Research Evaluation Metrics

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Piled Higher and Deeper ***by Jorge Cham*** **www.phdcomics.com**

Your (real) Impact Factor

$$\text{Impact Factor (corrected)} = \frac{\text{\# times your work is cited} - \text{\# citations that actually trash your work} - \text{\# times you cited yourself (nice try)} - \text{\# times you were cited just to pad the introduction section} - \text{\# citations the editor pressured the author to include to increase the journal's impact factor}}{\text{\# original articles you've written} + \text{\# articles you were included in out of pity or politics} + \text{\# not-so-original articles you've ~~written~~ copied and pasted}}$$

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WWW.PHDCOMICS.COM

title: "Your Impact Factor" - originally published 12/8/2008

Impact factor

In the early 1960s Irving H. Sher and Eugene Garfield created the journal impact factor to help select journals for the Science Citation Index…

Arthur Seidel, Eugene Garfield, Kimber Vought and Irving H. Sher

[Garfield] expected that "it would be used constructively while recognizing that in the wrong hands it might be abused"

The problem(s) with the Impact Factor

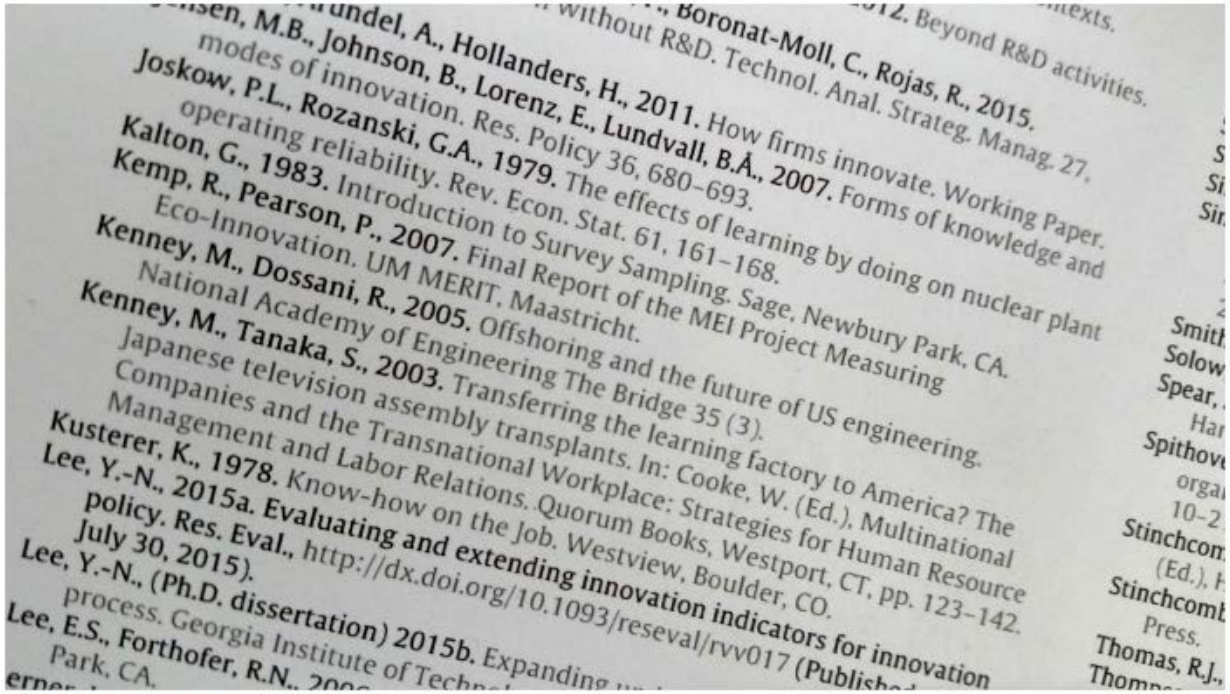
- The distribution of citations is highly skewed
- Thomson Reuters calculates the Impact Factor
  - Coverage has limitations
  - Prone to errors
- Impact Factor was never meant to be used as a quality measurement for researchers.

SHARE

11K

7

455



Citation lists are key to calculating journal impact factors. David Malakoff

Hate journal impact factors? New study gives you one more reason

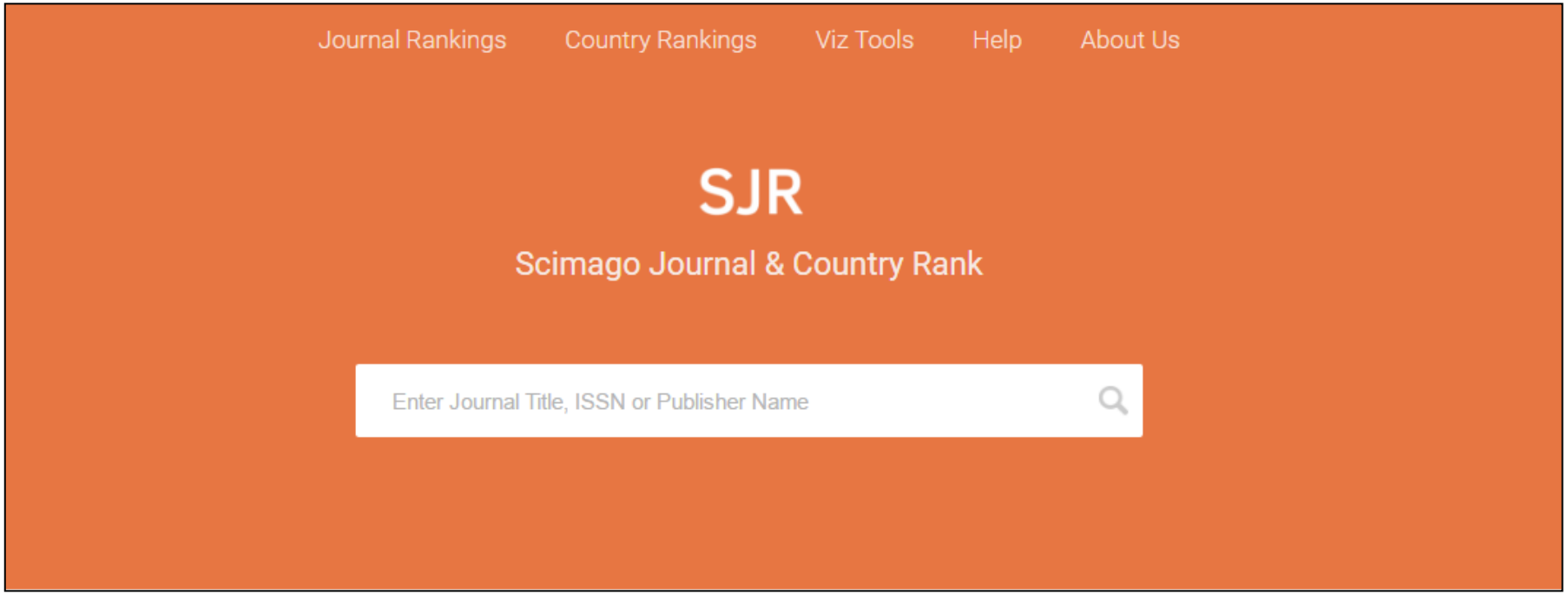
By John Bohannon | Jul. 6, 2016 , 4:30 PM

Publish or Perish – 74 years later

- Tenure, pro enced by:
  - Number
  - Publishin
  - Number
- Decades of s are highly flawed mainly beca
  - Databas
  - They do r rch and science that becomes

Is there anything else out there?

SJR: Scimago Journal Rank Indicator



http://www.scimagojr.com/

SNIP (Source Normalized Impact per Paper)

Journal Search

Search the entire collection of journals covered by Scopus along with their SNIP, IPP and SJR metrics going back to 1999.

Journal title keyword

Start Year Start Year

Sort by Source Title

Ordered Ascending

Search

Download full values

https://www.journalmetrics.com/

eigenFACTOR.org®

RANKING AND MAPPING SCIENTIFIC KNOWLEDGE

The **Eigenfactor** is a rating of the total **importance** of a scientific journal.

The Eigenfactor score, developed by Jevin West and Carl Bergstrom at the University of Washington

Journals are rated according to the number of incoming citations, with citations from **highly ranked journals weighted to make a larger contribution to the Eigenfactor than those from poorly ranked journals.**

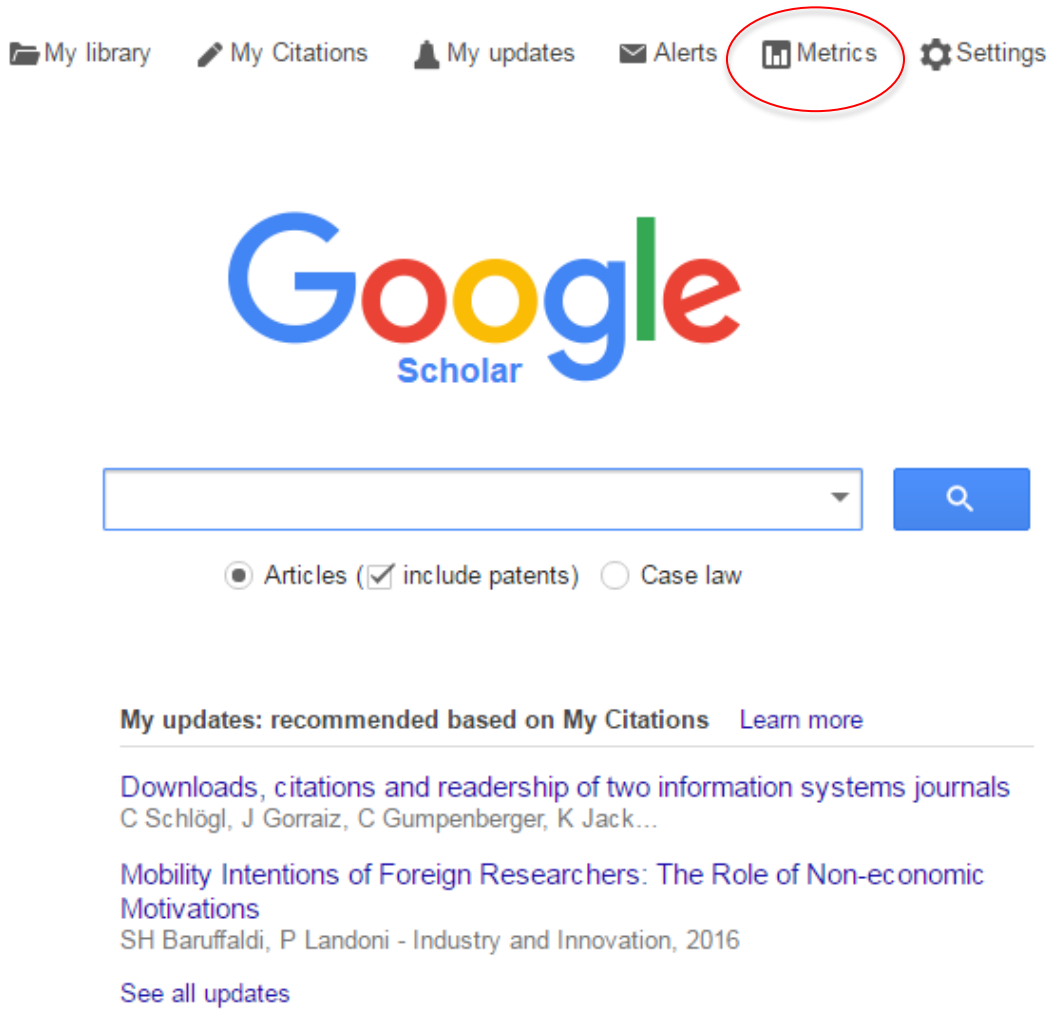
Journals generating **higher impact to the field** have larger Eigenfactor scores.

Checkout how they work

InCites™ Journal Citation Reports®

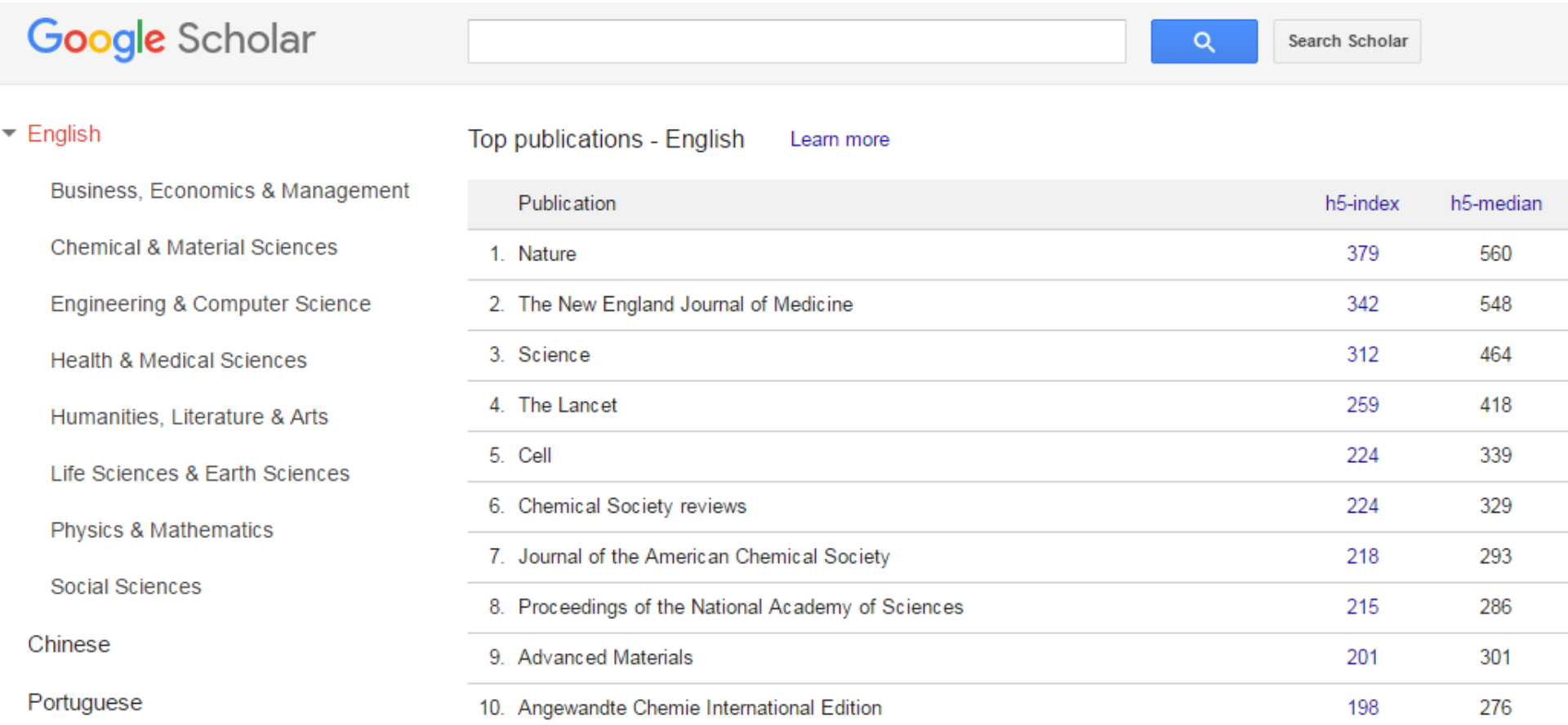
THOMSON REUTERS

Did you know that Google Scholar has Metrics Too?



https://scholar.google.com/intl/en/scholar/metrics.html

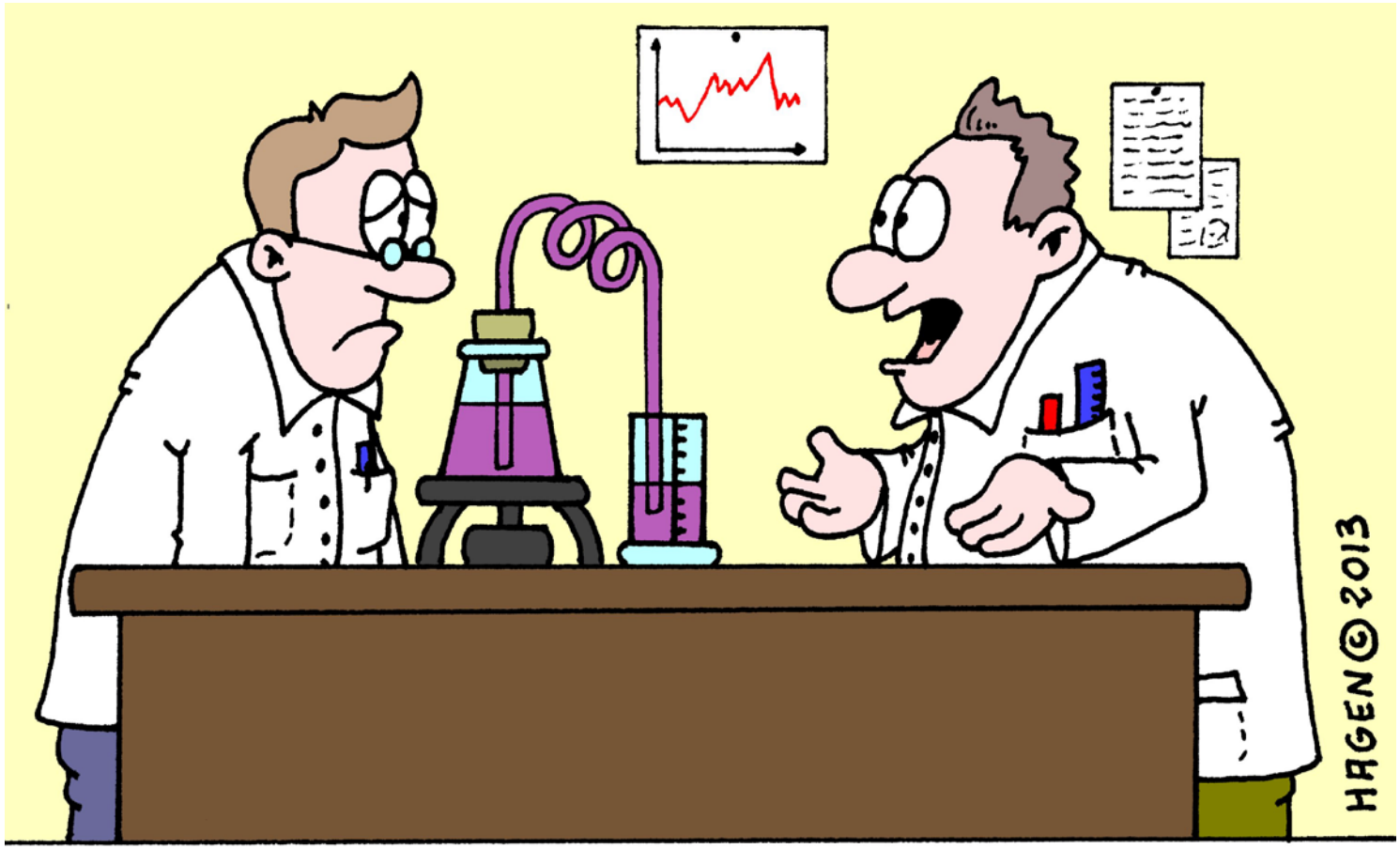
Google Scholar Metrics



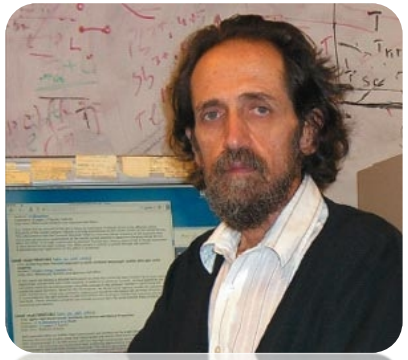
	Publication	h5-index	h5-median
1.	Nature	379	560
2.	The New England Journal of Medicine	342	548
3.	Science	312	464
4.	The Lancet	259	418
5.	Cell	224	339
6.	Chemical Society reviews	224	329
7.	Journal of the American Chemical Society	218	293
8.	Proceedings of the National Academy of Sciences	215	286
9.	Advanced Materials	201	301
10.	Angewandte Chemie International Edition	198	276

https://scholar.google.com/citations?view_op=top_venues&hl=en

Lets' talk about the H-index



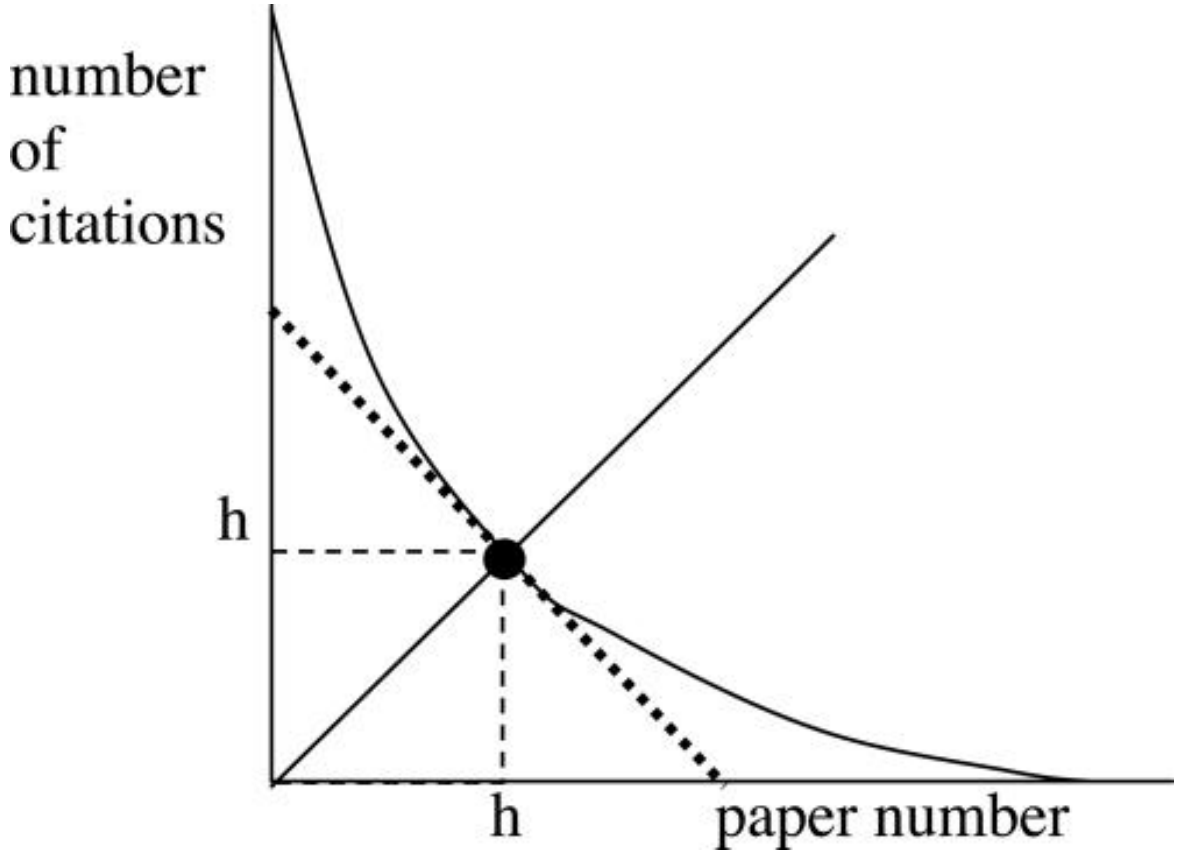
She didn't want to go out with you
even though you told her you had a h-index of 37!
Boy I don't understand women!



"For the few scientists who earn a Nobel Prize, the impact…of their research is unquestionable. For the rest of us, how does one quantify the cumulative impact…of an individual's scientific research output?"

Jorge E. Hirsch

"A scientist has index h if h of his/her Np papers have at least h citations each, and the other (Np–h) papers have no more than h citations each." Hirsch (2005)



Hirsch, J. E. "An Index to Quantify an Individual's Scientific Research Output." *Proceedings of the National Academy of Sciences of the United States of America* 102.46 (2005): 16569–16572. *PMC*. Web. 25 Nov. 2016.

So why is it a problem?

h-index increases with age so comparing productivity of younger researchers is problematic.

Calculated in controlled databases but need comprehensive citation report of all author's publications.

The index works properly only for comparing scientists working in the same field; citation conventions differ widely among different fields.

Different databases yield different h-index scores.

My h-index:

Scopus
publications indexed = 10
H-index= 3

Google Scholar
publications indexed = 28
H-index = 6

Web of Science
publications indexed = 5
H-index = 1

To sum this up…

The oversimplification of research evaluation metrics

- Grade-like metrics take into consideration the number of publication and citations.
- All such metrics are easy to calculate and provide a simplistic way to compare researchers.
- We have to be aware of the fact that each of them can be challenges on several levels including:
  - Validity – especially how they are field-dependent
  - Limitation – not taking into account other forms of scientific output and impact

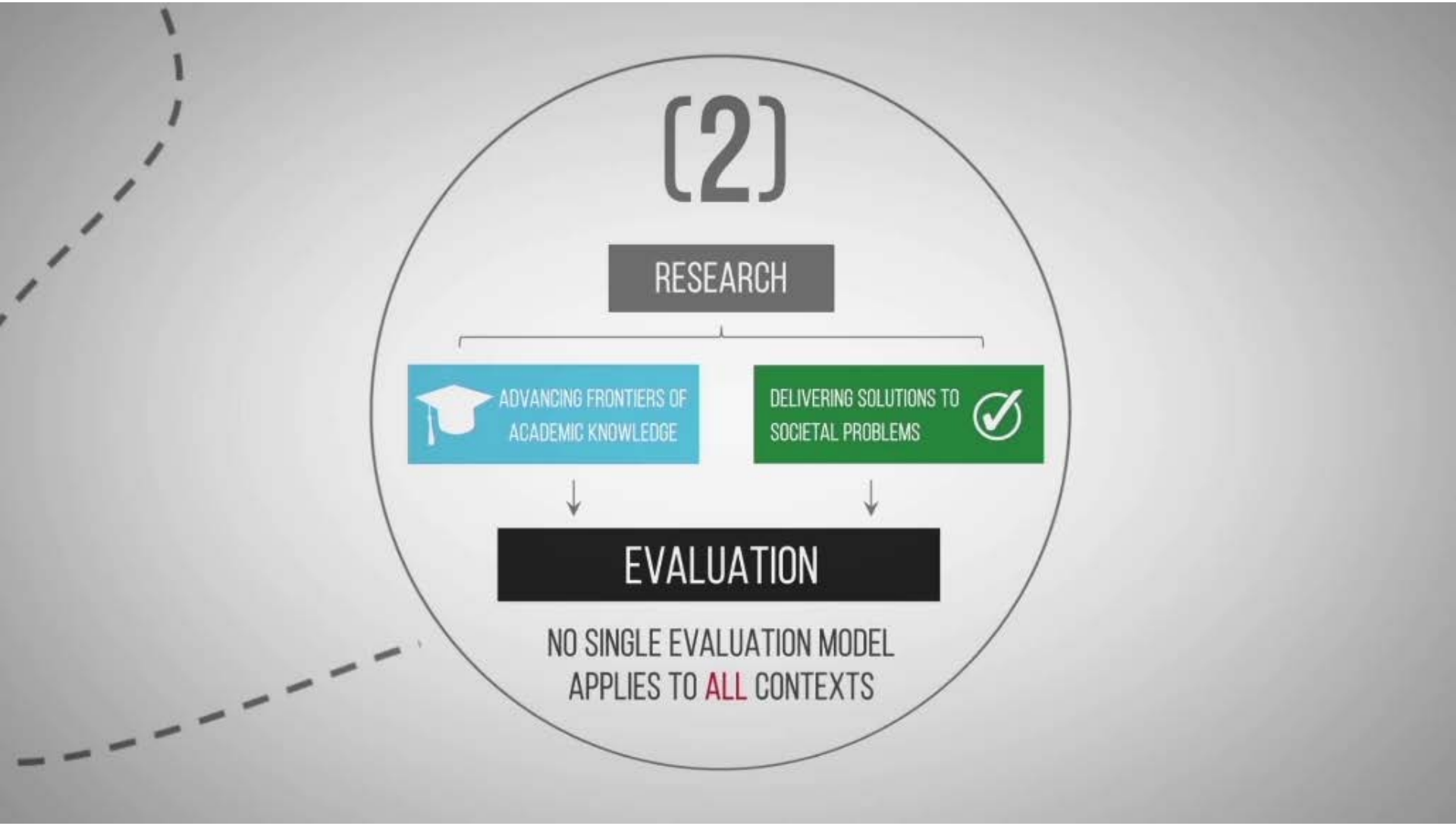
What's wrong with citations metrics?

- Your research will not be cited once it is covered in a review
  - The findings will often be credited to the review article rather than your own.
- Databases are limited
  - Citation databases are limited in coverage
- Google Scholar: Calculations on GS citations are flawed
  - Redundancies and duplications
  - Junk sources
  - Coverage and scope are never disclosed
  - No quality control
- The Matthew Effect – or "the rich get richer."
  - People tend to cite already well-cited material by well-known researchers

So in order not to get here….


For Organizations That Supply Metrics
• Be transparent
• Provide access to data
• Discourage data manipulation
• Provide different metrics for primary literature and reviews
For Publishers
• Cease to promote journals by Impact Factor; provide an array of metrics
• Focus on article-level metrics
• Identify different author contributions
• Open the bibliographic citation data
• Encourage primary literature citations
For Research Institutions
• When hiring and promoting, state that scientific content of a paper, not the JIF of the journal where it was published, is what matters
• Consider value from all outputs and outcomes generated by research
For Funding Agencies
• State that scientific content of a paper, not the JIF of the journal where it was published, is what matters
• Consider value from all outputs and outcomes generated by research
For Researchers
• Focus on content
• Cite primary literature
• Use a range of metrics to show the impact of your work
• Change the culture!
San Francisco
DORA
Declaration on Research Assessment
See the full text of DORA at www.ascb.org/SFdeclaration.html. Sign the Declaration!

The Leiden Manifesto for research metrics



DISCOVER

Powerful algorithms suggest articles relevant to your research, with the best articles highlighted as recommended by F1000 Faculty Members.

F1000Prime

WORK

A rich suite of tools help with writing, collaborating, reference management and preparation for publishing in the journal of your choice.

F1000Workspace

PUBLISH

An open science publishing platform for life scientists that offers immediate publication and transparent peer review.

F1000Research

Access F1000Prime via the Levy Library database page – http://libguides.mssm.edu/az.php?a=f

Research Assessment in Transition - Towards Participatory Evaluation

Traditional vs. Altmetrics

- Impact can be defined in different ways. Citations are one form of impact as they capture the research built upon.
- With the rise of technology today we are able to track not citations but also impact through:
  - Social media mentions
  - Traditional media/news coverage
  - Downloads and views
  - Sharing of scientific output
- These types of metric are called ”Altmetrics” (alternative to the traditional citations based ones)
- These metrics balance biases and allow researchers to showcase the impact of their body of work beyond citations.

Altmetrics

Altmetrics is the creation and study of new metrics based on the Social Web for analyzing and informing scholarship:

- **Usage**
  - HTML views, PDF/XML downloads (various sources – eJournals, PubMed Central, FigShare, Dryad, etc.)
- **Captures**
  - CiteULike bookmarks, Mendeley readers/groups, Delicio.us
- **Mentions**
  - Blog posts, news stories, Wikipedia articles, comments, reviews
- **Social Media**
  - Tweets, Google+, Facebook likes, shares, ratings
- **Citations**
  - Web of Science, Scopus, CrossRef, PubMed Central, Microsoft Academic Search

Altmetrics Manifesto - http://altmetrics.org/about/

Altmetrics data is aggregated from many sources

Measuring Altmetrics

ImpactStory.

non-profit	publisher	usage stats provided by publisher
for profit	service provider	coverage of all journals coverage of books, datasets, etc. value-added services
non-profit		
for profit		

Why do we need to measure both?

- Researchers are communicators:
  - Within academia:
    - Presentations and seminars
    - Academic books
    - Journal articles and posters
    - Term papers and essays
    - Meetings and conferences
  - Within society:
    - Speaking at public events
    - Interviews and news mentions
    - Press Social media Blogs

How are we Measuring Research at Mount Sinai?

Edit this Group | Embed Widget

Mount Sinai Health System

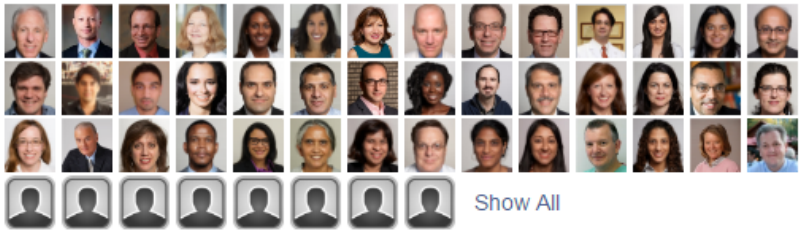
Artifact Summary

Book	Article	Review	Chapters	Research
68924	53323	7551	3847	554

Researchers

Add Existing Researcher | Add New Researcher

Showing 50 of 1400



Show All

Narrow by

Add Subgroup

Showing 10 of 53

- 2015 World's Most Highly Cited Researchers
- Active PostDocs
- All Researchers 2010-2016
- Anesthesiology
- Books
- Cardiovascular Surgery
- Cell, Developmental, and Regenerative Biology
- Center for Comparative Medicine & Surgery
- Dentistry
- Department of Pharmacological Sciences

Show All

All (136384) | Book (68924) | Article (53323) | Review (7551) | Book Chapter (3847) | Research Artifact (554) | Conference Paper (546) | Letter (448) | Export Data

Correction (361) | Retraction (356) | Guideline (282) | Reference (63) | Clinical Trial (35) | Web resource (15) | Code / Software (11) | Interview (10)

Blog (10) | Video (8) | Speech (7) | Other (6) | Press Release (5) | Reference Entry (5) | Abstract (3) | Case (3) | Textual Work (3) | Report (2)

Commentary (2) | Patent (1) | Grant (1) | Data (1) | Bibliography (1)

Why is this important?

- Each scientist can include over 25 different sources of output that go beyond just articles
  - Allows for a wholesome view of the body of work
- You can embed your profile on any webpage and showcase your impact
- Metrics include “traditional” (i.e. citations) and ‘altmetrics’ (i.e. social media mentions)
- Editing a profile is easy and straightforward
- Articles and other indexed materials are updated automatically

Homework
(you can't get away without)

Create your ORCID profile

- The ORCID ID:
  - Unique, persistent identifier for researchers & scholars.
  - Free to researchers.
  - Can be used throughout one's career, across professional activities, disciplines, nations & languages.
  - Embedded into workflows & metadata.

For a list of organizations and integrations see:
http://orcid.org/organizations/integrators

Scopus | ORCID

Link ORCID to Your Scopus profile

Scopus | ORCID

If you need help with your “homework,” feel free to contact the library. We’ve be glad to assist you!

RefDesk@mssm.edu

Main Takeaways

- Research evaluation metrics are complex.
- There are numerous metrics out there.
- Altmetrics measures are gaining prominence.
- PLUM is a Mount Sinai effort to measure both traditional and alternative metrics.
- ORCID and Scopus can help you keep your profile updated.

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