Demystifying Citation Metrics

Michael Ladisch
Pacific Libraries
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<th>Journal</th>
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Outline

• Use and Misuse of Bibliometrics
• Databases for Citation Analysis
  • Web of Science
  • Scopus
  • Google Scholar
• Journal Ranking
  • Journal Citation Reports
  • ScImago Journal Rank
• Alt-metrics
• Your Resume
Not everything that can be counted counts, and not everything that counts can be counted.

William Bruce Cameron (1963) “Informal Sociology: A Casual Introduction to Sociological Thinking”
Bibliometrics

... is a set of methods to quantitatively analyze academic literature.

**Metrics are one indicator used for**
- Evaluation of research by individual researcher / group / institution
- Awarding research grants
- Recruitment / Promotion
- Discovering relevant publications
- Finding relevant journals

**Be aware**
- Measuring “Impact” not “Quality”
- Works better in some disciplines than in others
- Metrics are not the “whole picture”, no replacement for peer review
**Bibliometrics**

**Primary metrics:**
- Number of publications
- Number of citations received
- Collaborations
- Weighted Impact

**Secondary metrics:**
- Journal Impact Factor
- H-Index

**Types of metrics:**
- Journal metrics
- Author metrics
- Article metrics
- Alt-metrics
Many reasons for citing

- Acknowledge published or unpublished sources
- Highlight other sources
- Criticize other sources (negative citations)
- Self-citations
- “Strategic citations”
  - Citation networks
  - Publications in same journal/by same publisher
Bibliometrics

Citation = Citation?

Number of Authors / Contribution to publication

- Single author vs. multiple authors
- Position in author listing

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## Bibliometrics

**Citation = Citation?**

### Document types
- Book
- Book chapter
- Review
- Article
- Conference paper
- Editorial
- Book review
- Note
- Letter to editor
- Correspondence

### Location in publication
- Introduction
- Background
- Methods
- Results
- Discussion
- Conclusion

### Number of occurrences
Bibliometrics

Citation = Citation?

Publication Year

Bibliometrics

Citation = Citation?

Discipline

http://www.harzing.com/data_metrics_comparison.htm#indivh
The Controversy

“The Leiden Manifesto for research metrics

Use these ten principles to guide research evaluation, urge Diana Hicks, Paul Wouters and colleagues.

Data are increasingly used to govern science. Research evaluations that were once bespoke and performed by peers are now routine and reliant on metrics. The problem is that evaluation is now led by the data rather than by judgement. Metrics have proliferated: usually well intended, not always well informed, often ill applied. We risk damaging the system with the very tools designed to improve it; an evaluation is increasingly implemented by organisations without knowledge of, or advice on, good practice and interpretation. Before 2003, there was the Science Citation Index on CD-ROM from the Institute for Scientific Information (ISI), used by experts for specialist analysis. In 2002, Thomson Reuters launched its integrated platform, making the Web of Science database widely accessible. Competing citation indices were created: Thomson's SciWeb (released in 2004) and Google Scholar (beta version released in 2006). Web-based tools to easily compare institutional research productivity and impact were introduced, such as iConsulting (using the Web of Science) and SciVal (using Scopus), as well as software to analyse individual citation profiles using Google Scholar (Pichler or Parraga, released in 2007).

In 2005, Jorge Hirsch, a physician at the University of California, San Diego, proposed the h-index, popularising the citation metric for individual researchers. Interest in the journal impact factor grew, and by the early 2000s a term—"impact factor obsession"—surfaced.

Lastly, metrics related to social usage.

Quantitative evaluation should support qualitative, expert assessment.”

http://www.nature.com/news/bibliometrics-the-leiden-manifesto-for-research-metrics-117351
H Index

my H-INDEX
is bigger than yours
H-Index

Aims to capture both productivity (output) and impact (citations)

How many \( h \) of a researcher’s publications have at least \( h \) citations each.
The h index is...

**Pros**
- Considering productivity and impact
- Comprehensible
- Easy to compute

**Cons**
- Not taking subject differences in account
- Disadvantaging early career researchers
- Distinguishing between single and multi-author articles
The Tools

- Scopus (Elsevier)
- Web of Sciences (Clarivate)
- Google Scholar
- Publisher Databases
The Tools

Web of Science Vs. Scopus Coverage

Source: JISC [http://adat.crl.edu]
Analyze author output

Vierra, Craig A.  
University of the Pacific, California, Department of Biological Sciences, Stockton, United States
Author ID: 6602322840

Documents (29)  h-index (13)  Citations (534)  Co-authors (85)

Analyze documents published between: 1993 to 2017

- Exclude self citations
- Exclude citations from books

This author's h-index is 13

The h-index is based upon the number of documents and number of citations.

Note: Scopus is in progress of updating pre-1996 cited references going back to 1970. The h-index might increase over time.
<table>
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<tr>
<th>Title</th>
<th>Cited by</th>
<th>Year</th>
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<tr>
<td>SoundRuler: acoustic analysis for research and teaching</td>
<td>98 *</td>
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<td>M Gridi-Papp</td>
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<td>Animal communication: complex call production in the túngara frog</td>
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<td>M Gridi-Papp, AS Rand, MJ Ryan</td>
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<td>Pure ultrasonic communication in an endemic Bornean frog</td>
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<td>PLoS One 4 (4), e5413</td>
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<td>Active control of ultrasonic hearing in frogs</td>
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<td>M Gridi-Papp, AS Feng, JX Shen, ZL Yu, JJ Rosowski, PM Narins</td>
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<td>Proceedings of the National Academy of Sciences 105 (31), 11014-11019</td>
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<td>Differential fruit consumption of two Melastomataceae by birds in Serra da Mantiqueira, southeastern Brazil</td>
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<td>Ararajuba, 5-10</td>
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Journal Metrics
- 55 Subject categories
- Uses Web of Science dataset
- Calculates 2 years period

<table>
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<th>Selected Journals</th>
<th>Add Journals to New or Existing List</th>
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<td>Journal Titles Ranked by Impact Factor</td>
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<td>Full Journal Title</td>
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<td>eLife</td>
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SCImago Journal & Country Rank

- 27 Subject areas and 313 Subject categories
- Uses Scopus dataset
- Calculates 3 years period

http://www.scimagojr.com
### SCImago Journal & Country Rank

#### Journal Rankings

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<th>Total Cites</th>
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Scopus - CiteScore

Source details

Plant Cell
Scopus coverage years: from 1989 to Present
Publisher: American Society of Plant Biologists
ISSN: 1040-4651 E-ISSN: 1532-298X
Subject area: Agricultural and Biological Sciences: Plant Science

Visit Scopus Journal Metrics

CiteScore 2016
7.66
SJR 2016
5.516
SNIP 2016
2.102

CiteScore 2016
8,241 Citations >
1,076 Documents >

CiteScore rank
In category: Plant Science
Percentile: 98th
Rank: #5/379

View CiteScore methodology >
View CiteScore trends >
Add CiteScore to your site >
Altmetrics
"Altmetrics are measures of scholarly impact mined from activity in online tools and environments."

Jason Priem, author of “Altmetrics: a manifesto”

Benefits:

• A more **nuanced** understanding of impact, showing us which scholarly products are read, discussed, saved and recommended as well as cited.

• Often more **timely** data, showing evidence of impact in days instead of years.

• A window on the impact of web-native **scholarly products** like datasets, software, blog posts, videos and more.

• Indications of impacts on **diverse audiences** including scholars but also practitioners, clinicians, educators and the general public.

New perspectives of impact

**ACADEMIC IMPACT**
- Journal Impact Factor
- Citation counts
- H-index
- Number of publications
- Traditional bibliometrics

+ Can be slow to accrue

**SOCIETAL IMPACT**
- Download counts
- Page views
- Mentions in news reports
- References in policy
- Mentions in social media
- Mentions in blogs
- Reference manager readers
  - etc.
- Alternative metrics
  - “altmetrics”
Altmetrics

Potentially “measured”

- Viewed (publisher websites, Dryad)
- Downloaded (publisher websites, Slideshare, Dryad)
- Shared (Facebook, Twitter)
- Reused/adapted (Github)
- Bookmarked (Mendeley, CiteULike, Delicious)
- Purchased (Library catalogues, Sales numbers)
- Commented upon (Twitter, Mendeley, blogs, publisher websites, Wikipedia, Faculty 1000)

Source: S. Konkiel, Univ. of Indiana
Altmetrics

Caveats

• Lack of standard
• Use of online tools may differ by individual researcher, discipline, over time
• Popularity (attention) does not always equal quality of research or researcher
• Was the spike in hits a one-time, short-attention event?
• Data sources come and go (think MySpace, Connotea)
• Open to manipulation and gaming
Altmetrics - Impactstory

http://impactstory.org/
Altmetrics – Altmetric.com

Statistics from Altmetric.com

- Picked up by 2 news outlets
- Blogged by 6
- Tweeted by 7
- Referenced in 3 Wikipedia pages
- 1,829 readers on Mendeley
- 5 readers on CiteULike

See more details

https://www.altmetric.com/

Tools for researchers

It's quick and easy to start exploring the Altmetric data for your publications – here's an overview of the tools we provide for individual researchers:

- **Altmetric Bookmarklet**: This free browser plug-in lets you instantly see the Altmetric data for any publication with a DOI. Click on the donut to view the full details page for each output.
- **Altmetric badges**: The Altmetric badges enable you to showcase the online attention surrounding your research, and it's free to embed them in your individual profile or publications page in just a few simple steps.
- **Altmetric API**: The Altmetric API is free to use for research purposes! You can use it to query our entire database (which currently contains attention data for over 4 million research outputs).
The timing and spatiotemporal patterning of Neanderthal disappearance.

Citation data: Nature, ISSN: 1476-4487, Vol: 512, Issue: 7514, Page: 306-9
Publication Year: 2014

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https://plumanalytics.com/
Your Resume

To include in your CV

- Books
- Book chapters
- Journal articles
- Conference papers
- Working papers
- Patents
- Government publications

Count and mention

- Number of citations
- Impact factor of journal
- Your h-Index
- Downloads/views from Repository
- Reviews of book or book chapter
Your Resume

Include also

• Datasets / Open Source Software (download statistics)
• Awards (best paper award etc.)
• Reviewing invitations (journals, conferences)
• Editorial board membership
• Interviews, public appearances
• Scholarly articles in newspapers/magazines
• Links to professional blogs and professional accounts in social media (Twitter, Facebook, ResearchGate, Acedemia.edu, LinkedIn, etc.)
Your Resume

Add Summary for Publications

**Publications**

**Summary:** Since 2004 I have published 21 peer-reviewed journal articles (18 as first/corresponding author) and 3 book chapters. I have an h-index of 6 as calculated using Web of Science or 7 as calculated using Google Scholar. The following lists ISI Impact Factors and citations according to Google Scholar.

**Peer-Reviewed Journal Articles (published or accepted for publication):**


**Research Publications (listed earliest to latest):**

- ISI Thompson H-index (all journal publications = 6; research publications = 5)
- Google Scholar H-index (all journal publications = 7; research publications = 5)
- 16 original articles (authorship: 10 first, 4 senior, 1 second, 1 other)
- 29 abstracts (authorship: 25 first, 1 senior)
Internet downloads

- 75,000 page downloads from my home page in 2009.
- Over 10,000 hits on INFFER web pages in 2009
- Most downloaded paper in *Australian Journal of Experimental Agriculture* since 2000 – effectively the all time most downloaded paper out of 1300 published in that time (have been no. 1 since May 2008 to present): Pannell, Marshall, Barr, Curtis, Vanclay and Wilkinson (2006).
- 17th most downloaded paper of all time in *Australian Journal of Experimental Agriculture*: Ridley and Pannell (2005).
Thank you!

Feel free to attend other Scholarly Communication Talks
For schedule see: http://scholarlycommons.pacific.edu/plw/

And check out the workshops provided by:
- Office of Sponsored Programs
- Institutional Review Board
- Graduate School
- Center for Teaching and Learning

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- Michael Ladisch
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- Email: mladisch@pacific.edu
- Twitter: MichaelLibrCA
- ORCID: http://orcid.org/0000-0002-0124-5582