

**HOT TOPIC IN INFORMATION SCIENCE**  
**2005-2007: The H-Index**  
BASED ON DATA IN THOMSON SCIENTIFIC'S  
ESSENTIAL SCIENCE INDICATORS

**1 Citations:** 70

**Title:** AN INDEX TO QUANTIFY AN INDIVIDUAL'S SCIENTIFIC RESEARCH OUTPUT

**Authors:** HIRSCH JE

**Source:** [PROC NAT ACAD SCI USA](#)  
102 (46): 16569-16572 NOV 15 2005

**Addresses:** [Univ Calif San Diego](#), Dept Phys, La Jolla, CA 92093 USA.

**2 Citations:** 22

**Title:** DOES THE H-INDEX FOR RANKING OF SCIENTISTS REALLY WORK?

**Authors:** BORNMANN L; DANIEL HD

**Source:** [SCIENTOMETRICS](#)  
65 (3): 391-392 DEC 2005

**Addresses:** ETH, Swiss Fed Inst Technol, Zahringerstr 24, CH-8092 Zurich, [Switzerland](#).  
ETH, Swiss Fed Inst Technol, CH-8092 Zurich, [Switzerland](#).  
[Univ Zurich](#), Evaluat Off, Zurich, [Switzerland](#).

**3 Citations:** 14

**Title:** COMPARISON OF THE HIRSCH-INDEX WITH STANDARD BIBLIOMETRIC INDICATORS AND WITH PEER JUDGMENT FOR 147 CHEMISTRY RESEARCH GROUPS

**Authors:** VAN RAAN AFJ

**Source:** [SCIENTOMETRICS](#)  
67 (3): 491-502 JUN 2006

**Addresses:** [Leiden Univ](#), Ctr Sci & Technol Studies, Wassenaarseweg 52,POB 9555, NL-2300 RB Leiden, [Netherlands](#).  
[Leiden Univ](#), Ctr Sci & Technol Studies, NL-2300 RB Leiden, [Netherlands](#).

**4 Citations: 12**

**Title:** ON THE H-INDEX - A MATHEMATICAL APPROACH TO A NEW MEASURE OF PUBLICATION ACTIVITY AND CITATION IMPACT

**Authors:** [GLANZEL W](#)

**Source:** [SCIENTOMETRICS](#)  
67 (2): 315-321 MAY 2006

**Addresses:** [Katholieke Univ Leuven](#), Dekenstr 2, B-3000 Louvain, [Belgium](#).  
[Katholieke Univ Leuven](#), B-3000 Louvain, [Belgium](#).  
[Hungarian Acad Sci](#), ISSRU, IRPS, Budapest, [Hungary](#).

**5 Citations: 11**

**Title:** USING THE H-INDEX TO RANK INFLUENTIAL INFORMATION SCIENTISTS

**Authors:** [CRONIN B](#); MEHO L

**Source:** [J AM SOC INF SCI TECHNOL](#)  
57 (9): 1275-1278 JUL 2006

**Addresses:** [Indiana Univ](#), Sch Lib & Informat Sci, Bloomington, IN 47401 USA.

**6 Citations: 11**

**Title:** IS IT POSSIBLE TO COMPARE RESEARCHERS WITH DIFFERENT SCIENTIFIC INTERESTS?

**Authors:** BATISTA PD; CAMPITELI MG; KINOUCI O; MARTINEZ AS

**Source:** [SCIENTOMETRICS](#)  
68 (1): 179-189 JUL 2006

**Addresses:** [Univ Sao Paulo](#), Fac Filosofia Ciencias Letras Ribeirao Preto, Ave Bandeirantes 3900, BR-14040901 Ribeirao Preto, [Brazil](#).  
[Univ Sao Paulo](#), Fac Filosofia Ciencias Letras Ribeirao Preto, BR-14040901 Ribeirao Preto, [Brazil](#).

7 Citations: 10

**Title:** AN INFORMETRIC MODEL FOR THE HIRSCH-INDEX

**Authors:** [EGGHE L](#); [ROUSSEAU R](#)

**Source:** [SCIENTOMETRICS](#)  
69 (1): 121-129 APR 2006

**Addresses:** Hasselt Univ, Agoralaan, B-3590 Diepenbeek, [Belgium](#).  
Hasselt Univ, B-3590 Diepenbeek, [Belgium](#).  
[Univ Antwerp](#), IBW, Antwerp, [Belgium](#).  
KHBO, Ind Sci & Technol, Oostende, [Belgium](#).

8 Citations: 3

**Title:** WHAT DO WE KNOW ABOUT THE H INDEX?

**Authors:** BORNMANN L; DANIEL HD

**Source:** [J AM SOC INF SCI TECHNOL](#)  
58 (9): 1381-1385 JUL 2007

**Addresses:** ETH, Zaehringstr 24, CH-8092 Zurich, [Switzerland](#).  
ETH, CH-8092 Zurich, [Switzerland](#).  
[Univ Zurich](#), Evaluat Off, CH-8001 Zurich, [Switzerland](#).

In late 2005, Jorge E. Hirsch, Professor of Physics at the University of California, San Diego, published an article describing the h-index, which, he claimed is “a useful index to characterize the scientific output of a researcher.” (See J.E. Hirsch, “An index to quantify an individual’s scientific research output,” PNAS, 102(46): 16569-72, 15

November 2005). This paper (which can be viewed at <http://www.pnas.org/cgi/content/abstract/102/46/16569>) has been cited 90 times as of this writing. A survey of the current edition of Thomson Scientific's Essential Science Indicators database reveals that the h-index is the hottest topic in information science today. The same database lists a Research Front, derived from co-citation analysis, with eight core papers (listed above), including that of Hirsch, that have collectively attracted more than 150 citations. Hirsch himself recently published another paper on this subject: "Does the h-index have predictive power?," PNAS, 104(49): 19193-8, 26 November 2007.

Hirsch describes the h-index as follows: "A scientist has an index  $h$  if  $h$  of his or her  $N_p$  papers have at least  $h$  citations each and the other ( $N_p - h$ ) papers have less than or equal to  $h$  citations each."  $N_p$  is the number of papers published over  $n$  years. He found that among physicists he surveyed, Edward Witten, a mathematical physicist at the Institute for Advanced Study in Princeton, New Jersey, and a pioneer in the field of string theory and related areas, had the highest h-index: 110. "That is," he explained, "Witten has written 110 papers with at least 110 citations each." Hirsch argued that "h is preferable to other single-number criteria commonly used to evaluate scientific output of a researcher," and he listed total papers, total citations, citation per paper, number of significant papers (defined as the number of papers with more than a certain number of citations), and number of citations to each of a researcher's  $q$  most-cited papers (for example,  $q = 5$ ).

Researchers in the field of infometrics and scientometrics have proposed several variations on the h-index, which, they claim, improves this measure in various ways. The h-index has also been applied to groups of researchers, institutions, nations, and journals.

But is the h-index really superior to other measures, such as total citations? Henry Small, Chief Scientist at Thomson Scientific, points out that the h-index "is highly correlated with total citations. In other words, you get almost the same ranking." He adds, "The convenient feature of  $h$  is that if you're looking at a common name that represents multiple people, then all you need to do is verify that the top  $n$  papers are by the same J. Smith, when total cites are not known. The reason  $h$  works has to do with the universality of the power law distribution of citations. Of course, one needs to add the usual caution that the h-index, as with other commonly used citation metrics, is highly sensitive to variations in time period and field of science."