

# Yet Another View on Citation Scores

#### Wil van der Aalst

"How to evaluate scientific research?" is a controversial topic. The easiest way to evaluate productivity and impact is to count the number of published papers and the number of citations. Clearly, this is very naïve because it is possible to publish many papers that are incremental or of low quality. Counting the total number of citations has the problem that one may be a co-author of a single high-cited paper. This does not say much about the contribution of the author, and citations tend to follow a power-law distribution (i.e., just a few papers attract most of the citations). To address the limitations of simply counting papers and citations, the scientific community has created journal and conference rankings, and metrics like the Hirsch index (first proposed by Jorge Hirsh in 2005, and adapted in many different ways).

Of course, all of these measures should be taken with a grain of salt. In the Netherlands, the "Recognition and Rewards" ("Erkennen en Waarderen") program [6] was initiated to improve the evaluation of academics and to give credits to people working in teams or focusing on teaching. Similar initiatives can be seen in other countries and at the European level [7]. Although the goals of such programs are reasonable and it is impossible to disagree with statements such as "quality is more important than quantity" and "one should recognize and value team performance and interdisciplinary research", suitable measures are lacking. Such programs are often used to abandon any measure to quantify and evaluate productivity and impact. In some universities, it has even become "politically incorrect" to talk about published papers and the number of citations. Yet, when evaluating and selecting academics, committee members still secretly look at the data provided by Google Scholar, Scopus, and Web of Science. This is because it is difficult to evaluate and compare academic performance in an objective and qualitative way. **This creates the risk that evaluations and selections become highly subjective, e.g., based on taste, personal preferences, and criteria not known to the individuals evaluated.** Moreover, in such processes, quantitative data are still used, but in an implicit and inconsistent manner.

Given the above, my personal opinion is that **we cannot avoid using objective data-driven approaches to evaluate productivity and impact**. Of course, quantitative measures should **only support expert assessment** and are not a substitute for informed judgment. When using citation scores, one should definitely consider the "Leiden Manifesto for research metrics" [1], which provides ten principles to guide research evaluations.

Some of the **practical challenges** that I see in research evaluations are the following:

**Subjectivity**. Rankings of journals and conferences tend to be problematic. Journal lists are highly subjective. For example, in the field of Information Systems, the "College of Senior Scholars" selected a "basket" of journals as the top journals in their field. However, the definition of Information Systems is considered in a very particular manner, mostly driven by non-technical US-based academics publishing in these journals and serving on the editorial boards of the journals they select. The CORE ranking of conferences is much broader, but has similar problems (e.g., the ranking was established by a few computer departments in Australia and New Zealand and is now used all over the globe to decide on research funding and travel budgets). The intentions behind these lists are good. However, it is unavoidable that there are topical biases and scoping issues. Moreover, such rankings are like a self-fulfilling prophecy. This leads to a variant of the Matthew effect ("the rich get richer"), i.e., the higher the ranking of a conference or journal, the more people want to submit to it, automatically leading to a higher status. This combined with a narrow focus, leads to a degenerate view of research quality and discourages innovations in new directions. Although research is changing rapidly, these journal lists tend to be relatively stable. Moreover, highly-ranked journals and conferences have many papers that are rarely cited. Hence, just looking at the publication venue says little about the quality, novelty, and impact of the work.

• **Biased data sources and data quality problems.** There are multiple databases that can be used to evaluate productivity and impact, e.g., Elsevier's Scopus and

Google Scholar (both released in 2004) and Web of Science (online since 2002). Also, dedicated tools running on top of these platforms, such as InCites (using the Web of Science) and SciVal (using Scopus), have been developed. Web of Science has a strong focus on journals published in the US and favors traditional disciplines such as Physics. Conferences are only partially covered. For a researcher in Computer Science, the number of citations in Google Scholar may be 2-3 times higher than the number of citations in Scopus, and over 10 times the number of citations in Web of Science! For a researcher in Physics, the differences between Google Scholar, Scopus, and Web of Science may be much smaller. This means that Web of Science is simply irrelevant for many disciplines. Google Scholar has the most extensive coverage, but also data quality problems. Google Scholar simply crawls academic-related websites and also counts non-peer-reviewed documents. One may also find stray citations where minor variations in referencing lead to duplicate records for the same paper [8]. Also, Scopus and Web of Science have such problems, but to a lesser degree. In Microsoft Academic Graph, my output and citations were split over eight different user profiles due to my last name ("W. van der Aalst", "Van der Aalst", etc.). Although Microsoft Academic Graph was discontinued, these flawed data are still used in all kinds of rankings (e.g. Research.com). These examples illustrate that the impact of data quality problems and limited coverage are not equally distributed. Considering data quality and coverage, Scopus can be seen as the "middle road".

• **Different publication practices.** Finally, there are different publication traditions that significantly impact the most common measures used today. In many disciplines, the average number of authors is around two. However, in areas like physics, the average is above ten authors, and there are papers with hundreds or even thousands of authors. An article on measuring the Higgs Boson Mass published in Physical Review Letters has **5,154** 

**authors** (cf. <u>https://link.aps.org/doi/10.1103/PhysRevLett.114.191803</u>). This 33-page article has 24 pages to list the authors, and only 9 pages are devoted to the actual paper. When counting H-indices in the standard way, this paper will increase the H-index by one for more than 5000 authors. Also, the order in which authors are listed varies from discipline to discipline. In mathematics, it is common to list authors alphabetically. In other disciplines, the order is based on contribution. Also, the "last author" position may have a specific meaning (e.g., the project leader or most senior researcher). Also, in Computer Science, conference publications are regarded as important and comparable to journal publications. In other areas, conference publications "do not count", and all work is published in journals. The above shows that counting just journal papers while ignoring the number of authors may have hugely diverging consequences for different disciplines.

These challenges are hard to address. However, as stated before, I do not think it is wise to resort to subjective evaluations of research productivity and impact while ignoring the data that are there. Therefore, I liked the approach and work

**presented by John Ioannidis and his colleagues** [2,3,4,5]. Ioannidis et al. propose to use a **composite indicator** (called **C**-score) which is the sum of the standardized six log-transformed citation indicators (**NC**, **H**, **Hm**, **NS**, **NSF**, **NSFL**):

- total number of citations received (NC),
- Hirsch index for the citations received (**H**),
- Schreiber co-authorship adjusted Hm index for the citations received (**Hm**).

total number of citations received to papers for which the scientist is single author (**NCS**),

total number of citations received to papers for which the scientist is single or first author (**NCSF**), and

total number of citations received to papers for which the scientist is single, first, or last author (**NCSFL**).

The resulting **C**-score focuses on impact (citations) rather than productivity (number of publications) and incorporates information on co-authorship and author positions (single, first, last author). Each **NC**, **H**, **Hm**, **NS**, **NSF**, **NSFL** score is normalized to a value between 0 and 1, and these are summed up. Hence, the **C**-score has a range between 0 and 6.

In the dataset [2], data for 194,983 scientists are reported. The selection is based on the top 100.000 scientists by **C**-score (with and without self-citations) or a percentile rank of 2% or above in the subfield. The researchers are classified into 22 scientific fields and 174 sub-fields. The dataset is based on all Scopus author profiles as of September 1, 2022. Scopus can be seen as the middle ground between Google Scholar and Web of Science. As mentioned, Google Scholar has much better coverage, but also more data quality problems. Web of Science is unusable for many disciplines due to its bias towards specific types of journals. Note that loannidis et al. tried to avoid the problems mentioned before, i.e., they aimed to avoid subjectivity and biased data, addressed data quality problems, and compensated for different publication practices (e.g., number of authors).

The data set [2] looks as follows (after hiding some of the columns and showing the first 40 rows):

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Grätzel, Michael	Ecole Polytechnique Fédér, che		318,94			,873 29,4				343,152	264 116.1275		30,101			Nanoscience & Nanc	0.1850 Chemical Physics	0.1327 Enabling & St	0.3926	1	103,235
Willett, Walter C.	Harvard T.H. Chan School (usa		2 302,008			,222 29,8				333,175	299 120.8142	11,743	32,210			B Epidemiology	0.1964 Nutrition & Dieteti	0.1510 Clinical Medi	0.5390	1	9,365
Wang, Zhong Lin	Georgia Institute of Techniusa Harvard Medical School usa		205,72			,789 30,5		5,4954		237,426	240 122.2488 233 85 2627	18,414	33,623			Nanoscience & Nanc	0.5555 Applied Physics 0.5914 Public Health	0.1083 Enabling & St 0.0544 Clinical Medi	0.7019	2	103,235
Kessler, Ronald C.			226,033			103 109,0 569 202.6						6,192	113,655			Psychiatry				1	71,064
Kresse, Georg Friston, Karl	Universität Wien aut		5 234,453							240,153	110 48.7481 199 105.8068	46,751	204,227			Applied Physics	0.4278 Chemical Physics	0.2513 Physics & Ast	0.8877	1	289,917
Friston, Karl Witten, Edward	University College London gbr Institute for Advanced Stucusa		5 1.62,208 7 92.075			,161 59,5 ,412 53.2			4 1		199 105.8068 135 106.9167	16,136	65,008	124,991 93.195		Neurology & Neuros Nuclear & Particle Pf	0.5396 Experimental Psyc 0.6743 Mathematical Phy	0.1119 Clinical Medi 0.1086 Physics & Ast	0.6997	1	305,851 141,567
Written, Edward Whitesides, George M.	Harvard Faculty of Arts ancusa		222,623			A12 53,2 372 24.6				235,510	218 114.8775	52,635	24,924			General Chemistry	0.6743 Mathematical Phy 0.2103 Organic Chemistry	0.1086 Physics & Ast 0.1297 Chemistry	0.8947	1	49,459
McEwen, Bruce S.	Rockefeller University usa		136,44			.175 43.0		5,4229		149.113	186 109.8921	24,915	44.922			Neurology & Neuros	0.2103 Organic Chemistry 0.4827 Endocrinology & N	0.1297 Chemistry 0.1570 Clinical Medi	0.5105	2	49,455
Barnes, Peter J.	National Heart and Lung In gbr		133,085			848 18.6				149.085	191 114.9647	24,918	41.112			Respiratory System	0.3747 Pharmacology & P	0.1370 Clinical Medi	0.8970	1	60,661
Vitman, Douglas	University of Oxford gbr		428.620			459 21.6		5,4093	11 4		232 102.9688	4,622	22.358			General & Internal M	0.3747 Pharmacology & P 0.3621 Oncology & Carcin	0.0498 Clinical Medi	0.8970	1	311.132
Ialliwell, Barry	NUS Yong Loo Lin School c sgp		104.72			813 56.1		5.3872	12 1		155 100.9387	28.335	57,103			Biochemistry & Mole	0.4858 Neurology & Neur-	0.0751 Biomedical F	0.6317	1	201,173
arin, Michael	UC San Diego School of Mrusa		186,878			595 28.0			13 1		221 91.9951	9,715	28,894			Developmental Biolc	0.2798 Biochemistry & Mc	0.1959 Biomedical F	0.5258	1	127,685
usuf, Salim	McMaster University can		215.242			250 40.0		5.3582	15 2		222 65,2333	12,536	51.033			Cardiovascular Syste	0.4501 General & Internal	0.1662 Clinical Medi	0.9227	1	127,08
Perdew, John P.	Temple University usa		248,340			.996 226.1		5.3557	14 2		89 49.3025	20.089		241.405		Applied Physics	0.3323 Chemical Physics	0.2908 Physics & Ast	0.9199	2	289.917
Semenza, Gregg L.	Johns Hopkins School of Musa		5 105,998			.591 38.3		5.3522	17 1		160 91.9338	32.094	39,156			Biochemistry & Mole	0.1883 Oncology & Carcin	0.1753 Clinical Medi	0.5498	2	205,517
Folkman, Judah	Children's Hospital Boston usa		125,592			797 42.6		5.3457	19 1		155 80.5286	26,959	43.064			Oncology & Carcinor	0.2163 Biochemistry & Mc	0.1310 Clinical Medi	0.7698	1	293,195
Ridker, Paul M.	Harvard Medical School usa		177.361			151 64.8			16 1		210 78,9770	8.379	69.032			Cardiovascular Syste	0.3944 General & Internal	0.1348 Clinical Medi	0.8315	2	199,278
Langer, Robert	Massachusetts Institute of usa		205,51			893 20.1			18 2		236 108.2544	6.056	20,714			Biomedical Engineeri	0.1621 Pharmacology & P	0.1519 Clinical Medi	0.3162	1	59,238
Akira, Shizuo	WPI Immunology Frontier Lion		246.00			887 27.9			20 2		241 93.1080	3.953	28.512			Immunology	0.4774 Biochemistry & Mr	0.1056 Clinical Medi	0.6805	1	138,595
Becke, Axel D.	Dalhousie University can		167,223			.659 160.3		5.3160	23 1		52 38.8333	152.954	160,930			Chemical Physics	0.8140 General Chemistry	0.0698 Physics & Ast	0.8837	1	95,895
Bandura, Albert	Stanford University usa		89,81			127 80.6			24		95 68.8112	67.327	81.255			Social Psychology	0.3254 Clinical Psychology	0.1347 Psychology 8	0.7098	1	21,288
libby. Peter	Harvard Medical School usa		135.74			217 37.5		5,3139	21 1		190 84.8697	16.648	38 850	78,869		Cardiovascular Syste	0.4932 Immunology	0.0993 Clinical Medi	0.8984		199,278
Vewman, M. E.J.	University of Michigan, Anrusa		113.134			055 79.5			25 1		88 64.1833	60,360	80.190			Fluids & Plasmas	0.6082 General Physics	0.0876 Physics & Ast	0.8144	1	48,581
ielkoe, Dennis	Harvard Medical School usa		114,463		5.7407 24	.047 29.7	04 88.040		31 1		155 78.7011	24,242	30.002	91,590		Neurology & Neuros	0.4346 Biochemistry & Mc	0.2321 Clinical Medi	0.6139	4	305,851
Anarello, Charles A.	Radboud University Medici nld		5 100,508			134 30.6			28 1		172 90.7020	24.530	31,422			Immunology	0.4229 Biochemistry & Mr	0.0577 Clinical Medi	0.8251	2	138,595
Mattson, Mark P.	Johns Hopkins School of Musa		106.378			.070 30.4		5.2769	22 1		191 103.2981	11.863	33.307	88,548		Neurology & Neuros	0.5693 Biochemistry & Mc	0.0873 Clinical Medi	0.7362	3	305,851
orma, Avelino	Conseio Superior de Invest esp		116,694			765 50.9		5.2737	26 1		160 91.6886	10.090	55.072			Physical Chemistry	0.3638 Organic Chemistry	0.2558 Chemistry	0.7759	1	37,107
ain, Rakesh K.	Harvard Medical School usa		121,28			215 25.9			29 1		172 81.5248	17,915	27,306			Oncology & Carcinos	0.4141 Cardiovascular Sys	0.0845 Clinical Medi	0.7271	2	293,195
Zadeh, Lotfi A,	University of California, Be usa		108,89			258 102.3		5,2706	33 1		57 53.9524	102.657	102,784	109,167		Artificial Intelligence	0.4055 Networking & Tele	0.1299 Information	0.7638	1	321,592
Hu, Frank B.	Harvard T.H. Chan School cusa		1 176,52		4.0644 5	826 23,9	59 89,055		30 1		231 85.9615	6,004	25,796			Endocrinology & Met	0.2050 Nutrition & Dieteti	0.1807 Clinical Medi	0.6093	1	84,176
oannidis, John P.A.	Stanford University School usa		181,57			509 30.2			27 1		169 83.9625	15.627	33,660			General & Internal M	0.1865 Epidemiology	0.1159 Clinical Medi	0.6310	2	311,132
rost, Barry M.	Stanford University usa	3	8 73,91	125 91	1.8833 11	,646 71,9	56 73,489	5,2500	32	78,751	130 95.9667	12,045	75,588	78,289	5.2608	General Chemistry	0.4533 Organic Chemistry	0.3975 Chemistry	0.9923	2	49,455
annel, William B.	National Heart, Lung, and Eusa	3	132,020	159 80	5.5042 7	.838 39,6	06 79,281	5.2491	37 1	135,335	162 87.7625	7,934	40,121	80,777	5.2377	Cardiovascular Syste	0.3847 General & Internal	0.2406 Clinical Medi	0.8588	4	199,278
lassague, Joan	Memorial Sloan-Kettering (usa		111,551			.854 27,1	74 92,873	5.2399		116,424	168 71.1940	15,979	27,548	95,119		Developmental Biolc	0.4032 Biochemistry & Mc	0.2865 Biomedical F	0.7480	2	127,685
irundy, Scott M.	UT Southwestern Medical usa	3	5 125,030	151 74	4.9877 11	,610 46,6	76 62,092	5.2328	39 1	131,803	155 75.5464	11,797	47,677	64,093	5.2258	Cardiovascular Syste	0.2997 General & Internal	0.1359 Clinical Medi	0.8374	5	199,278
Vang, Joseph	Department of NanoEngineusa	3	82,04	143 80	5.0989 13	,430 40,0	93 70,701	5.2295	34	90,685	152 90.7489	13,883	43,052	77,498	5.2516	Analytical Chemistry	0.5978 Nanoscience & Na	0.0923 Chemistry	0.7180	1	107,126
Lander, Fric S.	Broad Institute usa	3	372,860	249 45	0.8360 2	,655 37,6	70 106,166	5,2220	41 3	299,286	258 50.5930	2,673	38,733	109,674	5.2203	Developmental Biolc	0.3669 Genetics & Heredit	0.1276 Biomedical F	0.5874	3	127,685
Kroemer, Guido	Institut de Cancerologie Gufra	3	189,381	203 78	8.3713 2	,960 23,0	42 142,403	5.2209	35 2	214,514	221 82.5235	3,066	24,399	157,016	5.2479	Immunology	0.2393 Biochemistry & Mc	0.1651 Clinical Medi	0.5344	3	138,595
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The first three columns show the author, institution, and country. The orange columns show the **NC**, **H**, **Hm**, **NS**, **NSF**, **NSFL**, and **C** values for each author ignoring self-citations. The first orange column shows the **overall rank** based on the **C**-score, and the last orange column shows the **C**-score itself (with a value between 0 and 6). The yellow columns show the **NC**, **H**, **Hm**, **NS**, **NSF**, **NSFL**, and **C** values for each author, including self-citations. The final columns aim to show the positioning of the author's work in the respective subfields. The top-ranked Science-Metrix category and second-ranked Science-Metrix category are listed per author, including the fraction of papers in these fields, the **C**-score-based ranking in the top-ranked field, and the total number of authors within the subfield.

To illustrate the data [2], I take myself as an example:

Author name: van der Aalst, Wil M.P.

Institution: Rheinisch-Westfälische Technische Hochschule Aachen

Country: deu (Germany)

#### Without self-citations:

- total number of citations received (NC): 42,854
- Hirsch index for the citations received (H): 99
- Schreiber co-authorship adjusted Hm index for the citations received (Hm): 64
- total number of citations received to papers for which the scientist is single author (NCS): 6,678
- total number of citations received to papers for which the scientist is single or first author (NCSF): 21,516

- total number of citations received to papers for which the scientist is single, first, or last author (**NCSFL**): 35,435
- **C-score**: 4.8916
- Global rank across all fields based on C-score: 275

#### **Including self-citations:**

- total number of citations received (NC): 50,145
- Hirsch index for the citations received (**H**): 107
- Schreiber co-authorship adjusted Hm index for the citations received (**Hm**): 68
- total number of citations received to papers for which the scientist is single author (NCS): 7,365
- total number of citations received to papers for which the scientist is single or first author (NCSF): 24,116
- total number of citations received to papers for which the scientist is single, first, or last author (**NCSFL**): 41,397
- **C-score**: 4.9370
- Global rank across all fields based on C-score: 243

First subfield: Artificial Intelligence & Image Processing

Fraction of papers in the first subfield: 0.4585

Second subfield: Information & Communication Technologies

#### **Fraction of papers in the second subfield**: 0.1444

#### **Global ranking within the first subfield based on C-score**: 7

#### Number of researchers in the first subfield: 321,592

Hence, my global ranking based on the **C**-score not considering self-citations is 275, my global ranking based on the **C**-score also considering self-citations is 243, and I'm ranked 7th among the 321,592 in Artificial Intelligence & Image Processing.

The above describes one row in the table shown before. To further improve readability, I removed the columns related to the second subfield and only considered the citations, excluding self-citations. The top 25 authors based on **C**-score are then readable, and the top view is as follows:

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1	authfull	inst_name	cntry	rank (NS)	NC9621 (n		Hm21 (ns)			NCSFL (ns		sm-subfield-1	sm-subfielc			
	Grätzel, Michael	Ecole Polytechnique Fédér		1	318,947		111.7161	27,873	29,461	215,608		Nanoscience & Nano		1		3,235
	Willett, Walter C.	Harvard T.H. Chan School	cusa	2	,	284	114.9988	11,222	29,889	114,799		Epidemiology	0.1964	1		9,365
	Wang, Zhong Lin	Georgia Institute of Techn	cusa	3	205,724	218	113.8004	16,789	30,562	162,636		Nanoscience & Nano		2		3,235
	Kessler, Ronald C.	Harvard Medical School	usa	4	226,033	222	82.5782	6,103	109,010	165,298	5.4593	Psychiatry	0.5914	1	71	1,064
	Kresse, Georg	Universität Wien	aut	5	234,452	102	47.0366	46,569	202,647	217,457	5.4502	Applied Physics	0.4278	1	289	9,917
	Friston, Karl	University College London	gbr	6	162,208	184	97.8691	15,161	59,502	112,021	5.4318	Neurology & Neuros	0.5396	1	305	5,85
	Witten, Edward	Institute for Advanced Stu	c usa	7	92,075	134	105.9167	52,412	53,227	91,995	5.4274	Nuclear & Particle Pl	0.6743	1	141	1,56
	Whitesides, George M.	Harvard Faculty of Arts an	usa	8	222,622	213	109.8870	8,372	24,603	189,154	5.4266	General Chemistry	0.2103	1	49	9,45
)	McEwen, Bruce S.	Rockefeller University	usa	9	136,446	176	105.9418	24,175	43,094	90,604	5.4229	Neurology & Neuros	0.4827	2	305	5,85
I	Barnes, Peter J.	National Heart and Lung Ir	n gbr	10	133,085	179	109.0144	22,848	38,632	84,063	5.4104	Respiratory System	0.3747	1	60	0,66
	Altman, Douglas	University of Oxford	gbr	11	428,620	227	100.6762	4,459	21,608	194,512	5.4093	General & Internal N	0.3621	1	311	1,13
	Halliwell, Barry	NUS Yong Loo Lin School o	sgp	12	104,720	150	98.4981	27,813	56,140	84,917	5.3872	Biochemistry & Mole	0.4858	1	201	1,17
	Karin, Michael	UC San Diego School of M	eusa	13	186,878	214	90.0789	9,595	28,404	148,480	5.3763	Developmental Biolo	0.2798	1	127	1,68
	Yusuf, Salim	McMaster University	can	14	215,242	213	62.9363	12,259	49,077	117,625	5.3582	Cardiovascular Syste	0.4501	1	199	27
	Perdew, John P.	Temple University	usa	15	248,340	82	45.5858	19,996	226,135	237,934	5.3557	Applied Physics	0.3323	2	289	9,91
,	Semenza, Gregg L.	Johns Hopkins School of N	lusa	16	105,998	156	90.2633	31,591	38,345	80,397	5.3522	Biochemistry & Mole	0.1883	2	201	
	Folkman, Judah	Children's Hospital Boston	usa	17	125,592	151	78.9449	26,797	42,612	102,256	5.3457	Oncology & Carcinor	0.2163	1	293	
	Ridker, Paul M.	Harvard Medical School	usa	18		199		8,151	64,865	96,574		Cardiovascular Syste		2	199	
)	Langer, Robert	Massachusetts Institute of	usa	19	205,517	220		5,893	20,101	115,187		Biomedical Engineer		1		9,23
	Akira, Shizuo	WPI Immunology Frontier		20	246,002	229		3,887	27,933	128,306			0.4774	1	138	
	Becke, Axel D.	Dalhousie University	can	21	167.227	51		152,659	160.373	164.092		Chemical Physics	0.8140	1		5,89
	Bandura, Albert	Stanford University	usa	22	89,813	93		67,127	80,669	85,000		Social Psychology	0.3264	1		1,28
	Libby, Peter	Harvard Medical School	usa	23		179		16.217	37,552	74,492	5.3139			3		9,27
5	Newman, M. E.J.	University of Michigan, An		23	113,134	87	62.4000	60,055	79,561	105.121		Fluids & Plasmas	0.6082	1		3,58
;	Selkoe, Dennis	Harvard Medical School	usa	25	114,467	150		24.047	29,704	88.040		Neurology & Neuros		4		5,85
,	Dinarello, Charles A.	Radboud University Medic		25	· · ·	163		24,047	30,630	54,469	5.2787	Immunology	0.4229	2	138	·
	Mattson, Mark P.	Johns Hopkins School of N		20	106,378	103		11,070	30,492	78,061		Neurology & Neuros		3		5,85 5,85
	Corma, Avelino	Consejo Superior de Invest		27	116,694	174	86.9366	9,765	50,939	81,564		Physical Chemistry	0.3638	1		5,85 7,10
					· · · ·			· · · · ·	· · · · ·	· · · · ·				-		
	Jain, Rakesh K.	Harvard Medical School	usa	29	121,281	166		17,215	25,964	92,915		Oncology & Carcinog		2		3,19
	Zadeh, Lotfi A. Hu, Frank B.	University of California, Be		30	108,896	57	53.3690	102,258	102,381	108,707		Artificial Intelligence		1		1,59
1	Hu, Frank B. Key   Data	Harvard T.H. Chan School	cusa	31	176,529	221	84.0644	5,826	23,959	89,055	5.2673	Endocrinology & Me	0.2060	1	84	4,17

### For researchers from **RWTH Aachen University**, the table looks as follows:

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12	• I X V	$f_x$ University of O	xford												
	А	В	С	D	E	F	G	н	1	J	К	L	M	N	0
1	authfull 🛛	inst_name	T cntry	<ul> <li>rank (N</li> </ul>	NC9621 -	H21 (ns *	Hm21 ( 👻	NCS(ns 👻	NCSF(n 👻	NCSFL ( 👻	C (ns) 🛛 🝸	sm-subfield-1 🛛 👻	sm-subfi 👻	rank s 👻 s	m-subfield-
76	van der Aalst, Wil M.P.	Rheinisch-Westfälische T	edeu	27	5 42,854	4 99	64.5252	6,678	21,516	35,435	4.8916	Artificial Intelligence	0.4585	7	321,5
78	Bolm, Carsten	Rheinisch-Westfälische T	edeu	1,47	7 33,154	4 94	56.9778	747	9,938	29,181	4.5766	Organic Chemistry	0.7232	45	154,1
98	Waser, Rainer	Rheinisch-Westfälische T	edeu	1,79	7 37,29	2 87	44.6863	1,017	9,779	27,204	4.5408	Applied Physics	0.5030	64	289,9
43	Wagner, Wolfgang	Medizinische Fakultät, RV	⁄/ deu	3,44	2 24,86	1 69	35.8701	1,060	9,610	20,675	4.4042	Developmental Biol	0.0968	178	127,0
)49	Enders, Dieter	Rheinisch-Westfälische T	edeu	4,04	8 32,57	8 74	46.8528	72	21,643	31,235	4.3678	Organic Chemistry	0.8319	108	154,:
22	Floege, Jürgen	Rheinisch-Westfälische T	edeu	6,62	1 26,87	7 82	34.6901	421	4,955	11,874	4.2589	Urology & Nephrolo	0.5838	49	79,
23	Peters, N.	Rheinisch-Westfälische T	edeu	7,12	2 11,51	5 53	29.9762	3,414	4,773	9,545	4.2414	Energy	0.5033	67	265,
359	Wuttig, Matthias	Rheinisch-Westfälische T	edeu	8,35	8 20,58	7 67	31.8113	428	4,618	15,410	4.2018	Applied Physics	0.4628	213	289,
53	Pitsch, Heinz	Rheinisch-Westfälische T	edeu	9,55	2 13,28	7 57	34.6744	1,145	2,961	10,039	4.1692	Energy	0.5804	76	265,
85	Kuhl, Christiane K.	Uniklinik RWTH Aachen	deu	9,68	4 13,90	2 54	23.8514	1,439	7,299	8,461	4.1658	Nuclear Medicine &	0.5742	45	105,
119	Ney, Hermann	Rheinisch-Westfälische T	edeu	11,41	8 20,51	9 65	38.7281	384	1,133	17,582	4.1240	Artificial Intelligence	0.4647	205	321
939	Schulz, Jörg B.	Uniklinik RWTH Aachen	deu	11,93	8 26,08	7 82	30.8310	120	4,703	10,361	4.1135	Neurology & Neuros	0.6643	1,067	305
316	Kobbelt, Leif	Rheinisch-Westfälische T	edeu	16,31	.5 9.55	5 53	30.0762	711	2,335	8,440	4.0294	Software Engineerin	0.6157	13	21
351	Woeginger, Gerhard J.	Rheinisch-Westfälische T	edeu	16,35	0 6,924	4 45	32,7250	1.738	1.869	6,482	4.0288	Computation Theor	0.3459	42	18
416	Keim, Wilhelm	Rheinisch-Westfälische T	edeu	16,41		1 43	24,4306	1.120	2.678	9,877	4.0277	Organic Chemistry	0.4902	431	154
	Okuda, Jun	Rheinisch-Westfälische T	edeu	17,45		3 56	32,7794	438	1,465	10,197		Organic Chemistry	0.4812	386	154
	Hecht, Stefan	Rheinisch-Westfälische T	edeu	18.67			27.5540	280	2,374	9,236	3.9921	Organic Chemistry	0.2797	445	154
	De Doncker, Rik W.	Rheinisch-Westfälische T		18,78					2,474	14,570	3.9907	Electrical & Electron		43	106,
	Czakon, Michał	Rheinisch-Westfälische T		19,97					4,611	4,831	3.9733	Nuclear & Particle P		303	141,
	Albrecht, Markus	Rheinisch-Westfälische T		19,99				1.893	4,443	4,793		Organic Chemistry	0.5068	381	154,
	Gottstein, Günter	Rheinisch-Westfälische T		21.84	· · · · ·			178	1.664	9.611		Materials	0.9072	236	267,
	Hoelderich, W. F.	Rheinisch-Westfälische T		23,98	· · · · · ·			404	1,324	7,948	3.9204	Physical Chemistry	0.6590	96	37,
	Krämer, Michael	Rheinisch-Westfälische T		24,49					1,325	2,474		Nuclear & Particle P		331	141,
	Lammers, Twan	Uniklinik RWTH Aachen	deu	25,44				145	3,544	7,708	3.9032			212	134,
	,	Rheinisch-Westfälische T		26,32					4,640	5,739		Artificial Intelligence		550	321,
	Trautwein, Christian	Uniklinik RWTH Aachen	deu	28,12					1,364	7,380		Gastroenterology &		412	95.
	Dronskowski, Richard V.	Rheinisch-Westfälische T		28,12					2,172	8,043		Inorganic & Nuclear		151	93, 70,
	Marx, Nikolaus	Uniklinik RWTH Aachen	deu	31,16					4,318	6,275		Cardiovascular Syste		1,253	199,
	Herpertz-Dahlmann, Beat		deu	31,10				295	4,318	3,801		Developmental & Ch		215	199,
	Marguardt, Wolfgang	Rheinisch-Westfälische T		33,70					563	6,924		Chemical Engineerin		106	67,
				34,59				1.502	2,340	6,924 3,464		Fluids & Plasmas		274	
160	Felderhof, B. Ubbo Key Data si	Rheinisch-Westfälische T mplified (+)	ecdeu	34,69	3,82	9 30	24.5444	1,502	2,340	3,464	3.8112	Fiulus & Plasmas	0.5236	2/4	48,

For researchers working in **Germany**, the table looks as follows:

43       Sheldrick, George M.       Georg-August-Universität C d=u       42       143,376       52       29.4868       126,508       128,811       1         16       Man, Matthias       Max-Planck-Institut für Bid deu       115       179,990       199       80.9208       1,10       7,375       1         17       Sies, Helmut       Leibniz Research Institut für Bid deu       105       7,994       118       67,9401       1,348       7,433         29       Nexes, Frank       Max Planck Institute for C deu       288       45,641       102       56,8199       12,977       17,024         19       Fürstner, Alois       Max Planck Institute for C deu       348       35,440       98       62,9131       5,458       17,776       17,776         10       Georg-August-Universität Clai       344       34,479       46,445       101       62,8925       6,658       17,776         10       Kartneran, Lutz       Georg-August-Universität Clai       344       35,656       106       46,9922       5,619       17,423         24       Maker, Jaach Institute for Acteu       433       55,575       124       62,482       4,833       5,355         33       Atonietti, Markus       Max Planck Institute for		• <sup>م</sup> و 🖬					Table	_1_Analysisວ	dsx - Excel							– c	
A         B         C         D         E         F         G         H         I           authfull         Inst_name         cntry         Imst_name         cntry         Imst_name         Imst_name         NCSF(n × NCSF(n		File Home Insert	Page Layout Formulas	Data	Review	View Ç	) Tell me wh	iat you want	to do							۶	$Q_{\!$
authfull         Inst_name         entry         3         rank (N         NCS62         H21 (n         Hm21 (s)         NCS(ns)         NCS(n	3	12 - : ×	$\checkmark f_x$ University of 0	Oxford													
Grimme, Stefan         Universität Bonn         deu         40         89,873         99         61.4692         29,603         65,151           3         Sheldrick, George M.         Georg-August-Universität C deu         42         143,376         52         29,4888         126,508         128,811         1           1         Sies, Helmut         Leibniz Research Institute f (deu         170         57,593         111         67,9401         10,345         17,143           9         Bork, Peer         European Molecular Biolog deu         228         181,563         177         64,3198         1,334         7,808           9         Nesse, Frank         Max Planck Institute for C cleu         238         45,841         98         62,9131         5,448         25,485           9         Pierster, Alois         Max Planck Institute for C cleu         338         3,440         98         62,9131         5,448         25,485           10         Restram, Nutz         Georg-August-Universität C deu         349         33,479         94         60,4842         6,060         24,676           10         Restram, Nutz         Georg-August-Universität C deu         433         55,175         124         62,7452         4,631         5,035	4		В	-	-					1	J	К	L	M	N	0	
Sheldrick, George AL.         Georg-August-Universität C deu         42         143,376         52         29,4868         126,508         128,811         1           Mann, Matthias         Max-Planck-Institut für Bid deu         115         179,890         199         80,9208         1,101         7,735         1           Jeiss, Helmin L         Leibnir Research. Institut ef deu         170         57,593         111         67,9401         10,345         1,7143           Jess, Helmin L         Beink Research. Institut ef deu         228         181,563         177         64,3198         1,334         7,808           Vesser, Frank         Max Planck Institute for CC deu         258         45,841         102         56,619         12,777         17,024           Jeinster, Alois         Max Planck Institute for CC deu         346         36,445         96         64,522         56,058         17,076           Reetz, Manfred         Max Planck Institute for As deu         433         55,055         106         64,6922         5,161         1,335           Antonietti, Markus         Max-Planck Institute for SC deu         433         55,055         106         62,222         1,619         1,423           Binder, Kurt         Johannes Gutenberg-Uniw deu					<mark>rank (N</mark> 👻	NC9621 ~	H21 (ns ≚	Hm21 ( 👻	NCS(ns ≚	NCSF(n 🝸	NCSFL ( 👻			✓ sm-subfi ✓	rank s ≚	sm-subfi	eld-: ×
Mann, Matthias         Max-Planck-Institut für Bic deu         115         179,890         199         80.9208         1,101         7,375         1           Sies, Helmut         Leibniz Research Institute I deu         170         57,593         111         67,9401         10,345         17,143           Deork, Peer         European Molecular Biolog deu         228         181,563         177         64,3188         1,334         7,488           Neese, Frank         Max Planck Institute for Ccdeu         258         45,841         102         56,8199         12,977         17,024           Vender Aalst, Wil M.P.         Rheinisch-Westfälische Tei deu         275         42,854         99         64,2522         6,058         17,076           Zeitster, Alonis         Max Planck Institute for Ccdeu         346         36,445         101         62,892         6,058         17,076           Bectz, Manfred         Max Planck Institute for Scdeu         443         55,056         106         46,9922         5,619         17,423           Maier, Joachim         Max Planck Institute for Scdeu         443         55,175         124         6,613         5,033           Minthy Marku         Max-Planck Institute for Scdeu         453         36,288         87 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>· · · · ·</td> <td>· · · · ·</td> <td>81,271</td> <td></td> <td>Chemical Physics</td> <td></td> <td>2</td> <td></td> <td>95,895</td>									· · · · ·	· · · · ·	81,271		Chemical Physics		2		95,895
1         Sies, Helmut         Leibniz Research Institute (deu         170         57,593         111         67,9401         10,345         17,143           Bork, Peer         European Molecular Biolog deu         228         181,563         177         64,3198         1,334         7,808           Porese, Frank         Max Planck Institute for C deu         228         45,841         102         56,819         1,2977         17,024           5         van der Aalst, Wil M.P.         Rheinisch-Westfälische Te deu         275         42,854         99         64,5252         6,678         21,516           Fürstner, Alois         Max Planck Institute for C deu         346         36,445         101         62,8925         6,058         17,7024           2         Ackermann, Nutz         Georg-August-Universität C deu         349         33,479         94         60.4842         6,060         24,676           6         Biöch, P. E.         Technische Universität C deu         435         55,175         124         62,7452         5,619         17,724           4         Mare, Joachim         Max Planck Institute for Xo deu         432         150,006         44         21,377         48,507         5,480           5         Geinder, Kurt </td <td></td> <td>,,</td> <td></td> <td></td> <td>42</td> <td></td> <td>52</td> <td></td> <td></td> <td>128,811</td> <td>135,982</td> <td></td> <td>Inorganic &amp; Nucl</td> <td></td> <td>1</td> <td></td> <td>70,192</td>		,,			42		52			128,811	135,982		Inorganic & Nucl		1		70,192
Bork, Peer         European Molecular Biolog deu         228         181,563         177         64.3198         1,334         7,808           Neese, Frank         Max Planck Institute for C deu         258         45,841         102         56.8199         12,977         17,024           Verser, Alois         Max Planck Institute for C deu         278         45,841         102         56.8199         12,977         17,024           Pierstner, Alois         Max Planck Institute for C deu         318         35,440         98         62.9131         5,448         25,485           Rectz, Manfred         Max Planck Institute for C deu         346         36,445         101         60.28925         6,058         17,771         17,423           Rectz, Manfred         Max Planck Institute for As deu         345         55,055         106         46.9922         5,619         17,423           Maier, Joachim         Max Planck Institute for As deu         432         159,055         106         46.9922         5,619         17,423           Maier, Joachim         Max Planck Institute for Kol deu         432         159,033         161         80.8316         828         8,202           Vittchen, Hars Ulrich         Technische Universität Dre deu         457							199				111,422		Developmental B		11		127,685
Neese, Frank         Max Planck Institute for Cc deu         258         45,841         102         56,8199         12,977         17,024           Van der Aalst, Wil M.P.         Rheinisch-Westfälische Tei deu         275         42,854         99         64,2522         6,578         21,516           Z horder Aalst, Wil M.P.         Rheinisch-Westfälische Tei deu         336         36,449         98         62,911         5,448         52,485           Z Ackermann, Lutz         Georg-August-Universität Cdeu         346         36,445         101         62,8925         6,058         17,076           B Retz, Manfred         Max Planck Institute for Cc deu         346         36,445         101         62,8925         6,058         17,076           G Biöch, P. E.         Teichnische Universität Cl aleu         345         50,056         106         46,9922         5,619         17,423           Maier, Joachim         Max Planck Institute for So deu         423         55,175         124         6,61         2,822         4,613         5,035           Minter, Martu         Johannes Gutenberg-Unive deu         443         36,288         87         60,7603         5,583         14,375           Witthen, Hans Ulrich         Technical Universität Tor deu         467 </td <td></td> <td>1 Sies, Helmut</td> <td>Leibniz Research Institute</td> <td>fdeu</td> <td>170</td> <td>57,593</td> <td>111</td> <td>67.9401</td> <td>10,345</td> <td>17,143</td> <td>42,351</td> <td>4.9773</td> <td>Biochemistry &amp; N</td> <td>1ole 0.4750</td> <td>13</td> <td>2</td> <td>201,173</td>		1 Sies, Helmut	Leibniz Research Institute	fdeu	170	57,593	111	67.9401	10,345	17,143	42,351	4.9773	Biochemistry & N	1ole 0.4750	13	2	201,173
van der Aalst, Wil M.P.         Rheinisch-Westfälische Tei deu         275         42,854         99         64.5252         6,678         21,516           Fürstner, Alois         Max Planck Institute for C deu         318         35,440         98         62.9131         5,448         25,485           G Ackermann, Jutz         Georg-August-Universität (deu         346         36,445         101         62.8925         6,058         17,076           B Retz, Manfred         Max Planck Institute for C deu         349         33,479         94         60.4842         6,060         24,676           B Roch, P. E.         Technische Universität Clai deu         435         50,056         106         46.9922         5,619         17,743           Maier, Joachim         Max Planck Institute for So deu         423         55,175         124         62.7452         4,631         5,035           Intorietti, Markus         Max-Planck Institute for So deu         433         36,288         87         60.7603         5,883         4,032           B Inder, Kurt         Johanes Gutenberg-Unive deu         467         70,832         120         4,282         2,561         14,065           Crutzen, P. J.         Max Planck Institute for C deu         467         70,832		Bork, Peer	European Molecular Biolo	∉ deu	228	181,563	177	64.3198	1,334	7,808	57,801	4.9268	Developmental B	iolc 0.3297	17	1	127,685
2         Fürstner, Alois         Max Planck Institute for Ccdeu         318         35,440         98         62.9131         5,448         25,485           Ackermann, Lutz         Georg-August-Universität (deu         346         36,445         101         62.8925         6,058         17,076           Rectz, Manrfed         Max Planck Institute for Ccdeu         349         33,479         46.0482         6,060         24,676           6         Blöch, P. E.         Technische Universität Clai deu         395         60,069         41         21.3778         48,607         54,890           4         Springel, Volker         Max Planck Institute for Sodeu         423         55,151         24         6.0463         24,676         5,035           A Anonietti, Markus         Max-Planck-Institut for Kol deu         443         55,056         106         68,992         5,133         1,375           2         Mitchen, Hans Ulrich         Technische Universität Dre deu         453         36,288         87         60.7603         5,583         14,305           2         Crutzen, P. J.         Max Planck Institute for Thi deu         502         39,937         93         46.924         4,488         21,745           2         Heidelberg Institute for T		9 Neese, Frank	Max Planck Institute for C	c deu	258	45,841	102	56.8199	12,977	17,024	32,162	4.9043	Chemical Physics	0.3778	8		95,89
2         Ackermann, Lutz         Georg-August-Universität Cdeu         346         36,445         101         62.8925         6,058         17,076           Reetz, Manfred         Max Planck Institute for C cdeu         349         33,479         94         60,4842         6,060         24,676           BibCh, P. E.         Technische Universität Cladeu         395         60,069         41         21,3778         48,507         54,890           4         Springel, Volker         Max Planck Institute for As deu         413         55,056         106         46.9922         5,619         17,423           4         Maier, Joachim         Max Planck Institute for So deu         423         55,175         124         62.7452         4,631         5,035           9         Mitchen, Hans Ulrich         Technische Universität Dre deu         453         36,288         87         60.7603         5,583         14,375           9         Witchen, Hans Ulrich         Technical University of Mu deu         502         39,937         93         46.9924         4,489         21,745           9         Hardmann, Suleander, Haitute for Th deu         507         53,986         49         0.7997         28,655         36,109           9         Honinere		6 van der Aalst, Wil M.P.	Rheinisch-Westfälische Te	deu	275	42,854	99	64.5252	6,678	21,516	35,435	4.8916	Artificial Intellige	nce 0.4585	7	3	321,592
2         Reetz, Manfred         Max Planck Institute for Ccdeu         349         33,479         94         60.4842         6,060         24,676           Blöch, P. E.         Technische Universität Claideu         395         60,006         41         21.3778         48,507         54,890           Glöch, P. E.         Technische Universität Claideu         435         50,561         6106         46.9922         5,619         7,7423           Maier, Joachim         Max Planck Institute for Scdeu         423         55,175         124         62.7452         4,631         5,035           Intorietti, Markus         Max-Planck Institute for Scdeu         432         109,033         161         80.8316         282         8,202           Glücher, Kur         Johannes Gutenberg-Unive         453         36,288         76         0.7603         5,583         1,475           Wittchen, Hans Ulrich         Technische Universität Or deu         467         70,832         120         4,882         2,174           Herrmann, Wolfgang A.         Technische Universität Or deu         509         53,857         3,175         52,817         3,175           Herrmann, Wolfgang A.         Technisch Institute for Stdeu         636         43,660         3         49,892 <td></td> <td>9 Fürstner, Alois</td> <td>Max Planck Institute for C</td> <td>c deu</td> <td>318</td> <td>35,440</td> <td>98</td> <td>62.9131</td> <td>5,448</td> <td>25,485</td> <td>34,540</td> <td>4.8646</td> <td>Organic Chemistr</td> <td>y 0.5793</td> <td>4</td> <td>1</td> <td>154,10</td>		9 Fürstner, Alois	Max Planck Institute for C	c deu	318	35,440	98	62.9131	5,448	25,485	34,540	4.8646	Organic Chemistr	y 0.5793	4	1	154,10
Biöchl, P. E.         Technische Universität Cla deu         395         60,069         41         21.3778         48,507         54,890           Springel, Volker         Max Planck Institute for X a deu         413         55,056         106         46.9922         5,619         17,423           Maier, Joachim         Max Planck Institute for X a deu         413         55,056         106         46.9922         5,619         17,423           Antonietti, Markus         Max Planck Institute for X deu         423         159,175         124         62.7452         4,631         5,035           Antonietti, Markus         Max-Planck-Institut für Kol deu         432         109,033         168         80.8316         282         8,202           Binder, Kurt         Johannes Gutenberg-Unive deu         453         36,288         87         60,7603         5,583         14,375           Vittchen, Hans Ulrich         Technische Universität Dre deu         401         50,288         89         60,7693         12,955         36,109           Vittchen, Hans Ulrich         Technische University of Mu deu         502         39,937         93         49,6258         4,969         7,881           Stamatakis, Alexandros         Heichelberg Institute for Th deu         507		Ackermann, Lutz	Georg-August-Universität	(deu	346	36,445	101	62.8925	6,058	17,076	34,035	4.8472	Organic Chemistr	y 0.7056	6	1	154,10
Springel, Volker         Max Planck Institute for As deu         413         55,056         106         46.9922         5,619         17,423           Maier, Joachim         Max Planck Institute for So deu         423         55,175         124         62.7452         4,631         5,035           Antonietti, Markus         Max Planck Institute for So deu         423         55,175         124         62.7452         4,631         5,035           Binder, Kurt         Johannes Gutenberg-Unive deu         453         36,288         87         60.7603         5,583         14,375           Witchen, Hans Ulrich         Technicale Universitä Tore deu         467         70,832         120         47.8812         2,561         14,065           Crutzen, P. J.         Max Planck Institute for Th deu         502         39,937         93         46.9924         4,489         21,745           Stamatakis, Alexandros         Heidelberg Institute for Th deu         502         39,937         93         46.9924         4,489         21,745           Stamatakis, Alexandros         Heidelberg Institute for Br deu         636         43,660         93         49.6258         4,969         7,881           Brenner, Hermann         German Cancer Research (deu         637         103,		Reetz, Manfred	Max Planck Institute for C	c deu	349	33,479	94	60.4842	6,060	24,676	31,833	4.8446	Organic Chemistr	y 0.6472	9	1	154,10
Maier, Joachim         Max Planck Institute for Sc deu         423         55,175         124         62.7452         4,631         5,035           Antonietti, Markus         Max-Planck-Institut für Kol deu         432         109,033         161         80.8316         282         8,202           Binder, Kurt         Johannes Gutenberg-Unive deu         433         36,288         87         60.7603         5,583         14,475           Wittchen, Hans Ulrich         Technische Universität Dre deu         467         70,832         120         47.8812         2,561         14,065           Crutzen, P. J.         Max Planck Institute for CF deu         467         70,832         120         47.8812         2,561         14,065           Herrmann, Wolfgang A.         Technical University of Mu deu         502         39,937         34.9924         4,489         21,745           Stamatakis, Alexandros         Heidelberg Institute for Sr deu         616         62,499         122         55.8357         3,178         5,871           Holsboer, Florian         Max Planck Institute for Sr deu         637         103,605         127         52,9228         799         11,497           Kaufmann, Stefan H.E.         Max Planck Institute for Meu         670         37,891		Blöchl, P. E.	Technische Universität Cla	deu	395	60,069	41	21.3778	48,507	54,890	58,641	4.8192	Applied Physics	0.3404	21	2	289,91
Antonietti, Markus         Max-Planck-Institut für Koldeu         432         109,033         161         80.8316         282         8,202           Binder, Kurt         Johannes Gutenberg-Unive deu         453         36,288         87         60,7603         5,583         14,375           Wittchen, Hans Ulrich         Technische Universität Dre deu         467         70,832         120         47.8812         2,561         14,065           Crutzen, P. J.         Max Planck Institute for Ch deu         491         50,265         96         51.2010         6,522         11,809           Herrmann, Wolfgang A.         Technische University of Mu deu         502         39,937         93         46,9924         4,489         21,745           Stamatakis, Alexandros         Heidelberg Institute for Th deu         597         53,986         92         20.797         28,655         36,109           Holsboer, Florian         Max Planck Institute for Ps deu         616         62,499         122         55.837         3,178         5,871           Singer, Wolf         Max Planck Institute for R deu         636         43,660         93         40,6258         4,969         7,881           Kaufmann, Stefan H.E.         Max Planck Institute for M deu         6670         3	4	Springel, Volker	Max Planck Institute for A	s deu	413	55,056	106	46.9922	5,619	17,423	28,056	4.8073	Astronomy & Ast	ropl 0.9101	1		47,94
Binder, Kurt         Johannes Gutenberg-Unive deu         453         36,288         87         60.7603         5,583         14,375           Wittchen, Hans Ulrich         Technische Universität Dre deu         467         70,832         120         47.8812         2,561         14,065           Crutzen, P.J.         Max Planck Institute for Cheu         491         50,265         96         51,2010         6,522         11,809           Herrmann, Wolfgang A.         Technical University of Mu deu         502         39,937         93         46.924         4,489         21,745           Stamatakis, Alexandros         Heidelberg Institute for Th deu         597         53,986         49         20,7997         28,655         36,109           Volsboer, Florian         Max Planck Institute for Br deu         636         43,660         93         49,6258         4,969         7,881           Brenner, Hermann         German Cancer Research (deu         637         103,605         127         52,9228         7,79         11,497           Kaufmann, Stefnan H.E.         Max Planck Institute for In deu         670         37,891         103         57,5552         4,194         6,860           Hell, Stefan W.         Max Planck Institute for In deu         670         37		Maier, Joachim	Max Planck Institute for Se	o deu	423	55,175	124	62.7452	4,631	5,035	38,199	4.8024	Energy	0.2679	4	2	265,59
Binder, Kurt         Johannes Gutenberg-Unive deu         453         36,288         87         60.7603         5,583         14,375           Wittchen, Hans Ulrich         Technische Universität Dre deu         467         70,832         120         47.8812         2,561         14,065           Crutzen, P. J.         Max Planck Institute for Ch deu         491         50,265         96         51,2010         6,522         11,809           Herrmann, Wolfgang A.         Technical University of Mu deu         502         39,937         93         46.924         4,489         21,745           Stamatakis, Alexandros         Heidelberg Institute for Th deu         597         53,986         49         0,7997         28,655         36,109           Holsboer, Florian         Max Planck Institute for Br deu         636         43,660         93         49,6258         4,969         7,881           Brenner, Hermann         German Cancer Research (deu         637         103,605         122         5,837         11,497           Kaufmann, Stephen K.         Universität Heidelberg         deu         663         41,294         102         45,622         3,836         10,209           Hashmi, A. Stephen K.         Universität Heidelberg         deu         676			Max-Planck-Institut für Ko	deu	432	109,033	161	80.8316	282	8,202	61.696	4.7983	Nanoscience & N	anc 0.2295	14		, 103,23
Witchen, Hans Ulrich         Technische Universität Dre deu         467         70,832         120         47.8812         2,561         14,065           Crutzen, P. J.         Max Planck Institute for Ch deu         491         50,265         96         51.2010         6,522         11,809           Herrmann, Wolfgang A.         Technical University of Mu deu         502         39,937         34         69924         4,488         21.745           Stamatakis, Alexandros         Heidelberg Institute for Th deu         597         53,986         49         20.7997         28,655         36,109           Holsboer, Florian         Max Planck Institute for Bry deu         616         62,499         122         55.8357         3,178         5,871           Singer, Wolf         Max Planck Institute for Bry deu         637         103,605         127         52.9228         799         11,497           Kaufmann, Stefan H.E.         Max Planck Institute for In deu         670         37,891         102         45.8373         4,964         17,988           Jonas, Jost B.         Universität Heidelberg         deu         696         30,194         83         83.032         1,026         15,043           Andreae, Meinrat O.         Max Planck Institute for Ch deu		Binder, Kurt	Johannes Gutenberg-Univ	e deu	453	36.288	87	60,7603	5,583		32,640	4,7895	Fluids & Plasmas	0.3108	5		48,58
Crutzen, P. J.         Max Planck Institute for Ch deu         491         50,265         96         51.2010         6,522         11,809           Herrmann, Wolfgang A.         Technical University of Mu deu         502         39,937         93         46,9924         4,489         21,745           Stamatakis, Alexandros         Heidelberg Institute for Th deu         507         53,986         49         20,797         28,655         36,109           Holsboer, Florian         Max Planck Institute for Br deu         616         62,499         122         58,837         3,178         5,871           Singer, Wolf         Max Planck Institute for Br deu         636         43,660         93         49,6258         4,969         7,881           Brenner, Hermann         German Cancer Research (deu         637         103,605         127         52,9228         779         11,497           Kaufmann, Stefan H.E.         Max Planck Institute for In deu         670         37,891         103         57,5552         4,194         6,660           Hell, Stefan W.         Max Planck Institute for M deu         696         30,194         83         8,8373         4,964         17,988           Jonas, Jost B.         Universität Heidelberg         deu         706					467	· · · · ·	120	47.8812	· · · ·		33,013	4,7825	Psychiatry	0.4919	13		71,06
Herrmann, Wolfgang A.         Technical University of Mu deu         502         39,937         93         46.9924         4,489         21,745           Stamatakis, Alexandros         Heidelberg Institute for Th deu         597         53,986         49         0.7.997         28,655         36,109           Holsboer, Florian         Max Planck Institute of Ps deu         616         62,499         122         58.837         3,178         58,811           Singer, Wolf         Max Planck Institute of Ps deu         636         43,660         93         49.6258         4,969         7,881           Brenner, Hermann         German Cancer Research (deu         637         103,605         127         52.9228         7.79         11,497           Kaufmann, Stefna H.E.         Max Planck Institute for In deu         670         37,881         103         57.5552         4,194         6,860           Hell, Stefan W.         Max Planck Institute for M deu         693         41,294         102         45.6227         3,836         10,209           Hashmi, A. Stephen K.         Universität Heidelberg         deu         706         100,813         112         48.3032         1,026         15,043           Andreae, Meinar O.         Max Planck Institute for I'deu         75		· ·								· · · · ·	24,734		Meteorology & A		2		66,87
Stamatakis, Alexandros         Heidelberg Institute for Th deu         597         53,986         49         20.7997         28,655         36,109           Holsboer, Florian         Max Planck Institute for Bry deu         616         62,499         122         55,8357         3,178         5,871           Singer, Wolf         Max Planck Institute for Bry deu         636         43,660         34         49,602         7,881           Brenner, Hermann         German Cancer Research (deu         637         103,605         127         52,9228         779         11,497           Kaufmann, Stefan H.E.         Max Planck Institute for In deu         670         37,891         103         57,5552         4,194         6,860           Hell, Stefan W.         Max Planck Institute for Meu         693         41,224         102         45,627         3,836         10,209           Hashmi, A. Stephen K.         Universität Heidelberg         deu         696         30,194         83         83,032         1,026         15,043           Andreae, Meinrat O.         Max Planck.Institute for Cheu         754         43,074         95         48,262         2,970         13,347           Hardt, F. Ulrich         Max-Planck.Institute for Hicelu         758         44,225											31,332		Organic Chemistr		16		154,10
Holsboer, Florian         Max Planck Institute of Psy deu         616         62,499         122         55,8357         3,178         5,871           Singer, Wolf         Max Planck Institute for Br deu         636         43,660         93         49,0258         4,969         7,881           Brenner, Hermann         German Cancer Research (deu         637         103,605         127         52,9228         779         11,497           Kaufmann, Stefan H.E.         Max Planck Institute for In deu         670         37,891         103         57,5552         4,194         6,660           Hell, Stefan W.         Max Planck Institute for M deu         693         41,294         102         45,6227         3,836         10,209           Jonas, Jost B.         Universitä Heidelberg         deu         606         30,194         83         45,6327         4,964         17,988           Jonas, Jost B.         Universitä Heidelberg         deu         706         100,813         112         48,3032         1,026         15,043           Andreae, Meinrat O.         Max Planck Institute for Cl deu         758         44,225         108         41,9758         3,341         0,215           Friederici, Angela D.         Max Planck Institute for H, deu         835<		,									43,342		Evolutionary Biol		7		27,37
Singer, Wolf         Max Planck Institute for Br deu         636         43,660         93         49,6258         4,969         7,881           Brenner, Hermann         German Cancer Research (deu         637         103,605         127         52,9228         779         11,497           Kaufmann, Stephen K.         Max Planck Institute for In deu         670         37,891         103         57,552         4,194         6,860           Hell, Stefan W.         Max Planck Institute for M deu         693         41,294         102         45,6227         3,836         10,209           Hashmi, A. Stephen K.         Universität Heidelberg         deu         696         30,194         83         8,8373         4,964         17,988           Jonas, Jost B.         Universität Heidelberg         deu         6706         100,813         112         48.3023         1,026         15,043           Andreae, Meinrat O.         Max Planck Institute for Cl deu         758         43,074         95         48,2626         2,970         13,347           Hartl, F. Ulrich         Max Planck Institute for Hi deu         835         30,667         89         55,5647         3,843         9,746           Löscher, Wolfgang         Tierärtliche Hochschule H deu         843 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>· · · · ·</td> <td></td> <td>23,501</td> <td></td> <td>Psychiatry</td> <td>0.3817</td> <td>18</td> <td></td> <td>71,06</td>									· · · · ·		23,501		Psychiatry	0.3817	18		71,06
Brenner, Hermann         German Cancer Research (deu)         637         103,605         127         52.9228         779         11,497           Kaufmann, Stefan H.E.         Max Planck Institute for In deu         670         37,891         103         57.5552         4,194         6,860           Hell, Stefan W.         Max Planck Institute for In deu         693         41,294         102         45.6227         3,836         10,209           Hashmi, A. Stephen K.         Universität Heidelberg         deu         696         30,194         83         45.8373         4,964         17,988           Jonas, Jost B.         Universität Heidelberg         deu         706         100,813         112         48.3032         10,205         15,043           Jonas, Jost B.         Universität Heidelberg         deu         776         10,813         112         48.3032         10,205         13,347           Hardt, F. Ulrich         Max-Planck-Institute for Cheu         758         44,225         108         41,0758         3,344         10,215           Friederici, Angela D.         Max Planck Institute for H, deu         835         30,667         89         55.5647         3,843         9,746           Uscher, Wolfgang         Tierärtliche Hochschule H deu<									· · · · ·		35,240		Neurology & Neu		68		305,85
Kaufmann, Stefan H.E.         Max Planck Institute for In deu         670         37,891         103         57.5552         4,194         6,860           Hell, Stefan W.         Max Planck Institute for M deu         693         41,294         102         45,6227         3,836         10,209           Hashmi, A. Stephen K.         Universität Heidelberg         deu         696         30,194         83         45,8373         4,964         17,988           Jonas, Jost B.         Universität Heidelberg         deu         706         100,813         112         48,3032         1,026         15,043           Andreae, Meinrat O.         Max Planck Institute for Cf deu         754         43,074         95         48,262         2,970         13,347           Hardt, F. Ulrich         Max Planck-Institute for Gf deu         758         44,225         108         41,9758         3,344         0,215           Friederici, Angela D.         Max Planck-Institute for H deu         835         30,667         89         55,5647         3,843         9,746           Löscher, Wolfgang         Tierärztliche Hochschule H deu         843         28,707         77         52,3948         3,996         14,383											30,547		Oncology & Carci		22		293,19
Hell, Stefan W.         Max Planck Institute for M deu         693         41,294         102         45,6227         3,836         10,209           Hashmi, A. Stephen K.         Universität Heidelberg         deu         696         30,194         83         48,8373         4,964         17,988           Jonas, Jost B.         Universität Heidelberg         deu         706         100,813         112         48.3023         1,026         15,043           Andreae, Meinrat O.         Max Planck Institute for Cl deu         774         43,074         95         48,2626         2,970         13,347           Hartl, F. Ulrich         Max Planck Institute for Hielde         758         44,225         108         41,9758         3,343         10,215           Friederici, Angela D.         Max Planck Institute for Hi deu         835         30,667         89         55,5647         3,843         9,746           Uscher, Wolfgang         Tierärztliche Hochschule H deu         843         28,707         75         5,394         3,986         1,838											27,220		Immunology	0.4046	31		138,59
Hashmi, A. Stephen K.         Universität Heidelberg         deu         696         30,194         83         45,8373         4,964         17,988           Jonas, Jost B.         Universität Heidelberg         deu         706         100,813         112         48.3032         1,026         15,043           Andreae, Meinrat O.         Max Planck Institute for Cl deu         754         43,074         95         48.2626         2,970         13,347           Hartl, F. Ulrich         Max-Planck-Institute for Gl deu         758         44,225         108         41.9758         3,334         10,215           Friederici, Angela D.         Max Planck Institute for H         825         30,667         89         55.5647         3,843         9,746           Löscher, Wolfgang         Tierärztliche Hochschule H         deu         843         28,707         77         52.3948         3,996         14,383		,									31,219		Optics	0.4040	31		64,04
Jonas, Jost B.         Universität Heidelberg         deu         706         100,813         112         48.3032         1,026         15,043           Andreae, Meinrat O.         Max Planck Institute for Cf deu         754         43,074         95         48.2626         2,970         13,347           Hartl, F. Ulrich         Max-Planck-Institute for Cf deu         758         44,225         108         41.9758         3,343         10,215           Friederici, Angela D.         Max Planck Institute for H, deu         835         30,667         89         55,5647         3,843         9,746           Löscher, Wolfgang         Tierärztliche Hochschule H deu         843         28,707         77         52,3948         3,996         14,383									- /		27.954		Organic Chemistr		22		
Andreae, Meinrat O.         Max Planck Institute for Ch deu         754         43,074         95         48.2626         2,970         13,347           Hartl, F. Ulrich         Max-Planck-Institut für Bic deu         758         44,225         108         41.9758         3,334         10,215           Friederici, Angela D.         Max Planck Institute for H, deu         835         30,667         89         55.5647         3,843         9,746           Löscher, Wolfgang         Tierärztliche Hochschule H deu         843         28,707         77         52.3948         3,996         14,383						· · · ·			· · ·	· · ·	· · · ·		Organic Chemistr Ophthalmology 8		3		154,10 69,07
Hartl, F. Ulrich         Max-Planck-Institut für Bio         758         44,225         108         41.9758         3,334         10,215           Friederici, Angela D.         Max Planck Institute for Ht deu         835         30,667         89         55.5647         3,843         9,746           Löscher, Wolfgang         Tierärztliche Hochschule H deu         843         28,707         77         52.3948         3,996         14,383		· ·	0						· · ·	· · ·	23,845				4		
Friederici, Angela D. Max Planck Institute for Hu deu 835 30,667 89 55.5647 3,843 9,746 Löscher, Wolfgang Tierärztliche Hochschule H deu 843 28,707 77 52.3948 3,996 14,383						· · · · ·			· · · · ·	· · · ·	24,849		Meteorology & A				66,87
Löscher, Wolfgang Tierärztliche Hochschule H deu 843 28,707 77 52.3948 3,996 14,383									· · · ·		30,260		Developmental B		53		127,68
		, .				· · · · ·			· · · ·	· · · ·	23,521		Experimental Psy		12		29,97
											25,482		Neurology & Neu		64		305,85
List, Benjamin Max Planck Institute for Cc deu 873 30,841 82 44.8588 5,201 10,313		List, Benjamin	Max Planck Institute for C	c deu	873	30,841	82	44.8588	5,201	10,313	29,803	4.6640	Organic Chemistr	y 0.5953	31	1	154,10

#### For researchers working in **The Netherlands**, the table looks as follows:

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27 Dinarello, Charles A.	Radboud University Med	licanId	26	100,508	163	87.8870	24,134	30,630	54,469	5.2787	Immunology	0.4229	2	138,59
59 Clevers, Hans	Hubrecht Institute for D	ev∈nld	58	131,335	176	68.8009	8,276	14,021	89,141	5.1486	Developmental Biolo	0.4358	6	127,68
46 Spek, Anthony L.	Bijvoet Centre for Biom	ole nld	145	71,442	81	43.9741	32,226	32,305	44,559	4.9989	Inorganic & Nuclear	0.4166	2	70,19
29 Van Genuchten, Martinus	I Universiteit Utrecht	nld	428	38,108	75	39.9536	17,128	20,363	31,450	4.7996	Environmental Engin	0.5080	2	54,00
85 Bakker, Arnold B.	Erasmus Universiteit Ro	tte nld	484	56,846	111	57.8381	1,505	20,588	31,924	4.7749	Business & Managen	0.5266	2	48,10
64 van der Heijde, Desirée	Leids Universitair Medis	ch nld	563	73,532	131	45.9654	1,733	12,283	30,600	4.7428	Arthritis & Rheumato	0.8314	4	35,28
05 Feringa, B. L.	Stratingh Institute for Ch	er nld	604	55,095	113	60.8949	1,942	6,076	42,851	4.7319	Organic Chemistry	0.5465	18	154,10
11 Rosendaal, Frits R.	Leids Universitair Medis	ch nld	610	69,181	123	50.8156	2,590	7,812	25,127	4.7288	Cardiovascular Syste	0.3403	32	199,27
78 Beenakker, C. W.J.	Lorentz Institute for The	or nld	777	27,917	76	47.0385	7,849	12,607	24,092	4.6864	Applied Physics	0.4083	34	289,9
18 Cuijpers, Pim	Vrije Universiteit Amster	da nld	817	44,558	108	51.9002	1,699	13,716	22,358	4.6778	Psychiatry	0.4109	25	71,0
33 Schaufeli, Wilmar B.	Universiteit Utrecht	nld	932	53,016	98	52.3753	797	14,590	35,369	4.6545	Business & Managen	0.4078	6	48,1
002 't Hooft, Gerard	Universiteit Utrecht	nld	1,001	22,475	44	40.2000	17,540	21,013	22,233	4.6444	Nuclear & Particle Pl	0.6259	11	141,5
007 Fauser, Bart C.J.M.	University Medical Cent	erinld	1,006	40,633	95	36.3594	4,321	11,607	23,669	4.6437	Obstetrics & Reprod	0.5667	4	87,5
016 Berendsen, Herman J.C.	Rijksuniversiteit Groning	en nld	1,015	90,747	66	37.0524	434	36,877	77,394	4.6426	Chemical Physics	0.4083	40	95,8
019 Katsnelson, Mikhail I.	Radboud Universiteit	nld	1,018	80,355	92	44.8099	2,757	8,004	17,591	4.6424	Applied Physics	0.4807	36	289,9
102 Lips, P.	Vrije Universiteit Amster	da nld	1,101	44,145	105	40.0421	3,626	8,222	19,458		Endocrinology & Me	0.4065	37	84,1
126 van Os, Jim	University Medical Cent	er nld	1,125	67,123	111	51.5551	667	10,303	26,562	4.6255	Psychiatry	0.7072	30	71,06
228 Mackenbach, Johan P.	Erasmus MC	nld	1,227	37,891	92	49,9563	1,908	9,018	23,944		Public Health	0.2579	6	59,0
273 de Kloet, E. Ronald	Leids Universitair Medis	ch nld	1,272	36,366	92	49,7507	1.603	10,745	23,158	4,6034	Neurology & Neuros	0.3739	113	305,8
290 Bos, Johannes L.	University Medical Cent	er nld	1,289	31,985	82	35.9662	6,235	9,346	21,117		Developmental Biolo		96	127,6
359 van Uzendoorn, Marinus H			1.358	38,827	93	46.8270	1.956	8,238	23,314		Developmental & Ch		15	19.0
363 Blasse, George	Debye Instituut voor Na		1,362	20,399	66	50.4333	5,629	10,530	19,512		Inorganic & Nuclear	0.2882	14	70.1
375 de Vos, Willem	Wageningen University		1,374	82,824	135	60.0351	742	1,934	29,843		Microbiology	0.5135	21	175,94
515 Reedijk, Jan	Leiden Institute of Chem		1,514	44,668	80	45.8962	3,272	3,932	28,569		Inorganic & Nuclear	0.6279	9	70,19
540 Dekker, Cees	Kavli Institute of Nanoso		1,539	50,174	91	37,7907	2,840	3,339	41,857		Nanoscience & Nano		43	103,2
554 Dorenbos, Pieter	Delft University of Tech		1,553	20,128	68	49.0306	7,646	9,247	12,103		Applied Physics	0.4331	49	289,9
555 Koper, Marc T.M.	Leiden Institute of Chem		1,554	28,089	91	53.9091	2,735	4,788	20,741		Energy	0.2719	13	265,5
71 Scheffer, Marten	Wageningen University a		1,570	50,033	90	40.1531	842	16,360	25,157		Ecology	0.3993	28	59,9
759 Grol, Richard	Radboud University Med		1,758	30,814	78	41.9687	2,574	9,371	20,477		Public Health	0.3088	12	59,0
323 Seidell, Jacob C.	Vrije Universiteit Amster		1,822	40,637	93	44.5808	2,165	6,258	15,040		Endocrinology & Me		75	84,1
833 Krishna, Rajamani	Van 't Hoff Institute for		1,822	30,405	90		1,574	8,572	14,171		Chemical Engineerin		75	67,8
	implified (+)	WICH III	1,052	30,403	90	52.4525	1,374	0,372 : 1		4.3370	chernical Eligineerin	0.4324	3	07,8

For the researchers having **Artificial Intelligence & Image Processing** as the first subfield, the table looks as follows:

6	ب ≎ <b>د</b> ا					Table_	1_Analysis.xl	sx - Excel							- 0
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1	Zadeh, Lotfi A.	University of California, Be	usa	30	108,896	57	53.3690	102,258	102,381	108,707	5.2706	Artificial Intelligen	e 0.4055	1	321,59
0	Jain, Anil	Michigan State University	usa	49	94,530	136	78.7909	7,200	43,113	84,249	5.1811	Artificial Intelligen	e 0.7880	2	321,5
B	Hinton, Geoffrey	Google LLC	usa	57	222,230	94	54.6175	6,625	38,259	182,728	5.1512	Artificial Intelligen	e 0.5105	3	321,59
2	Bengio, Yoshua	Montreal Institute for Lear	can	81	191,194	114	49.6589	6,956	29,790	110,239	5.0974	Artificial Intelligen	e 0.6406	4	321,59
1	Yager, Ronald	Machine Intelligence Instit	usa	110	39,627	85	74.1262	25,790	31,216	38,370	5.0366	Artificial Intelligen	e 0.7984	5	321,5
)1	Xu, Zeshui	Business School of Sichuar	chn	190	41,064	99	74.5742	12,263	22,378	30,258	4.9595	Artificial Intelligen	e 0.6120	6	321,5
6	van der Aalst, Wil M.P.	Rheinisch-Westfälische Te	deu	275	42,854	99	64.5252	6,678	21,516	35,435	4.8916	Artificial Intelligen	e 0.4585	7	321,5
9	Deb, Kalyanmoy	Michigan State University	usa	298	62,259	73	46.6607	5,313	45,683	53,178	4.8744	Artificial Intelligen	e 0.6837	8	321,5
7	Lowe, David G.	Google LLC	usa	326	67,759	37	24.5706	55,208	55,240	65,982	4.8595	Artificial Intelligen	ce 0.6548	9	321,5
2	Kleinberg, Jon	Cornell University	usa	421	45,752	82	46.7833	12,465	15,578	27,793	4.8037	Artificial Intelligen	e 0.3823	14	321,5
0	Pentland, Alex	MIT Media Lab	usa	439	56,178	92	55.5384	4,636	9,381	48,863	4.7964	Artificial Intelligen	e 0.5054	13	321,5
5	Yang, Xin she	Middlesex University	gbr	514	35,424	66	40.0190	13,999	24,746	28,882	4.7642	Artificial Intelligen	e 0.4654	12	321,5
7	Schmidhuber, Jürgen	IDSIA Dalle Molle Institute	che	526	76,278	66	33.9623	9,634	10,021	71,506	4.7573	Artificial Intelligen	ce 0.7327	15	321,5
0	Mallat, Stéphane	Collège de France	fra	559	44,024	44	27.7333	23,586	38,278	42,161	4.7445	Artificial Intelligen	e 0.3162	18	321,5
1	Cao, Jinde	Southeast University	chn	630	46,541	105	73.8833	1,552	8,229	29,782	4.7231	Artificial Intelligen	e 0.3179	11	321,5
4	Shamir, Adi	Weizmann Institute of Scie	isr	633	42,202	62	38.9333	14,158	14,662	29,780	4.7221	Artificial Intelligen	e 0.5631	19	321,5
0	Jordan, Michael I.	University of California, Be	usa	659	86,635	111	55.9921	930	5,929	64,655	4.7157	Artificial Intelligen	e 0.4167	20	321,5
0	Pedrycz, Witold	University of Alberta	can	779	32,757	79	57.9762	5,017	9,540	23,277	4.6861	Artificial Intelligen	e 0.7035	16	321,5
1	Herrera, Francisco	Universidad de Granada	esp	780	57,273	112	58.9984	516	12,699	48,384	4.6859	Artificial Intelligen	e 0.8094	17	321,5
5	Canny, John	University of California, Be	usa	794	28,256	48	34.5429	21,321	22,151	27,195	4.6825	Artificial Intelligen	e 0.2622	24	321,5
4	Han, Jiawei	University of Illinois Urban		813	70,458	120	60,9885	310	14,924	41,470		Artificial Intelligen			321,5
1	Mendel, Jerry M.	University of Southern Cali		880	29,629	69	48,5095	5,963	11,557	27,774		Artificial Intelligen			321,5
1	Girshick, Ross	Facebook Research	usa	900	118,183	59	16.8219	9,834	25,597	38,939		Artificial Intelligen			321,5
	Blei, David	Columbia University	usa	936	48,346	64	32.8500	2,661	32,218	41,429		Artificial Intelligen		26	321,5
9	Boneh, Dan	Stanford University	usa	978	39,931	83	42.4560	1.104	31,394	34,863		Artificial Intelligen			321,5
	Zhang, Zhengyou	Tencent	chn	1.002	27.049	53	32.5262	17,265	19,335	23,613		Artificial Intelligen			321,5
	Zhou, Zhi Hua	Nanjing University	chn	1.016	37,327	87	49.9143	2,328	9,968	30,246		Artificial Intelligen			321,5
	Unser, Michael	Ecole Polytechnique Fédér		1,049	29,940	81	45.3591	4,397	9,884	27,060		Artificial Intelligen			321,5
	Lamport, Leslie	Microsoft Research	usa	1,219	23,329	46	36.9417	14,657	18,221	22,513		Artificial Intelligen			321,5
	Elad, Michael	Technion - Israel Institute		1,215	41,868	70	39.1512	3,910	12,865	22,513		Artificial Intelligen			321,5
	Szeliski, Richard	University of Washington		1,203	40,968		45.0357	2,705	6,175	32,810		Artificial Intelligen			321,5
4		simplified (+)	0.50	1,277	10,900	04	10.0007	2,705	: 4			ratificar intelligen	0.0033	33	521,5
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Readers interested in creating their own analyses can download the dataset created by John loannidis and his colleagues [2] and read the supporting articles [3,4,5]. In my view, this is a great initiative to address the apparent problems related to naively counting papers and citations. As usual, the impact of scientific work can only be measured after some time. Hence, measures such as the C-score should not be used to evaluate early career researchers. However, it could help younger researchers to set goals. Also, one should never forget the first principle of the Leiden Manifesto for research metrics [1]: "Quantitative evaluation should support gualitative, expert assessment. Quantitative metrics can challenge bias tendencies in peer review and facilitate deliberation. This should strengthen peer review, because making judgments about colleagues is difficult without a range of relevant information. However, assessors must not be tempted to cede decision-making to the numbers. Indicators must not substitute for informed judgment. Everyone retains responsibility for their assessments." However, as also demonstrated in [8], it is very well possible to conduct a fair and inclusive cross-disciplinary comparison of research performance using Google Scholar or Scopus as a data source and more refined measures that correct for the number of authors.

## References

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 431, <u>https://doi.org/10.1038/520429a</u> [2] Ioannidis, J. (2022), "September 2022 data-update for "Updated science-wide author databases of standardized citation indicators"", Mendeley Data, V5, doi: 10.17632/btchxktzyw.5 <u>https://elsevier.digitalcommonsdata.com/datasets/btchxktzyw</u>/5

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[4] Ioannidis J., Baas J., Klavans R., Boyack K. (2019), A standardized citation metrics author database annotated for scientific field. PLoS Biol 17(8): e3000384. <u>https://doi.org/10.1371/journal.pbio.3000384</u>

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