structures.

The "Abstract"

1. Introduction

Additive Manufacturing (AM) is a layer-by-layer build process that enables the realisation of geometrically complex structures. Recent development in AM hardware and software means builds can now achieve greater accuracy, finer resolution, better surface quality and improved mechanical properties [1–3]. Increasing capability and reducing cost means AM is now attractive to industry, creating market demand for new base materials [4–6]. Thermoplastic elastomers (TPE) are a material group with diverse application across many industrial sectors, though components are typically manufactured via injection moulding [7]. Emerging AM capability means high-quality TPE parts can now be achieved using fused filament fabrication (FFF) [8], laser sintering [9,10] and digital light synthesis [11].

Lattice structures are strut- or surface-based geometries that enable optimised design relative to an objective function [12,13]. The former is created by struts connecting nodes arranged in three-dimensional space, with some structures resembling crystalline models including body-centred cubic, face-centre cubic, and diamond. Surface-based structures are typically more complex and often generated by mathematically- or parametrically-driven scripts [14,15]. Common examples include triply periodic minimal surface models (TPMS) - non-self-intersecting and continuously curved geometries, or origami-inspired structures with a series of flat, folded surfaces [10,16,17].

AM-built complex geometries are now produced as functional components, with numerous quasi-static compression studies describing their relative energy absorption [18–22]. Combining complex geometries and TPE materials creates new opportunities for application including helmet liners [10,23], shoe soles [11,24] and other mechanical shock absorption and actuation devices [25–27]. Whilst developing strain-rate dependent material models to achieve computational-based investigation remains technically challenging [28–30], they have enabled design of functionally graded structure to achieve a desired

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2214-8604/

Contact information of the corresponding Author

How to reference articles

Researchers must understand the basic format for referencing articles.
For instance, a reference list entry in **APA style** has following items:

- Author or authors. The surname is followed by first initials.
- Year of publication of the article.
- Article title.
- Journal title (in *italics*).
- Volume of journal (in *italics*).
- Issue number of journal (no italics).
- Page range of article.
- DOI or URL.

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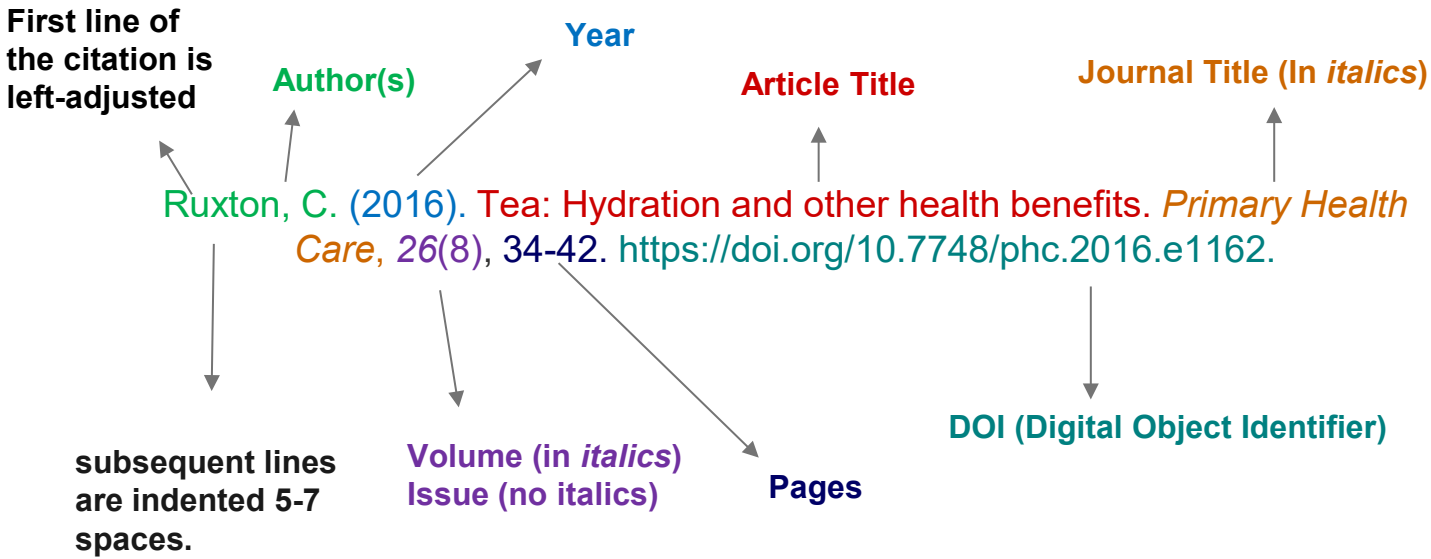
How to reference articles

(An example):



02

Title, Abstract and Keywords

In this chapter we introduce:

- Various types of “Titles” and also reveal the importance of the “Abstract”.
- Some tips for drafting a good “Title” as well as an appropriate “Abstract”
- Keywords, the reason why they are important and finally, we give some approach to craft effective keywords.

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Types of Titles

Descriptive (neutral) titles

- They have the essential elements of the research theme and give a glimpse of the paper by several keywords included but does not reveal the main result or the conclusion.

Declarative titles

- This title states the main finding of the study in the title itself. It may reduce the curiosity of the reader.

Interrogative titles

- They have a query or the research question in the title, sometimes used for a review article. They also have the ability to sensationalize the topic but can be distracting as well.

Tips for drafting a good “Title”

- The title should be straightforward and clear.
- It should be engaging and informative.
- Ensure it is specific, accurate, and includes essential scientific keywords for indexing.
- Keep it concise, precise, and reflective of the paper’s main theme.
- Any misleading or misrepresented titles should be avoided.
- The title should be neither too lengthy nor cryptic.

Abstract

- The abstract serves as a concise summary of the entire research paper, sharing similarities with the title.
- It stands independently and can be understood without reading the full paper.
- Editors rely on the abstract to make decisions about the article's fate.
- Essentially, it functions as a preview or "trailer" for the complete article.

Abstract

- The abstracts can be structured or unstructured.
- Unstructured abstracts are free-flowing and commonly used for papers that usually do not describe original research.
- Structured abstracts, followed by most journals, include specific subsections under which the abstract needs to be composed.
- A standard format for the abstract is suggested, with subheadings including Introduction, Methods, Results, and Conclusion.

Tips for drafting a good “Abstract”

- The abstract should use straightforward language and phrases, rather than complex sentences.
- It must provide relevant information, maintain coherence, and follow the structure outlined by the target journal’s subheadings.
- The abstract should be succinct, engaging, impartial, truthful, well-balanced.
- Importantly, it should avoid any misleading content and align with the main text of the paper.
- Additionally, the key message should be prominently featured.

Keywords

- Keywords are words that capture the essence of your paper.
- They have a profound impact on search results as well.
- Using the right words will speed up the research process.
- Wrong keywords can bring to it to a painfully screeching halt.
- Journals ask for anywhere between 3-8 keywords.

Keywords

(How to create effective ones):

1. Think from the point of view of the reader. What keywords would the reader search for?

2. Keywords should contain words and phrases that suggest what the topic is about as well as closely related ones.

   (e.g. Heart diseases → stroke, circulatory system, blood, etc.)

Keywords

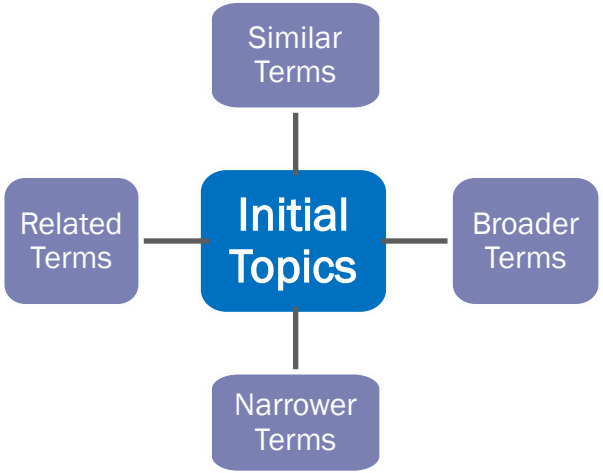
(How to create effective ones):

3. Keywords should ideally be phrases of 2-4 words; single word keywords may lead to false matches.
4. Also use variants terms or phrases that readers are likely to use.

   (e.g. Spine disorders → spinal cord, backbone, etc.)
5. The full forms of shortened words or acronyms and abbreviations should be included.

Keywords

(An approach):



Initial Topic:
Kangaroo

Similar Terms:
- Kangaroos
- roos
- joeys

Narrower Terms:
- Macropus (genus)
- Giganteus (species)
- Eastern Gray Kangaroo

Related Terms:
- Australia
- Grassland
- Wallabies

Broader Terms:
- Mammalia (class)
- Marsupialia (order)
- Macropodidae (family)

An academic Journal

03

In this chapter we pay attention to:

- Defining an scholarly journal.
- Introducing some of the well-known publishers.
- Introducing two services giving information about journals and evaluating them.
- Explaining different metrics such as impact factor and h-index

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An academic journal

An **academic journal** (also scholarly journal) is a periodical publication in which scholarship relating to a particular academic discipline is published.

Academic disciplines (fields) are conventionally divided into the:

- **humanities**, including language, art and cultural studies, and the
- **scientific disciplines**, such as physics, chemistry, and biology;
- the **social sciences** are sometimes considered a third category.

Publishers

Academic publishing is the subfield of publishing which distributes academic research and scholarship. There are number of academic publishing companies contributing to the field.

They can categorize by the yearly volume of paper outputs, by the annual profit margin, size of the publishing company, reputation among the academic community, or the number of journals published.

Publishers

A comprehensive list of various publishing companies are addressed here (Link). The table below highlights specify some of them along with their approximate number of journals:

Publisher	No. journals
Springer	+2900
Taylor & Francis	+2700
Elsevier	+2600
Wiley	+1600
SAGE	+1100
MDPI	+350
*University of Tehran	+100

Metrics

There are various metrics used to evaluate journals, such as impact factor and h-index.

- **Impact Factor (IF):** In any given year, impact factor of a journal is calculated as follows:

Two-year impact factor formula

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

y: Any given year

- **h-index:** The *h*-index, used for both researchers and journals, is the largest number *h* such that *h* articles have at least *h* citations each.

$$h\text{-index } (f) = \max\{i \in \mathbb{N} : f(i) \geq i\}$$

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Assessment Services

There are various portals providing access to journals and their rankings, derived from various databases. These portals facilitate scientific domain assessment. To name a few:

- Journal Citation Reports (JCR)

It is an annual publication base on “Web of Science” sources providing informationand assessment about academic journals.

- Scimago Journal & Country Rank (SJR)

this portal is integrated with Scopus database and measures the prestige of scholarly journals as well as other indicators.

JCR- 2022 top 30 journals

Journal Name	Category & Journal Quartiles	Citations	IF 2022
CA-A CANCER JOURNAL FOR CLINICIANS	ONCOLOGY - SCIE(Q1)	61124	286.130
LANCET	MEDICINE, GENERAL & INTERNAL - SCIE(Q1)	403221	202.731
NEW ENGLAND JOURNAL OF MEDICINE	MEDICINE, GENERAL & INTERNAL - SCIE(Q1)	506069	176.079
JAMA-JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION	MEDICINE, GENERAL & INTERNAL - SCIE(Q1)	242479	157.335
NATURE REVIEWS MOLECULAR CELL BIOLOGY	CELL BIOLOGY - SCIE(Q1)	66072	113.915
NATURE REVIEWS DRUG DISCOVERY	PHARMACOLOGY & PHARMACY - SCIE(Q1)	47615	112.288
NATURE REVIEWS IMMUNOLOGY	IMMUNOLOGY - SCIE(Q1)	67751	108.555
Lancet Respiratory Medicine	RESPIRATORY SYSTEM - SCIE(Q1); CRITICAL CARE MEDICINE - SCIE(Q1)	29214	102.642
BMJ-British Medical Journal	MEDICINE, GENERAL & INTERNAL - SCIE(Q1)	183681	93.333
NATURE MEDICINE	MEDICINE, RESEARCH & EXPERIMENTAL - SCIE(Q1); CELL BIOLOGY - SCIE(Q1)	141857	87.241
Lancet Microbe	INFECTIOUS DISEASES - SCIE(Q1); MICROBIOLOGY - SCIE(Q1)	3096	86.208
World Psychiatry	PSYCHIATRY - SCIE(Q1); PSYCHIATRY - SSCI(Q1)	11951	79.683
NATURE REVIEWS MICROBIOLOGY	MICROBIOLOGY - SCIE(Q1)	51100	78.297
Lancet Psychiatry	PSYCHIATRY - SCIE(Q1); PSYCHIATRY - SSCI(Q1)	21986	77.056
Nature Reviews Materials	NANOSCIENCE & NANOTECHNOLOGY - SCIE(Q1); MATERIALS SCIENCE	27820	76.679
Nature Reviews Gastroenterology & Hepatology	GASTROENTEROLOGY & HEPATOLOGY - SCIE(Q1)	21962	73.082
Lancet Public Health	PUBLIC, ENVIRONMENTAL & OCCUPATIONAL HEALTH - SCIE(Q1); PUBLIC	10449	72.427
CHEMICAL REVIEWS	CHEMISTRY, MULTIDISCIPLINARY - SCIE(Q1)	243908	72.087
LANCET INFECTIOUS DISEASES	INFECTIOUS DISEASES - SCIE(Q1)	52835	71.421
NATURE REVIEWS CANCER	ONCOLOGY - SCIE(Q1)	66699	69.800
NATURE	MULTIDISCIPLINARY SCIENCES - SCIE(Q1)	1008544	69.504
NATURE BIOTECHNOLOGY	BIOTECHNOLOGY & APPLIED MICROBIOLOGY - SCIE(Q1)	91927	68.164
Nature Energy	MATERIALS SCIENCE, MULTIDISCIPLINARY - SCIE(Q1)	37355	67.439
CELL	CELL BIOLOGY - SCIE(Q1); BIOCHEMISTRY & MOLECULAR BIOLOGY - SCIE(Q1)	362236	66.850
Nature Reviews Disease Primers	MEDICINE, GENERAL & INTERNAL - SCIE(Q1)	21565	65.038
Nature Reviews Clinical Oncology	ONCOLOGY - SCIE(Q1)	22751	65.011
SCIENCE	MULTIDISCIPLINARY SCIENCES - SCIE(Q1)	883834	63.714
CHEMICAL SOCIETY REVIEWS	CHEMISTRY, MULTIDISCIPLINARY - SCIE(Q1)	187107	60.615
LANCET NEUROLOGY	CLINICAL NEUROLOGY - SCIE(Q1)	49221	59.935
NATURE REVIEWS GENETICS	GENETICS & HEREDITY - SCIE(Q1)	46474	59.581
Psychological Science in the Public Interest	PSYCHOLOGY, MULTIDISCIPLINARY - SSCI(Q1)	2781	56.200

Quartiles indicate where a journal's ranking lies within a particular subject category. Q1 journals have the highest rank.

2022 calculated **Impact Factor** of different journals

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SJR- 2022 top 10 journals

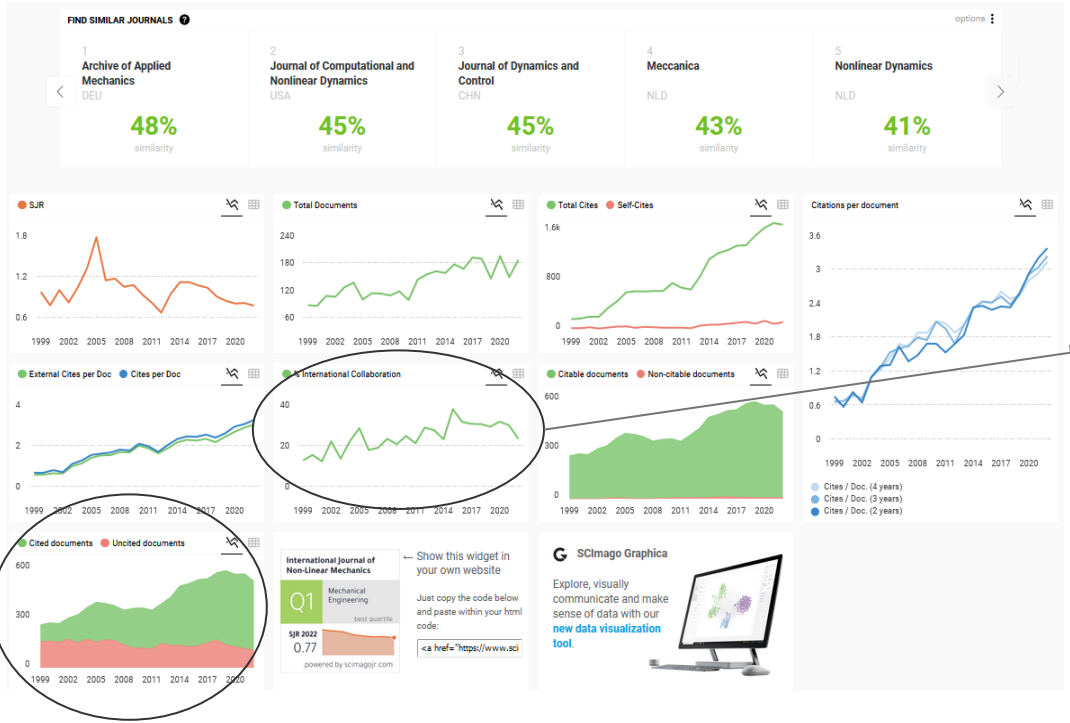
	Title	Type	↓ SJR	H index	Total Docs. (2022)	Total Docs. (3years)	Total Refs. (2022)	Total Cites (3years)	Citable Docs. (3years)	Cites / Doc. (2years)	Ref. / Doc. (2022)	
1	Ca-A Cancer Journal for Clinicians	journal	86.091 Q1	198	44	118	4268	30318	85	299.99	97.00	
2	Quarterly Journal of Economics	journal	36.730 Q1	292	36	122	2398	2141	122	14.83	66.61	
3	Nature Reviews Molecular Cell Biology	journal	34.201 Q1	485	121	328	10804	13331	156	35.47	89.29	
4	Cell	journal	26.494 Q1	856	420	1637	27609	67791	1440	43.80	65.74	
5	New England Journal of Medicine	journal	26.015 Q1	1130	1410	4561	14396	133956	1854	33.93	10.21	
6	Nature Medicine	journal	24.687 Q1	605	522	1245	15256	41058	664	34.67	29.23	
7	MMWR Recommendations and Reports	journal	23.962 Q1	151	103	138	940	3469	133	25.28	9.13	
8	Nature Biotechnology	journal	22.781 Q1	491	423	1038	10852	20441	426	16.35	25.65	
9	Nature Reviews Materials	journal	21.927 Q1	156	122	294	11032	11854	168	40.82	90.43	
10	American Economic Review	journal	21.833 Q1	337	71	355	4237	4108	354	9.78	59.68	

The SCImago Journal Rank (SJR) indicator:
a measure of the prestige of scholarly journals

All-time **h-index** of journals

SJR- graphical metrics trends of a journal (Link)

you can check **cited and uncited documents** trend



Also, you can track **international collaboration** of a journal through the years

04

Bibliographic Databases

In this chapter we concentrate on:

- Establishing the concept of bibliographic databases.
- Presenting the most renowned databases.
- Offering visual walkthroughs of the interface for each database.
- Supplying additional details about each database.

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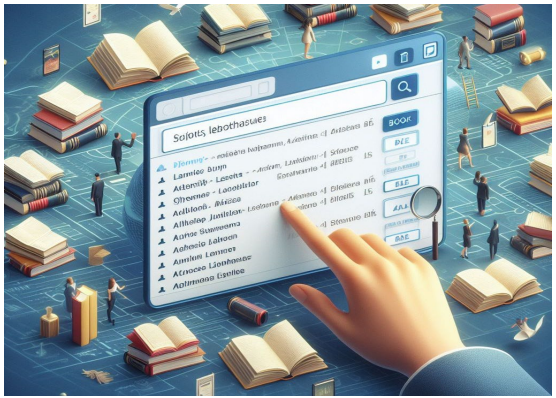
A bibliographic database

A **bibliographic database** is a database of bibliographic records. This is an organized online collection of references to published written works like journal and newspaper articles, conference proceedings, reports, government and legal publications, patents and books.



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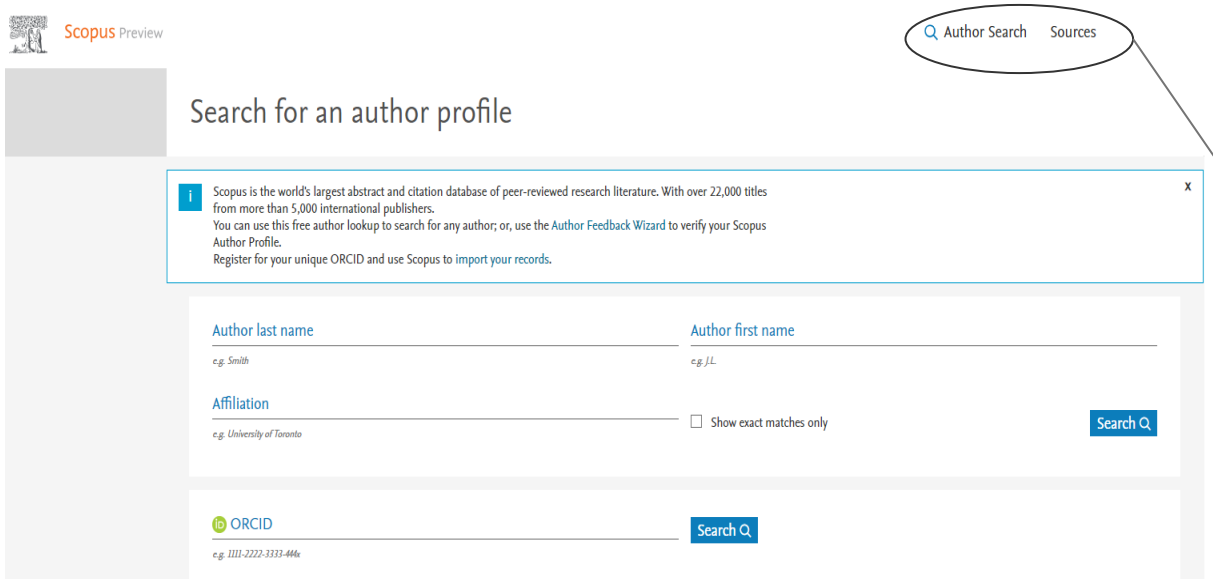
The most well-known databases

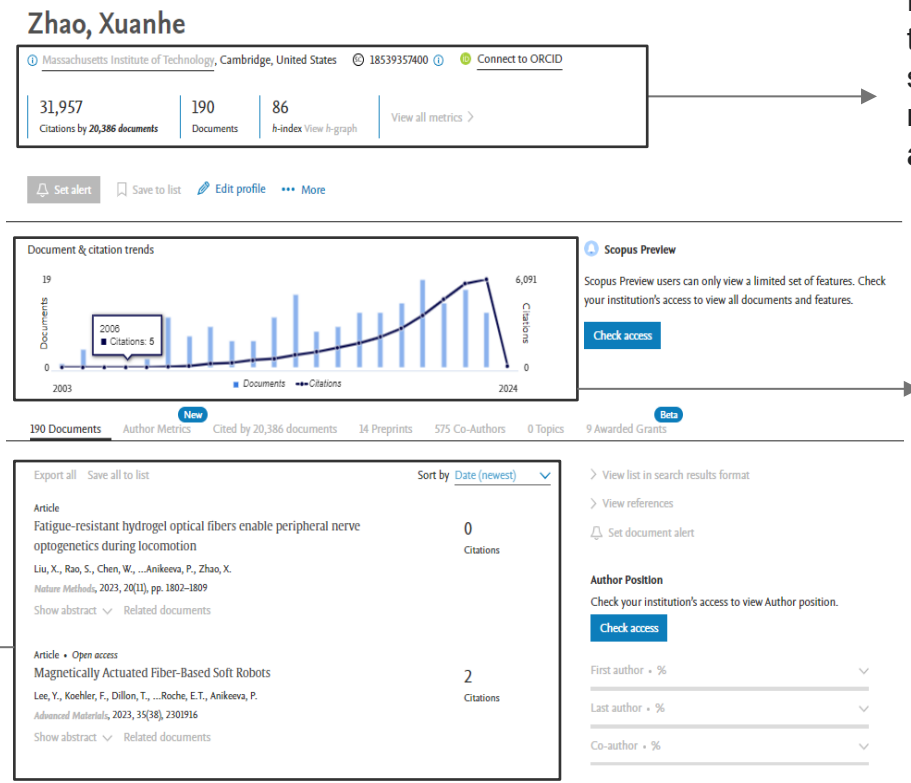
1. **Scopus:** Scopus is one of the two big commercial, bibliographic databases that cover scholarly literature from almost any discipline (Link).
2. **Web of Science:** “Web of Science” also known as Web of Knowledge is the second big bibliographic database (Link).
3. **ScienceDirect:** a gateway to the millions of academic articles published by Elsevier (Link).
4. **PubMed:** well-known for literature related to medicine or biological sciences.
5. **ERIC:** Mostly for education sciences, ERIC is mostly used.

Scopus Interface



You can search for whether an **author** or **sources**

Scopus Interface (Results for “Xuanhe Zhao” as an example - Link)

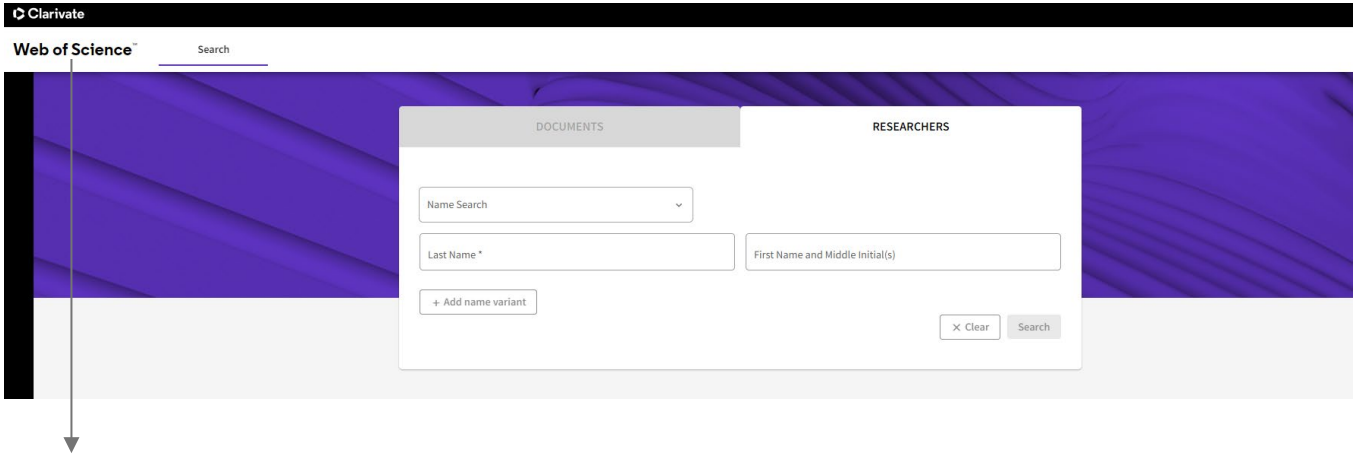


Researcher’s and their information such as their **metrics**, **affiliation**, etc.

Citation trend of their work

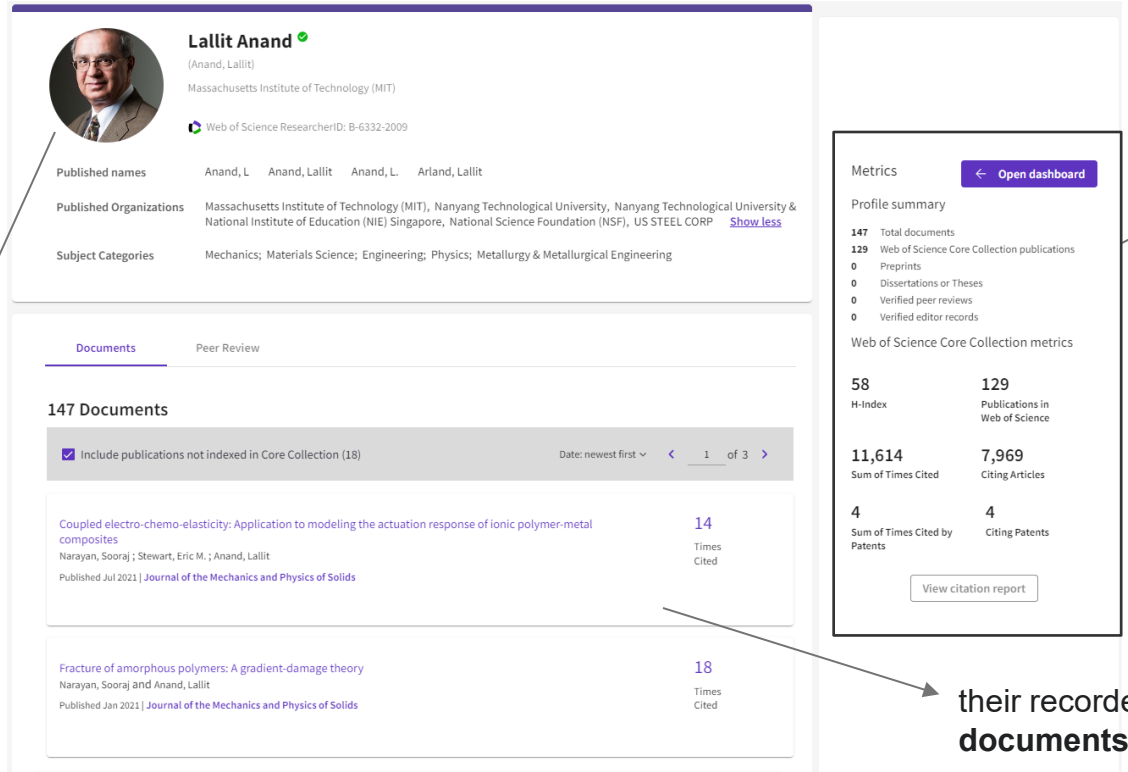
Their **documents** having been published

WOS Interface



WOS also provides comprehensive information about researchers

WOS Interface (results for “Lallit Anand” as an example (Link))



Researcher’s **info**, **organization** & their research **field**

Metrics related to the researcher

their recorded **documents**

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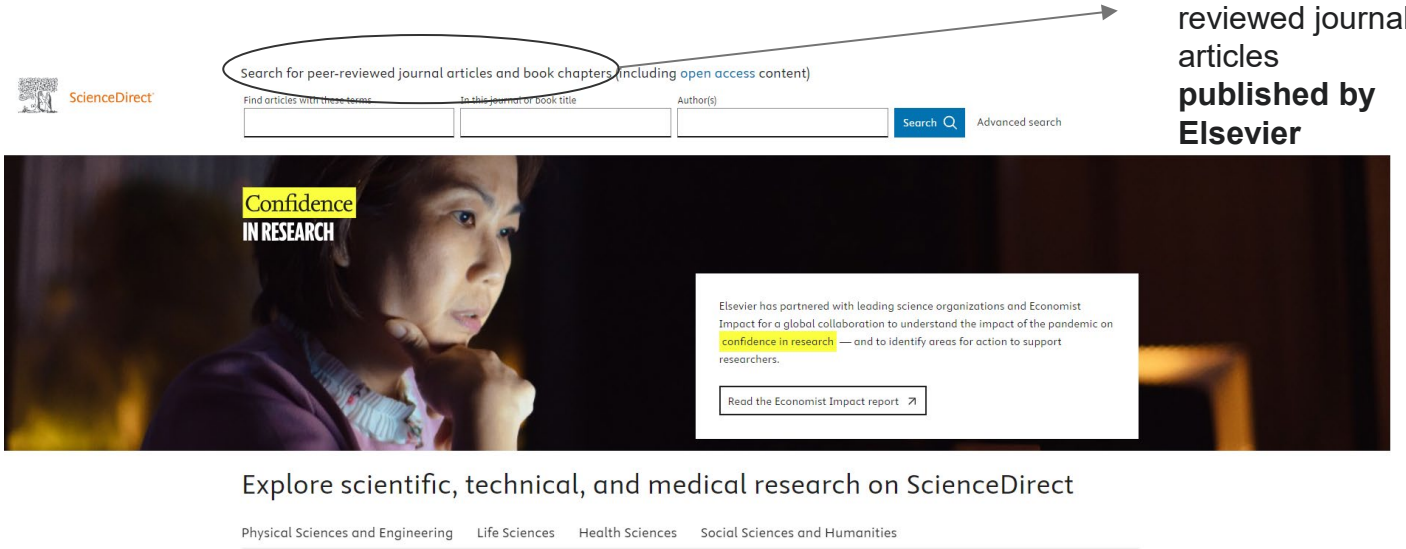
ScienceDirect Interface

Yu can search for book chapters and peer-reviewed journal articles **published by Elsevier**



Journal Finders

05

In this chapter, we emphasize:

- Various ‘Journal Finder’ platforms, each accompanied by unique links.
- Additionally, we provide a visual illustration for each platform and offer further details about them.

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Platforms

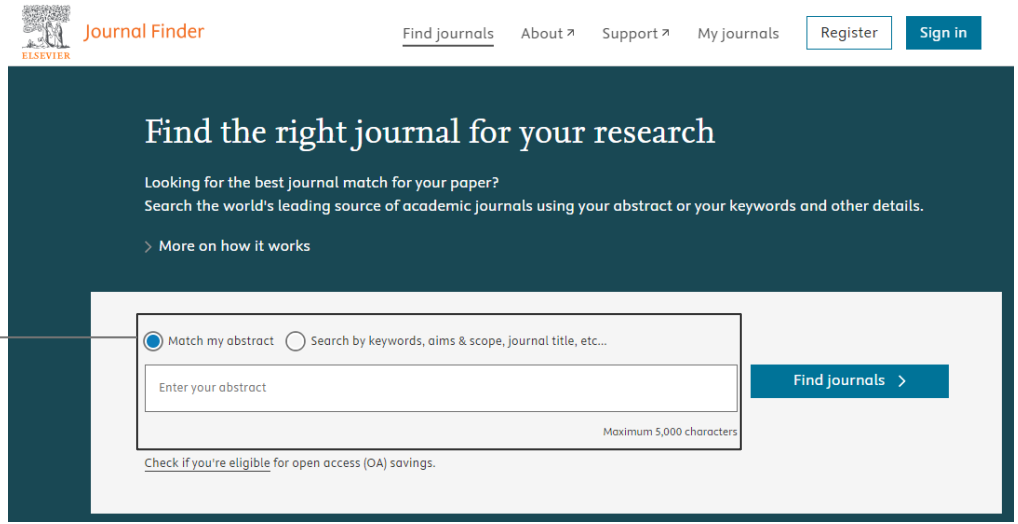
There are several “journal finder” platforms. To name a few:

- Elsevier (Link).
- Springer (Link).
- Wiley (Link).
- MDPI (Link).
- Taylor & Francis (Link).
- etc.

Naturally, depending on the publisher that owns the platform, each one recommends its own journals.

Platforms
(Elsevier)

You Can Search by your **written abstract, keywords,** etc.

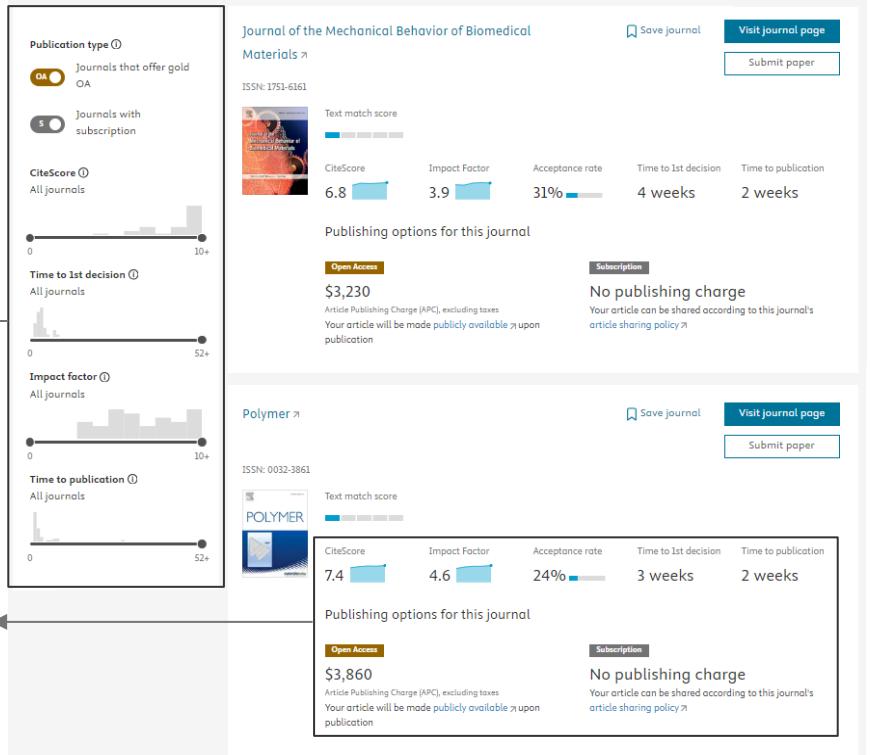


Platforms

(Elsevier – results for a given abstract)

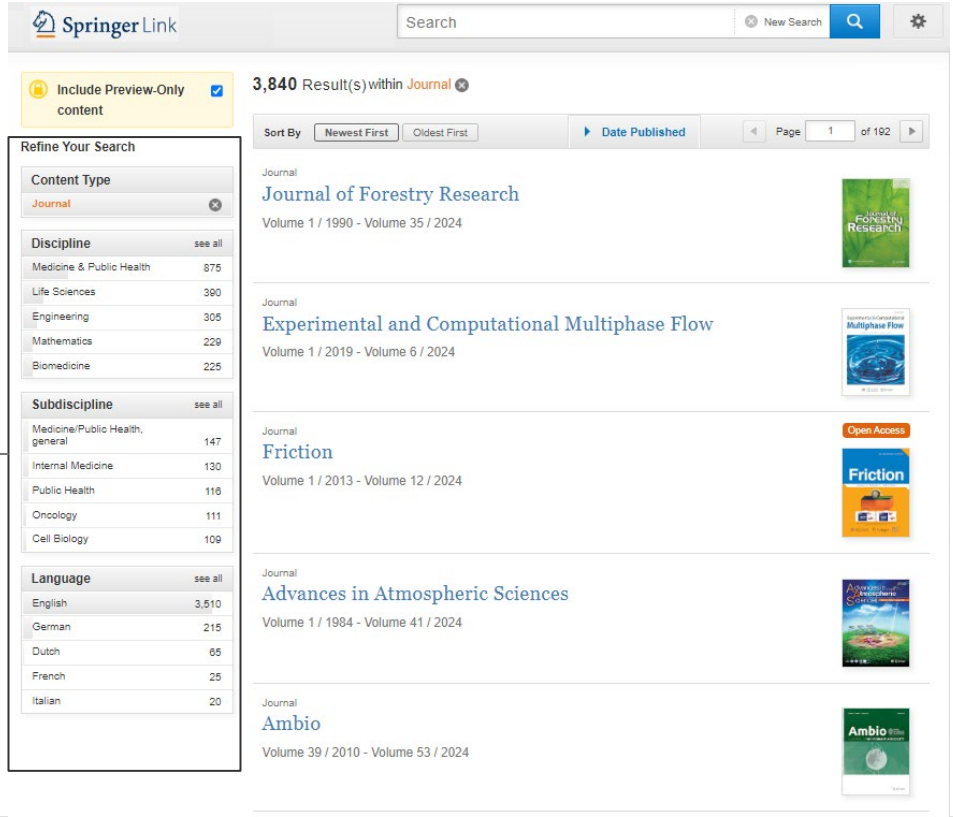
Results can be adjusted

Journal Info (Metrics, Acceptance rate, fees,etc.)



Platforms
(Springer)

You Can find a large number of journals by suitable keywords.



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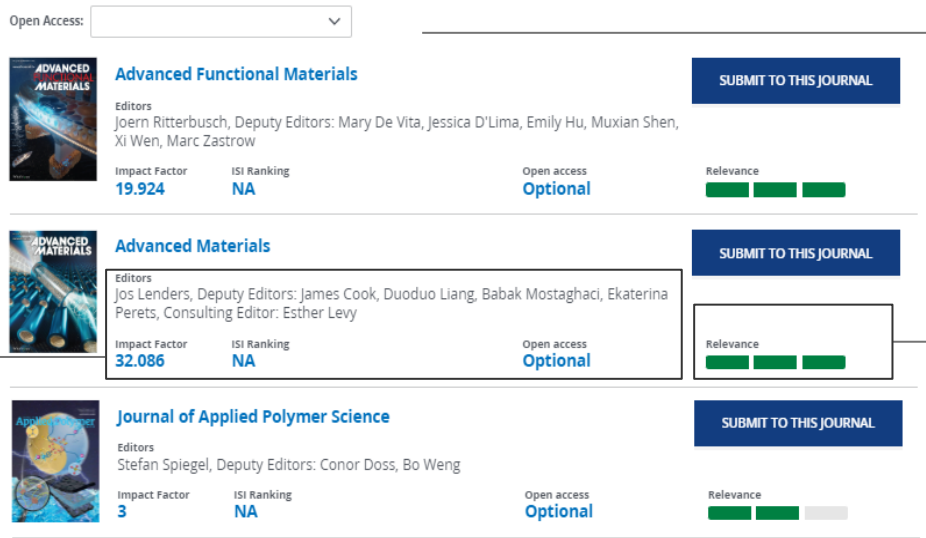
Platforms

(Wiley – results for a given title & abstract)



You can choose "open access" suggestions

Metrics of suggested journals and the list of editors

The degree of relevance of your abstract to suggestions

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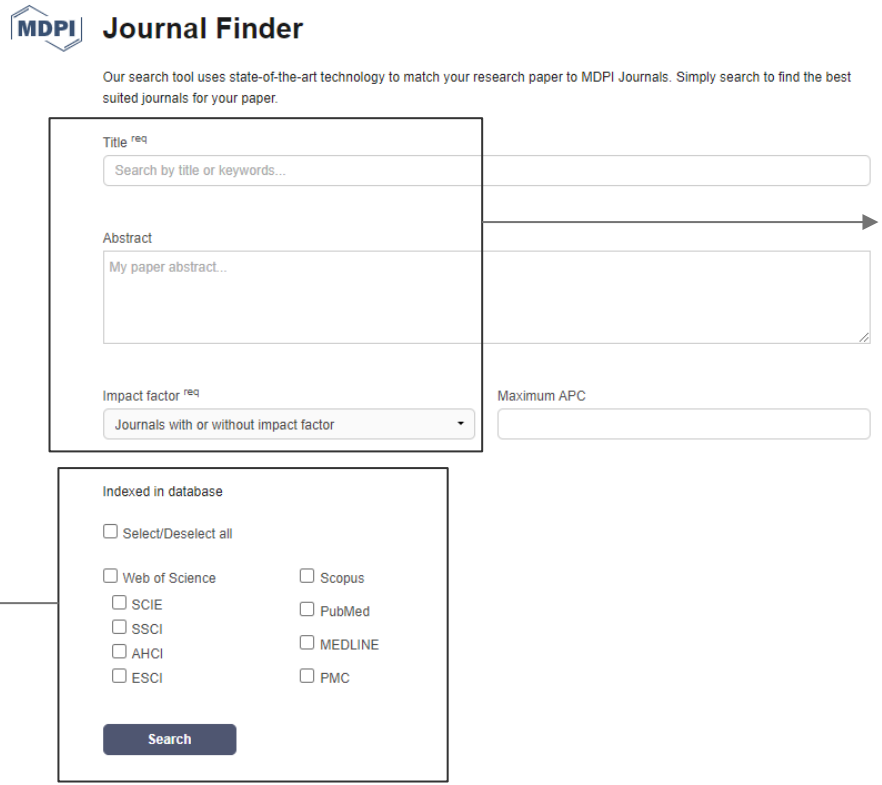
Platforms
(MDPI)



Search with the **title** and the **abstract**.

You can search within a **specific database.**

Platforms

(MDPI – results for a given title)

Journal Name	Match Rank	Impact Factor	CiteScore	Launched Year	First Decision (median)	APC
Gels	1	4.6	2.9	2015	10.03 days	CHF 2600
Journal of Composites Science	2	3.3	4.5	2017	12.77 days	CHF 1600
Polymers	3	5.0	6.6	2009	13.99 days	CHF 2700
Biomimetics	4	4.5	4.5	2016	17.49 days	CHF 2200
Chemistry	5	2.1	2.5	2019	14.62 days	CHF 1600
Nanomaterials	6	5.3	7.4	2011	11.7 days	CHF 2900
Journal of Functional Biomaterials	7	4.8	5.0	2010	13.93 days	CHF 2700
C	8	4.1	-	2015	16.82 days	CHF 1400
Inorganics	9	2.9	4.0	2013	13.03 days	CHF 2700
Molecules	10	4.6	6.7	1996	13.64 days	CHF 2700

Information of suggested journals

Matched journals based on their rank

Platforms

(Taylor & Francis – results for a given abstract)

Information about suggested journal

Metrics of suggested journal

Permission condition whether you can publish your paper “open access” or not

01
02
03
04
05

References

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- Some pictures used in the presentation are created by GPT-4 (Link).

Thanks!

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Any Questions → 

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