Astronomical and Astrophysical Transactions (*AApTr*), 2018, Vol. 30, Issue 4, pp. 499–504,
ISSN 1055-6796, Photocopying permitted by license only, ©Cambridge Scientific Publishers

Selected Serbian astronomers in the Web of Science in the period 1977–2014

Bojan Arbutina*

Department of Astronomy, Faculty of Mathematics, University of Belgrade, Studentski trg 16, 11000 Belgrade, Serbia

Received 20 June, 2016

I discuss the number of papers and citation information for selected Serbian astronomers in the Thomson Reuters' Web of Science for the period 1977–2014.

Keywords: Publications, bibliography, sociology of astronomy

1 Analysis and results

In some of the previous papers I have been monitoring Serbian Astronomical Journal citation (Arbutina 2007, 2010, 2013). In this paper I have decided to discuss the number of papers and citation information for Serbian astronomers in the Thomson Reuters' Web of Science (WoS 2014) for the period 1977–2014. I have included in this category all active astronomers from Serbia whose names I found listed at Astronomical Observatory of Belgrade (AOB) (http://www.aob.rs) and Department of Astronomy, Faculty of Mathematics, University of Belgrade (MATF) (http://astro.math.rs) web sites in January 2015, as well as some other researchers working in the field of Astronomy and Astrophysics from institutions such as University of Novi Sad (UNS), University of Kragujevac (UK), Institute for Nuclear Sciences "Vinča" (IV), Institute of Physics, Belgrade (IPB) and Technoexperts instutute (IHIS). Similar research has been conducted by Dimitrijevic (2005).

Tables 1 and 2 list a total of 65 researchers for which WoS Core Collection search was performed in March 2015. WoS data are available for the Serbian scientific community through the Serbian Library Consortium KoBSON (http://kobson.nb.rs) but only for years after 1995. For some older researchers, data was extended to 1977 with the help of foreign colleagues with longer WoS subscription. The selected category was Astronomy and Astrophysics (for researchers also working in other fields the listing was thus not complete). I have refined the search to include only document types: article, review, note and letter (proceedings paper and other materials were excluded).

*Email: arbo@matf.bg.ac.rs

WoS is regularly used by scientific councils and ministries of science of countries around the world (including Serbia) for evaluation of journals' or scientists' performance. However, what has been usually established as the merit of scientific quality is the number of papers published in a given period. While this is certainly important, it may also be a cause for overproduction of papers that we are seeing these days.

Establishing fully objective criteria for evaluation of scientists is, of course, impossible, but in addition to the number of papers it should somehow include citation information. The easiest way to do this, until we find something better, is to use average citation (number of citations divided by the number of papers) $AC = \frac{1}{n}\sum_{i=1}^{n} c_i$, which is already available in WoS. Citations by default include self-citations. In an ideal world it is normal that an author cites his/her own work, since he is most familiar with it. In reality, this, as everything else, may be subject to manipulation.

There are other measures of scientific quality. h-index (Hirsch 2005), for example, is defined as the number of papers n that are each cited at least n times. In this case only the most highly cited articles contribute to the performance measure, but since h-index grows as citations accumulate it is career level dependent. Also, if an author has one crucial paper with hundreds of citations it will not alter his/her h-index much. This can be corrected with g-index (Egghe 2006) which is the number n of top cited papers that are all together cited at least n^2 times. Nevertheless, I have decided to use average citation, but listed h-indices in the last column of Table 2.*

Inspection of Table 2 first shows that the order of researchers from Table 1 has changed significantly. Novice researchers are not ranked well, which is expected. The average-citation ranking scheme does not treat senior and young researchers equally and is far from ideal. What is missing and could improve citation based evaluation is e.g. number of co-authors/first authorship information (so that not all authors get all/equal credits for a paper), more detailed citation information (self cites vs. other cites), etc.

As the next step I suggest ponderated average citation

$$PAC = \frac{1}{n}\sum_{i=1}^{n}\sum_{j=1}^{c_i}\frac{1}{a_i}\Big(1-\frac{m_{ij}}{a_i}\Big) = \frac{1}{n}\sum_{i=1}^{n}\frac{1}{a_i}\Big(c_i-\frac{1}{a_i}\sum_{j=1}^{c_i} m_{ij}\Big),$$

where n is the total number of papers, c_i is number of cites for each paper, a_i number of authors of cited paper and m_{ij} number of matched authors between citing and cited paper for each citation. If $m_{ij} = 0$ there are no self-citations at all and average citation for an author is only corrected to account for the number of co-authors that he/she has, $PAC = \frac{1}{n}\sum_{i=1}^{n}\frac{c_i}{a_i}$. If $m_{ij} = a_i$ for every i, j, the author has nothing but self-citations and $PAC \equiv 0$. Finally, if an author is the sole author of his papers, $a_i = 1$, and does not have self-citations, $m_{ij} = 0$, then $PAC = AC$. The downside of PAC is that it treats all self-citations as non-legitimate and does not account for the order of authors (first authorship, particularly, thus stays unawarded), but this might introduce too much subjectiveness (e.g. in some fields it is a custom thing that the order of authors is alphabetic).

*Interactive Tables 1 and 2 are available at http://poincare.math.rs/~arbo/serbawos/.

Table 1 Serbian astronomers in WoS 1977–2014, ranked according to the number of papers. The last column gives citations.

No.	Researcher	Affiliation	Papers	Citations
1	Dimitrijevic Milan	AOB, IHIS	154	1941
2	Popovic Luka	AOB	90	1050
3	Djurasevic Gojko	AOB	54	380
4	Knezevic Zoran	AOB	49	1186
5	Jankov Slobodan	AOB	35	862
6	Urosevic Dejan	MATF	33	187
7	Jovanovic Predrag	AOB	28	343
8	Ninkovic Slobodan	AOB	28	111
9	Ilic Dragana	MATF	26	218
10	Cirkovic Milan	AOB	26	102
11	Cvetkovic Zorica	AOB	26	98
12	Kovacevic Andjelka	MATF	24	133
13	Arbutina Bojan	MATF	20	107
14	Simic Zoran	AOB	20	92
15	Novakovic Bojan	MATF	19	155
16	Jevremovic Darko	AOB	18	806
17	Danilovic Sanja	AOB	16	300
18	Samurovic Srdjan	AOB	15	106
19	Erkapic Sanja	AOB	15	95
20	Pavlovic Rade	AOB	15	49
21	Borka Jovanovic Vesna	IV	14	66
22	Bogosavljevic Milan	AOB	12	590
23	Damjanov Ivana	AOB	12	248
24	Bon Edi	AOB	12	182
25	Prodanovic Tijana	UNS	12	168
26	Kovacevic Jelena	AOB	12	104
27	Vukotic Branislav	AOB	12	55
28	Vince Oliver	AOB	11	51
29	Simic Sasa	UK	10	37
30	Celebonovic Vladan	IPB	10	23
31	Borka Dusko	IV	9	35
32	Damljanovic Goran	AOB	9	10
33	Tankosic Dragana	AOB	8	126
34	Stalevski Marko	AOB	8	103
35	Atanackovic (Atanackovic-Vukmanovic) Olga	MATF	7	23
36	Milovanovic Nenad	AOB	6	71
37	Micic Miroslav	AOB	6	63
38	Bon (Gavrilovic) Natasa	AOB	6	55
39	Vidojevic Sonja	IHIS	6	17
40	Milic Ivan	AOB	6	9
41	Pavlovic Marko	MATF	5	30
42	Vucetic (Andjelic) Milica	MATF	5	24

Table 1 (continued)

No.	Researcher	Affiliation	Papers	Citations
43	Latkovic Olivera	AOB	5	12
44	Todorovic Natasa	AOB	4	20
45	Pejovic Nadezda	MATF	4	17
46	Segan Stevo	MATF	4	10
47	Ceki (Cseki) Atila	AOB	4	9
48	Jovanovic Bora	AOB	3	9
49	Vudragovic (Lalovic) Ana	AOB	3	8
50	Onic Dusan	MATF	3	6
51	Stojanovic Milan	AOB	3	5
52	Marceta Dusan	MATF	3	4
53	Dobardzic (Ciprijanovic) Aleksandra	MATF	3	2
54	Jurkovic Monika	AOB	3	1
55	Micic Milica	AOB	2	14
56	Milic Zitnik Ivana	AOB	2	3
57	Bozickovic (Bozhichkovich) Djuro	AOB	1	0
58	Jovanovic Milena	AOB	1	0
59	Radovic Viktor	MATF	1	0
60	Zekovic Vladimir	MATF	1	0
61	Markovic-Krsljanin Snezana	AOB	–	–
62	Martinovic Nemanja	AOB	–	–
63	Smailagic Marijana	AOB	–	–
64	Trajkovska Veselka	AOB	–	–
65	Vujcic Veljko	AOB	–	–

Table 2 Serbian astronomers in WoS 1977–2014, ranked according to the average citation. The last column gives h-index.

No.	Researcher	Affiliation	Av. citation	h-index
1	Bogosavljevic Milan	AOB	49.17	10
2	Jevremovic Darko	AOB	44.78	9
3	Jankov Slobodan	AOB	24.63	19
4	Knezevic Zoran	AOB	24.2	16
5	Damjanov Ivana	AOB	20.67	5
6	Danilovic Sanja	AOB	18.75	7
7	Tankosic Dragana	AOB	15.75	7
8	Bon Edi	AOB	15.17	7
9	Prodanovic Tijana	UNS	14	9
10	Stalevski Marko	AOB	12.88	5
11	Dimitrijevic Milan	AOB, IHIS	12.6	22
12	Jovanovic Predrag	AOB	12.25	11
13	Milovanovic Nenad	AOB	11.83	5

Table 2 (continued)

No.	Researcher	Affiliation	Av. citation	h-index
14	Popovic Luka	AOB	11.67	20
15	Micic Miroslav	AOB	10.5	4
16	Bon (Gavrilovic) Natasa	AOB	9.17	5
17	Kovacevic Jelena	AOB	8.67	6
18	Ilic Dragana	MATF	8.38	8
19	Novakovic Bojan	MATF	8.16	8
20	Samurovic Srdjan	AOB	7.07	6
21	Djurasevic Gojko	AOB	7.04	11
22	Micic Milica	AOB	7	2
23	Erkapic Sanja	AOB	6.33	6
24	Pavlovic Marko	MATF	6	3
25	Urosevic Dejan	MATF	5.67	9
26	Kovacevic Andjelka	MATF	5.54	8
27	Arbutina Bojan	MATF	5.35	6
28	Todorovic Natasa	AOB	5	3
29	Vucetic (Andjelic) Milica	MATF	4.8	2
30	Borka Jovanovic Vesna	IV	4.71	5
31	Vince Oliver	AOB	4.64	2
32	Simic Zoran	AOB	4.6	6
33	Vukotic Branislav	AOB	4.58	4
34	Pejovic Nadezda	MATF	4.25	3
35	Ninkovic Slobodan	AOB	3.96	6
36	Cirkovic Milan	AOB	3.92	6
37	Borka Dusko	IV	3.89	3
38	Cvetkovic Zorica	AOB	3.77	6
39	Simic Sasa	UK	3.7	3
40	Atanackovic (Atanackovic-Vukmanovic) Olga	MATF	3.29	2
41	Pavlovic Rade	AOB	3.27	4
42	Jovanovic Bora	AOB	3	1
43	Vidojevic Sonja	IHIS	2.83	3
44	Vudragovic (Lalovic) Ana	AOB	2.67	1
45	Segan Stevo	MATF	2.5	2
46	Latkovic Olivera	AOB	2.4	2
47	Celebonovic Vladan	IPB	2.3	3
48	Ceki (Cseki) Atila	AOB	2.25	2
49	Onic Dusan	MATF	2	2
50	Stojanovic Milan	AOB	1.67	2
51	Milic Ivan	AOB	1.5	2
52	Milic Zitnik Ivana	AOB	1.5	1
53	Marceta Dusan	MATF	1.33	1
54	Damljanovic Goran	AOB	1.11	2
55	Dobardzic (Ciprijanovic) Aleksandra	MATF	0.67	1
56	Jurkovic Monika	AOB	0.33	1

Table 2 (continued)

No.	Researcher	Affiliation	Av. citation	h-index
57	Bozickovic (Bozhichkovich) Djuro	AOB	0	0
58	Jovanovic Milena	AOB	0	0
59	Radovic Viktor	MATF	0	0
60	Zekovic Vladimir	MATF	0	0
61	Markovic-Krsljanin Snezana	AOB	–	–
62	Martinovic Nemanja	AOB	–	–
63	Smailagic Marijana	AOB	–	–
64	Trajkovska Veselka	AOB	–	–
65	Vujcic Veljko	AOB	–	–

Acknowledgements During the work on this paper, the author was financially supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia through the projects No. 176004 and No. 176005.

References

Arbutina, B. (2007) *Serb. Astron. J.*, **174**, 91
Arbutina, B. (2010) *Serb. Astron. J.*, **180**, 113
Arbutina, B. (2013) *Serb. Astron. J.*, **186**, 77
Dimitrijević, M. S. (2005) Serbian Astronomers in Science Citation Index in the XX Century, Zadužbina Andrejević, Belgrade
Egghe, L. (2006) *Scientometrics*, **69**, 131
Hirsch, J. E. (2005) *Proc. Natl. Acad. Sci. USA*, **102**, 16569
WoS (2014) Web of Science ®, Thomson Reuters, Philadelphia