JpGU-AGU-EGU Great Debate: Impact of research assessment and going forward

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Who I am

1991-1999	Tokyo University of Foreign Studies（Librarian）
2000-2002	University of Hawai'I at Mānoa (MLIS)
2003-2012	Thomson Scientific / Thomson Reuters
	(Contract Research Sales / Solution Consultant)
2012-2015	Nature Publishing Group (Consultant / Custom Publishing)
2015-2018 Apr	ORCID, Inc. (Regional Director, APAC)
2018 May –	Scholarly Communications Consultant (Freelance)
	Paper Digest (Strategic Advisor)
2019 Jan –	World Data System (Communications Officer)
2019 Apr –	University of Tsukuba (Lecturer, part-time)

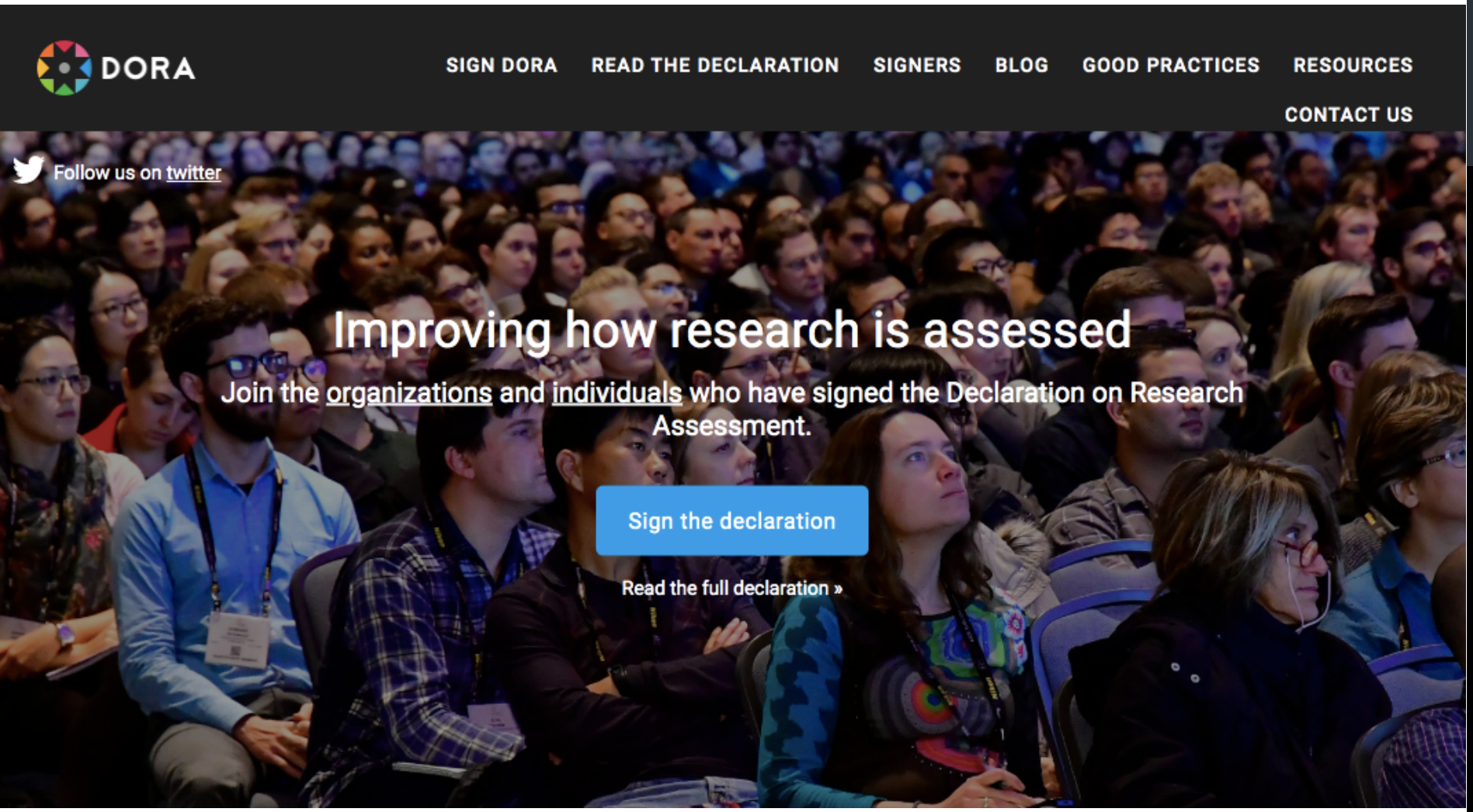
COI disclosure

I am a freelance consultant, based in Tokyo, Japan, providing consulting for academic societies, research institutions, scholarly publishers and solution vendors on issues surrounding scholarly communications.

I am a librarian by training. I received on-the-job training on bibliometrics as part of my work to deliver contract research sales, but had no formal education on the topic.

I was previously employed by, or currently provide my service to, some of the business and organizations mentioned in this presentation. I have contractual obligations to keep their company secrets.

The opinions and views expressed in this presentation and on the following slides, unless otherwise credited, are solely those of the presenter's.

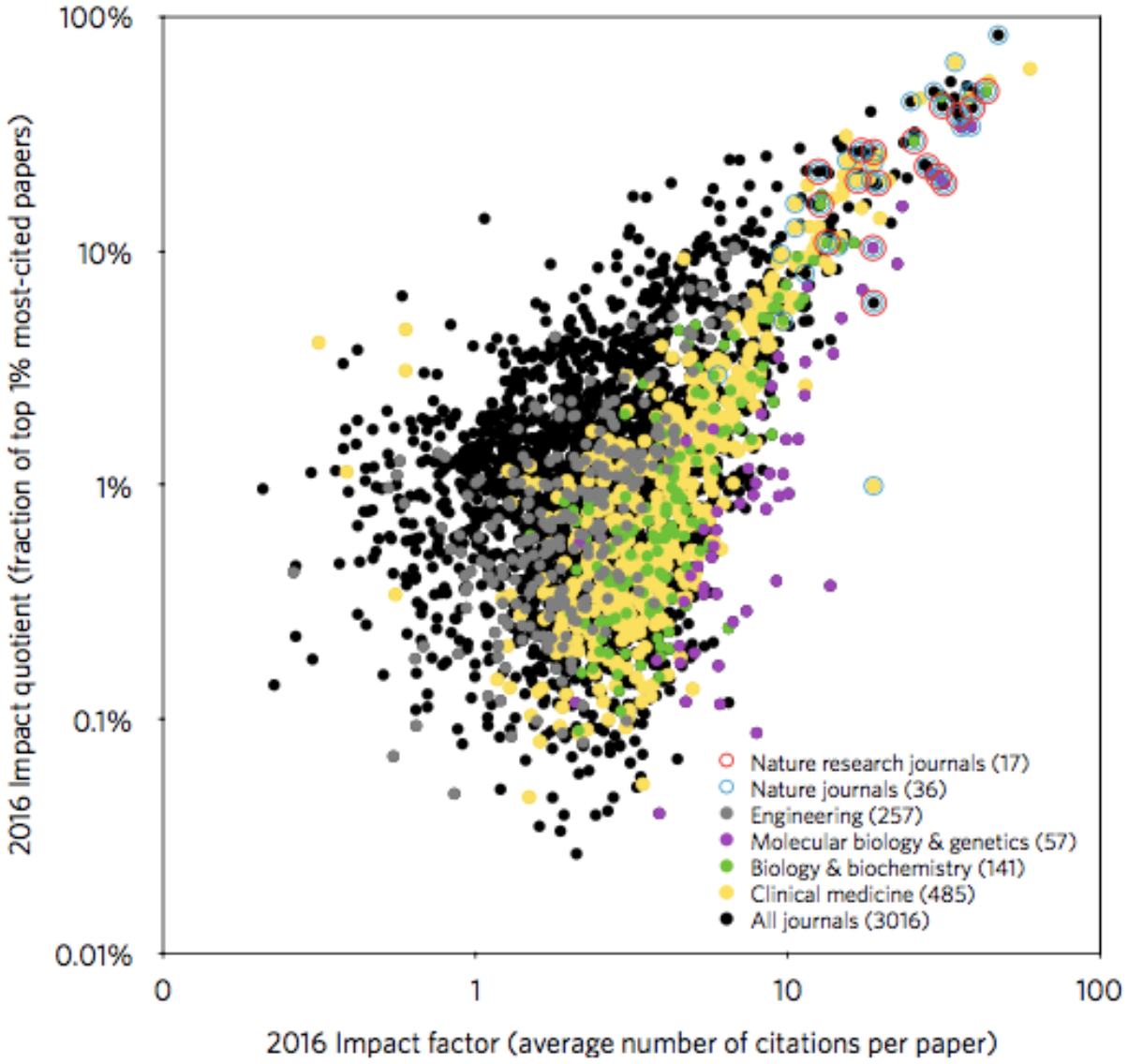


signed by 14,297 individuals and 1,373 organizations

https://sfdora.org/

（as of 2019/05/26）

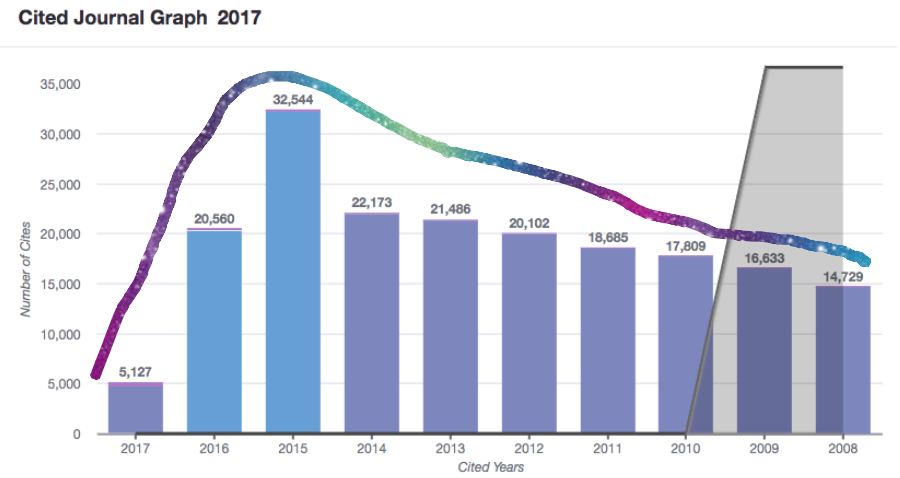
Only 20% of journals have more than 3.0 of Impact Factor



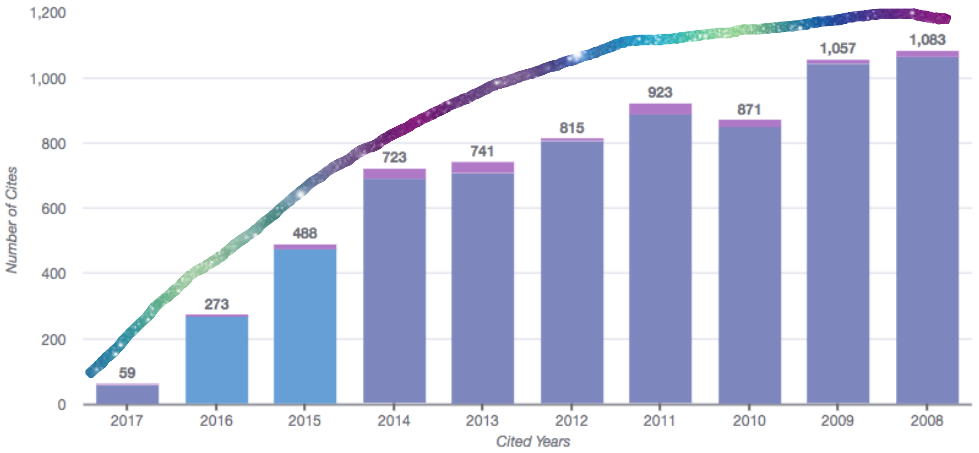
https://figshare.com/articles/IQ_vs_IF/5248381/3

Different fields show different citation rates and patterns.

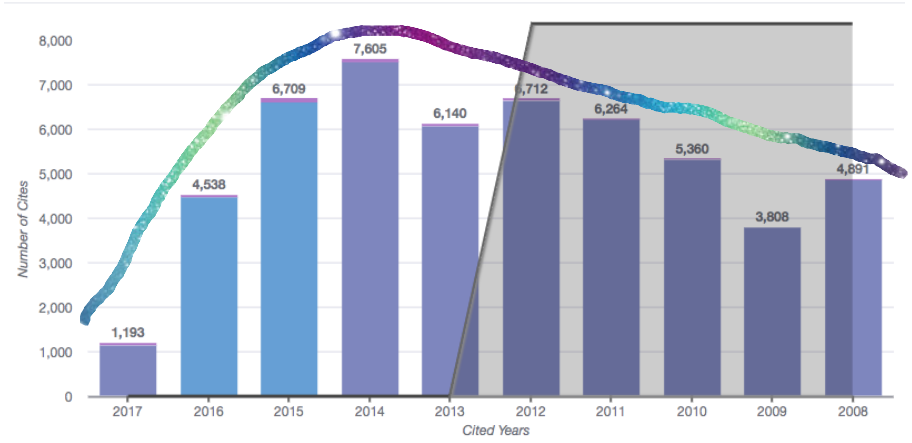
New England Journal of Medicine



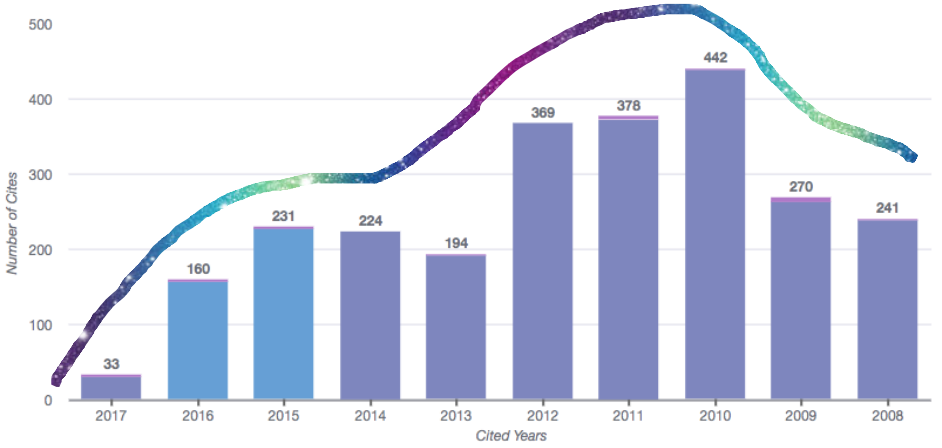
Journal of Finance



Nature Nanotechnology

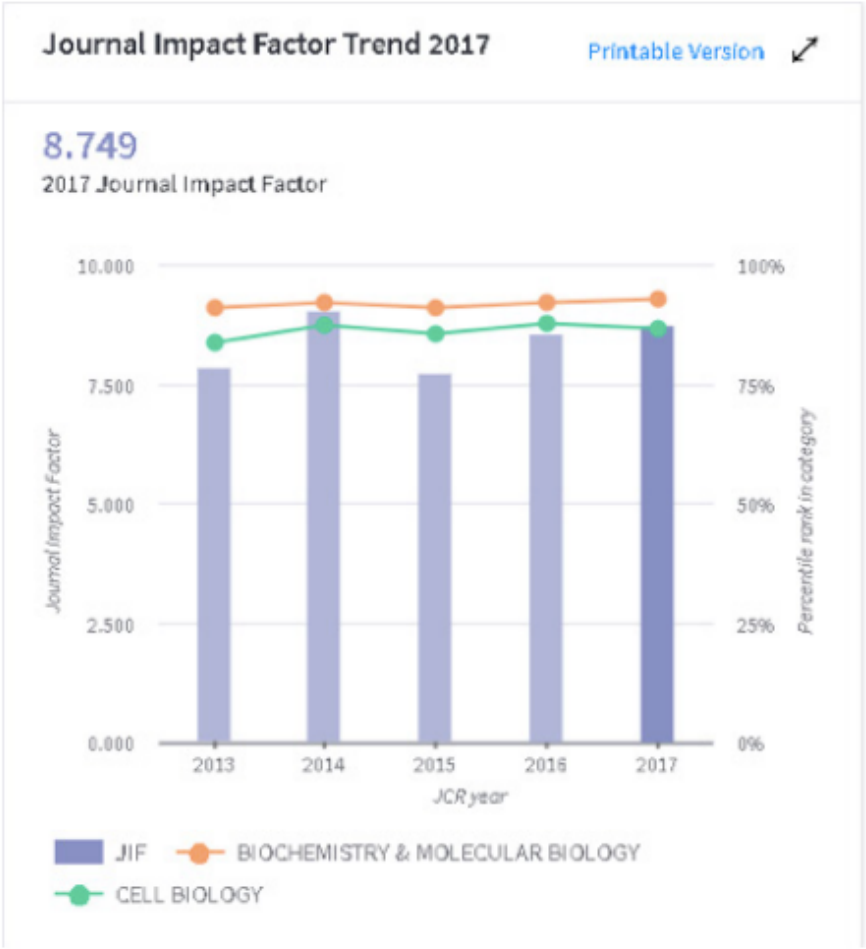


Annals of Mathematics



Source: Journal Citation Reports 2017 (Cited Journal Graph)

Citations always skew, even within the same journal



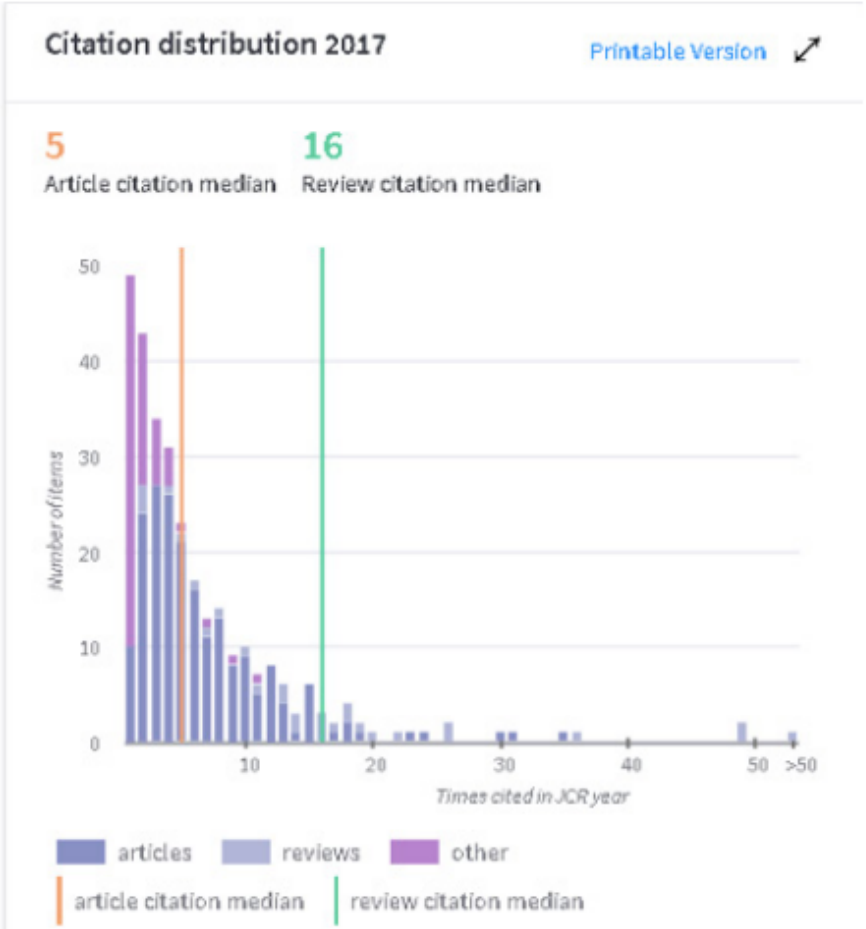


Figure 3. Left: *Journal Impact Factor* Trend graph for *EMBO Reports* shows *JIF* and percentile rank in category. Right: Citation distribution 2017 shows medians and overall spread.

https://clarivate.com/wp-content/uploads/dlm_uploads/2019/01/WOS_ISI_Report_ProfilesNotMetrics_Web_005.pdf

"Problems with IF" have been discussed for decades.
But those problems are not of IF but of people using it wrongly.

Problems associated with the use of journal impact factors

- Journal impact factors are not statistically representative of individual journal articles
- Journal impact factors correlate poorly with actual citations of individual articles
- Authors use many criteria other than impact when submitting to journals
- Citations to "non-citable" items are erroneously included in the database
- Self citations are not corrected for
- Review articles are heavily cited and inflate the impact factor of journals
- Long articles collect many citations and give high journal impact factors
- Short publication lag allows many short term journal self citations and gives a high journal impact factor
- Citations in the national language of the journal are preferred by the journal's authors
- Selective journal self citation: articles tend to preferentially cite other articles in the same journal
- Coverage of the database is not complete
- Books are not included in the database as a source for citations

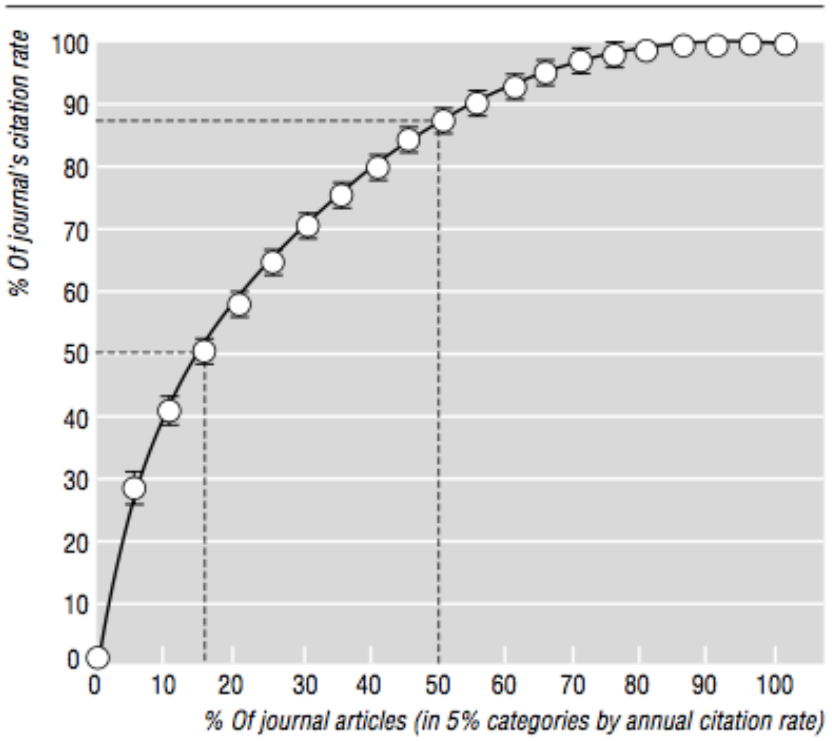


Fig 2 Cumulative contribution of articles with different citation rates (beginning with most cited 5%) to total journal impact. Values are mean (SE) of journals in fig 1; dotted lines indicate contributions of 15% and 50% most cited articles[11]

Seglen PO. Why the impact factor of journals should not be used for evaluating research. BMJ. 1997 Feb 15;314(7079):498–502. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2126010/

Impact Factor as a tool for journal evaluation

Essays of an Information Scientist, Vol1, p.527-544, 1962-73 Reprinted from :Science, (178):471-479, 1972

Citation Analysis as a Tool in Journal Evaluation

Journals can be ranked by frequency and impact of citations for science policy studies.

Also see: Citation frequency and citation impact -- and the role they play in journal selection for Current Contents and other ISI services.

Eugene Garfield

Item No. (1)	Cited Journal (2)	Times Cited Last Quarter 1969 (3)	1969 Citations to 1967 and 1968 Articles (4)	Articles Published in 1967 and 1968 (5)	Impact Factor (6)
1	J AM CHEM SOC	26323	22156	3946	5 614
2	PHYS REV	20674	20740	5767	3 596
3	J BIOL CHEM	17112	10768	1777	6 059
4	NATURE LONDON	15325	15956	6811	2 342
5	J CHEM SOC	14028	17764	5827	3 048
6	J CHEM PHYS	13690	11696	3738	3 128
7	SCIENCE	9752	11880	3968	2 993
8	BIOCHIM BIOPHYS ACTA	9550	10956	3531	3 102
9	P NAT ACAD SCI USA	8260	11548	1348	8 566
10	BIOCHEM J	7638	6348	2074	3 060

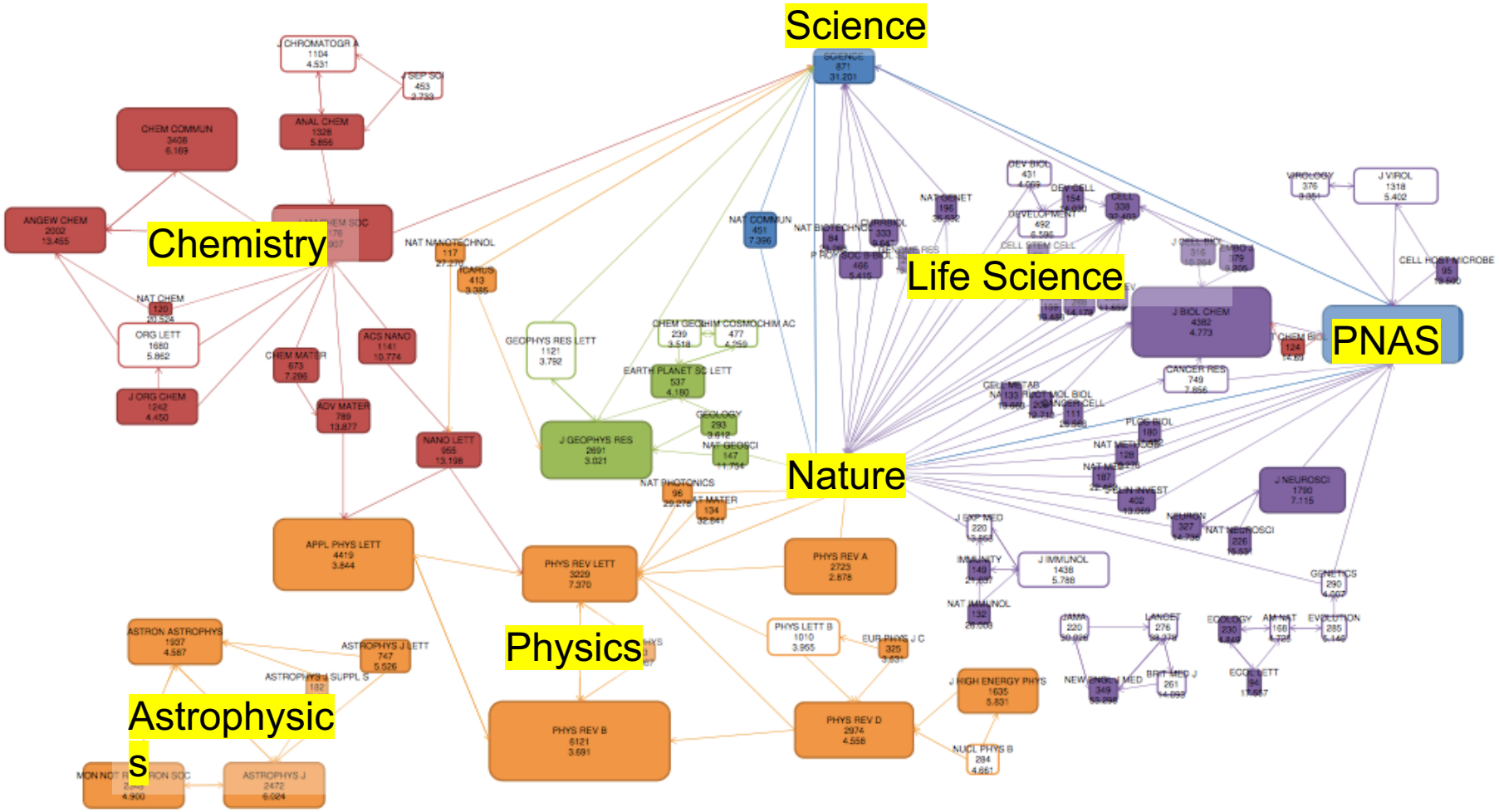
http://www.garfield.library.upenn.edu/essays/V1p527y1962-73.pdf

IF was developed as (one of many) journal evaluation indicators.

Item No. (1)	Cited Journal (2)	Times Cited Last Quarter 1969 (3)	1969 Citations to 1967 and 1968 Articles (4)	Articles Published in 1967 and 19[illegible] (5)	Impact Factor (6)
0001	ACCOUNTS CHEM RES	247	820	28	29.285
0002	ADV PROTEIN CHEM	373	184	8	23.000
0003	PHARMACOL REV	725	448	20	22.400
0004	BACTERIOL REV	646	804	39	20.615
0005	ANNU REV BIOCHEM	468	932	53	17.584
0006	PHYSIOL REV	1022	572	33	17.333
0007	SOLID STATE PHYS	384	228	14	16.285
0008	ADV ENZYMOL	291	192	20	9.600
0009	INT REV CYTOL	230	144	16	9.000
0010	J MOL BIOL	4982	7340	833	8.811
0011	REC PROG HORMONE RES	417	232	27	8.592
0012	P NAT ACAD SCI USA	8260	11548	1348	8.566
0013	J EXP MED	3871	2700	325	8.307
0014	Q REV	488	452	55	8.218
0015	CHEM REV	1003	408	50	8.160
0016	ANNU REV PL PHYSIOL	314	296	42	7.047
0017	J CRYST GROWTH	232	820	125	6.560
0018	ANNU REV MICROBIOL	254	288	44	6.545
0019	J BIOL CHEM	17112	10768	1777	6.059
0020	METHODS BIOCHEM ANAL	285	80	14	5.714
0021	BIOCHEMISTRY	4076	6344	1114	5.694
0022	J AM CHEM SOC	26323	22156	3946	5.614
0023	SOV PHYS USP	586	612	109	5.614
0024	COLD SPR HARB SYMP	1091	1060	194	5.463
0025	BIOL REV	358	176	34	5.176
0026	J VIROL	560	1860	360	5.166
0027	MEDICINE	410	240	48	5.000
0028	J CELL SCI	552	600	122	4.918
0029	PHYS REV LETT	6581	11380	2317	4.911
0030	ASTROPHYS J	4271	5440	1167	4.661
0031	AM J MED	2191	1784	395	4.516
0032	SOV PHYS JETP	4295	3400	754	4.509
0033	VIROLOGY	2376	2620	584	4.486
0034	J NEUROPHYSIOL	1015	692	156	4.435
0035	PSYCHOL REV	593	368	83	4.433
0036	REV MOD PHYS	1364	816	189	4.317
0037	BIOCHEM BIOPHYS RES	3417	5108	1190	4.292
0038	MON NOT ROY ASTR SOC	868	1008	238	4.235
0039	CIRC RES	1750	1820	432	4.212
0040	J IMMUNOL	2627	2992	726	4.121
0041	Q J MED	437	284	70	4.057
0042	J NAT CANCER I	1668	1672	417	4.009
0043	EUR J BIOCHEM	1635	1992	501	3.976
0044	MOL PHARMACOL	300	564	144	3.916
0045	DEVELOP BIOL	435	552	142	3.887
0046	J CLIN ENDOCR METAB	1903	1888	488	3.868
0047	CHEM ENG LONDON	268	392	104	3.769
0048	J LIPID RES	929	876	235	3.727
0049	ADV PHYS	318	284	77	3.688
0050	PSYCHOL B	610	564	154	3.662
0051	IMMUNOLOGY	801	1208	335	3.605
0052	PHYS REV	20674	20740	5767	3.596
0053	J PHARMACOL EXP THER	2781	2020	566	3.568
0054	APPL PHYS LETT	1337	2556	721	3.545
0055	J ORGANOMET CHEM	1089	2784	796	3.497
0056	J CELL PHYSIOL	860	628	180	3.488
0057	BRAIN RES	420	1140	327	3.486
0058	BRIT MED B	426	432	127	3.401
0059	J CELL BIOL	4813	4596	1357	3.386
0060	J GEOPHYS RES	3537	5312	1569	3.385
0061	J CLIN INVEST	4785	3652	1086	3.362
0062	J BACTERIOL	4147	4712	1410	3.341
0063	ANALYT BIOCHEM	1519	1672	502	3.330
0064	IMMUNOCHEMISTRY	271	404	125	3.232
0065	ARCH BIOCHEM BIOPHYS	3689	3776	1169	3.230
0066	INORG CHEM	2620	3976	1247	3.188
0067	J CHEM PHYS	13690	11696	3738	3.128
0068	J ULTRASTRUCT RES	979	1392	445	3.128
0069	AM J PHYSIOL	5420	3156	1013	3.115
0070	TRANSPLANTATION	513	1000	321	3.115
0071	BIOCHIM BIOPHYS ACTA	9550	10956	3531	3.102
0072	ANN PHYSICS	1105	692	224	3.089
0073	P ROY SOC LOND	4864	1916	621	3.085
0074	BIOCHEM J	7638	6348	2074	3.060
0075	J CHEM SOC	14028	17764	5827	3.048
0076	METHODS ENZYMOL	1391	1456	482	3.020
0077	SCIENCE	9752	11880	3968	2.993
0078	GENET RES	371	464	155	2.993
0079	J GEN PHYSIOL	1507	1208	407	2.968
0080	ANGEW CHEM	2728	3660	1251	2.925
0081	ENDOCRINOLOGY	2548	2276	783	2.906
0082	CANCER RES	2349	2344	814	2.879
0083	EXP PARASITOL	437	492	171	2.877
0084	NUCL PHYS	4034	6716	2345	2.863
0085	TETRAHEDRON LETT	3937	8252	2902	2.843
0086	PLANTA	707	1172	414	2.830
0087	HELV CHIM ACTA	2249	1524	539	2.827
0088	J COMP NEUROL	969	376	133	2.827
0089	BIOPOLYMERS	452	656	235	2.791
0090	CHROMOSOMA	458	440	159	2.767
0091	Z ZELLF MIKR ANAT	1286	1800	653	2.756
0092	CLIN SCI	680	552	205	2.692
0093	BRIT J PHARMACOL	1348	1348	507	2.658
0094	SURFACE SCI	399	844	321	2.629
0095	AM J HUM GENET	405	332	128	2.593
0096	PLANET SPACE SCI	508	892	348	2.563
0097	DISCUSS FARADAY SOC	702	292	114	2.561
0098	J NEUROCHEM	801	900	357	2.521
0099	SOV J NUCL PHYS	742	1588	630	2.520
0100	MUTAT RES	274	532	213	2.497
0101	J CATAL	431	764	308	2.480
0102	ACTA PHYSIOL SCAND	1816	1024	413	2.479
0103	CHEM PHYS LETT	294	996	402	2.477
0104	GEOCHIM COSMOCH ACTA	814	744	301	2.471
0105	P IEEE	1610	1856	756	2.455
0106	STEROIDS	473	680	277	2.454
0107	TETRAHEDRON	2071	3220	1313	2.452
0108	J PHYSIOL LOND	4966	3036	1248	2.432
0109	INT J CANCER	275	452	189	2.391
0110	PSYCHOPHARMACOLOGIA	277	388	163	2.380
0111	NEW ENGL J MED	4512	5252	2226	2.359
0112	PHYS LETT	3943	7160	3034	2.359
0113	EARTH PLANET SC LETT	269	672	286	2.349
0114	NATURE LONDON	15325	15956	6811	2.342
0115	J PHYS CHEM	4703	4516	1939	2.329
0116	J ORG CHEM	5401	5756	2475	2.325
0117	J EXP ANALYSIS BEHAV	509	424	184	2.304
0118	J HISTOCHEM CYTOCHEM	1229	828	362	2.287
0119	J APPL PHYSIOL	1836	1460	643	2.270
0120	AM J ANAT	637	256	113	2.265
0121	EXP CELL RES	1958	1464	653	2.241
0122	BLOOD	1614	1256	566	2.219
0123	J FLUID MECH	998	1036	472	2.194
0124	HISTOCHEMIE	323	668	305	2.190
0125	AM J CARDIOL	1238	1600	737	2.170
0126	REC TRAV CHIM	1010	728	337	2.160
0127	PHIL MAG	1943	1180	547	2.157
0128	J BIOCHEM	966	1064	498	2.136
0129	ACTA METALLURG	1304	964	452	2.132
0130	J GEN MICROBIOL	1445	1136	534	2.127
0131	CAN J PHYS	1352	2156	1019	2.115
0132	ANN MATH	702	184	87	2.114
0133	ACTA CHEM SCAND	2444	1984	943	2.103
0134	BRIT J HAEMATOL	581	608	290	2.096
0135	METABOLISM	550	564	270	2.088
0136	RADIO SCI	385	760	365	2.082
0137	CANCER	1416	1224	593	2.064
0138	PHOTOCHEM PHOTOBIOL	343	472	229	2.061
0139	AM J SCI	602	284	138	2.057
0140	T FARADAY SOC	2922	1808	879	2.056
0141	CHEM BER	4541	2128	1037	2.052
0142	MOL PHYS	698	652	319	2.043
0143	CAN J CHEM	2280	2392	1182	2.023
0144	J EXP BOT	352	336	167	2.011
0145	B SEISMOL SOC AM	344	416	208	2.000
0146	J SEDIMENT PETROLOGY	423	480	240	2.000
0147	ARCH MIKROBIOL	438	600	305	1.967
0148	DIABETES	785	936	477	1.962
0149	J PHYS CHEM SOLIDS	1430	1572	801	1.962
0150	INORG NUCL CHEM LETT	247	620	316	1.962
0151	J ENDOCRINOL	983	1104	566	1.950
0152	PROTOPLASMA	301	380	195	1.948

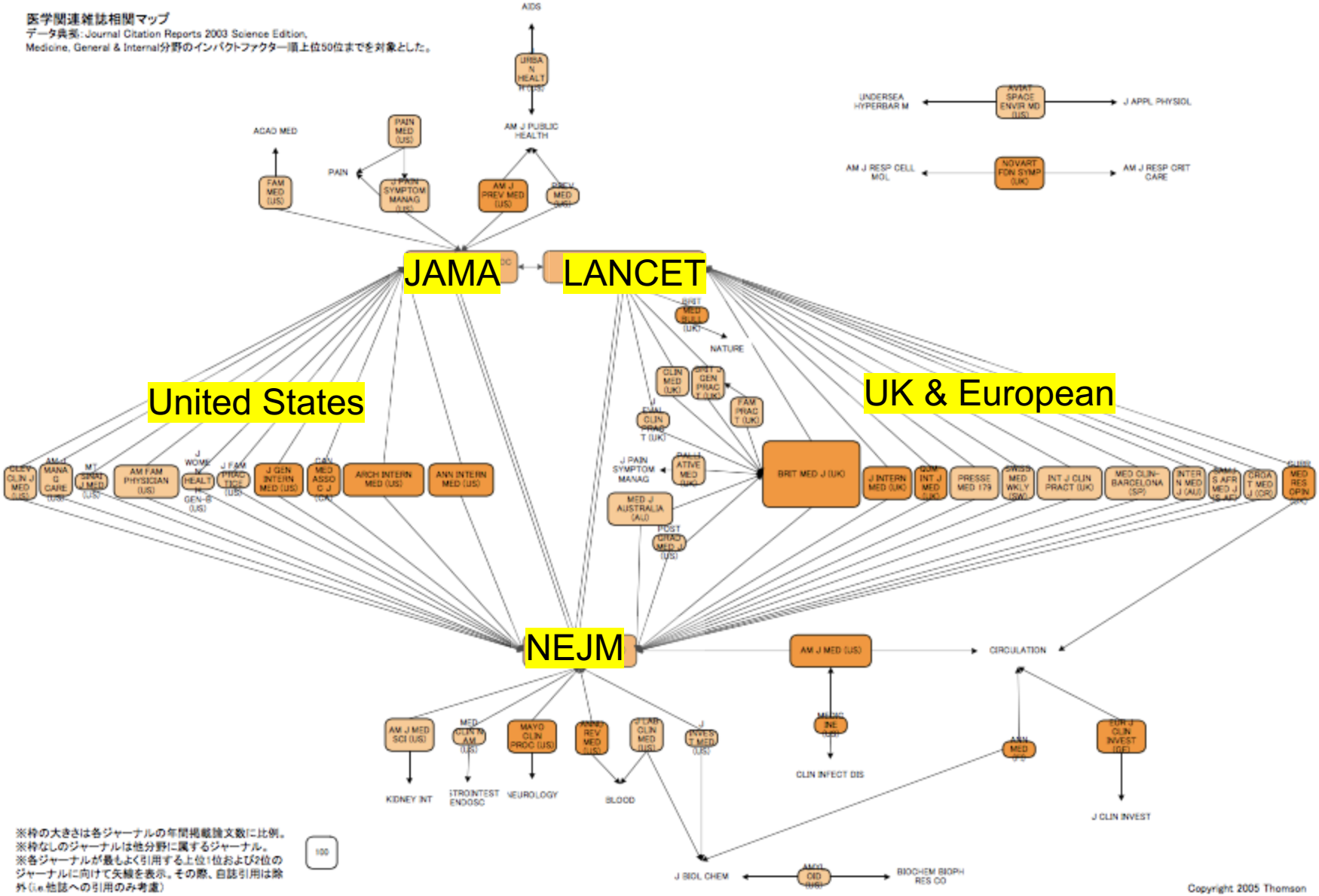
Fig. 8. The 152 most frequently cited journals ranked by impact factor (average number of citations per item published). The column headings are explained in the legend of Fig. 4.

Interdisciplinary journals attract more citations. Specialty journals tend to form its own group.



Miyairi, N. [not published]

There is a geographic bias in citations.



Miyairi, N. [not published]

H-index favors senior researchers. There is a variety of indicators to choose from, but people usually don't.

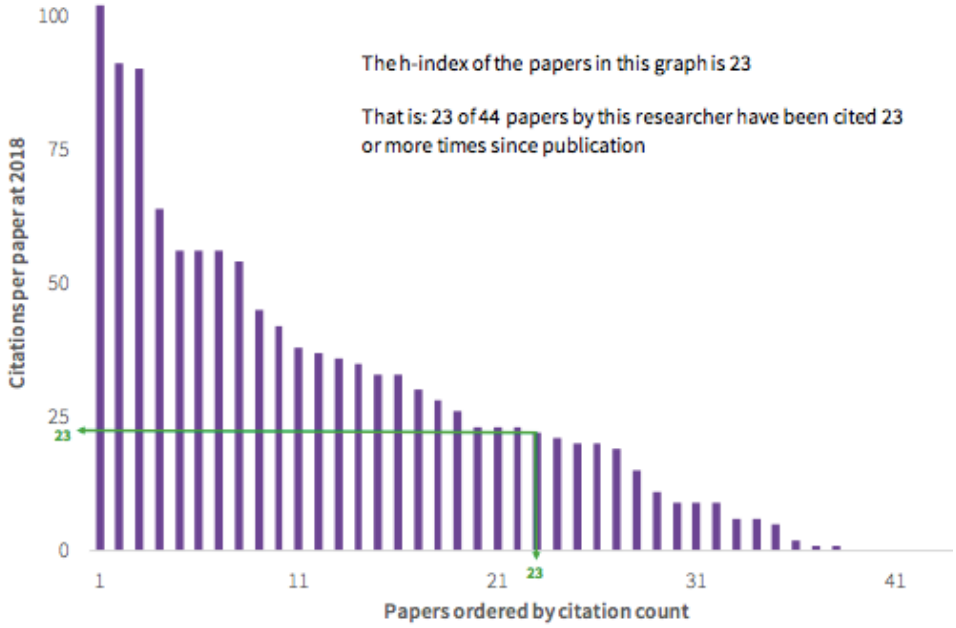


Figure 1. In this example h-index = 23 for a researcher who is an author or co-author on 44 citable journal articles over a 15-year period. Output included reports and proceedings that cannot be analysed in this way. Graphing the data reveals the spread, skew, and presence of relatively highly cited items buried under the 'h' value. Uncited items disappear.

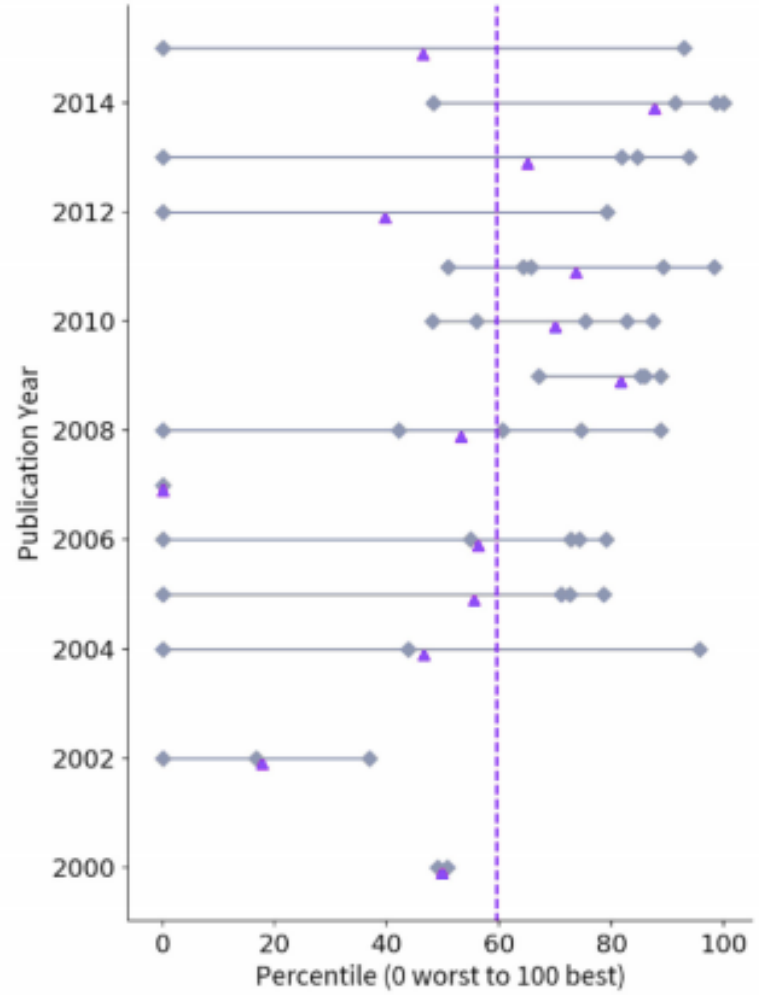
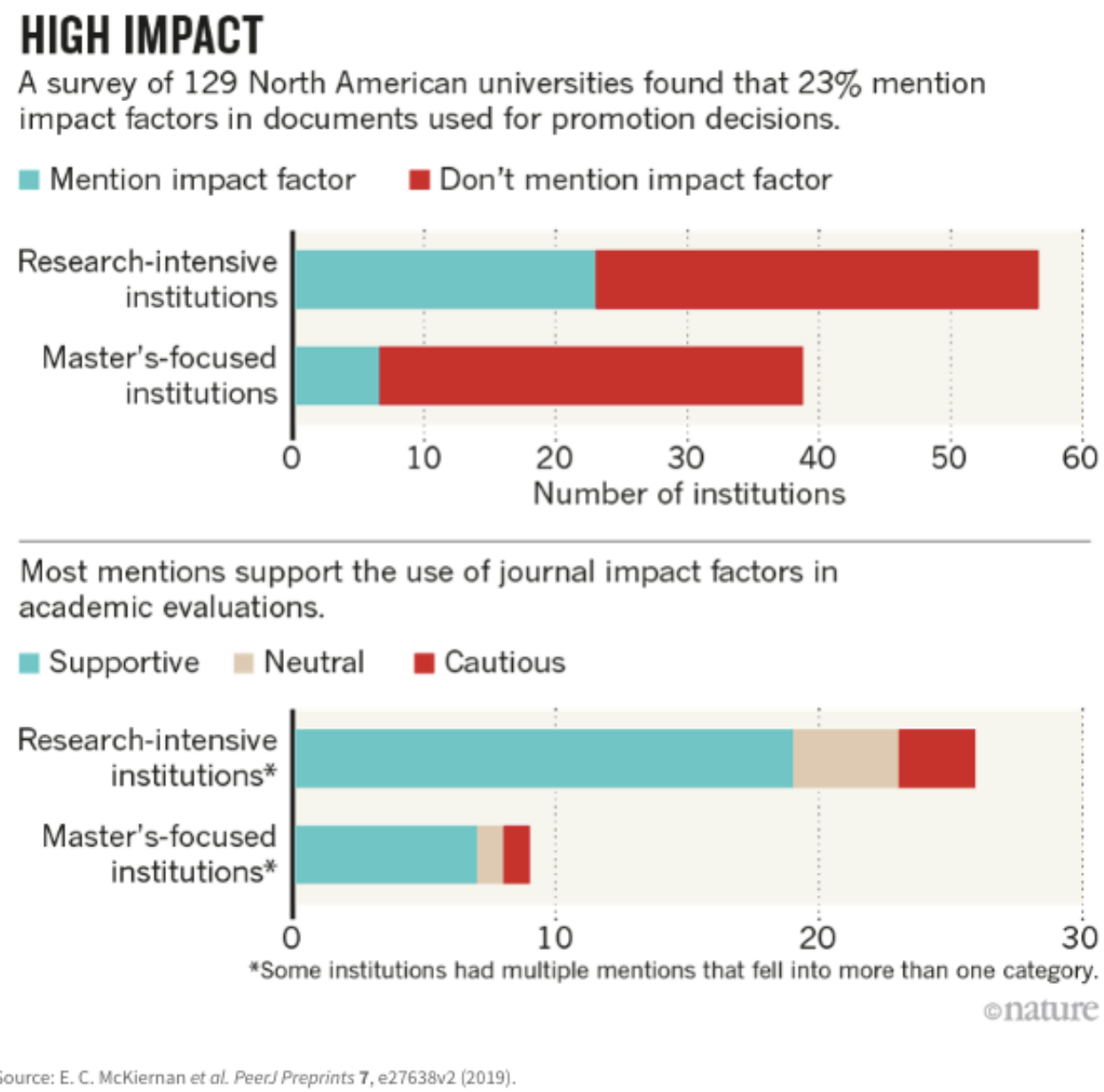


Figure 2. A beam-plot of the data in Figure 1. Each article is compared to its own reference set but all use a common 0-100 percentile scale. The ranges of each year's article percentiles are shown (grey marks, across the beam) with their annual median (purple mark, a pivot). The benchmark line is the researcher's overall average: the 59th percentile.

https://clarivate.com/wp-content/uploads/dlm_uploads/2019/01/WOS_ISI_Report_ProfilesNotMetrics_Web_005.pdf



Source: E. C. McKiernan *et al. PeerJ Preprints* **7**, e27638v2 (2019).

Else H. Impact factors are still widely used in academic evaluations. Nature. 2019 Apr 11;Available from: http://www.nature.com/articles/d41586-019-01151-4

Why IF is still being used for research evaluation?

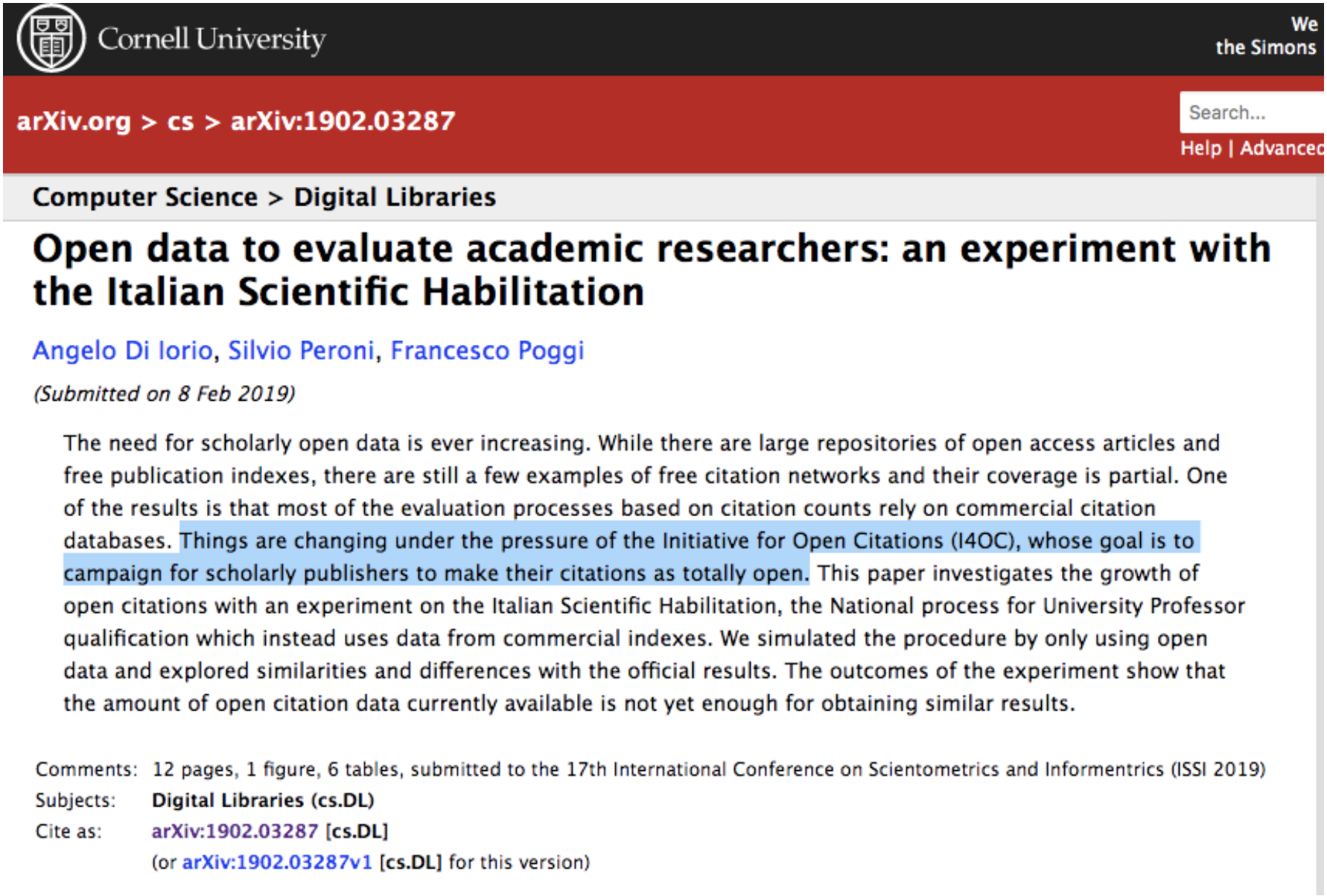
- “Easy to understand”
- “Readily available even before citations accumulate”
- “There is no other indicators”
- “Everyone uses it so I have to”

- Peer review should be the foundation of research evaluation and citation data can be useful to avoid possible human bias.
- Peer review is time-consuming and costly, but it cannot be the reason to choose simplistic measures instead.
- Doing “proper” bibliometrics was time-consuming and costly too, but open science is making it faster/easier.

Citation data are being democratized.

Learn more about the Initiative for Open Citations: https://i4oc.org/

More and more citation data are becoming open.



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Open data to evaluate academic researchers: an experiment with the Italian Scientific Habilitation

Angelo Di Iorio, Silvio Peroni, Francesco Poggi

(Submitted on 8 Feb 2019)

The need for scholarly open data is ever increasing. While there are large repositories of open access articles and free publication indexes, there are still a few examples of free citation networks and their coverage is partial. One of the results is that most of the evaluation processes based on citation counts rely on commercial citation databases. Things are changing under the pressure of the Initiative for Open Citations (I4OC), whose goal is to campaign for scholarly publishers to make their citations as totally open. This paper investigates the growth of open citations with an experiment on the Italian Scientific Habilitation, the National process for University Professor qualification which instead uses data from commercial indexes. We simulated the procedure by only using open data and explored similarities and differences with the official results. The outcomes of the experiment show that the amount of open citation data currently available is not yet enough for obtaining similar results.

Comments: 12 pages, 1 figure, 6 tables, submitted to the 17th International Conference on Scientometrics and Informentrics (ISSI 2019)
Subjects: **Digital Libraries (cs.DL)**
Cite as: arXiv:1902.03287 [cs.DL]
(or arXiv:1902.03287v1 [cs.DL] for this version)

Di Iorio, Angelo, et al. “Open Data to Evaluate Academic Researchers: An Experiment with the Italian Scientific Habilitation.” *ArXiv:1902.03287 [Cs]*, Feb. 2019, http://arxiv.org/abs/1902.03287.


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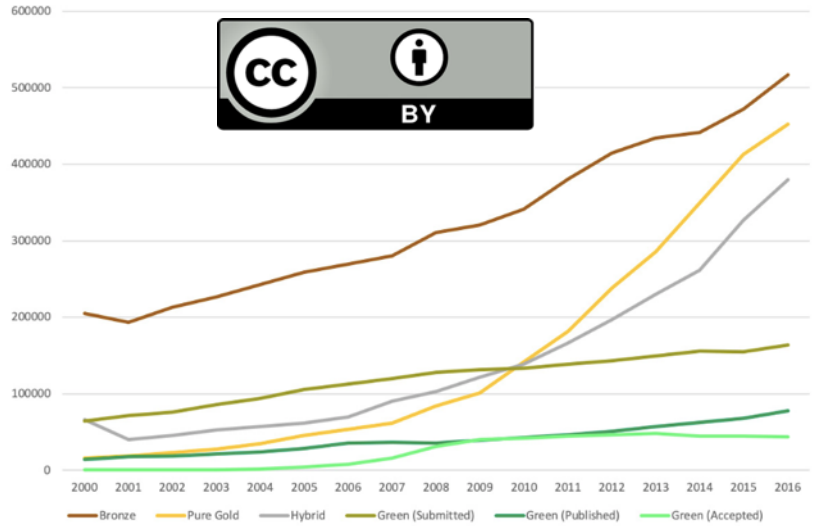
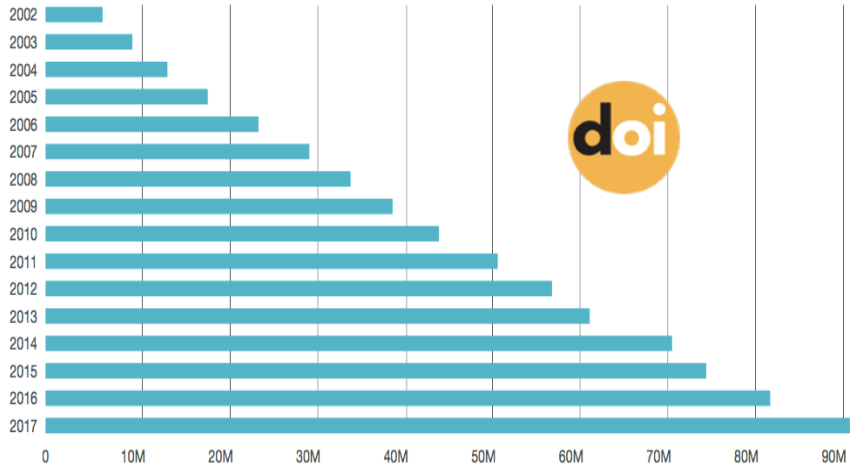
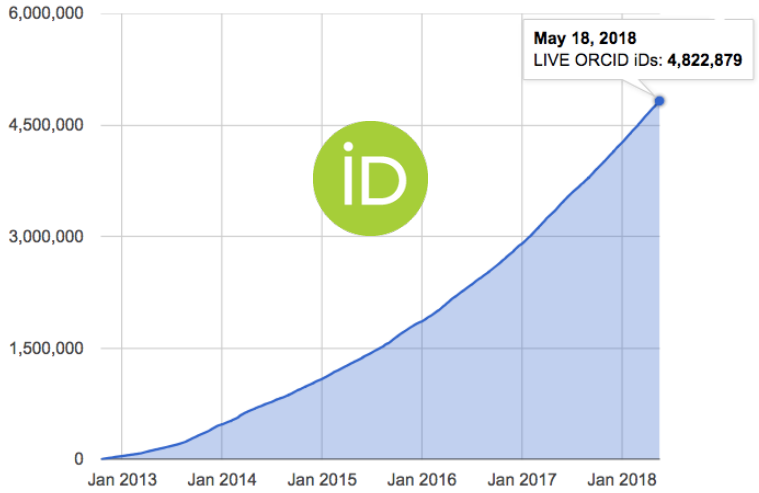


The Ascent of Open Access
https://doi.org/10.6084/m9.figshare.7618751.v2

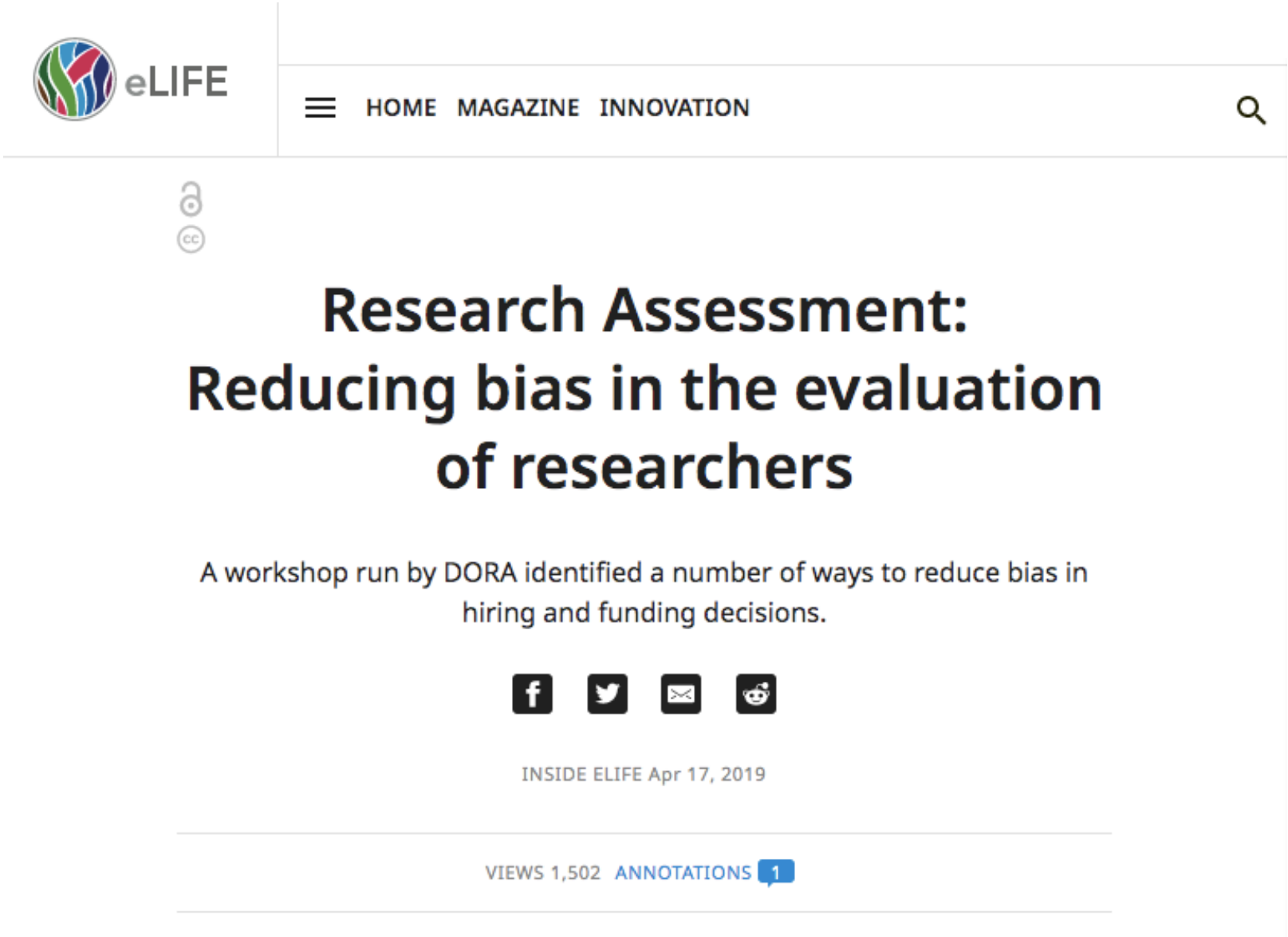


Crossref. 2016-17 annual report.
https://www.crossref.org/pdfs/annual-report-2016.pdf



ORCID live iDs
https://support.orcid.org/knowledgebase/articles/150557-number-of-orcid-ids

More machine-readable open metadata are being made available to expand opportunities beyond human curated research evaluation data.



Research Assessment: Reducing bias in the evaluation of researchers. eLife. 2019. https://elifesciences.org/inside-elife/1fd1018c/research-assessment-reducing-bias-in-the-evaluation-of-researchers

Research related outputs	Preprints Research articles Review articles Commentary or perspective pieces Books Monographs Invited talks Conference presentations Conference papers Conference abstracts Patents Data Code Software Protocols Reagents Tools
Teaching and mentorship	Teaching classes Advising students Effective mentorship Graduating students Successful trainee job placement Promotion of diversity, equity, and inclusion on campus, in the classroom, and in the lab Service on committees – qualifying exam, thesis defense and/or advisory committees Leading career training and leadership workshops and/or lectures for trainees Teaching summer courses and workshops outside of home university Education focused publications

Academic service	Service on department committees Service on grant review panels Grant writing to support institutional initiatives Peer-review research articles Journal editor Conference organizer Service on committees for scholarly societies Other positions of leadership in or outside the university
Collaboration and team science	Partnership with industry or other stakeholders Partnerships with other research groups Contributions to open science including data and educational resource repositories
Societal impacts	Creation of new policy Science advocacy Effects on community
Public engagement	Public talks Participation in citizen science projects Outreach at K-12 schools Judging science fair projects

For researchers

15. When involved in committees making decisions about funding, hiring, tenure, or promotion, make assessments based on scientific content rather than publication metrics.

16. Wherever appropriate, cite primary literature in which observations are first reported rather than reviews in order to give credit where credit is due.

17. Use a range of article metrics and indicators on personal/supporting statements, as evidence of the impact of individual published articles and other research outputs [11].

18. Challenge research assessment practices that rely inappropriately on Journal Impact Factors and promote and teach best practice that focuses on the value and influence of specific research outputs.

https://sfdora.org/read/

Summary

- **Impact Factor has been increasingly criticized for its abuse and misuse in the research assessment context.**
- **It was originally developed for journal evaluations and there is an array of other indicators and techniques developed in the field of bibliometrics.**
- **Bibliometrics can be useful, if properly done, to avoid possible human bias in peer review; both are a costly and time-consuming process.**
- **Not only open contents but also open metadata are expanding opportunities to collect a more holistic view of researchers' activities and output than before.**
- **It's time to discuss 'how to' evaluate more properly, not 'how not to'.**

Are you ready to be OPEN?

THANKS!

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