Demystifying Citation Metrics

Michael Ladisch
Pacific Libraries
<table>
<thead>
<tr>
<th>Rank</th>
<th>Full Journal Title</th>
<th>Journal Impact Factor</th>
<th>Eigenfactor Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NATURE REVIEWS MOLECULAR CELL BIOLOGY</td>
<td>40.102</td>
<td>0.0963</td>
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<tr>
<td>2</td>
<td>CELL</td>
<td>30.410</td>
<td>0.09576</td>
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<tr>
<td>3</td>
<td>NATURE MEDICINE</td>
<td>29.886</td>
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<tr>
<td>4</td>
<td>CANCER CELL</td>
<td>27.407</td>
<td>0.17086</td>
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<tr>
<td>5</td>
<td>Cell Stem Cell</td>
<td>26.394</td>
<td>0.10293</td>
</tr>
<tr>
<td>6</td>
<td>NATURE CELL BIOLOGY</td>
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<tr>
<td>7</td>
<td>Cell Metabolism</td>
<td>20.060</td>
<td>0.09976</td>
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</tbody>
</table>
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
Citation = Citation?

**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- Acknowledge published or unpublished sources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
Number of Authors / Contribution to publication

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

**Citation = Citation?**

## Document types
- Book
- Book chapter
- Review
- Article
- Conference paper

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

## Number of occurrences
- Editorial
- Book review
- Note
- Letter to editor
- Correspondence
Bibliometrics

Citation = Citation?

Publication Year

Bibliometrics

Citation = Citation?

Discipline

http://www.harzing.com/data_metrics_comparison.htm#indivh
The Leiden Manifesto for research metrics

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

Quantitative evaluation should support qualitative, expert assessment.
The Controversy

San Francisco

DORA

Declaration on Research Assessment

http://www.ascb.org/dora/
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 ...

**Pro Contra**

- Considering productivity and impact
- Comprehensible
- Easy to compute

- 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

<table>
<thead>
<tr>
<th>Documents</th>
<th>Citations</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>64</td>
<td>Molecular mechanisms of spider silk</td>
</tr>
<tr>
<td>2</td>
<td>56</td>
<td>E2A expression, nuclear localizatio...</td>
</tr>
<tr>
<td>3</td>
<td>50</td>
<td>Molecular and mechanical properti...</td>
</tr>
<tr>
<td>4</td>
<td>44</td>
<td>Pyriform spidroin 1, a novel membra...</td>
</tr>
<tr>
<td>5</td>
<td>43</td>
<td>Egg case protein-1: A new class of...</td>
</tr>
<tr>
<td>6</td>
<td>42</td>
<td>Araneoid egg case silk: A fibroin wi...</td>
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<tr>
<td>7</td>
<td>36</td>
<td>Acanthoscurria spidroin, a constituent of ...</td>
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<tr>
<td>8</td>
<td>35</td>
<td>Spider egg case core fibers: Trimer...</td>
</tr>
<tr>
<td>9</td>
<td>28</td>
<td>Analysis of aqueous glue coating p...</td>
</tr>
<tr>
<td>10</td>
<td>23</td>
<td>Synthetic spider silk fibers spun fro...</td>
</tr>
<tr>
<td>11</td>
<td>19</td>
<td>Conserved C-terminal domain of ...</td>
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<tr>
<td>12</td>
<td>16</td>
<td>The Pan basic helix-loop-helix protein...</td>
</tr>
<tr>
<td>13</td>
<td>13</td>
<td>Spidroin proteins have distinct a...</td>
</tr>
<tr>
<td>14</td>
<td>13</td>
<td>Characterization of a novel class II ...</td>
</tr>
<tr>
<td>15</td>
<td>11</td>
<td>The genomic structure and promot...</td>
</tr>
<tr>
<td>16</td>
<td>7</td>
<td>Isolation and characterization of th...</td>
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</tbody>
</table>

**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.
## Marcos Gridi-Papp

**University of the Pacific**  
animal comunication, auditory physiology, vocal physiology, amphibia, bioacoustics  
Verified email at pacific.edu - Homepage

### Citation indices

<table>
<thead>
<tr>
<th>Citation indices</th>
<th>All</th>
<th>Since 2012</th>
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</thead>
<tbody>
<tr>
<td>Citations</td>
<td>317</td>
<td>201</td>
</tr>
<tr>
<td>h-index</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>i10-index</td>
<td>6</td>
<td>6</td>
</tr>
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</table>

### Cited by

<table>
<thead>
<tr>
<th>Title</th>
<th>Cited by</th>
<th>Year</th>
</tr>
</thead>
</table>
| **SoundRuler: acoustic analysis for research and teaching**  
M Gridi-Papp  
| **Animal communication: complex call production in the túngara frog**  
M Gridi-Papp, AS Rand, MJ Ryan  
Nature 441 (7089), 38-38 | 70 | 2006 |
| **Pure ultrasonic communication in an endemic Bornean frog**  
VS Arch, TU Grafe, M Gridi-Papp, PM Narins  
PLoS One 4 (4), e5413 | 38 | 2009 |
| **Active control of ultrasonic hearing in frogs**  
M Gridi-Papp, AS Feng, JX Shen, ZL Yu, JJ Rosowski, PM Narins  
Proceedings of the National Academy of Sciences 105 (31), 11014-11019 | 26 | 2008 |
| **Differential fruit consumption of two Melastomataceae by birds in Serra da Mantiqueira, southeastern Brazil**  
CO Gridi-Papp, M Gridi-Papp, WR Silva  
Ararajuba, 5-10 | 18 | 2004 |
Journal Metrics
- 55 Subject categories
- Uses Web of Science dataset
- Calculates 2 years period
### Key Indicators

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Cites</th>
<th>Journal Impact Factor</th>
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<tbody>
<tr>
<td></td>
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<td></td>
</tr>
<tr>
<td>2016</td>
<td>26,893</td>
<td>9.797</td>
</tr>
<tr>
<td>2015</td>
<td>25,871</td>
<td>8.668</td>
</tr>
<tr>
<td>2014</td>
<td>25,729</td>
<td>9.343</td>
</tr>
<tr>
<td>2013</td>
<td>24,324</td>
<td>11.771</td>
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<tr>
<td>2012</td>
<td>22,908</td>
<td>12.680</td>
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<tr>
<td>2011</td>
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<td>11.452</td>
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<td>2010</td>
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<td>12.472</td>
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<td>2009</td>
<td>15,699</td>
<td>12.916</td>
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<tr>
<td>2008</td>
<td>12,186</td>
<td>12.683</td>
</tr>
<tr>
<td>2007</td>
<td>9,223</td>
<td>13.501</td>
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</table>
SCImago Journal & Country Rank

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

http://www.scimagojr.com
<table>
<thead>
<tr>
<th>Title</th>
<th>Type</th>
<th>SJR</th>
<th>H Index</th>
<th>Total Docs. (2016)</th>
<th>Total Cites (3years)</th>
<th>Citable Docs. (3years)</th>
<th>Cites / Doc. (2years)</th>
<th>Ref. / Doc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Studies in Mycology</td>
<td>journal</td>
<td>6.468</td>
<td>6.468</td>
<td>72</td>
<td>41</td>
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<td>15.00</td>
<td>115.44</td>
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<tr>
<td>Plant Cell</td>
<td>journal</td>
<td>5.516</td>
<td>5.516</td>
<td>289</td>
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<td>932</td>
<td>8.21</td>
<td>55.98</td>
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<tr>
<td>Annual Review of Phytopathology</td>
<td>book serie</td>
<td>5.160</td>
<td>5.160</td>
<td>131</td>
<td>80</td>
<td>80</td>
<td>11.42</td>
<td>141.20</td>
</tr>
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Scopus - CiteScore

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

CiteScore 2016
7.66
SJR 2016
5.516
SNIP 2016
2.102

CiteScore = 7.66
8,241 Citations / 1,076 Documents

CiteScore rank
98th Percentile
Rank: #5,379

View CiteScore methodology > CiteScore FAQ > View CiteScore trends > Add CiteScore to your site >
Altmetrics
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

SOCIOETAL IMPACT

- Download counts
- Page views
- Mentions in news reports
- Mentions 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)
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/
The timing and spatiotemporal patterning of Neanderthal disappearance.

Citation data: Nature, ISSN: 1476-4687, Vol: 512, Issue: 7514, Page: 306-9
Publication Year: 2014

Altmetrics – PlumAnalytics

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, Academia.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 down loaded 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).
- 17\textsuperscript{th} 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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