2010 International Conference on Web Information Systems and Mining

Scientometric Study of the Journal NeuroImage 1992–2009

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***Abstract*—For young researchers starting in a specific field of work, it is not always easy to make an opinion of a journal which potential for publication apart from the basis of peers' advices and indicators such as impact factor. In this paper we use web technologies to create a scientometric picture, using bibliometric analysis methods, of the journal NeuroImage from its creation in 1992 until 2009. The aim of this work is show how to provide a good account of the journal's bibliometrics which will help to quickly identify the journal's main features.**

Results indicated that the NeuroImage literature consists of a total of 11604 contributions. The five top 5 major contributors were identified to be Kark J. Friston, Jon Ashburner, Keith J. Worsley, Bruce R. Fischl and Thomas E. Nichols. The top 5 most cited papers achieve very high number of citations (from 1026 to 1888). From authors affiliation, we also found strong international collaboration between US and Europe including UK, Germany, Switzerland, France and Italy, and with Asian countries such as Japan and China, shown using a strength color-coded connection-wheel diagram.

This study will help future web sites to provide more bibliometric information about scientific journals, authors and research fields. As these are evolving very rapidly after each publication issue (e.g. citation counts, new contributing authors, etc.), web tools should be developed to provide the most recent bibliometric updates.

***Keywords*-Bibliometric; neuroscience; NeuroImage**

I. INTRODUCTION

For the young researcher entering a field it is not easy to find who are the best leading researchers and most appropriate journals to submit to, etc. Generally, the choice of journals to submit manuscripts and subsequently get published is sometimes difficult. Many journals have great overlap in their topics of interests, and too often the choice is based on metric such as the journal impact factor or recommendation from peers.

In this paper using web technologies we present a scientometric study of the journal NeuroImage, aiming to provide detailed bibliometric information on its contributions, authors, citation space, etc. NeuroImage is published by Elsevier[1] and has an Impact Factor (IF) of 5.694 (5-Year Impact Factor: 6.884) with 20 issues published per year. Historically, Arthur W. Toga is the founding editor and co-editor-in-chief of the journal NeuroImage, and professor of neurology and director of the Laboratory of Neuro Imaging (LONI) and associate director of the Division of Brain Mapping at UCLA (Florida, USA).

[1] http://www.elsevier.com/locate/ynimg

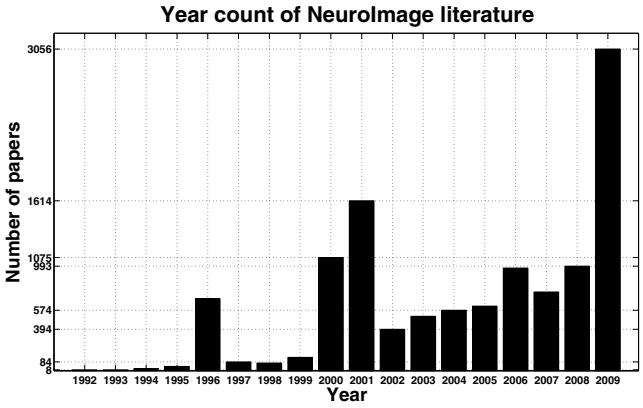

Figure 1. NeuroImage year count

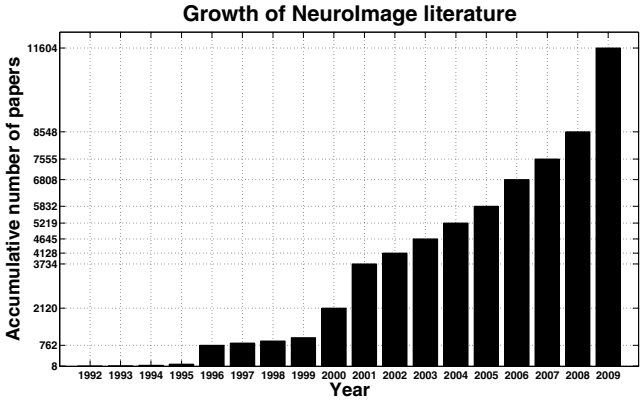

Figure 2. Growth of NeuroImage literature

Using the Elsevier website we query the expert search engine for specific bibliometric metric all related to the journal NeuroImage. Results were used to picture a status of the journal from its creation in 1992 until the end of 2009, to obtain full year counts. We are particularly interested to identify the best cited papers, most cited authors, important research topics and strength of international collaborations. Such information will provide neuroscience researchers some useful indications about current state-of-the-art methods and key investigative studies in the research field. Most importantly it will draw a picture of NeuroImage from a bibliometric perspective.

The rest of the paper is organized as follows: In Section II

978-0-7695-4224-9/10 $26.00 © 2010 IEEE
DOI 10.1109/WISM.2010.166

Table I
TOP CONTRIBUTORS OF NEUROIMAGE (1992–2009)

Name	Nb Papers[1]	1st Paper	Citations	H-index[2]
KJ Friston	196	1995	17175	61
J Ashburner	92	1995	6452	29
KJ Worsley	55	1992	4162	23
B Fischl	49	1999	2357	13
T Nichols	39	1996	2448	16

[1] Elsevier search
[2] Harzing's POP[3] search

we present the results of the bibliometric study, and conclude the paper in Section III.

II. BIBLIOMETRIC RESULTS

A. Growth

The NeuroImage literature sums up to 11604 entries (from its beginning until end of 2009). These entries consist not only of research articles, technical notes, but also editorial board, corrigendum, erratum. We plot the accumulative count of NeuroImage papers from year 1992 until 2009 in Figure 2. It increases gradually with some very high counts in the years 2000 and 2001, as well as 2009. One should note that some of high count for these years are likely to be due to the inclusion of Organization for Human Brain Mapping (OHBM) abstract into the NeuroImage publications.

B. Top contributors

After looking at the distribution of authors, we are more interested in the main contributors to NeuroImage. These authors are likely to be pioneer, eminent and leading researchers in the field of neuroscience (and likely to be related to the most cited NeuroImage papers). The top 5 contributors of NeuroImage are listed in Table I with the number of NeuroImage authored (1st or co-author) from 1992 to 2009, cumulative number of citations and h-index [1] using Harzing's *Publish Or Perish* (POP[2]) tool.

C. Country of affiliations

We also looked at the authors' country of affiliation, searching for their country in the affiliation field. We list of world countries with most counts in Table II, from the Americas (United States of America, Canada), Asia (China, Korea, Japan, Singapore, Australia, Taiwan, Hong Kong) and Europe (France, Ireland, United-Kingdom, Spain, Germany, Italy, Sweden, Finland, Belgium, Netherlands, Denmark, Austria and Switzerland). Results indicate that the US (2514), then UK (1260) and Germany (1160) are the countries from which researchers are contributing the most to the NeuroImage literature, followed by Canada (498), Japan (452), France (418), Italy (343) and Netherlands (333).

[2]http://www.harzing.com/pop.htm

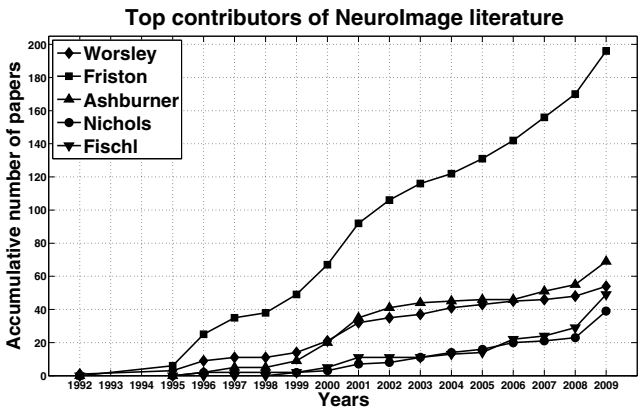

Figure 3. Top contributors

D. Most cited articles

Using Google Scholar[4], we assessed the number of citation of each articles and draw a list of the most cited NeuroImage articles, shown in Table IV. It should be obvious that recent articles are less likely to be as cited as older ones. Although equally important, recent papers detailing guidelines for reporting neuroscience studies (e.g. as in [2][3] and [4]) are not highly cited.

The results are a combination of the Harzing's citation count from a search with NeuroImage as publication field, verified using Elsevier's own search plus Google Scholar.

The most cited NeuroImage paper describes a method called Voxel-Based Morphometry (VBM) which allow research to compare group based on statistical of when typically looking at White Matter (WM) and Grey Matter (GM) of the brain. Another often used key reference is by Good [5] with some limitation described by Bookstein [6]. The second most cited paper proposed some statistical approach based on False Discovery Rate (FDR) which provides more adequate accuracy when dealing with large number of voxels as it is the case with high quality Magnetic Resonance Image (MRI). The third and fifth most cited papers are part of a fundamental debate that occured at the early days of fMRI analysis research which lead to solid statistical grounds for modern fMRI analysis. The fourth most cited NeuroImage article is a technical note by Tzourio-Mazoyer *et al* proposing an Automated Anatomical Labeling (AAL) [7] of the brain activations in SPM using a Macroscopic Anatomical Parcellation of the Montreal Neurological Institute (MNI) MRI single-subject brain. These papers are key references, providing important background details and pillars in neuroscience research.

E. International collaboration

Using the authors' countries of affiliation, we identified international collaboration in NeuroImage studies. The as-

[4]http://www.scholar.google.com

Table II
YEARLY COUNT BY COUNTRY AFFILIATIONS

Year	America		Asia							Europe												
	US	CA	CN	KR	JP	SG	AU	TW	HK	FR	IE	UK	ES	DE	IT	SE	FI	BE	NL	DK	AT	CH
1992	5	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1993	–	–	–	–	–	–	–	–	–		–	1	–	–	1	–	–	–	–	–	–	–
1994	–	–	–	–	2	–	–	–	–	2	–	–	1	–	–	–	–	–	–	–	–	–
1995	–	3	–	–	–	–	–	1	–	3	–	11	–	1	1	2	1	1	–	–	–	–
1996	1	2	–	–	4	–	–	–	–	1	–	15	–	6	2	2	1	1	–	1	–	–
1997	–	4	–	–	3	–	1	–	–	1	–	15	–	6	4	2	3	3	2	1	–	1
1998	–	4	–	–	4	–	1	1	–	13	–	14	–	5	2	3	1	1	2	2	–	–
1999	–	11	–	1	10	–	4	–	–	8	–	26	–	15	2	4	5	4	3	4	2	–
2000	–	10	1	1	11	1	4	1	–	13	–	32	1	18	4	2	4	5	4	1	4	3
2001	–	17	1	1	18	1	4	2	1	19	1	54	4	58	17	7	12	12	9	3	4	6
2002	1	24	5	1	21	1	9	4	1	27	1	78	7	71	19	9	14	10	15	9	5	11
2003	178	29	3	3	34	5	13	8	–	29	2	100	6	96	25	7	15	13	25	8	9	18
2004	233	45	13	7	42	2	13	3	9	39	4	95	7	73	24	8	12	7	15	7	9	19
2005	243	41	7	7	45	3	13	6	1	32	3	98	11	96	28	4	28	14	32	11	9	21
2006	399	78	11	12	67	10	21	8	4	44	2	150	12	147	47	29	20	17	49	49	12	43
2007	298	51	14	11	42	6	19	1	–	49	2	132	13	147	38	4	14	11	38	9	9	23
2008	430	69	19	11	62	8	16	19	8	50	5	154	20	140	50	27	19	22	58	31	17	44
2009	386	56	24	12	38	10	18	14	8	43	–	141	17	142	38	8	11	20	34	19	9	36
2010[1]	338	53	36	12	49	7	30	16	5	45	15	143	26	137	41	11	12	18	47	10	13	33
Sum	2514	498	134	80	452	54	166	84	37	418	35	1260	125	1160	343	129	172	159	333	165	102	258

[1] as of April 2010

sumption is that if the authors' affiliation include two different countries, the research (study, development of a methodology, etc.) resulted from an international research collaboration. We obtained the collaboration matrix as shown in Table III which can be visualized as a strength color-coded connection-wheel diagram, as shown in Figure 4. Collaboration within one country (not shown) could also be one between research groups from different universities or with hospital, medical center, clinic, etc.

III. CONCLUSION

In this paper we exploited with the help of web technologies to create bibliometric analysis of the journal NeuroImage. With the development of tools to automatically query data from the internet (e.g. the Elsevier site), we can obtain a wealth of useful information to create such bibliometric study. Results are useful for potential future contributors to such prestigious journals, identifying top contributors, top cited articles and obtaining bibliometric measures. These can be used for comparison with other journals in the same research field (e.g. neuroscience), and help identify what most suitable journal one should submit their recent research to. Future work will also focus on Author Co-citation Analysis (ACA) [8] to define author research space of specific journals.

REFERENCES

[1] J. E. Hirsch, "An index to quantify an individual's scientific research output," *Proceedings of the National Academy of Sciences*, vol. 102, no. 46, pp. 16 569–16 572, 2005.

[2] G. R. Ridgway, S. M. D. Henley, J. D. Rohrer, R. I. Scahill, J. D. Warren, and N. C. Fox, "Ten simple rules for reporting voxel–based morphometry studies," *NeuroImage*, vol. 40, no. 4, pp. 1429–1435, 2008.

[3] R. A. Poldrack, P. C. Fletcher, R. N. Henson, K. J. Worsley, M. Brett, and T. E. Nichols, "Guidelines for reporting an fMRI study," *NeuroImage*, vol. 40, no. 2, pp. 409–414, April 2008.

[4] K. E. Stephan, W. Penny, H. d. R. Moran, J. Daunizeau, and K. Friston, "Ten simple rules for dynamic causal modeling," *NeuroImage*, vol. 49, no. 4, pp. 3099–3109, February 2010.

[5] C. Good, I. Johnsrude, J. Ashburner, R. Henson, K. Friston, and R. Frackowiak, "A Voxel–Based Morphometric Study of Ageing in 465 Normal Adult Human Brains," *NeuroImage*, vol. 14, no. 1, pp. 21–36, July 2001.

[6] F. L. Bookstein, "Voxel–Based Morphometry Should Not Be Used with Imperfectly Registered Images," *NeuroImage*, vol. 14, no. 6, pp. 1454–1462, December 2001.

[7] N. Tzourio–Mazoyer, B. Landeau, D. Papathanassiou, F. Crivello, O. Etard, N. Delcroix, B. Mazoyer, and M. Joliot, "Automated Anatomical Labeling of Activations in SPM Using a Macroscopic Anatomical Parcellation of the MNI MRI Single–Subject Brain," *NeuroImage*, vol. 15, no. 1, pp. 273–289, January 2002.

[8] H. D. White and B. Griffith, "Author cocitation: A literature measure of intellectual structure," *Journal of the American Society for Information Science*, vol. 32, pp. 163–171, 1981.

Table III
INTERNATIONAL COLLABORATIONS BASED ON AUTHORS' AFFILIATION

Country		America		Asia							Europe												
		US	CA	CN	KR	JP	SG	AU	TW	HK	FR	IE	UK	ES	DE	IT	SE	FI	BE	NL	DK	AT	CH
United States	US	–	126	58	27	58	22	42	36	15	54	19	176	23	181	49	0	32	21	49	19	0	47
Canada	CA	126	–	2	8	13	2	3	2	1	36	0	60	4	41	8	2	2	3	10	15	5	8
China	CN	58	2	–	0	1	1	1	7	21	1	0	14	1	5	2	2	1	2	3	2	0	0
Korea	KR	27	8	0		1	0	2	1	0	1	0	0	0	1	0	0	0	2	1	0	0	1
Japan	JP	58	13	1	1	–	3	3	1	0	8	0	21	1	23	6	9	3	4	0	4	0	3
Singapore	SG	22	2	1	0	3	–	1	1	0	3	0	5	0	6	0	0	0	0	2	2	0	1
Australia	AU	42	3	1	2	3	1	–	3	0	7	5	27	4	14	3	2	0	0	3	0	0	1
Taiwan	TW	36	2	7	1	1	1	3	–	3	1	0	9	1	0	0	2	2	2	1	1	0	2
Hong Kong	HK	15	1	21	0	0	0	0	3	–	0	0	4	1	0	0	0	0	1	0	0	0	0
France	FR	54	36	1	1	8	3	7	1	0	–	1	83	9	36	22	8	7	15	11	2	3	19
Ireland	IE	19	0	0	0	0	0	5	0	0	1	–	7	2	5	0	0	0	0	0	0	1	2
United Kingdom	UK	176	60	14	0	21	5	27	9	4	83	7	–	20	157	80	4	18	20	48	29	7	39
Spain	ES	23	4	1	0	1	0	4	1	1	9	2	20	–	13	12	2	3	2	4	2	2	5
Germany	DE	181	41	5	1	23	6	14	0	0	36	5	157	13	–	63	13	12	19	53	14	26	61
Italy	IT	49	8	2	0	6	0	3	0	0	22	0	80	12	63	–	2	8	7	18	5	8	25
Sweden	SE	0	2	2	0	9	0	2	2	0	8	0	4	2	13	2	–	5	0	11	6	1	5
Finland	FI	32	2	1	0	3	0	0	2	0	7	0	18	3	12	8	5	–	0	6	3	2	3
Belgium	BE	21	3	2	2	4	0	0	2	1	15	0	20	2	19	7	0	0	–	12	0	3	7
Netherlands	NL	49	10	3	1	0	2	3	1	0	11	0	48	4	53	18	11	6	12	–	6	4	15
Denmark	DK	19	15	2	0	4	2	0	1	0	2	0	29	2	14	5	6	3	0	6	–	1	4
Austria	AT	0	5	0	0	0	0	0	0	0	3	1	7	2	26	8	1	2	3	4	1	–	9
Switzerland	CH	47	8	0	1	3	1	1	2	0	19	2	39	5	61	25	5	3	7	15	4	9	–
Internal collaborations		1054	351	124	45	162	49	121	75	46	327	42	828	111	743	318	74	107	120	257	115	72	257

[1] using Harzing's POP software

Table IV
TOP 5 MOST CITED NEUROIMAGE ARTICLES

Citations	Paper details
1888	**Voxel–Based Morphometry – The Methods** Ashburner and Friston NeuroImage, Vol. 11, No. 6, June 2000, pp. 805–882
1261	**Thresholding of Statistical Maps in Functional Neuroimaging Using the False Discovery Rate** Genovesea, Lazara and Nichols NeuroImage, Vol. 15, No. 4, April 2002, pp. 870–887
1079	**Analysis of fMRI Time–Series Revisited – Again** Worsley and Friston NeuroImage, Vol. 2, No. 3, Sept. 1995, pp. 173–118
1050	**Automated Anatomical Labeling of Activations in SPM Using a Macroscopic Anatomical Parcellation of the MNI MRI Single–Subject Brain** Tzourio–Mazoyer, Landeau, Papathanassiou, Crivello, *et al* NeuroImage, Vol. 15, No. 1, January 2002, pp. 273–228
1026	**Analysis of fMRI Time–Series Revisited** Friston, Holmes, Poline, Grasby, Williams, *et al* NeuroImage, Vol. 2, No. 1, March 1995, pp. 45–53

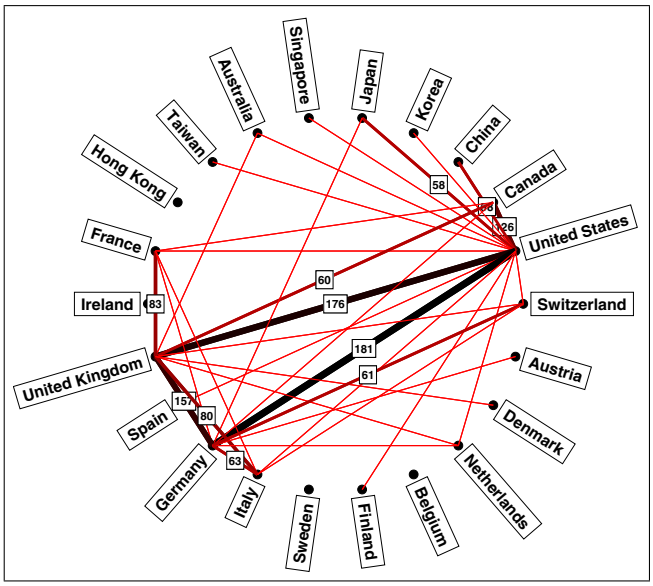

Figure 4. International collaborations