Measuring + Maximizing Research Impact

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Objectives

What's in store for today

- define commonly used author, article, and journal level metrics
- understand the limitations of using certain metrics
- search databases for various metrics
- take steps to help maximize research impact
What are Research Metrics?

- Tools used across the publishing industry to measure the performance of journals, publications, and authors.
- They use quantitative methods, but often require more analysis and contextual understanding.
Types of Metrics

Author Level

Article Level

Journal Level

Alternative Metrics
Caveats...

- It is best to use multiple metrics to paint a more robust picture of research impact, as one metric rarely can tell the whole story.

- Metrics can be manipulated or gamed.

- Citation and other data found within sources that contain research metrics are not perfectly clean and usually require some manual work and data cleanup.

- Because metrics are quantitative, they require you to add the impact story and qualitative information for context.
Author Level Metrics

H-index, RCR, g-index
H-index

This is an author-level metric that attempts to measure both the productivity and citation impact of an author's publications.

It is based on the set of the author's most cited papers and the number of citations that they have received in other publications. h-indices can vary by source since the sources may not all include the same publications.

For example, an author with h-index of 61 has at least 61 published papers cited at least 61 times each.

Source: Scopus
Pros / Cons

- Corrects for the disproportionate weight of highly cited publications or publications that have not yet been cited.
- Allows for direct comparisons (but only within a discipline)

- Does not give an accurate measure for early-career researchers, because it doesn't distinguish between early, mid, or late career individuals.
- Author name variant issues and multiple versions of the same work pose challenges in establishing accurate citation data for a specific author.
- Does not consider author contribution, e.g. first, last, middle author.
- Self-citations or gratuitous citations among colleagues can skew the h-index.
The H-index will vary across databases/tools

**Scopus**

- Metrics overview
  - 293 Documents by author
  - 17585 Citations by **13240 documents**
  - 61 *h*-index: View *h*-graph

**Google Scholar**

- Cited by
  - All
    - Citations: 26940
    - *h*-index: 77
    - i10-index: 236
  - Since 2016
    - Citations: 18612
    - *h*-index: 66
    - i10-index: 217

**Web of Science**

- Citation Network
  - 55 *H*-Index
  - 388 Publications in Web of Science
  - 15,729 Sum of Times Cited
  - 10,000 Citing Articles

different *h* indices for Duke author Bryce Reeve, PhD
Where to find your h-index

Scopus (find it: library homepage, databases, S)  
Web of Science (find it: library homepage, databases, W)  
Scholars@Duke (if you keep up your profile)  
Google Scholar (usually inflated/misleadingly high)  

Instructions here:  
https://guides.mcllibrary.duke.edu/researchimpact/author
The RCR (relative citation ratio) is fundamentally an article-level metric but has been proposed as an alternative to the h-index to evaluate author impact.

The RCR was developed by the National Institutes of Health (NIH) Office of Portfolio Analysis. The RCR makes use of a co-citation network, which means that when it assesses one paper it looks at the other papers that appear alongside it in the reference list. By doing this, it field-normalizes the number of times an article is cited.

https://icite.od.nih.gov/analysis
Pros / Cons

- Field normalized - so, comparing within the related field(s).
- Limited to NIH-funded research, so it is not comprehensive.
Article Level Metrics

Citation Counts, RCR, alt metrics (more later)
Citation Counts

Simply count up the number of times your article, book, or other published research has been cited.

Like the h-index, citation counts may vary across databases, such as Scopus, Web of Science, and Google Scholar, as each database indexes different journals.

Google Scholar citation counts are often over-inflated because they may count multiple versions of the same paper. PubMed does not contain citation counts for articles.
Limitations

- Dependent on database coverage/scope, text-mining, algorithms, and human curation
- Does not take into account the nature of the citation
- Does not take into account the age of the publication
- Does not consider differences in fields; non-normalized
- Some databases may not include the option to exclude self-citations
Journal Level Metrics

Journal Impact Factor, Eigenfactor, SNIP, SJR Scimago
Impact Factor

Impact factor is a measure of the frequency with which the average article in a journal has been cited in a particular year.

The Journal Citation Report (database; library subscribes) also lists journals and their impact factors and ranking in the context of their specific field(s) through JCI and Journal Quartile Ranking.

Source: Journal Citation Reports

How to find it: https://guides.mclibrary.duke.edu/researchimpact/journal
Pros / Cons

- Now has the option to remove the self-citations within a journal (something that has been found to falsely inflate the JIF)
- Now has Journal Citation Indicator, which is more of a category-normalized citation impact (WoS has created journal categories, e.g. Surgery)... but this is still very new

- Can be difficult to understand or interpret
- Does not take into account the nature of the citation (is it good attention or negative attention, for example)
- Does not consider differences in fields; non-normalized
- Includes some self-citations
In the news...

Impact Factor Denied to 20 Journals For Self-Citation, Stacking

The emergence of a Citation Cartel is a concern. Editors have been caught coercing authors into self-citing their journal. Other editors have published editorial “reviews” of the articles published in their own journal, focusing entirely on papers that have been published in the previous two years — the window from which the impact factor is generated.
The eigenfactor score is a journal-level metric that measures the number of times, in the past five years, that articles from a journal have been cited in the Journal Citation Reports (JCR).

Eigenfactor metrics differ from impact factors, because the former both counts citations as well as takes into account the location from which the citations appear. The eigenfactor score:

- Counts citations to journals in both the sciences and social sciences.
- Eliminates self-citations.
- Weights each reference according to a stochastic measure of the amount of time researchers spend reading the journal.

<table>
<thead>
<tr>
<th>Order</th>
<th>Journal</th>
<th>Percentile</th>
<th>EF</th>
<th>AI</th>
<th>EFn</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>JAMA SURG</td>
<td>86</td>
<td>0.012</td>
<td>2.8</td>
<td>1.4</td>
</tr>
<tr>
<td></td>
<td>2168-6254</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

How to find it: [https://guides.mclibrary.duke.edu/researchimpact/journal](https://guides.mclibrary.duke.edu/researchimpact/journal)

Source: Eigenfactor website
The SNIP (source normalized impact per paper) indicator measures the average citation impact of the publications of a journal. Source Normalized Impact per Paper measures actual citations received relative to citations expected for the serial’s subject field.

Unlike the journal impact factor, SNIP corrects for differences in citation practices between scientific fields, thereby allowing for more accurate between-field comparisons of citation impact.

How to find it:
https://guides.mclibrary.duke.edu/researchimpact/journal
### Improved Citescore

We have updated the CiteScore methodology to ensure a more robust, stable and comprehensive metric which provides an indication of research impact, earlier. The updated methodology will be applied to the calculation of CiteScore, as well as retroactively for all previous CiteScore years (i.e. 2018, 2017, 2016…). The previous CiteScore values have been removed and are no longer available. [View CiteScore methodology](#).

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#### Filter refine list

**Display options**

- Display only Open Access journals
- Adjusts for 4-year timeframe
- No minimum selected
- Minimum citations
- Minimum documents
- citescore highest quartile
- Show only titles in top 10 percent

**Display options**

- Source title
- Documents 2017-20
- % Cited
- SNIP
- SJR
- Publisher

<table>
<thead>
<tr>
<th></th>
<th>Source title</th>
<th>Documents 2017-20</th>
<th>% Cited</th>
<th>SNIP</th>
<th>SJR</th>
<th>Publisher</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>JAMA Surgery</td>
<td>581</td>
<td>88</td>
<td>4.916</td>
<td>3.757</td>
<td>American Medical Association</td>
</tr>
<tr>
<td>3</td>
<td>American Journal of Surgical Pathology</td>
<td>745</td>
<td>85</td>
<td>2.552</td>
<td>2.625</td>
<td>Wolters Kluwer Health</td>
</tr>
</tbody>
</table>
To sum, you can find journal level metrics:

**Journal Citation Reports** - includes Journal Impact Factor, Journal Citation Indicator, Journal Quartile Rankings

**Scopus (Sources section)** - includes SNIP + SciMago

**Eigenfactor website**

Instructions here: [https://guides.mclibrary.duke.edu/researchimpact/journal](https://guides.mclibrary.duke.edu/researchimpact/journal)
Alternative Metrics

Altmetrics, Plum Metrics
What are alternative metrics?

Measure of social engagement with online research outputs.

Image taken from: https://altmetric.figshare.com/articles/online_resource/Introduction_to_Altmetric_and_altmetrics/5774094
Alternative metrics include:

**Mentions**
- News
- Blogs
- Social media shares, likes, and comments
- Grey literature (non-commercial publications)

**Usage**
- Views
- Clicks/link-outs
- Library holdings

**Captures**
- Exports/downloads
- Saves (citation managers, other accounts)
- Bookmarks
- Favorites
- Followers/subscribers
Sources

PlumX metrics (Scopus)

Altmetric.com

Duke does NOT have a subscription; but, altmetric donut + attention score are in Scholars@Duke
Limitations

- Alternative metrics are meant to COMPLEMENT other traditional metrics.

- Attention can be negative!

- Like citation counts, these are measures of attention but not quality.

- Easier for authors to inflate numbers.
Maximizing your Impact
1. Establish your profile(s) and identity

- ORCID
- Google Scholar Profile
- Scholars@Duke
**ORCID**
- Unique identification number for you
- Add CV-esque content
- Add publications
- Institution agnostic, travels with you
- Connects to other tools, like SciENcv for NIH Biosketches as well as Scholars @ Duke

**Google Scholar**
- Claim your profile!

**Scholars@Duke**
- Duke’s profile system
- Connect with ORCID

https://orcid.org/
2. Enhance your discoverability + reach

- Use the tools in #1
- Ensure publications are indexed in major databases like MEDLINE
- Consider open access publishing
- Avoid predatory publishers
- Consider depositing your work in an open repository.
Check the journal's indexing:

- When selecting a journal, ensure that it is indexed (i.e., included) in databases like MEDLINE.
- Check the NLM Journal Catalog here: https://www.ncbi.nlm.nih.gov/nlmcatalog/

*American journal of obstetrics and gynecology*
American Gynecological Society.
NLM Title Abbreviation: Am J Obstet Gynecol
ISSN: 0002-9378 (Print); 1097-6868 (Electronic); 0002-9378 (Linking)
Currently indexed for MEDLINE
NLM ID: 0370476 [Serial]
Consider Open Access Publishing

Open access journals are accessible to more people and are thus sometimes cited more frequently. Open access journals are also more likely to allow you to retain rights to a work, allowing for further dissemination of research.

In this model, the article processing charges (APCs) are shifted to the authors. FYI - these can be anywhere from $500 to $3000+.
Avoid Predatory Publishers

Check the DOAJ to ensure you are selecting a non-predatory publisher: https://doaj.org/

Avoid publishing in predatory journals using our Be iNFORMEd checklist.
Consider Open Repositories

- If publishing in a traditional journal, try to negotiate permission to archive a version of your article (like the galley proofs) in an open repository such as DukeSpace.

- Include data availability statements and link publications to data in an open repository such as the Duke Research Data Repository.
3. Use social media

- Share/link to your work on: FB, IG, Twitter, LinkedIn, YouTube, Blogs, Podcasts, etc.
- Post a video abstract and link to your article!
Publication Metrics Guide from Duke Med Ctr Library

Getting Published Guide from Duke Med Ctr Library

Tips for Sharing Articles from Duke University Press

Metrics Toolkit
Get in Touch

Research & Education Librarians
medical-librarian@duke.edu

Ask a Librarian Chat/Email/Phone
https://mclibrary.duke.edu/about/ask-librarian

Website
www.mclibrary.duke.edu