

Measuring Research Impact

A Georgetown University Library Research Guide



“For the journal papers in [your] cv, do you also list their ISI impact factor values?” asked an anonymous poster in 2009 at the *Chronicle of Higher Education* web forums. Several responders had never seen impact factors listed on a CV, and thought the practice would be annoying. But one poster noted that these numbers sometimes crop up when discussing tenure and promotion: “in the promotion case the H-index and publication citations are sometimes discussed in the context of the candidate’s research.”¹

Less than four years later, the *Chronicle* reported on an assistant professor at a major research university whose tenure portfolio included not only citation counts of their publications, but also tweets, blog post views, and other mentions of their lab’s research on social media. Although it’s impossible to say what weight these metrics played in the decision, the professor was successfully granted tenure and a promotion.²

Tracking citations and attempting to measure research impact isn’t new, but in recent years the available tools have grown more sophisticated. “Traditional” metrics, based on citations in formal publications such as journals or books, have been joined by “alternative” metrics, attempting to capture paper downloads, views of supplemental data sets and presentations, and mentions of research on Twitter, Facebook, or other social media.

As the tools have evolved, the pressure to use them has also increased. Scholars, departments, and universities increasingly are asked to explain the impact of their research to external funders and measure themselves against similar peers.

This guide, a print version of the Library’s online Research Impact Guide, outlines some of the tools available to scholars and how you might use them to enhance the impact of your own research.

Author Identification

Why use an author ID?

Have you ever been mistaken for another scholar? Even if you don’t have a common surname, author IDs help uniquely identify you and your publications. IDs ensure you aren’t confused with another researcher with a similar name, and that citations aren’t “lost” due to name misspellings (it happens more often than you think!).

Author IDs help promote you and your research: they provide an easy way for you, and scholars interested in your work, to see a complete list of works. Some author ID systems make it easy to generate citation counts and other metrics.

Author IDs also ensure your publications and citations are appropriately credited, even if you change names or move to another institution.

What tools are available?

Author ID tools are principally concerned with uniquely identifying authors to avoid cases of mistaken identity.

ORCID provides a persistent digital identifier for researchers. The ORCID system is open access and community based. Your ORCID can be linked to ResearcherID, another author ID system.

ResearcherID, developed by ThomsonReuters (the company behind Web of Science), provides

persistent author identification to Web of Science subscribers and other invited scholars. Registration is free to GU students and faculty. Your ResearcherID can be linked to your ORCID.

SciENcv (Science Experts Network Curriculum Vitae) is an author identification system developed by the National Institutes of Health and other Federal agencies. You will need a My NCBI, eRA, or NIH account to access SciENcv.

Google Scholar allows authors to set up profiles and track their citations in Google Scholar.

What are author profile services?

Author profile services provide a place for authors to upload their research, create profile pages, and connect with other researchers. (Some have called them “Facebook for academics.”) Some publishers prohibit uploading of published articles to these services. Check with your publisher for details.

Vitae, produced by the *Chronicle of Higher Education*, allows users to create an online profile and dossier. Particularly useful for those applying for academic jobs.

Academia.edu enables researchers to create profiles and upload their publications. Academia.edu provides some metrics (views and downloads) of uploaded works.

In this guide:

- Author Identification
- Citation Metrics
- Journal Impact
- Altmetrics

continued on next page

ResearchGate aims to “connect researchers and make it easy for them to share and access scientific output, knowledge, and expertise.” Allows uploading and tracking of papers and other work.

Will my publication list update automatically?

Most systems allow for searching and importing citations from existing article databases:

- **ORCID:** MLA Bibliography, Web of Science (via linked ResearcherID), CrossRef, Airiti (Chinese articles), BibTeX
- **ResearcherID:** Web of Science, EndNote, RIS, ORCID
- **SciENcv:** PubMed
- **Vitae:** none (can upload documents to online dossier)
- **Google Scholar Citations:** Google Scholar

Generally, you have to add publications and update biographical information yourself. (Exception: Google Scholar has an option to automatically add new articles.) However, All ID tools also allow researchers to manually add citations by hand.

Which ID system should I use?

Some researchers use multiple systems. The various ID tools are not mutually exclusive, and some (ORCID and ResearcherID) have linkages to share information.

Author ID Tools

- **ORCID** <http://orcid.org/>
- **ResearcherID** <http://www.researcherid.com/>
- **SciENcv** <http://www.ncbi.nlm.nih.gov/sciencv/>
- **Google Scholar Citations** <https://scholar.google.com/>

Author Profile Services

- **Vitae** <https://chroniclevitae.com/>
- **Academia.edu** <https://www.academia.edu/>
- **ResearchGate** <http://www.researchgate.net/>

We also suggest checking with other researchers: journals in your field may prefer a specific author ID system. In particular, applicants for NIH funding are encouraged to use SciENcv to create their NIH biosketch profiles.

Can I generate citation counts with an ID tool?

Once you have added articles to your author profile, ResearcherID and Google Scholar Citations can generate citation counts (using Web of Science and Google Scholar, respectively). SciENcv and Vitae do not generate citation metrics.

ORCID cannot generate a citation count natively (within the ORCID system), but several third-party metric tools can import and track an ORCID publication list. (See our Citation Metrics section for more information.)

Citation Metrics

How do I measure the impact of my work?

Generally, there are two ways to measure an author’s impact: (1) create a citation report listing each work with a citation count; (2) calculate an index score that assigns a numerical value to the overall impact of an author’s publications.

These methods are not exclusive. A citation report can identify specific works with high impact and provide an easy way to list both total works and total citations. An index score can illuminate nuances missed by a citation count (for example, the recency of citations).

What tools are available?

Web of Knowledge/Web of Science: Indexes over 12,000 journals, with citation counts available back to 1970.

Google Scholar: Covers “scholarly articles from a wide variety of sources.” Generally will produce much higher citation counts than Web of Science.

PLoS Article-Level Metrics (ALM): ALM tracks citations to articles published in PLoS (Public Library of Science) journals.

Impactstory: ImpactStory gathers data from a variety of traditional and alternative sources, including altmetric.com, Scopus, Mendeley, PubMed Central, and more. *Free 30 day trial; \$60 annual subscription*

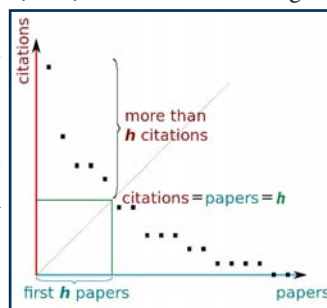
Publish or Perish: Publish or Perish (PoP) uses data from Google Scholar, but allows researchers to easily calculate advanced metrics, such as different h-indices, g-index, and more.

What are index numbers?

Citation index numbers provide a way to measure impact beyond raw citation counts. Index numbers can be calculated for individual articles, a group/list of publications, or even all the articles published in a journal or field (see our Journal Impact page).

What is the “best” index number?

Generally, the “best” measurement depends on what matters to you. The h-index is the most widely known index measurement. Some alternative measurements, like the g-index, address specific issues with the h-index. Other measurements target recent publications and citations, such as the contemporary h-index.



Graph of h-index from Wikipedia.

Citation Metric Tools

- **Web of Science** <http://isiknowledge.com/wos>
- **Google Scholar** <http://scholar.google.com/>
- **PLoS ALM** <http://article-level-metrics.plos.org/>
- **ImpactStory** <https://impactstory.org/>
- **Publish or Perish** <http://www.harzing.com/pop.htm>

What is the “Impact Factor”?

A journal’s Impact Factor measures citations relative to “citable items” published by that journal (usually articles) in the past two years. Articles in journals with high Impact Factors generally get cited more frequently than articles in low-impact journals.

The Impact Factor is part of JCR - Journal Citation Reports, a component of Web of Science. More information about the impact factor is available from Thomson Reuters.

Are high-impact journals the best or top journals?

The Impact Factor and other metrics can be “rough approximations” of the top journals in a field, but the highest-ranked journals are not always the most prestigious or appropriate for a specific article. *We strongly recommend consulting with the Library’s subject specialists, GU faculty or other experts to identify appropriate journals, especially if you are preparing a manuscript for publication.* Some lists of “top” or quality journals are also found on our online guide.

Journal Impact Tools

- **Journal Citation Reports** <http://isiknowledge.com/jcr>
- **ScImago Journal Rankings** <http://www.scimagojr.com>
- **Google Scholar Journal Metrics** https://scholar.google.com/citations?view_op=top_venues&hl=en

What other journal metrics are widely used?

Although the Impact Factor is the most well-known measurement of journal quality, Web of Science (WoS) and other groups have developed many other journal metrics, including:

5-Year Impact Factor (WoS): Calculates the Impact Factor over a five-year period, instead of the (default) two years.

Immediacy Index (WoS): Measures the citations to articles within the same year. Useful for determining how quickly articles are generally cited.

Cited Half-Life (WoS): Measures the number of previous years that account for 50% of the articles cited in a particular journal. A long half-life indicates articles get cited for many years after publication.

Eigenfactor Score (WoS): Calculates citations relative to citable items, similar to the Impact Factor, but assigns more weight to citations from articles in influential journals categorized by Web of Science.

SCImago Journal Rank (SJR): provides journal rankings based on data from Scopus.

Google Scholar Metrics: Google ranks journals based on h5-index (the h-index for articles published in the previous 5 years).

Altmetrics

What are altmetrics?

Traditional citation metrics only count citations to a given article in other peer-reviewed publications. “Altmetrics” attempt to broaden this picture by including citations, quotations, and mentions in other venues. Some of the places altmetrics seek to measure include:

- Page views: views or downloads of a paper from a journal website
- Social media: mentions on Twitter, Facebook, etc.
- Citation managers: uses of a paper in citation managers like Mendeley
- and more—altmetrics tools regularly change and refine the spaces they measure.

Why include altmetrics?

In *Altmetrics: a manifesto*, Jason Priem and others argue that altmetrics complement traditional citation metrics by providing (1) a broader measure of research impact beyond peer-reviewed publications; (2) quicker and more responsive measurements than traditional citation metrics, which can take months or years to compile; and (3) a richer view of impact by including more context of citations.³ Altmetrics do not replace traditional citation metrics, but can provide additional evidence of an article’s (or researcher’s) impact on the scholarly community.

What altmetric tools are available?

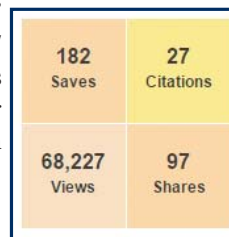
Although the Library does not subscribe to a site-wide altmetric tool like Plum Analytics or Altmetric.com, we continue to monitor

altmetric tools for their relevance to faculty and researchers. Some altmetric tools that are freely available or for moderate cost are:

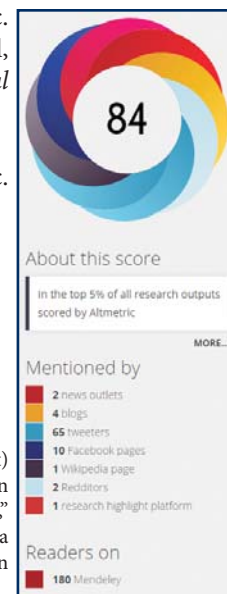
PLoS Article-Level Metrics: PLoS Article-Level Metrics track a mixture of traditional metrics and altmetrics. Only for articles published in PLoS journals.

ImpactStory: ImpactStory gathers data from a variety of traditional and alternative sources, including altmetric.com, Scopus, Mendeley, PubMed Central, and more. *Free 30 day trial; \$60 annual subscription*

Altmetric.com Bookmarklet: Altmetric.com’s “bookmarklet” widget for Firefox/Chrome/IE allows you to easily discover the metrics of an individual article.



Metrics from PLoS (above) and Altmetric.com (right) for “Retention of Memory through Metamorphosis: Can a Moth Remember What It Learned As a Caterpillar?” by Douglas J. Blackiston, Elena Silva Casey, and Martha R. Weiss, all of Georgetown University. Published in *PLOS One*, March 5, 2008. Measured in October 2015.



The Challenge of Research Metrics

“...the abuse of research metrics has become too widespread to ignore.”

– The Leiden Manifesto

Metrics to measure research impact hold both promise and peril. Many researchers and research administrators welcome measurements that are easily quantified, devoid of favoritism or bias, and provide a (limited) opportunity to compare similar research outputs.

But research metrics can also be abused. Individual authors and journal editors can try to “game the system” and artificially boost their scores on certain metrics, most notably on journal Impact Factor. Researchers and administrators can also push metrics to support conclusions that ignore the metric’s limitations. One prominent scientist observed that this pressure for “scoring well” is especially acute on junior researchers: “Some of them come in [and say] ‘if I don’t get a *Cell*, *Science*, or *Nature* [article] I’m not going to get a faculty position.’ And that comes from the impact factor hype.”⁴

Although altmetrics have had fewer charges of “gaming,” their novelty makes their significance

harder to understand: do views and downloads actually mean people read the paper, or just saved it? Do tweets or Facebook posts about a researcher’s new book indicate significant engagement with its scholarship, or merely passing mentions?

Several “high-impact” journals, including *Nature*⁵ and *PNAS*⁶, have published recent warnings about over-relying on metrics, and advocated a more balanced picture: one where quantitative measurements complement the qualitative judgments of peers and experts. The Leiden Manifesto, developed at an international conference for science and technology indicators, notes: “Indicators must not substitute for informed judgement. Everyone retains responsibility for their assessments.”⁶

We hope this Guide leads to thoughtful and nuanced use of research metrics—and because the topic of metrics is evolving rapidly, we welcome suggestions and feedback.

Citations and Further Reading

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4. Siebert S, Machesky LM, and Insall RH. “Overflow in Science and Its Implications for Trust.” *eLife* 4(September 14, 2015):e10825ff. DOI: 10.7554/eLife.10825#sthash.dDuwAR82.dpuf
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Further Reading:

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