

H-INDEX FOR PRICE MEDALISTS

by Wolfgang Glänzel and Olle Persson

■ Introduction

Bibliometrics has become a proven tool in research evaluation and policy relevant science studies – at least what concerns the performance assessment of countries, institutes or research groups. Bibliometricians were always shunning the evaluation of individual scientists. And rightly so. Bibliometricians might be afraid of exposing themselves to possibly heavy reactions on the part of the concerned scientists. Breaking anonymity is only one aspect. The questionability of reliability, the lacking methodological groundwork of how to treat and interpret statistics gained from small publication sets is another one. Scientists at times believe that bibliometric methods – as they are – may not be applied to their particular research field. At least, this is an often-heard argument. However, a remedy seems to be at hand. Recently, Jorge E. Hirsch (2005) has suggested a new indicator, one single index for the assessment of the research performance of individual scientists. The ‘*h-index*’ is an extremely simple and comprehensible indicator that is based on quite long publication periods and variable citation windows. It can be applied to any publication set, and can be reproduced by anybody. Thus nobody could use the above arguments against its application to individual scientists. Thus Hirsch’s article has almost immediately provoked reactions on the part of the scientific community (Ball, 2005, Diniz Batista et al., 2005, Popov, 2005, Bornmann and Daniel, 2005, Braun et al., 2005, van Raan, 2005, Glänzel, 2005a,b) and the reception was rather positive. Nonetheless, first concerns were articulated as well (van Raan, 2005, Glänzel 2006). In a recent paper, Glänzel (2006) has summarised some *pros* and *cons* of this indicator.

As mentioned above, the *h-index* has been designed as indicators of individual performance and it is predestined for purpose indeed.

According to the definition by Jorge E. Hirsch, “*a scientist has index h if h of his/her N papers have at least h citations each, and the other ($N - h$) papers have fewer than h citations each*”.

When Hirsch published his paper in August 2005, he had an *h-index* of 49. From his own observations he concluded that in physics an *h-index* of 20 after 20 years of scientific activity, characterises a successful scientist, $h = 40$ characterises outstanding researchers and $h = 60$ or more characterizes unique scientists. Diniz Batista et al. (2005) have shown that the *h-index* is quite sensitive to the science field. The question arises of what might be the standard in our own field. For an interdisciplinary subfield of the social sciences we expect, in general, a somewhat lower *h-index*. In order to shed some light on this discussion we have looked at the *h-index* of all still active Price Medal awardees. Since the Price Medal is periodically awarded by the international journal *Scientometrics* to scientists with outstanding contributions to the fields of quantitative studies of science we expect that their *h-indexes* will characterise them as most prolific and highly cited authors..

■ Methods and results

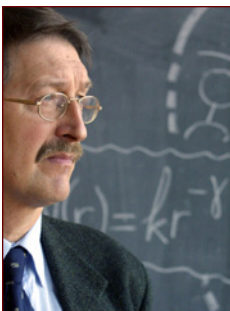
We have selected all journal papers of the active Price Medallists published in the last 20 years, namely in the period January 1986 – August 2005. Since we have retrieved data in early September, we had to restrict the analysis to the last available update of the Web of Science® (Thomson – ISI, Philadelphia, PA, USA). We have calculated the *h-index* for all Price Medallists who are still active in quantitative studies of science and we have ignored papers that are not relevant for the field. In what follows we are presenting the results of our search in chronological order of awarding below. We would like to stress again that the data reflect the situation of August 2005.

**Eugene Garfield**

is one of the 'fathers' of scientometrics and a scientific information pioneer, awarded the first Derek de Solla Price Medal in 1984. He is

Founder & Chairman Emeritus of the Institute for Scientific Information. Garfield is the president and editor-in-chief of the journal 'The Scientist'.

Rank	Cites	PY
1	122	1989
2	104	1986
3	86	1990
4	84	1988
5	79	1988
6	67	1987
7	57	1999
8	29	1994
9	27	1987
10	27	1987
11	26	1987
12	23	1994
13	20	1986
14	18	1986
15	18	1986
16	17	1996
17	15	1993

**Anthony F. J. van Raan**

is Professor of Quantitative Studies of Science at the University of Leiden, The Netherlands. He is the Director of the Centre for Science and

Technology Studies (CWTS) at University of Leiden since 1985. He is editor of the international journal *Research Evaluation*.

Rank	Cites	PY
1	46	1991
2	46	1996
3	33	1991
4	29	1990
5	29	1990
6	25	1993
7	22	1998
8	22	1995
9	21	2000
10	21	1997
11	19	2001
12	19	1994
13	18	1994
14	17	1998
15	17	1993
16	16	1993
17	15	1993

**Tibor Braun**

is director of the *Information Science and Scientometric Research Unit (ISSRU)* at the Hungarian Academy of Sciences. He has founded this Hungarian

Research Centre almost 30 years ago. Braun is also Professor of Chemistry at the Loránd Eötvös University. He is the Editor-in-Chief of the journal *Scientometrics* and the international *Journal of Radioanalytical and Nuclear Chemistry*. In 1975, he has also been awarded the George Hevesy Medal which is the premier international award of excellence in radioanalytical and nuclear chemistry.

Rank	Cites	PY
1	120	1989
2	78	1986
3	57	1990
4	43	1992
5	33	1988
6	31	1995
7	29	1995
8	27	1988
9	27	1987
10	25	2000
11	24	1994
12	23	1987
13	22	1987
14	21	1994
15	18	1986
16	18	1993
17	17	2000
18	17	1988

**Ben Martin**

is Professor of Science and Technology Policy Studies and Director of *SPRU* at University of Sussex. He is one of the pioneers of *foresight in*

science and technology.

Rank	Cites	PY
1	66	1997
2	33	1987
3	30	1995
4	29	2001
5	27	1996
6	24	1988
7	21	1999
8	18	1986
9	16	1986
10	15	1996
11	13	1991
12	9	1987

**Henry Small**

is Chief Scientist and Director of Research Service Group at Thomson ISI. He is one of the foremost scholars in the area of developing

and applying co-citation analysis. This important work has resulted in a better understanding of the structure, relationships, and evolution of the sciences. He has been named the sixth President of ISSI for the period of four years in 2003.

Rank	Cites	PY
1	79	1985
2	64	1999
3	26	1986
4	22	1993
5	21	1997
6	18	1994
7	15	1999
8	12	1986
9	10	1989
10	8	1998

**Francis Narin**

established CHI in 1968, an internationally recognized research consultancy specializing in developing evaluation tools and indicators for science and technology analysis. He is recognised as one of the world's leading experts on science and technology analysis. Narin started with the analysis of science in the 1970s, before developing evaluations of patents in the 1980s and later, in the 1990s, analysing linkage between science and technology.

Rank	Cites	PY
1	107	1997
2	94	1987
3	70	1991
4	56	1992
5	51	1991
6	34	2000
7	33	1987
8	33	1999
9	33	1989
10	26	1994
11	25	1988
12	25	1996
13	24	1988
14	23	1995
15	18	1994
16	18	1998
17	14	1996

**András Schubert**

is Senior Scientist at the *Institute for Science Policy Research*, Hungarian Academy of Sciences in Budapest (Hungary). He is Editor of

the journal *Scientometrics*. Jointly with Tibor Braun and Wolfgang Glänzel, he developed the concept of *Relative Indicators* (1983).

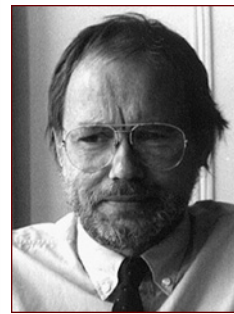
Rank	Cites	PY
1	120	1989
2	78	1986
3	74	2002
4	57	1990
5	33	1988
6	27	1988
7	27	1987
8	25	2000
9	24	1994
10	23	1987
11	22	1987
12	21	1994
13	18	1986
14	18	1986
15	18	1993
16	17	2000
17	17	1988
18	16	2001

**Wolfgang Glänzel**

is Senior Research Fellow at the *Steunpunt O&O Statistieken* and Professor at the Katholieke Universiteit Leuven (Belgium). He is

also Senior Scientist at the *Institute for Science Policy Research*, Hungarian Academy of Sciences in Budapest. He is co-editor of the journal *Scientometrics* and Secretary/Treasurer of ISSI.

Rank	Cites	PY
1	120	1989
2	54	1988
3	33	1988
4	31	1995
5	29	1995
6	27	1995
7	27	1988
8	27	1987
9	24	1994
10	23	1987
11	22	2001
12	22	1987
13	21	1994
14	19	1994
15	18	1986
16	18	1986
17	18	1993
18	17	1994

**Henk F. Moed**

is Senior Researcher at the Centre for Science and Technology Studies (CWTS) in Leiden (The Netherlands). Since

1981, he works on science indicators and quantitative studies of science at Leiden University. Current work in projects involves bibliometric analysis in relation to aspects of research performance. Recently, he has published a book on "Citation Analysis in Research Evaluation" (Springer, 2005).

Rank	Cites	PY
1	53	1995
2	52	1996
3	52	1995
4	46	1991
5	33	1991
6	29	1990
7	25	1989
8	23	1998
9	23	1999
10	23	2002
11	23	1996
12	22	1991
13	20	1999
14	19	2001
15	18	1989
16	15	2002

**Loet Leydesdorff**

is Senior Lecturer at the Department of Communication Studies, University of Amsterdam. Jointly with

Henry Etzkowitz, he developed the Triple Helix model of University-Industry-Government relations.

Rank	Cites	PY
1	69	2000
2	26	1998
3	24	1986
4	22	1999
5	21	1989
6	20	1987
7	19	1989
8	17	1991
9	16	1996
10	15	1994
11	14	1997
12	13	1993
13	13	1989
14	12	1994

**Leo Egghe**

is Professor and Chief Librarian at Limburgs Universitair Centrum in Diepenbeek (Belgium). He teaches

part-time at the University of Antwerp in the Library and Information Science Programme. Recently, he developed the theory of *Lotkaian informetrics*.

Rank	Cites	PY
1	43	1990
2	35	1992
3	35	2000
4	21	1992
5	18	1991
6	17	1986
7	16	1995
8	16	1986
9	16	1988
10	15	1993
11	13	1990
12	12	1996
13	12	1988

**Ronald Rousseau**

is Professor at the Catholic School for Higher Education Bruges-Ostend and Guest Professor at the School for Library and Infor-

mation Science (University Antwerp). Jointly with Leo Egghe he is one of the leading theoreticians of Informetrics.

Rank	Cites	PY
1	23	1996
2	18	1991
3	16	1995
4	16	1988
5	15	1987
6	15	1992
7	14	2003
8	13	1994
9	12	1996
10	12	1990
11	11	1999
12	11	1989



Peter Ingwersen
is Research Professor at the Department of Information Studies Royal School of Library and Information Science (Denmark). His

main field of research activity is *information retrieval* in which he has published also several books. Ingwersen is one of the founders of "Webometrics" (1997).

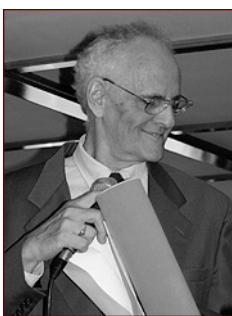
Rank	Cites	PY
1	118	1996
2	89	1998
3	78	1997
4	51	2001
5	36	1997
6	29	1987
7	27	1997
8	17	2000
9	15	1996
10	13	1997
11	10	1992

■ Concluding remarks

The *h-indexes* of the Price Medallists are clearly lower than what Hirsch reported for physics. However, this result does not strike unexpectedly; both publication activity and citation impact in our field is below the "standard" in physics. The *h* values in bibliometrics/informetrics range roughly between 10 and 20. We have checked the data in November again. The *h-index* of a few Price awardees increased by one, however, the general picture has not changed. Furthermore, the "new-fledged" Price Medallists tend to have lower *h* values than the "old" ones. We have to keep in mind that the starting point was 1986 and that the *h-index* might have become somewhat different, especially for the early Price Medal winners, if we had covered the back years even if we take into account that quantitative science studies were not a truly established discipline with adequate communication channels in the 1970s. Thus one might conclude that a scientist with an *h-index* of 10 and above in quantitative science studies can justly be considered a possible candidate for one of the future awards.

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Howard D. White
He was distinguished professor at Drexel University (USA) till 2002. He is now professor emeritus. Jointly with Belver Griffith he developed the *author co-citation analysis*

(ACA) in the early 1980s.

Rank	Cites	PY
1	105	1998
2	100	1989
3	43	1997
4	21	1987
5	19	2001
6	15	1987
7	14	1986
8	12	1996
9	10	1990
10	10	2003
11	10	1990

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