

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):

File Home Insert	Page Layout Formulas Data	Review	View	Tell me what ye	ou want to do.	÷				-											A sh
K Cut	Calibri - 11 - A*	A.	-	- 8/-	(IP)	Wrap Text	Gen	ral				Normal	Bac	d	Good	Neutral	Calculation	🖶 🏊 🚺	∑ AutoSum	· 47	Q
En Copy -					-						Conditional Format as	CONTRACTOR OF			Input	Linked Cell	Note		🖕 Fill -		Find A
ste	B I U ·	A -	10	3 43	• = N	ferge & Cente	·	. %	, 20		formatting * Table *	Construction of the second	E Ap	oranacory r.	ropus	Linked Cen	Note	Insert Delete	d Clear -		Select *
																			Cica .		
Cipboard 5	Fort			Ng	nment			Nazim	ber	- G)					Styles			Cells		Lilling	
1983 - I 🛛 🛪	√ ft																				
A	B C	D	E		G H		1	К		м	N O	P	Q	R	s	т	u v	w x		Z	AA
		rank (N					 NCSFL (- 			9621 -				NCSFL -						m-subf * sm	n-subfield-1 cc = i
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
Key Data	۲																				
× 10																			III (2)	四	1 +

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:

	ء ^ي د ا					Table	_1_Analysis.	xlsx - Excel								
F	ile Home Insert	Page Layout Formulas	Data	Review	View 🤇	Tell me w	hat you want	t to do							ጸ	Share
13	2 • • • ×	$\sqrt{-f_x}$ 1														
1	А	В	С	D	E	F	G	н	1	J	К	L	М	N	0	
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:

	⊸ ≎					Table_1	_Analysis.xls							五 —	
File	Home Insert	Page Layout Formulas	Data	Review	View 🖓	Tell me wha	t you want to	o do							∕A Share
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	 rank (N 	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		• ^م 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 & 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 & 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:

÷ ⊘ ک ⊟					Table_	1_Analysis.xl	sx - Excel							
File Home Insert	Page Layout Formulas	Data	Review	View 🖓										∕A₁ Share
812 • I × •	f_x University of	Oxford												
A	В	С	D	E	F	G	Н	1	J	к	L	М	N	0
1 authfull 👻	inst_name	✓ cntry ज	′ <mark>rank (N</mark> 🔹	NC9621 -	H21 (ns 🕤	Hm21 (👻	NCS(ns 👻	NCSF(n 👻	NCSFL (👻)	C (ns) 🔄	sm-subfield-1	sm-subfi 👻	rank s 🝸 s	m-subfield-:
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 ≎ د ا					Table_	1_Analysis.xl	sx - Excel							- 0
Fil	e Home Insert	Page Layout Formulas	Data	Review	View 🖓	Tell me wha	it you want t	o do							₽ Shar
12	• I X	$\checkmark f_x$ University of O	ford												
	А	В	С	D	E	F	G	н	1	J	К	L	M	N	0
	authfull	<pre>inst_name *</pre>	cntry 💌	rank (N 🗠	NC9621 -	H21 (ns ≚	Hm21 (👻	NCS(ns 👻	NCSF(n ≚	NCSFL (👻	C (ns) 🛛 🝸	sm-subfield-1	≖ sm-subf -	rank s 🝸	sm-subfield-
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
ad													n m		+ 10

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

 [1] Hicks, D., Wouters, P., Waltman, L. et al. Bibliometrics (2015), The Leiden Manifesto for research metrics. Nature 520, 429–
 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

[3] Ioannidis J., Klavans R., Boyack . K. (2016), Correction: Multiple Citation Indicators and Their Composite across Scientific Disciplines. PLOS Biology 14(8): e1002548. <u>https://doi.org/10.1371/journal.pbio.1002548</u>

[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>

[5] Ioannidis J., Boyack K., Baas J. (2020), Updated science-wide author databases of standardized citation indicators. PLoS Biol 18(10): e3000918. <u>https://doi.org/10.1371/journal.pbio.3000918</u>

[6] Recognition and Rewards ("Erkennen en Waarderen") program (2019), an initiative by VSNU, NFU, KNAW, NWO and ZonMw, <u>https://recognitionrewards.nl/</u>

[7] COARA (2022), Agreement on reforming research assessment, https://coara.eu/.

[8] Harzing, AW., Alakangas, S. Google Scholar, Scopus and the Web of Science: a longitudinal and cross-disciplinary comparison. Scientometrics 106, 787–804 (2016). <u>https://doi.org/10.1007/s11192-015-1798-9</u>

Originally published as a LinkedIn article <u>https://www.linkedin.com/pulse/yet-another-view-citation-</u> <u>scores-wil-van-der-aalst/</u> (3-1-2023)