MEANINGFUL METRICS AND WHAT TO DO WITH THEM

A DDS WORKSHOP

WHAT ARE METRICS

- Tools we use to try and measure the **worth** or **value** research has by calculating its **impact**.
- Include basic measures such as numbers of publications and their citation counts.
- Evolved from a sub-discipline of library and information science to an instrument of evaluation and benchmarking.

WHAT IS IMPACT

- Impact is the effect or influence that one agent, event, or resource has on another.
- Different from but related to **attention** and **dissemination**.

WHAT IS IMPACT

- Consider metrics from Facebook:
- 'reach' and 'engagement'

Post Message	Type	Posted	Lifetime Post Total Reach	Lifetime Engaged Users
			Lifetime: The total number of people your Page post was served to. (Unique Users)	Lifetime: The number of people who clicked anywhere in your posts. (Unique Users)
This is a really exciting opportunity to meet an amazing writer!	Link	1/12/16 10:11 AM	21	0
David Bowie reveals his favourite 100 books	Link	1/11/16 8:48 AM	548	16
Historical UI music clubs, feat. some amazing disco action, courtesy of the UI Special Collections tumblr.	Link	1/10/16 7:40 AM	360	13
Check out the new digital collections available from the New York Public Library for FREE!	Link	1/7/16 7:48 AM	158	7

WHY USE METRICS

- Impact metrics can provide tangible evidence of the benefits of research.
- Useful for comparing institutions or research programs, within reason.
- Metrics SHOULD NOT be used to make comparisons across disciplines, because they are discipline specific and vary over time.
- It is important that metrics are used in context.

WHY USE METRICS

- Metrics are important but shouldn't be used in all instances or situations.
- Researchers can begin tracking their own metrics, gathering information that could influence future work.
- Some metrics can be useful to track research impact, but shouldn't be used in hiring/firing or promotion decisions.

WHY USE METRICS

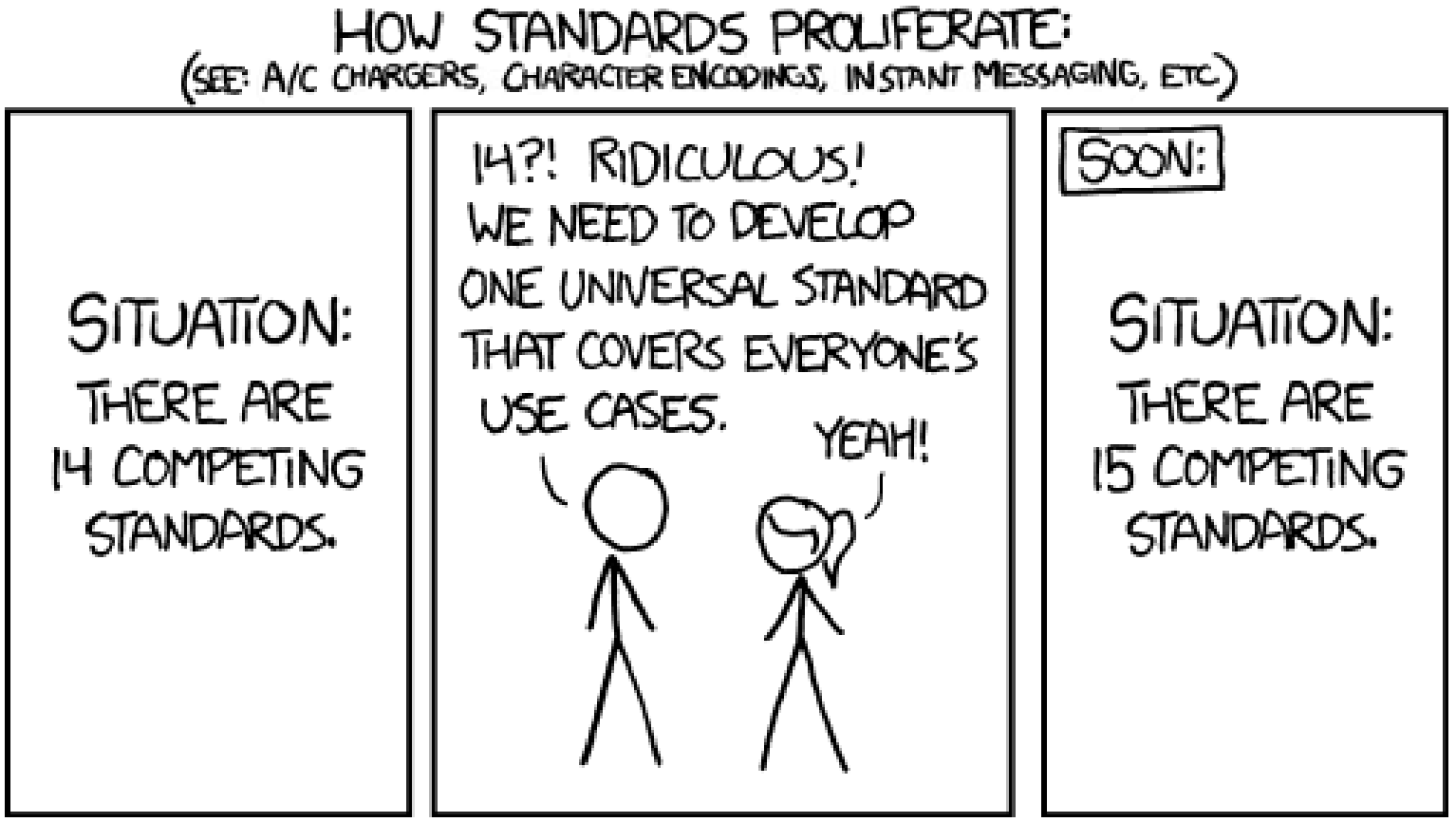
- Unfortunately, universities have become obsessed with metrics.
- We risk damaging our academic system with the very tools designed to improve it.

https://vimeo.com/133683418

Diana Hicks, Paul Wouters, Ludo Waltman, Sarah de Rijke, Ismael Rafols (2015) The Leiden Manifesto for research metrics: use these 10 principles to guide research evaluation. Nature, April 23, 520:429-431, doi:10.1038/520429a.

TIMELINE

- Before 2000, experts used the Science Citation Index on CD-ROM from the Institute of Science (ISI)
- 2002 – Thomson Reuters made the Web of Science database widely accessible
- 2004 – Elsevier's Scopus & Google Scholar (beta version)
- 2005 – h-index proposed by Jorge Hirsch, a physicist at the University of California, San Diego
- 2007 – Publish or Perish
- 2008 – Mendeley
- 2011 – Altmetric.com
- 2014 – Plum Analytics



Comic courtesy of XKCD

TYPES OF METRICS – BASIC METRICS

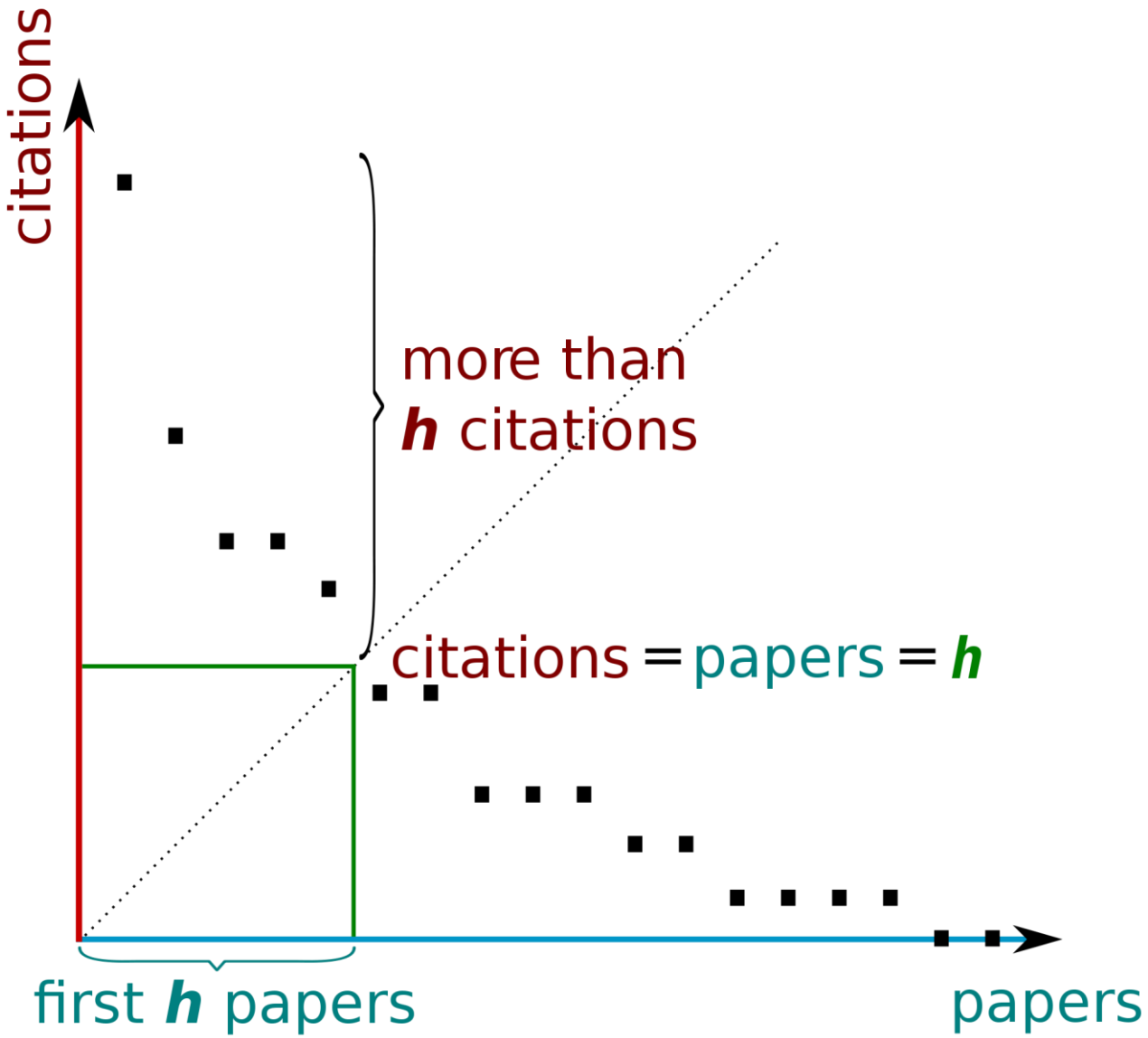
- Total number of papers
- Total number of citations
- Average number of citations per paper
- Average number of citations per author
- Average number of citations per author per year
- Average number of papers per author
- Average number of authors per paper
- http://www.harzing.com/pophelp/metrics.htm#gindex

TYPES OF METRICS – AUTHOR IMPACT

- An author's impact on their field or discipline.
- Measured using the number of times their academic publications are cited by other researchers.
- There are numerous algorithms to calculate author impact.
- There are many potential biases with these measurements and **they should be used with care**.

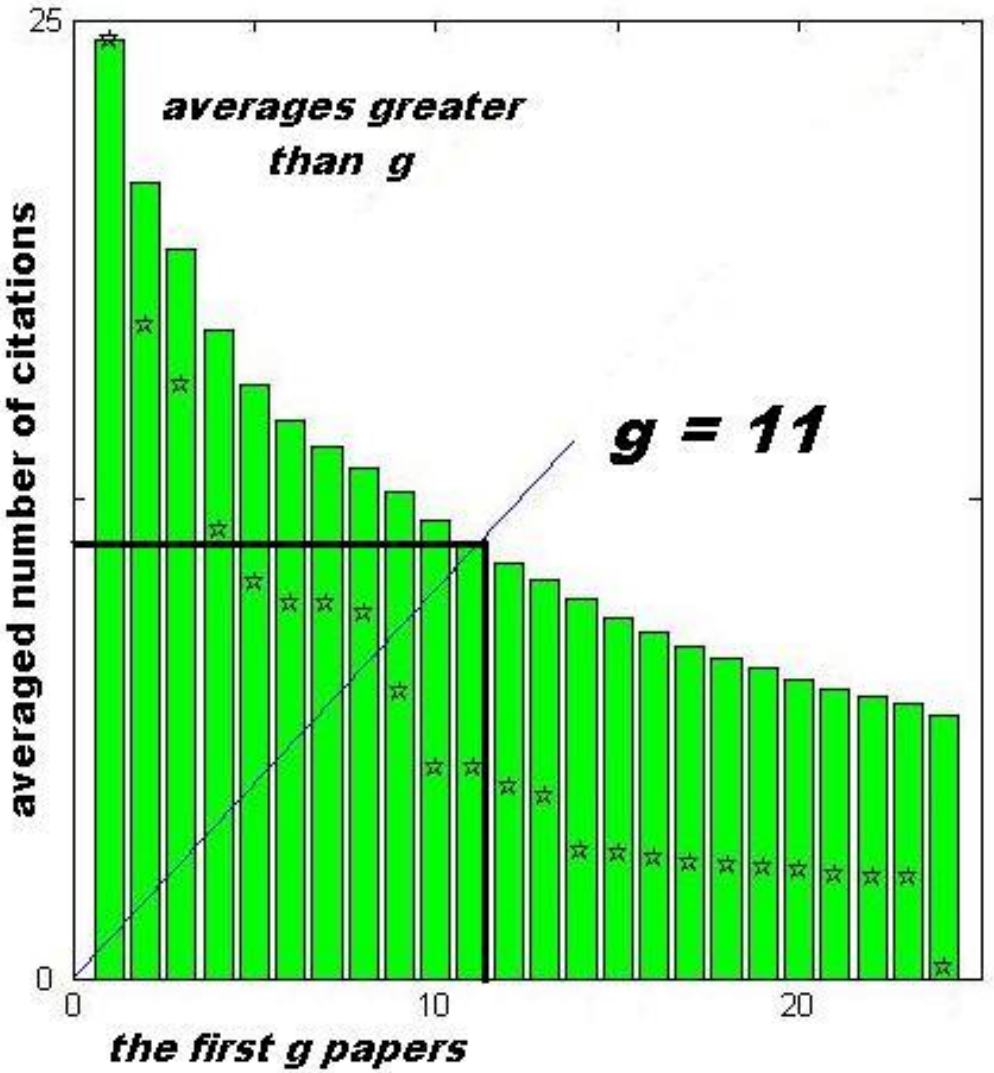
AUTHOR IMPACT – H-INDEX

- The h-index was proposed by J.E. Hirsch in 2005. Now one of the most widely used metrics.
- H-index = number of papers (h) with a citation number ≥ h.
- Advantages of the h-index:
  - Allows for direct comparisons within disciplines
  - Measures quantity and impact by a single value
- Disadvantages of the h-index:
  - Does not give an accurate measure for early-career researchers
  - Calculated *only* with articles indexed in Web of Science.


citations
more than
h citations
citations = papers = h
first h papers
papers

AUTHOR IMPACT – G-INDEX

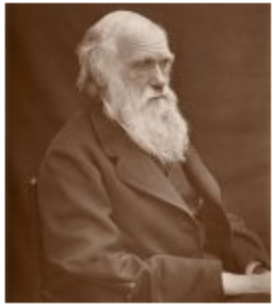
- The G-index was proposed by Leo Egghe in 2006 in order to improve on the h-index.
- "[Given a set of articles] ranked in decreasing order of the number of citations that they received, the G-Index is the (unique) largest number such that the top g articles received (together) at least g^2 citations.“
- Advantages of the G-index:
  - Accounts for the performance of author’s top articles
  - Helps to make more apparent the difference between author’s respective impacts. The inflated values of the G-index help to give credit to lowly cited or non-cited papers while giving credit for highly-cited papers
- Disadvantages of the G-index:
  - The debate has continued since 2006 on whether the G-index is superior to the h-index.



By Ael 2 - Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=19031847

AUTHOR IMPACT – I10-INDEX

- The i10-index was created by Google Scholar and measures the number of publications with at least 10 citations.
- Advantages of i10-index:
  - Very simple and straightforward to calculate
  - My Citations in Google Scholar is free and easy to use
- Disadvantages of i10-index
  - Used only in Google Scholar



Charles Robert Darwin

naturalist (1809-1882)

life sciences - evolution - biogeography - speciation - natural selection

Verified email at unr.edu.ar

Homepage

Citation indices

	All	Since 2008
Citations	77539	27837
h-index	80	49
i10-index	331	159

Citations to my articles

Select: All, None Export Show: 20 **1-20** Next >

Title / Author	Cited by	Year
Origin of species CMA Darwin DMP	21606 *	1978
The descent of man C Darwin Digireads. Com	11815	2009
The expression of the emotions in man and animals C Darwin	9556	2002

ACTIVITY

CREATE A GOOGLE SCHOLAR PROFILE

TYPES OF METRICS – JOURNAL IMPACT

- Reflect the importance of a particular journal in a field, taking into account the number of articles published and citations per year.
- Like author impact measurements, journal impact measures can only be so informative.

JOURNAL IMPACT – JOURNAL CITATION REPORTS

- Journal Citation Reports (or JCR) is a product of ISI Web of Knowledge and is an authoritative resource for impact factor data.
- Provides impact factors and rankings based on millions of citations, with numerous sorting options including impact factor, total cites, total articles, and immediacy index.
- In addition, JCR provides a five-year impact factor and visualized trend data.

BIOGEOCHEMISTRY

ISSN: 0168-2563

SPRINGER
VAN GODEWIJCKSTRAAT 30, 3311 GZ DORDRECHT, NETHERLANDS
NETHERLANDS

Go to Journal Table of Contents Go to Ulrich's

Titles
ISO: Biogeochemistry
JCR Abbrev: BIOGEOCHEMISTRY

Categories
ENVIRONMENTAL SCIENCES - SCIE;
GEOSCIENCES, MULTIDISCIPLINARY - SCIE;

Languages
ENGLISH

15 Issues/Year;

Key Indicators

Year	Total Cites Graph	Journal Impact Factor Graph	Impact Factor Without Journal Self Cites Graph	5 Year Impact Factor Graph	Immediacy Index Graph	Citable Items Graph	Cited Half-Life Graph	Citing Half-Life Graph	Eigenfacto Score Graph	Article Influence Score Graph	% Articles in Citable Items Graph	Normalize Eigenfacto Graph	Average JIF Percentile Graph
2014	8,575	3.488	3.122	4.143	0.738	149	9.7	9.3	0.01280	1.373	100.00	1.43332	87.937
2013	8,006	3.730	3.332	4.121	0.558	156	9.6	9.7	0.01311	1.490	100.00	1.44521	89.819
2012	6,997	3.531	3.132	4.077	0.717	145	9.0	9.5	0.01356	1.582	99.31	Not A...	89.132
2011	6,347	3.069	2.925	3.710	1.000	111	9.1	9.7	0.01304	1.484	100.00	Not A...	86.144
2010	5,902	2.674	2.524	3.629	0.482	85	8.8	9.5	0.01414	1.455	98.82	Not A...	81.136
2009	5,285	2.771	2.521	3.476	0.711	90	8.4	8.8	0.01429	1.344	94.44	Not A...	84.133
2008	5,324	2.961	2.700	3.912	0.361	97	7.9	8.9	0.01792	1.618	97.94	Not A...	86.796
2007	4,161	2.524	2.330	3.498	0.398	108	7.5	9.2	0.01565	1.496	96.30	Not A	86.427

JOURNAL IMPACT – JOURNAL CITATION REPORTS

- Advantages of JCR
  - Helps to measure research influence and impact at both journal and category levels
  - Shows relationship between citing and cited journals
- Disadvantages
  - Lack of credibility with impact factor

Journal impact factors ‘no longer credible’

The measure of scholarly impact is now being manipulated so much that it has ceased to be meaningful, editorial claims

Trickery by editors to boost their journal impact factor means that the widely used metric “has now lost most of its credibility”, according to *Research Policy* journal.

With many editors now engaged in “ingenious ways” of boosting their impact factor, “one of the main bastions holding back the growing scourge of research misconduct” has been “breached”, the publication warns in an editorial.

In the past two decades, the reliance on impact factors when deciding which academics are promoted or granted tenure has grown.

TIMES HIGHER EDUCATION WORLD UNIVERSITY RANKINGS

the scholarly kitchen

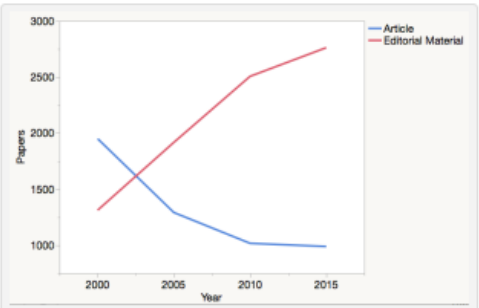
CONTROVERSIAL TOPICS, METRICS AND ANALYTICS

Citable Items: The Contested Impact Factor Denominator

POSTED BY PHIL DAVIS · FEB 10, 2016 · 19 COMMENTS

FILED UNDER IMPACT FACTOR, JOURNAL IMPACT FACTOR, JOURNAL OF CLINICAL INVESTIGATION, JOURNAL OF MEDICAL INTERNET RESEARCH, PLOS MEDICINE, SCIENCE TRANSLATIONAL MEDICINE, THOMSON REUTERS

Discussing the Journal Impact Factor inevitably leads one down a rabbit hole. While the numerator of the ratio (total citations) to the journal is clear enough, the denominator (citable items) causes great confusion, and getting a clear answer to its construction requires real work.



The Rise of Editorial Material: Papers published in the NEJM, JAMA, The Lancet, and The BMJ. Data source: Web of Science.

This post is about the Impact Factor denominator — how it is is defined, why is it inconsistent, and how it could be improved.

In their paper, The Journal Impact Factor Denominator: Defining Citable (Counted) Items, Marie McVeigh and Stephen Mann describe how Thomson Reuters determines what makes a citable item. Their guidelines include such characteristics as whether a paper has a descriptive title, whether there are named authors and addresses, whether there is an abstract, the article length, whether it contains cited references, and the density those cited references.

JOURNAL IMPACT – EIGENFACTOR/ARTICLE INFLUENCE SCORE

- A journal's Eigenfactor score is measured as its importance to the scientific community. Scores are scaled so that the sum of all journal scores is 100.
- It is intended to reflect the influence and prestige of journals
- The mean Article Influence Score is 1.00. A score greater than 1.00 indicates articles in the journal have above-average influence.

Order	Journal	Percentile	EF ↓	AI ↓
1	ECOLOGY ISSN: 0012-9658	EF: 98 AI: 96	0.081672	2.6366
2	MOL ECOL ISSN: 0962-1083	EF: 98 AI: 95	0.07334	2.0817

JOURNAL IMPACT – EIGENFACTOR/ARTICLE INFLUENCE SCORE

- Advantages of Eigenfactor / Article Influence Score:
  - Can be accessed for free
  - Includes built in evaluation period of five years
  - Attempts to give a more accurate representation of the merit of citations than raw citation counts
- Disadvantages of Eigenfactor / Article Influence Score:
  - Eigenfactor assigns journals to a single category, making it more difficult to compare across disciplines
  - Some argue that Eigenfactor score isn't much different than raw citation counts.

JOURNAL IMPACT – SCIMAGO JOURNAL & COUNTRY RANK

- The SCImago Journal & Country Rank is a portal that includes the journals and country scientific indicators developed from the information contained in the Scopus® database.
- The SJR is a measure of a journal's impact, influence or prestige.
- It expresses the average number of weighted citations received in the selected year by the documents published in the journal in the three previous years.

	Title	Type	SJR	H index	Total Docs. (2014)	Total Docs. (3years)	Total Refs.	Total Cites (3years)	Citable Docs. (3years)	Cites / Doc. (2years)	Ref. / Doc.	Country
1	Annual Review of Psychology	k	10,392	165	27	68	4.500	1.625	65	22,48	166,67	
2	Trends in Cognitive Sciences	j	9,243	202	122	342	5.984	4.171	239	14,06	49,05	
3	Perspectives on Psychological Science	j	7,163	45	62	197	4.205	2.218	192	8,99	67,82	
4	Personnel Psychology	j	6,585	94	32	87	2.726	503	77	3,94	85,19	
5	Psychological Bulletin	j	6,466	209	57	174	10.318	1.931	136	11,63	181,02	
6	Journal of Applied Psychology	j	6,173	179	121	264	7.499	1.540	249	4,72	61,98	
7	Personality and Social Psychology Review	j	5,987	98	20	55	3.038	528	55	7,41	151,90	

JOURNAL IMPACT – GOOGLE SCHOLAR METRICS

- Google Scholar Metrics allows authors to view journal rankings and rating by various h-indeces.
- Journal rankings can be viewed for the top 100 publications in 9 different languages, or by broad subject areas and numerous subcategories.

Top publications - Library & Information Science Learn more

Publication	h5-index	h5-median
1. Journal of the American Society for Information Science and Technology	54	82
2. Scientometrics	46	58
3. arXiv Digital Libraries (cs.DL)	40	66
4. Journal of Informetrics	39	57
5. Journal of Information Science	26	39
6. The Journal of Academic Librarianship	26	37
7. Journal of Documentation	26	36
8. Library & Information Science Research	26	34

ACTIVITY

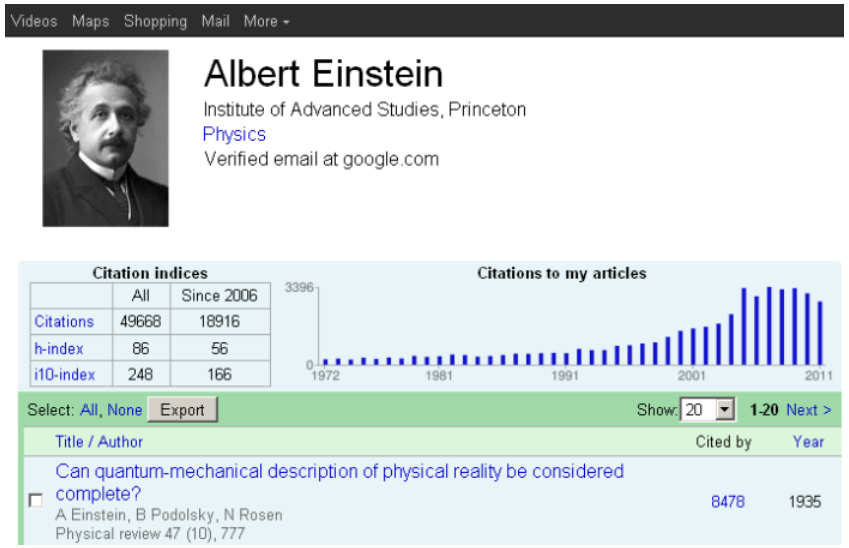
BROWSE THROUGH THE JOURNAL METRIC SERVICES FOR YOUR DISCIPLINE

TRACKING AND MEASURING YOUR IMPACT

Publish or Perish 4

RESEARCHERID

THOMSON REUTERS



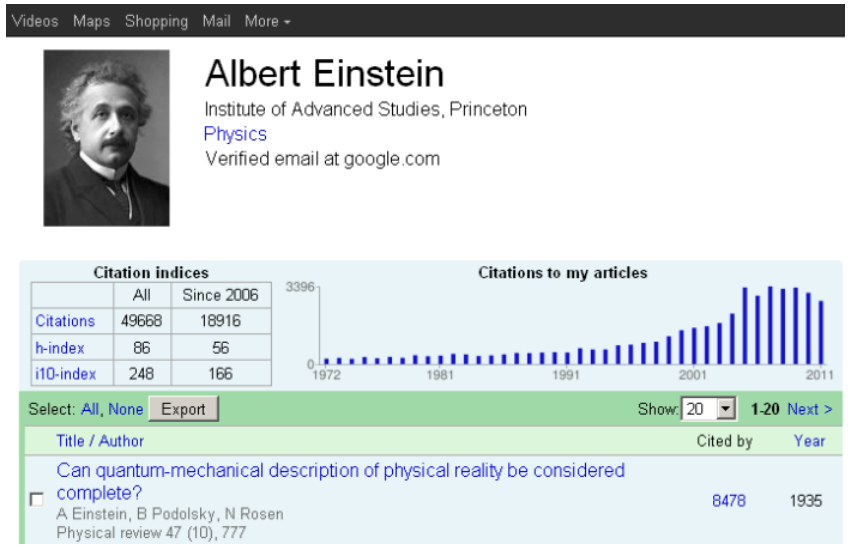
PLOS | ARTICLE-LEVEL METRICS

ORCID

TRACKING AND MEASURING YOUR IMPACT

- The Web of Knowledge features ResearcherID, a service with which you can create and manage your scholarly profile, generate citation metrics and connect with other scholars.
- One problem that ResearcherID addresses is name ambiguity.
- ResearcherID, in tandem with ORCID, assigns a unique ID to each author and allows authors to identify papers that they contributed to.
- With the Web of Knowledge, you can set up citation alerts.

TRACKING AND MEASURING YOUR IMPACT

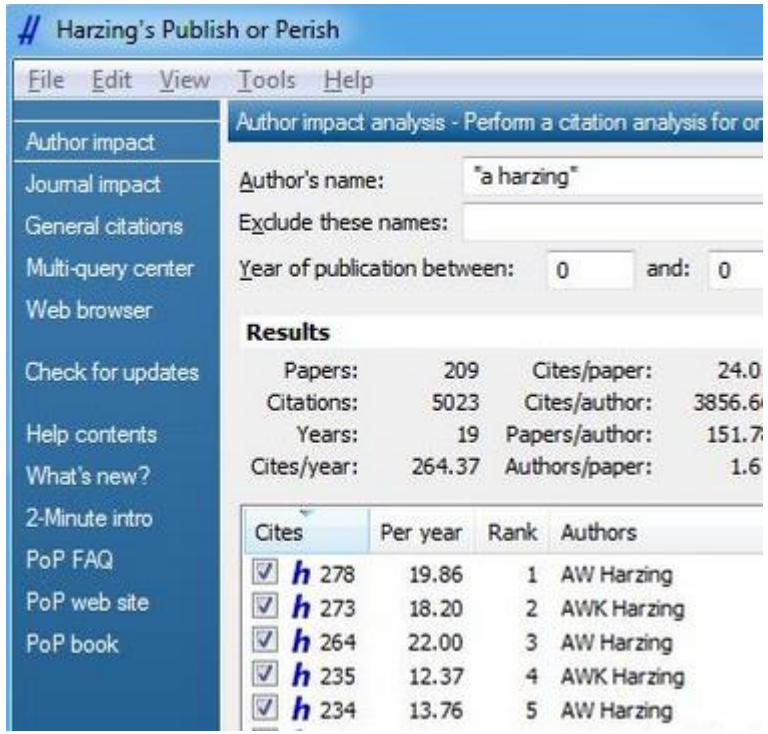


- Google Scholar Citations is a citation service provided free of charge.
- It is easy to set up, especially if you already have a Google account.
- Like other citation tracking services, it tracks academic articles, but it also counts theses, book titles and other documents towards author citation metrics.
- Google Scholar Citations can be used to view citation graphs of your articles or get an email alert every time an article is cited

TRACKING AND MEASURING YOUR IMPACT

- PLoS Article Level metrics (ALM) is a service provided by the Public Library of Science (PLoS) for all authors of works published in PLoS journals.
- ALM goes beyond traditional metrics and considers not just citation data, but also data regarding usage (such as views and downloads), mentions in blogs and other media, as well as metrics related to social media.

TRACKING AND MEASURING YOUR IMPACT



- Publish or Perish is downloadable software that uses Google Scholar data to calculate the following metrics:
  - Total number of papers
  - Total number of citations
  - Average number of citations per paper
  - Average number of citations per author
  - Average number of papers per author
  - Average number of citations per year
  - Hirsch's H-Index and related parameters
  - Egghe's G-Index
  - The contemporary G-Index
  - The age-weighted citation rate
  - Two variations of individual H-Indices
  - An analysis of the number of authors per paper

TRACKING AND MEASURING YOUR IMPACT

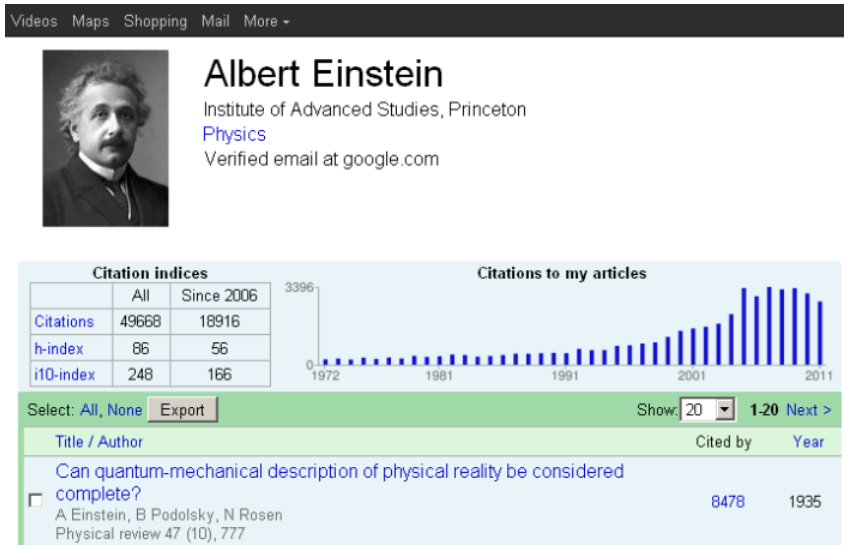
- The Open Researcher Community ID is an increasingly recognized persistent digital identifier.
- The unique number assigned to you will allow publishers and aggregators of scholarly literature to distinguish you from researchers with similar names.
- This is a powerful tool in author disambiguation and it takes just a few minutes to sign up.

TRACKING AND MEASURING YOUR IMPACT

Publish or Perish 4

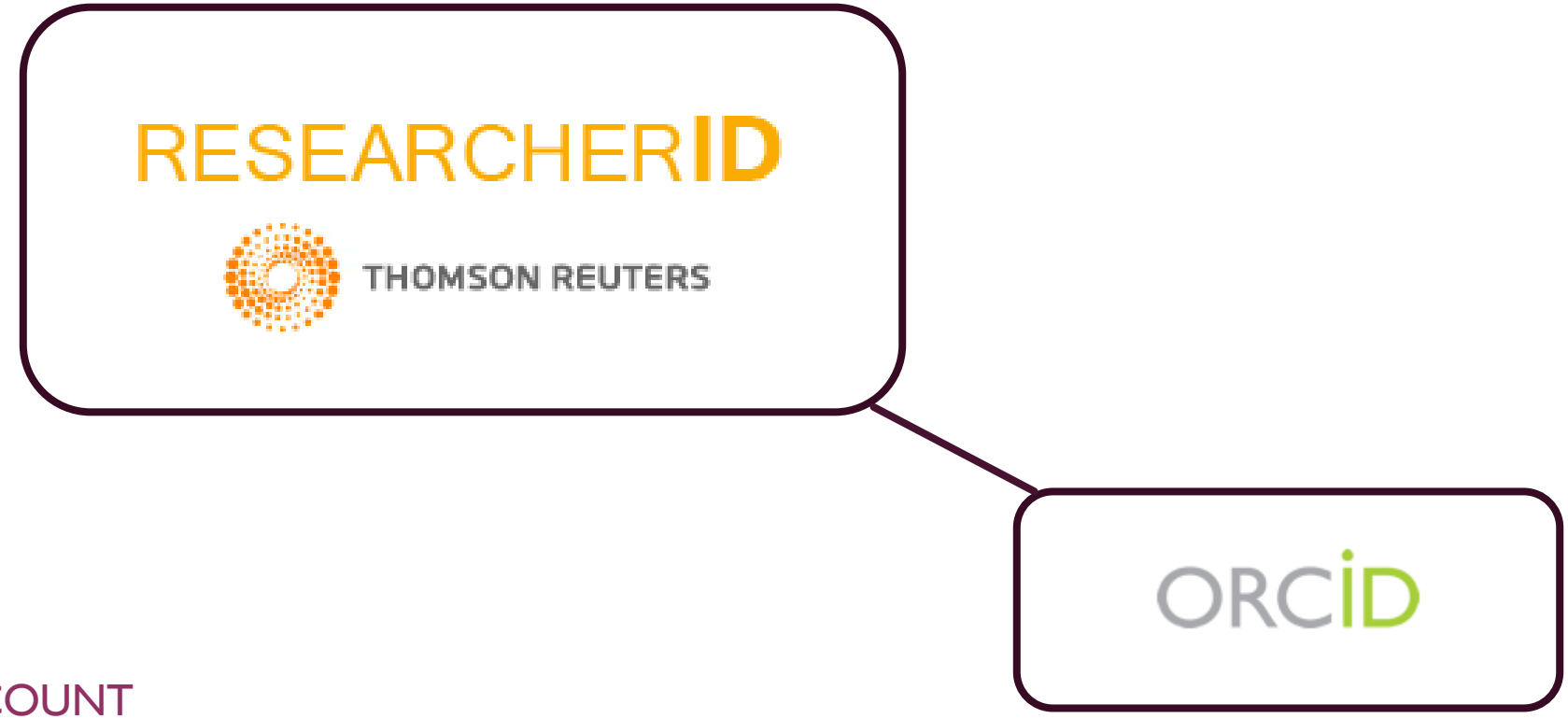
RESEARCHERID

THOMSON REUTERS



PLOS | ARTICLE-LEVEL METRICS

ORCID



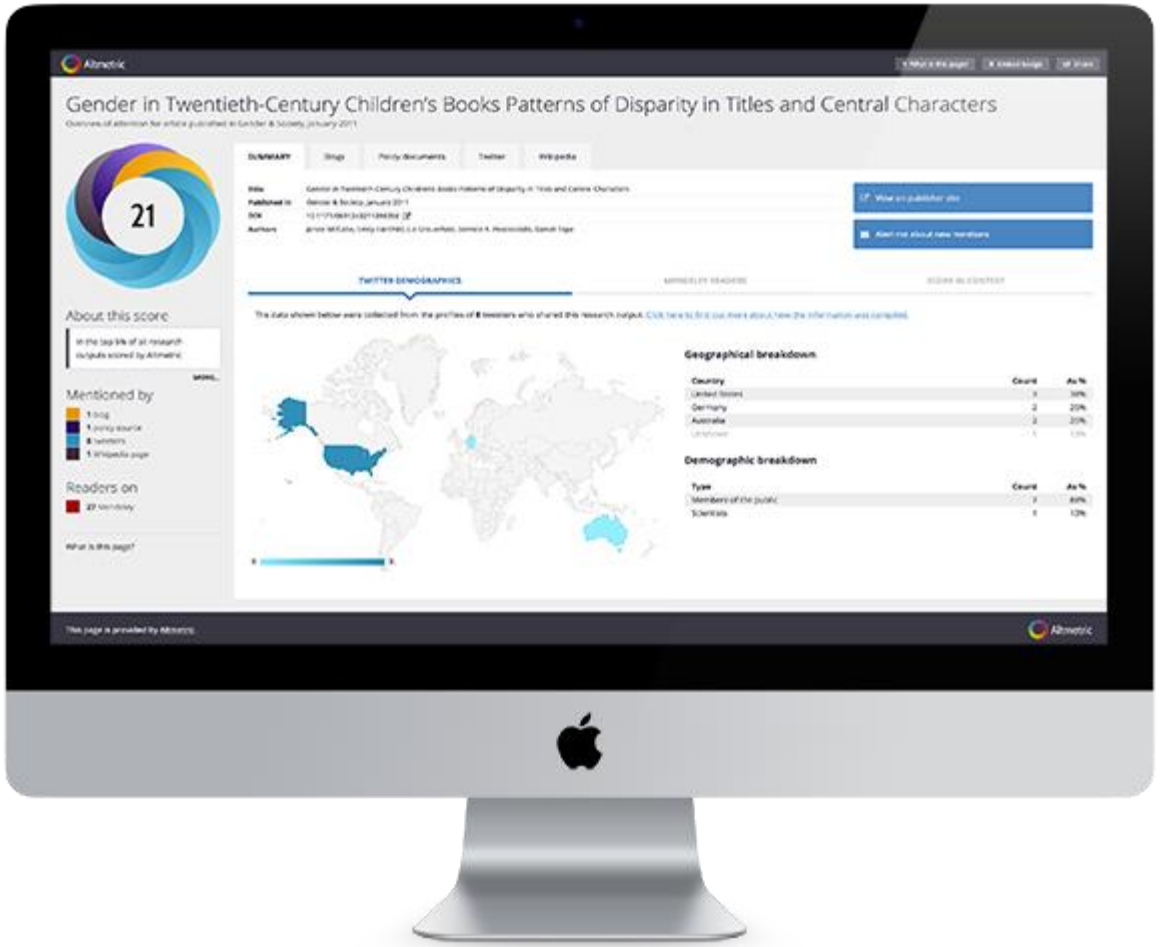
ACTIVITY

CREATE RESEARCHER ID ACCOUNT

OTHER METRICS / PROFILE SERVICES

Altmetric

- Altmetric collects and collates disparate information to provide you with a single visually engaging and informative view of the online activity surrounding your scholarly content.



Contribution of anthropogenic warming to California drought during 2012–2014

Overview of attention for article published in Geophysical Research Letters, January 2015

About this score

In the top 5% of all research outputs scored by Altmetric

MORE...

Mentioned by

- **28** news outlets
- **18** blogs
- **213** tweeters
- **1** Wikipedia page
- **14** Google+ users
- **1** Redditor

Readers on

You are seeing a free-to-access but limited selection of the activity Altmetric has collected about this research output. **Click here to find out more**.

Title	Contribution of anthropogenic warming to California drought during 2012–2014
Published in	Geophysical Research Letters, January 2015
DOI	10.1002/2015gl064924
Authors	Williams, A. Park, Seager, Richard, Abatzoglou, John T., Cook, Benjamin I., Smerdon, Jason E., Cook... [show]

View on publisher site

Alert me about new mentions

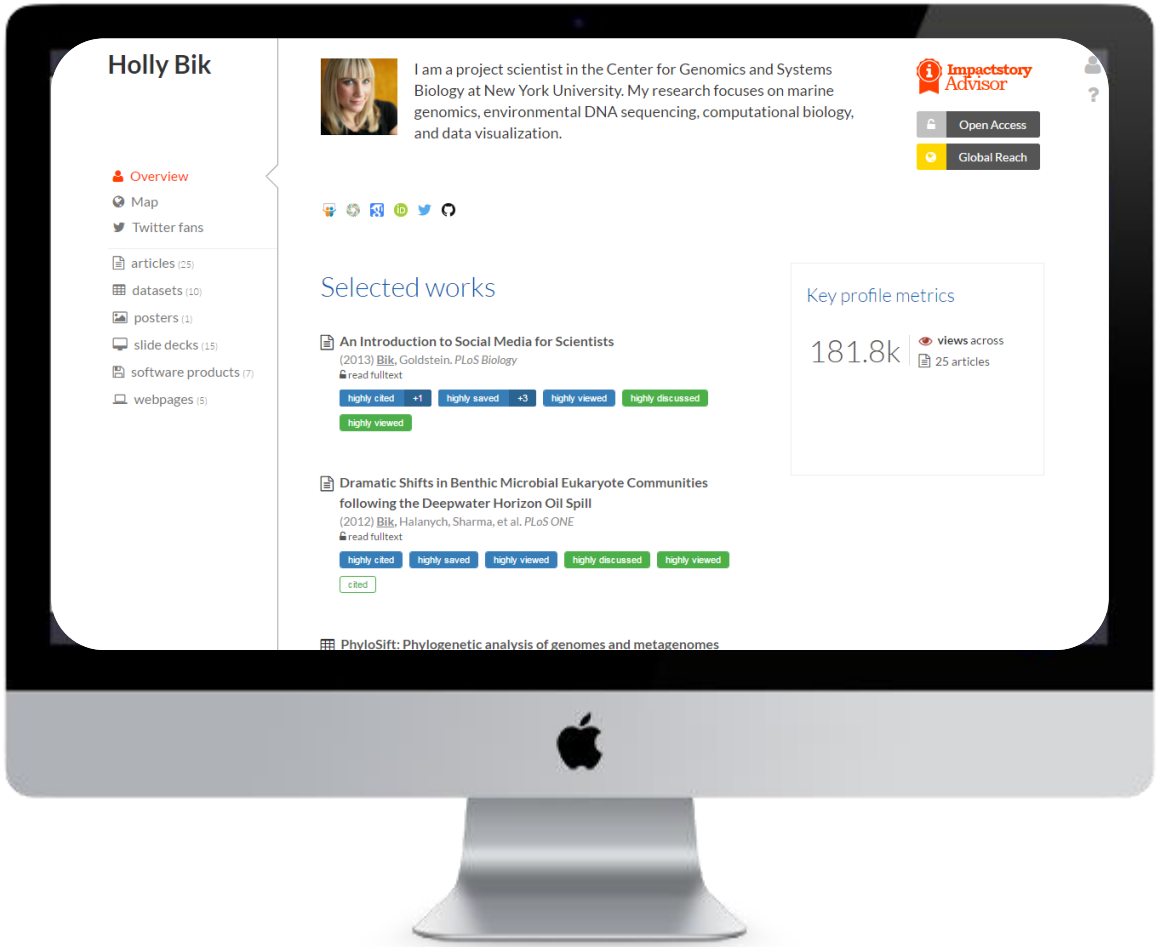
TWITTER DEMOGRAPHICS | MENDELEY READERS | SCORE IN CONTEXT

The data shown below were collected from the profiles of **213** tweeters who shared this research output. Click here to find out more about how the information was compiled.

OTHER METRICS / PROFILE SERVICES

Impactstory

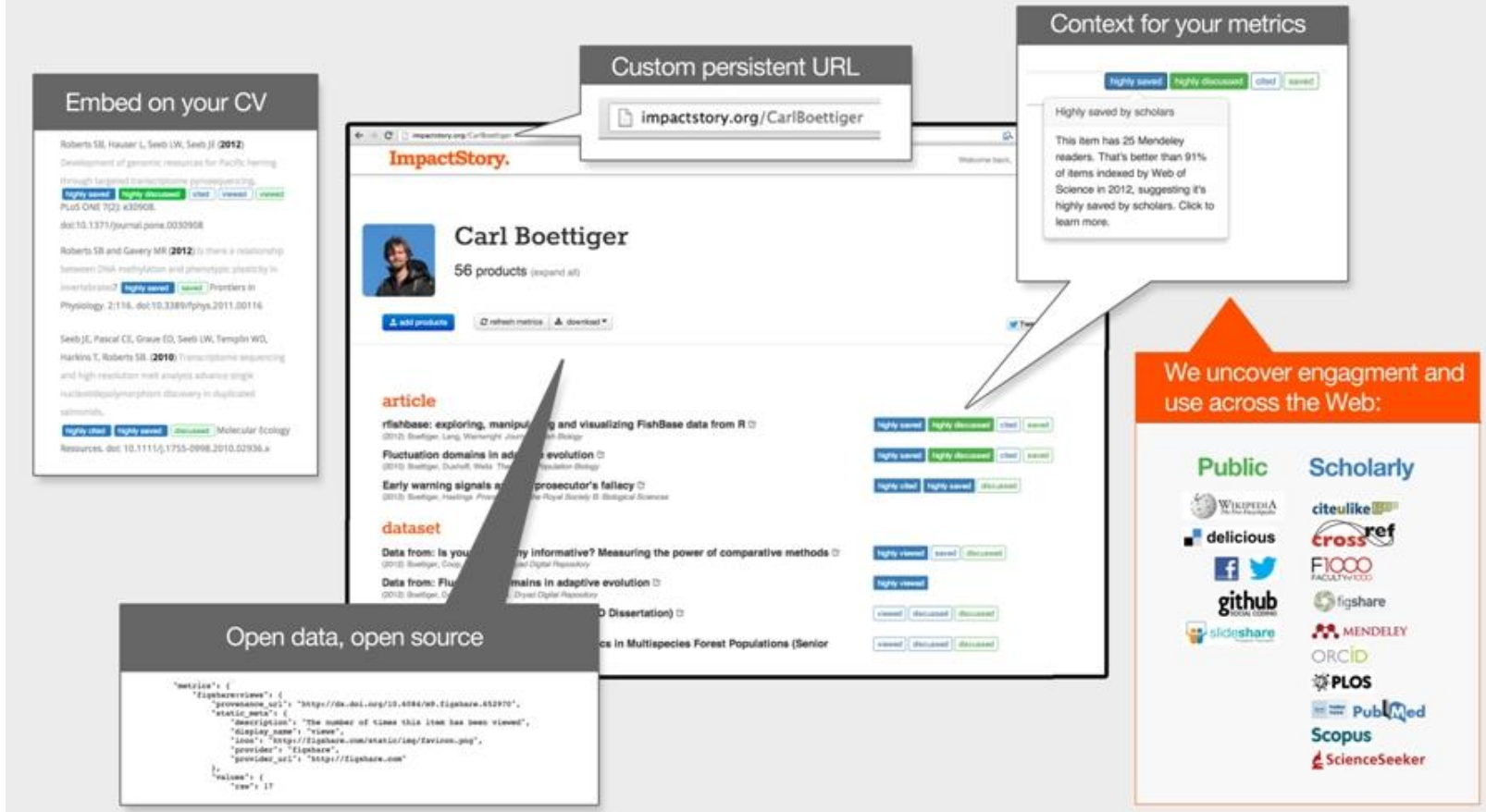
- Impact Story is an open-source web-based tool that helps scientists explore and share the diverse impact of their research products.



ImpactStory.

Open carrots for Open science

Funders bring the sticks, we add carrots. ImpactStory helps open scientists tell the full story of their research impact: we reveal diverse metrics of engagement and reuse for articles, datasets, software, and more.



ImpactStory is a non-profit built around open tools to support web-native scholarship.

Heather Piwowar @researchremix
Jason Priem @jasonpriem
impactstory.org

Supported by Alfred P. Sloan Foundation

AM MORE *than my* H-INDEX.

Impactstory

OTHER METRICS / PROFILE SERVICES

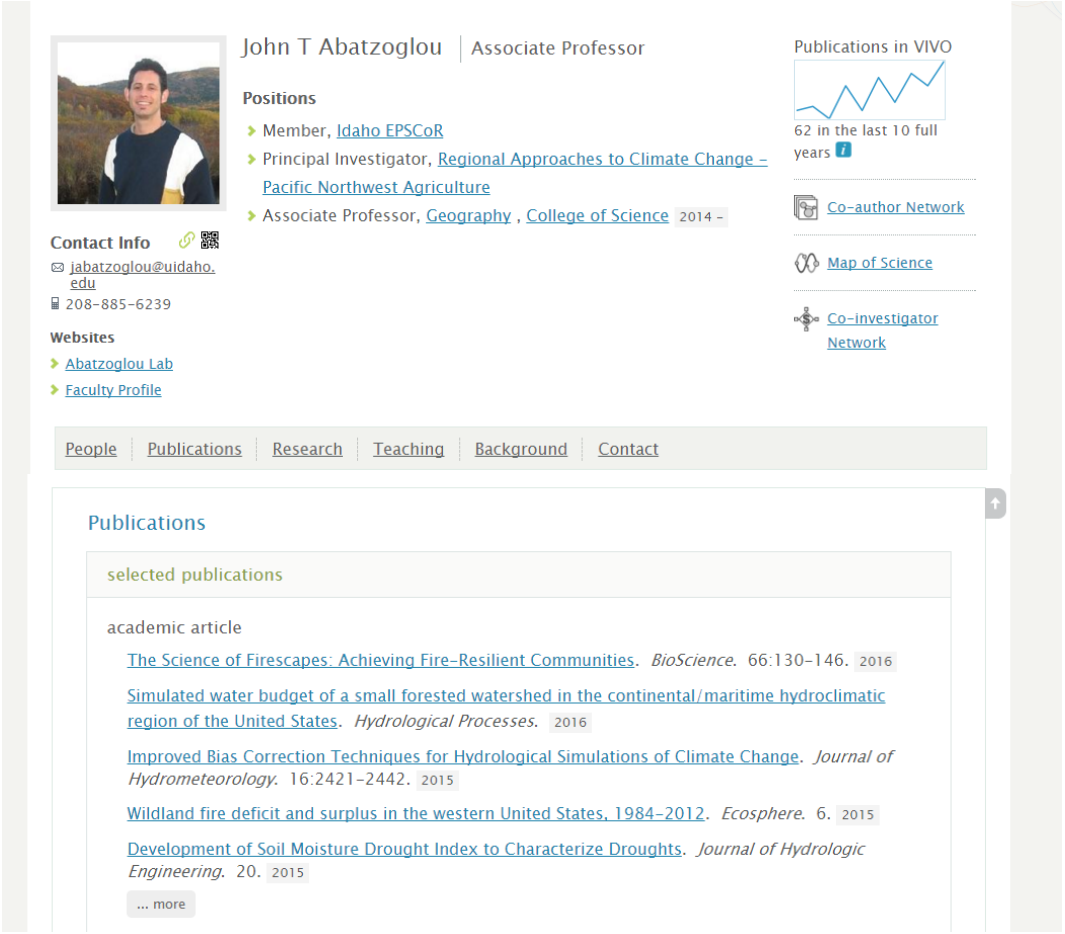
PLUM ANALYTICS

- Plum Analytics uses modern metrics to help answer the questions and tell the stories about research. Plum expands the traditional metric profile with
  - Usage – clicks, downloads, views, library holdings, video plays
  - Captures – bookmarks, code forks, etc.
  - Mentions – blog posts, comments, etc.
  - Social media – likes, shares, tweets

OTHER METRICS / PROFILE SERVICES

VIVO | University of Idaho Research & Expertise

- VIVO is a scholarship and research-focused discovery tool fed from institutional and publicly accessible data
- VIVO includes a network of experts and profiles, and an archive of publications, including UI theses and dissertations
- Library-run project in development since 2013 with updates weekly
- Profiles automatically generated, with user accounts easy to make



Contribution of anthropogenic warming to California drought during 2012–2014 | Academic Article

- View record in Web of Science ®
- Link to article (via DOI)

Overview | Identity | Additional Document Info | View All

authors

Abatzoglou, John T

Cook, Benjamin I

Cook, Edward R

Seager, Richard

Smerdon, Jason E

... more

Contribution of anthropogenic warming to California drought during 2012–2014

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View on publisher site

Alert me about new mentions

TWITTER DEMOGRAPHICS | MENDELEY READERS | SCORE IN CONTEXT

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IN SUMMARY…

THINGS TO REMEMBER

- All metrics are flawed but some are useful
- Do not use journal-based metrics to measure the quality of research articles, to assess individuals, or in hiring/firing or promotion decisions
- Use a range of article metrics and indicators when you need to
- Challenge research assessment practices that rely heavily on impact factors
- Promote and teach best practices that focus on the value and influence of research, not the value and influence of metrics

THANK YOU!

ANNIE GAINES – AGAINES@UIDAHO.EDU | @LIBRARIANNIES

Metric	How Calculated	Update Frequency	Source	Keep in mind	Use it for
Journal Impact Factor (JIF)	Calculated annually from average number of citations received per paper during the 2 preceding years. Calculation is based only on journals indexed by Thomson Reuters. (citation based)	Full year's data necessary before calculating 2014-2015 data will not be ready until summer 2016	Proprietary algorithm Published in database: Journal Citation Reports (JCR) from Thomson Reuters (ISI)	• Journal level metric • Calculated only for JCR journals • Journal self-citations included in calculation • Easily manipulated, and no longer trusted	• Targeting journals in which to publish • Identifying journals relevant to a specific discipline • Measuring a journal's status
Eigenfactor Score	Based on the number of times articles from the journal published in the past five years have been cited in the JCR year and takes into account which (highly cited or less highly cited) journals have contributed to these citations. Journal self-citations are removed. (Citation based)	Updated with each new release of JCR Impact Factors	Algorithms and metadata are described at the website: www.eigenfactor.org Published in Journal Citation Reports, and at Eigenfactor website	• Journal level metric • A journal's Eigenfactor score doubles when it doubles in size – the more articles a journal publishes, the higher the Eigenfactor	• Targeting journals in which to publish • Identifying journals relevant to a specific discipline • Measuring a journal's status
Article Influence Score	Calculated from the journal's Eigenfactor Score divided by the normalized fraction of all articles published in all journals. The mean score is 1.00, greater than 1.00 indicates above average influence, and less than one below average influence. (citation based)	Updated with each new release of JCR impact factors	Algorithms and methodology are described at the website: www.eigengactor.org Published in Journal Citation Reports and at Eigenfactor website	• Journal level metric • Score captures relative importance of a journal on a per article basis, but is not tied to a specific article • Article influence scores of a journal can vary between Eigenfactor and JCR even for the same year • Eigenfactor metrics may take into account some other sources (such as dissertations) besides journals	• Targeting journals in which to publish • Identifying journals relevant to a specific discipline • Measuring a journal's status

Metric	How Calculated	Update Frequency	Source	Keep in mind	Use it for
h-index	The largest number *h* such that *h* publications have at least *h* citations. Developed to quantify cumulative impact of a scholar's published works and may also be used as a productivity measure. (citation based)	Timeframe and updates depend on the source	Can be manually calculated using citation databases. Calculated automatically by Web of Science, Scopus, Google Scholar	• Typically a scholar-level metric; may also be calculated for journals or any other defined set of documents • Bounded by total number of publications • Favors scholars with longer careers • Does not account for author position or number of co-authors • Researchers with common surnames may be better off calculating the h-index manually	• Measuring impact of an individual's publications • Comparing researchers within disciplines
i10 index	Number of publications with at least ten citations (citation based)	Based on citations from all articles indexed by Google Scholar.	Created by Google Scholar and used in Google's My Citations feature. Sources are unclear and subject to change.	Scholar-level metric	Measuring impact for an individual's publications Comparing researchers within disciplines
Artilce-level metrics (PLoS)	Not a single metric but a suite of metrics: Article usage (views & downloads) Citations Social networks Blogs & media coverage PLoS community input	Real-time	• Article usage: PLoS, PubMed Centeral • Citations: PubMed Central, Scopus, CrossRef, Web of Science • Social networks: CiteULike, Connotea, Twitter, Facebook, Mendeley • Blogs & Media: Nature Blogs, Research Blogging	No single metric, so it can be more complex to present in context	• Demonstrating immediate impact of your research across multiple non-traditional communication channels • Benchmarking performance of a particular item against similar items

Metric	How Calculated	Update Frequency	Source	Keep in mind	Use it for
Impact story	Not a single metric but a suite of metrics: Article usage (views and downloads) Citations Social networks Blogs & media coverage PLoS community input	n/a	Including but not limited to: PLoS ALM, Facebook, Slideshare, Github, Wikipedia, CiteULike, Delicious, Mendeley, Dryad, F1000 www.impactstory.org	• Gathering IDs may not capture everything • Artifacts may be missing some metrics • Number of items on a report is currently limited • Data displayed is not currently CC0 due to licenses with data sources	• Demonstrating immediate impact of your research across multiple non-traditional communication channels • Benchmarking performance of a particular item against similar items
Journal acceptance rates	Proportion of items accepted for publication in the past year	n/a	Editors (may have to request)	• May not be transparent or easily available	• Demonstrating potential impact for an unpublished or relatively recent article
Visibility	n/a Examples: book reviews, links to an item, reputation of individuals reviewing/linking, media coverage, use for policy decisions or clinical guidelines, and other impact upon a community or population.	Varies	Sources vary	• May be difficult to do a systematic search and capture for this type of information • Difficult to provide context for comparison	• Demonstrating broader impact of your research that does not fit into traditional or formal metrics
Ownership count (libraries)	As indexed in the WorldCat catalog	Depends on the contributing library, but a record is added every 10 seconds	OCLC, or Online Computer Library Center Inc, a non-profit library service and research organization.	• May not be recognized or valued as an indicator of impact in some fields • As library budgets have decreased, libraries are purchasing fewer items and instead relying on ILL	• Demonstrating broad dissemination • Demonstrating value to academic and/or public audiences • Ideal for monographs

Metric	How Calculated	Update Frequency	Source	Keep in mind	Use it for
Indexed in major databases	A general indication of the quality of a scholarly publication. Example: for biomedical disciplines, indexed for PubMed in MEDLINE by the National Library of Medicine	Varies depending on database	Typically commercial publishers	The criteria for indexing varies by database and may not be transparent	Demonstrating value of publishing in a journal that is new or not yet established
Web metrics (views, downloads, shares)	Calculated by the repository or website, typically excluding bots	Varies, typically real-time	Analytic code within the repository or database system itself	Similar accuracy issues with all web statistics, although many repositories screen out traffic from bots and web crawlers	Demonstrating the reach and impact of the item Complementing data from other sources to provide overall indication of impact
Editorial board quality	Journal website, reputation among colleagues	Varies	Colleagues	Can be unreliable, biased, or lag behind actual events	Complementing quantifiable metrics