What's Inside...

For Fast-Breaking Papers, A Citation Surge

The Fleet of the Elite

- Average bimonthly citation increase for "fast-breaking" papers published in 2001 and 2000.
- Average bimonthly citation increase for highly cited papers in ESI (top 1% by citations).

Percent increase in citations — Publication (database) year
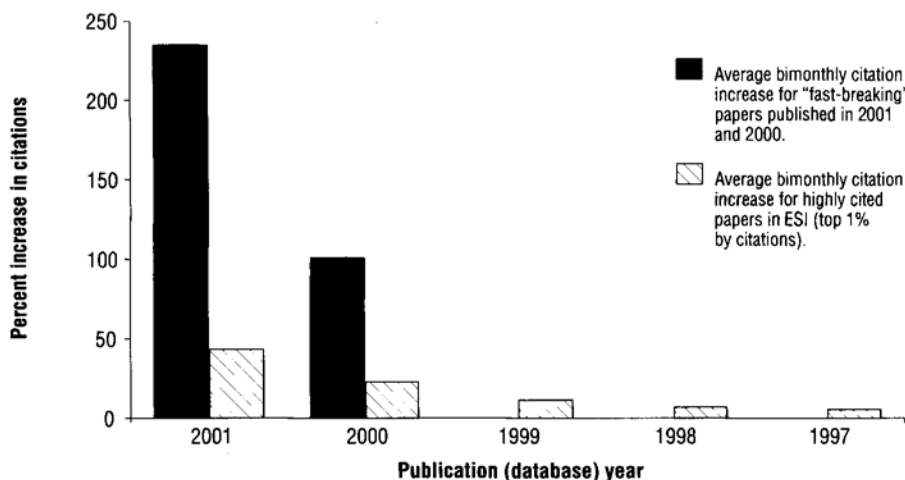
SOURCE: ISI Essential Science Indicators (ESI)

For a dozen years now, this publication has tracked Hot Papers—recently published reports that, according to citation counts logged in the last two months, are cited at a level markedly above papers of comparable type and age. Now *Science Watch* turns its attention to a slightly different species of elite report: "fast-breaking papers," whose cumulative citation counts display a notably high percentage increase from one two-month period to the next.

To present a recent selection of fast-breaking reports, *Science Watch* turned to *Essential Science Indicators* (*ESI*), an ISI/Thomson Scientific web-based evaluation tool and database. *ESI* lists highly cited papers, in 22 broad fields, published and cited since 1991 to the present. *ESI* is updated every two months. *Science Watch* compared figures from the two most recent bimonthly updates and identified the papers in each field that displayed the highest percentage increase in citations. The table on page 2 lists these fast-breaking papers in 18 of the 22 fields.

Papers covered in *ESI* already represent the citation elite—papers that rank in the top 1%, by total citations, for each field and each year. Fast-breaking reports constitute a select group within this elite. This is demonstrated in the graph above. For a fast-breaking report published in 2001, the average increase in citations from one bimonthly period to the next (that is, comparing two successive updates) was 235%.

For other *ESI* papers published in 2001, the average increase was "just" 43%. For papers published in 2000 (or indexed by ISI during that year), the average increase for fast-breaking papers was 101% during

Crime Against *Nature*?

As Biology correspondent Jeremy Cherfas explains on page 8 of this issue, ISI and *Science Watch* inadvertently undercounted citations to the February 15, 2001 *Nature* paper presenting sequence data from the publicly funded International Human Genome Sequencing Consortium. It was belatedly discovered that, in citing the *Nature* report, some ISI-indexed papers have specified the full consortium as "author," while others, referring to the report's first listed author, cite "E.S. Lander" and colleagues. This discrepancy, in effect, split the citation tally, initially preventing the paper from receiving its due recognition in *Science Watch*. With citations now consolidated, the paper assumes its proper place in the Biology Top Ten.

Science Watch and ISI apologize for the miscount and deeply regret any false impressions that may have resulted.

Highly Cited Authors in Mathematics, 1991-2001

(Ranked by citations)

Rank	Name	Affiliation	Department/Field	Papers	Citations
1	Pierre-Louis Lions	University of Paris 9	Mathematics	75	1,207
2	David L. Donoho	Stanford University	Statistics	27	1,182
3	Adrian F.M. Smith	University of London	Statistics	40	1,026
4	Elizabeth A. Thompson	University of Washington	Biostatistics	11	973
5	Iain M Johnstone	Stanford University	Statistics	17	968
6	Jianqing Fan	Chinese University of Hong Kong	Statistics	53	901
7	Donald B. Rubin	Harvard University	Statistics	38	854
8	Ingrid Daubechies	Princeton University	Mathematics	20	807
9	Adrian E. Raftery	University of Washington	Statistics/Sociology	31	804
10	Alan E. Gelfand	University of Connecticut	Statistics	35	747
11	Sun-Wei Guo	Medical College of Wisconsin	Biostatistics	6	737
12	Scott L. Zeger	Johns Hopkins University	Biostatistcs	23	723
13	Peter J. Green	University of Bristol	Statistics	14	667
14	Bradley P. Carlin	University of Minnesota	Biostatistics	28	663
15	J. Stephen Marron	University of North Carolina	Statistics	43	618
16	David G. Clayton	MRC, Cambridge	Biostatistics	4	598
	Gareth O. Roberts	Lancaster University	Statistics	41	598
17	Albert Cohen	University of Paris 6	Mathematics	61	572
	Michael Röckner	University of Bielefeld, Germany	Mathematics	69	572
18	Yangbo Ye	University of Iowa	Mathematics	42	567
19	Jinchao Xu	Pennsylvania State University	Mathematics	22	566
20	Xiao-Li Meng	University of Chicago	Statistics	27	561
21	Matthew P. Wand	Harvard University	Biostatistics	31	558
22	Wally R. Gilks	MRC, Cambridge	Biostatistics	16	551
23	M. Chris Jones	Open University	Statistics	52	542
24	Sergio Albeverio	University of Bonn	Mathematics	109	541
25	Norman E. Breslow	University of Washington	Biostatistics	9	540

SOURCE: ISI Essential Science Indicators, 1991-2001

Mathematics Exam

Continued from page 1

other mathematical techniques for exploring and interpreting genetic data. Both of the paper's authors, not suprisingly, wound up among the decade's most-cited mathematics researchers as determined by ESI. Guo and Thompson are just two of the eight representatives in the ranking from the field of biostatistics. Another University of Washington biostatistician, Norman E. Breslow, contributed to the survey's second-most-cited paper, "Approximate inference in generalized linear mixed models," *J. Amer Stat. Assn.*, 88(421):9-25, 1993, with more than 420 citations. Breslow and coauthor Douglas G. Clayton, of the MRC Biostatistics Unit in Cambridge, U.K., also appear among the decade's most-cited authors.

Another standout among institutions was Stanford University, which scored second in both the total-citations and impact rankings. Stanford's most-cited paper was "Multivariate adaptive regression splines," by J.H. Friedman, (*Ann. Statist.*, 19[1]:1-67, 1991), with approximately 350 citations. Stanford's next-most-cited paper, "Ideal spatial adaptation by wavelet shrinkage," (*Biometrika*, 81[3]:425-55, 1994), with 300 citations, was written by two more of this survey's featured authors, Stanford colleagues David L. Donoho and Iain M. Johnstone.

As Donoho explains in a commentary written for *in-cites*, the online editorial component of ESI, the "wavelet shrinkage" that he and Johnstone discuss is a technique for removing noise from "signals, images, and other sorts of data." Wavelets, Donoho notes, have been a popular and broadly applicable topic in statistics over the last two decades. (Donoho's comments can be read at http://in-cites.com/scientists/DrDavid Donoho.html.)

Of all the authors in this survey, none was more highly cited than Pierre-Louis Lions of the University of Paris 9, whose research has included work on nonlinear partial differential equations. Lions's most-cited paper in this survey, "Users guide to viscosity solutions of second-order partial differential equations" (with M.G. Crandall and H. Ishii, *Bull. Amer. Math. Soc.*, 27[1]:1-67, 1992), has been cited more than 315 times. Lions

Highly Cited Journals in Mathematics, 1991-2001

(Ranked by citations to papers published and cited between 1991 and December 2001)

Rank	Journal	Citations
1	J. Amer. Statist. Assn.	16,457
2	Biometrics	10,854
3	J. Math. Analysis Appl.	9,845
4	Annals of Statistics	9,702
5	Proc. Amer. Math Soc.	9,237
6	C.R. Acad. Sci. Ser. I Math.	9,153
7	Trans. Amer. Math. Soc.	8,586
8	Journal of Algebra	8,531
9	J. Functional Analysis	7,999
10	Biometrika	7,911
11	SIAM J. Numer. Anal.	7,383
12	Inventiones Mathmaticae	7,382
13	J. Roy. Stat. Soc. Ser. B Meth.	6,575
14	Mathemat. Programming	6,444
15	Linear Algebra Appl.	6,112

SOURCE: ISI Essential Science Indicators, 1991-2001

was awarded the Fields Medal, the highest prize in mathematics, in 1994. ■