

COMP08009 RESEARCH METHODS IN COMPUTING & IT

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Department of Computer Science & Applied Physics

1

RESEARCH EVALUATION - THE METRICS

DO WE NEED MORE METRICS?

1962

Semi-finals

13 June 1962
14:30

Czechoslovakia 

3 – 1
(Report) 

 Yugoslavia

Estadio Sausalito, Viña del Mar

Referee: Dienst (Switzerland)

METRICS ARE HERE TO STAY!

Team Statistics in World Friendlies

Wales	Achievement	Republic of Ireland
1	Longest winning run	1
0	Longest losing streak	1
3	Longest run without loss	3
2	Longest run without win	2
1	Clean sheets	5
1	Matches over 2.25 goals	2
2	Matches under 2.25 goals	5
1	Matches First Half Over 0.5	4
2	Matches First Half Under 0.5	3
1	Matches odd	1
2	Matches even	6
1	Average goals scored	1.43
0.67	Average goals allowed	0.43
1	Failure to score	3
2 - 1	Biggest victory	4 - 0
-	Biggest defeat	2 - 0
0	Missed penalties	0
0	Penalty goals	0
0	Own goals	0
1 (33%)	Goalless draw at home match	0 (0%)
0	Goalless draw at away match	2 (50%)
0	Comeback win	0
S. Vokes	Top Goal Scorer	R. Keane
G. Bale	Top Assist	J. McClean

CITATION METRICS

- What Types of Data are best for which Purposes?
 - There are no all-purpose indicators
 - Start by identifying the question the results are supposed to answer, then collect data
 - Clearly define
 - Purpose of the evaluation
 - Types of data required
 - How the results will be used

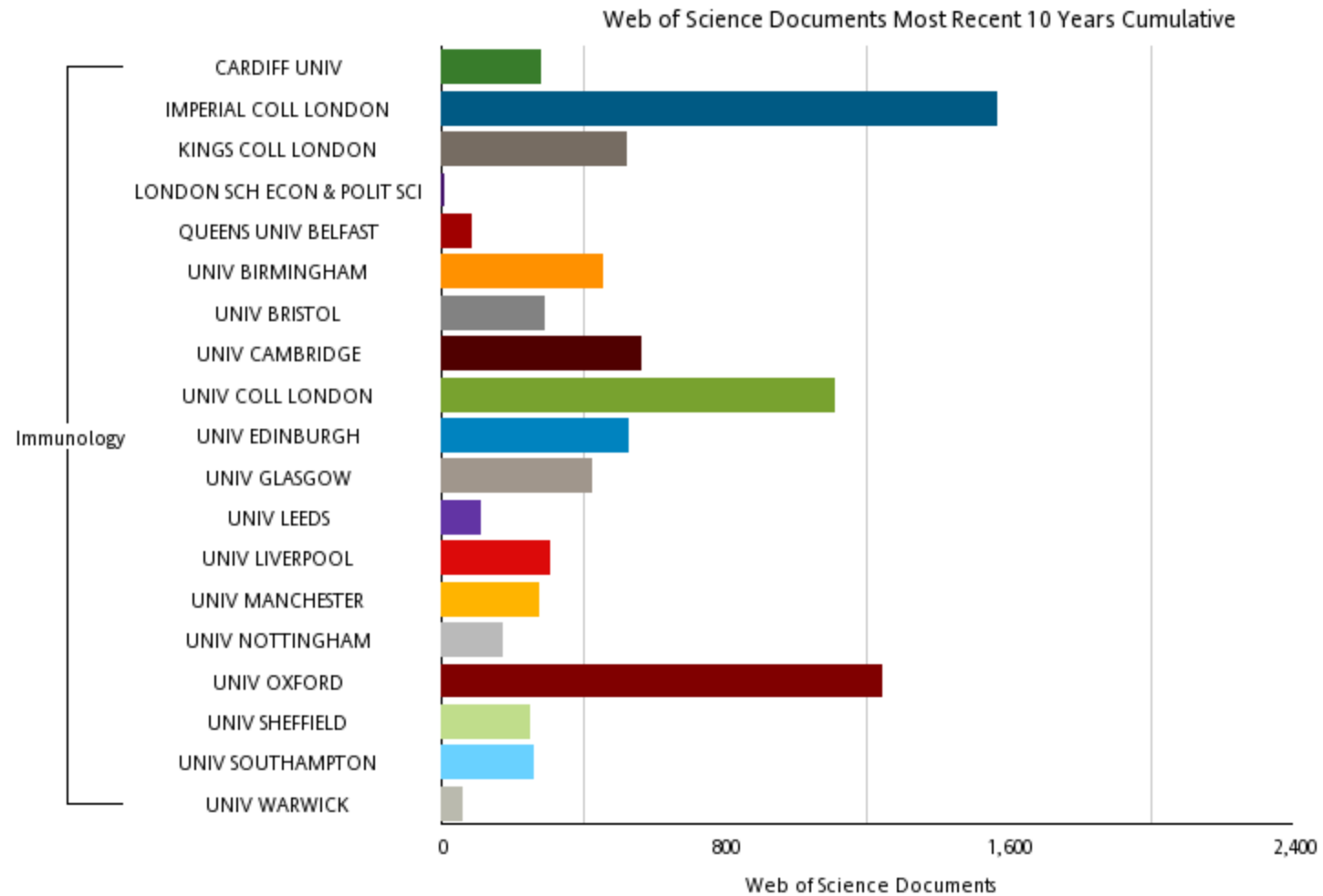
WHAT DO INSTITUTIONS WANT TO FIND OUT FROM CITATION METRICS

- What is the institutes research performance?
- Are we competitive compared with our peers?
- How can the institutes forecast growth?
- Which are our centers of excellence?
- What is our citation ranking?
- What is the influence of our research?
- Which are our most influential papers?
- Which are our top researchers?

PRODUCTIVITY

- Publication counts – most basic bibliographic measure
 - Identifies areas of research intensity by field

PRODUCTIVITY — INSTITUTIONS

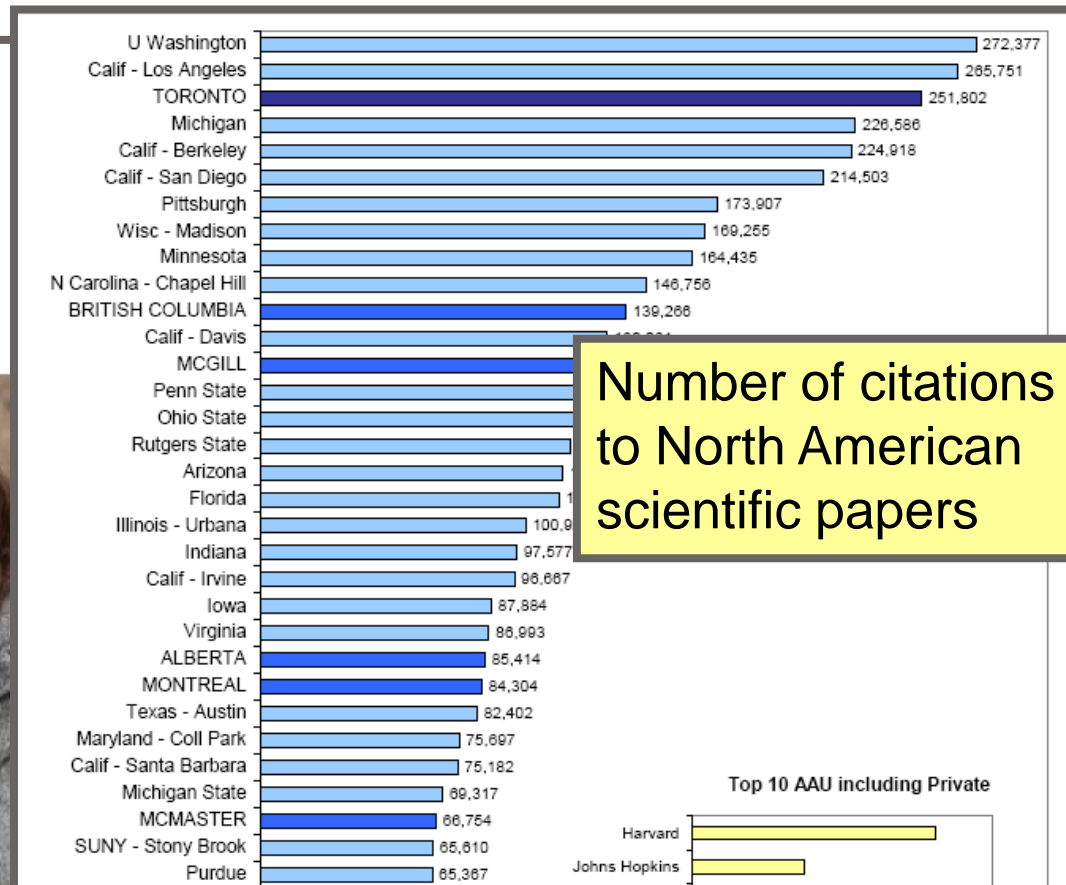


INFLUENCE — CITATIONS

INFLUENCE — CITATIONS



**PERFORMANCE INDICATORS
FOR GOVERNANCE, 2008**
A SUMMARY

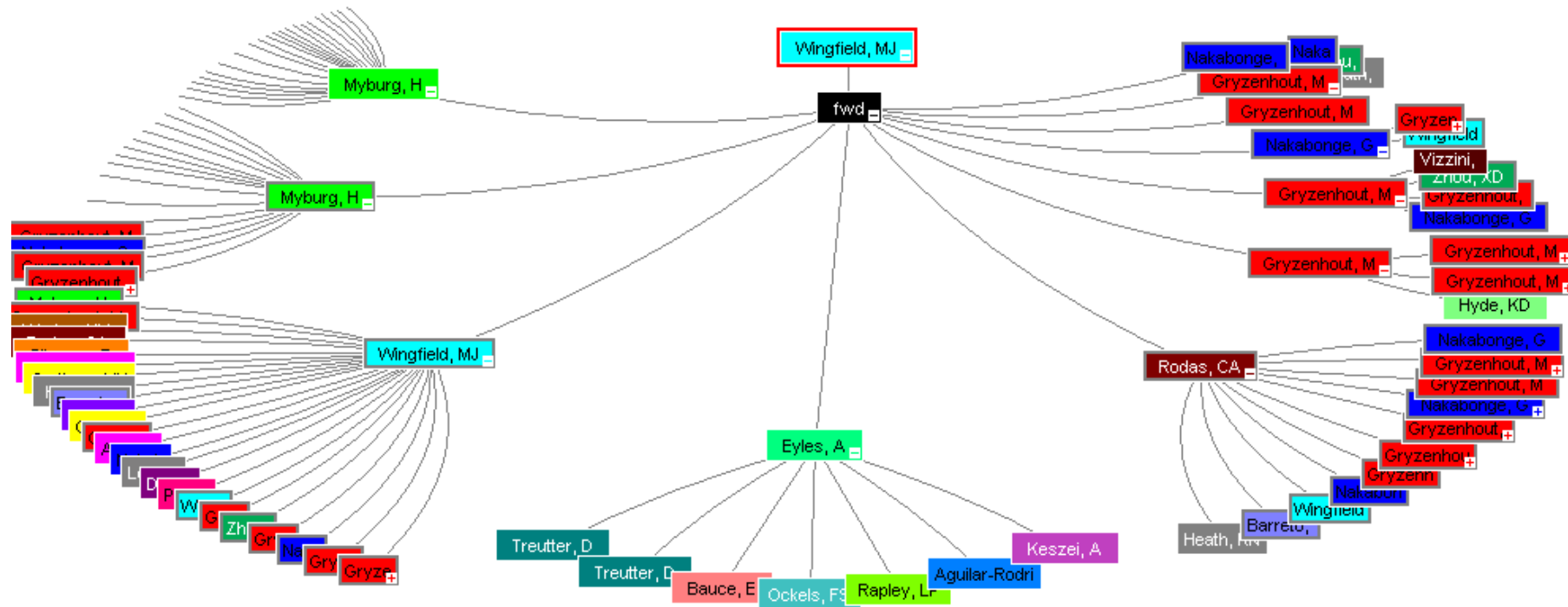


Source: Thomson Reuters
and Canadian University Science Indicators

U.S.

INDIRECT INFLUENCE SECOND GENERATION CITATION COUNTS

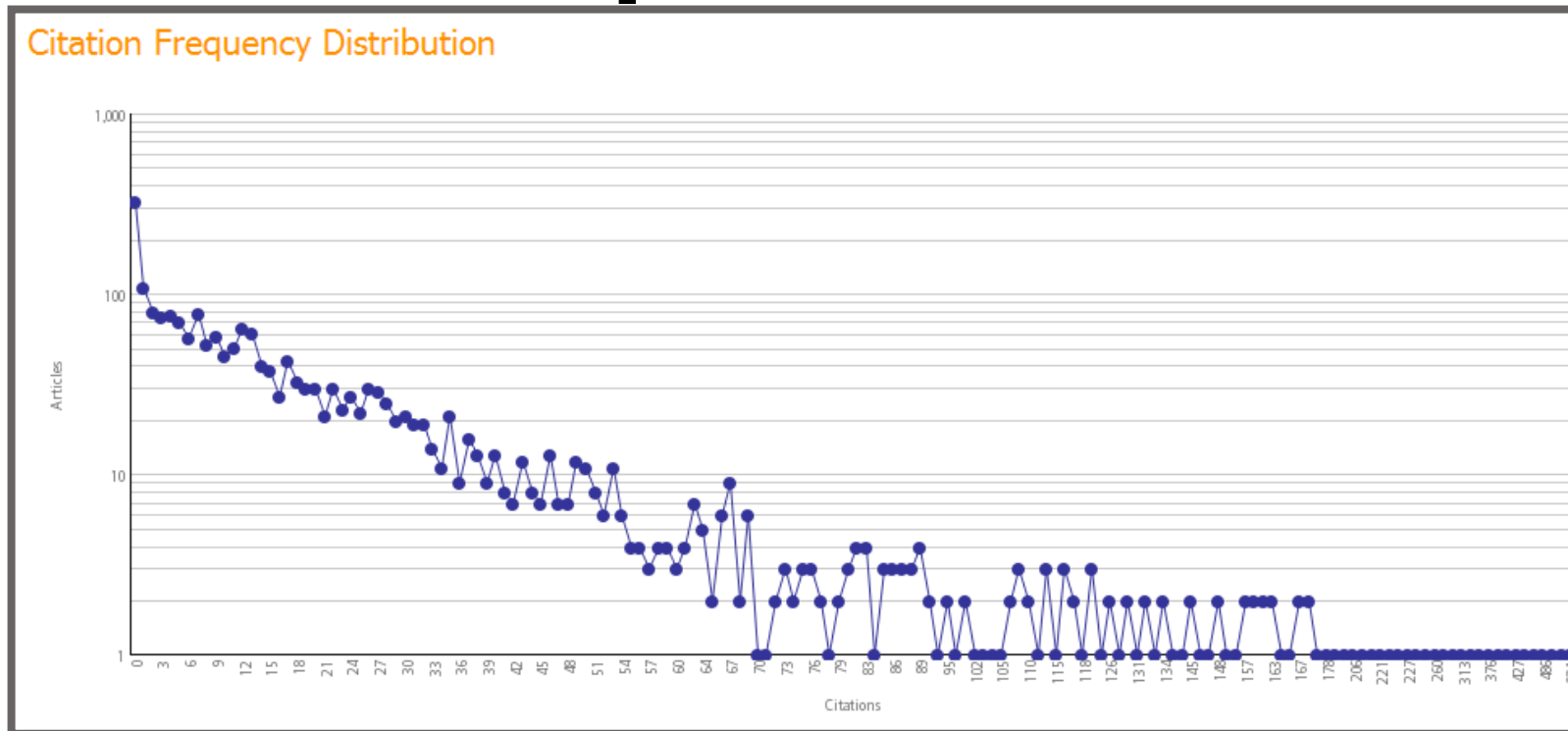
- Sum of citation counts for articles citing target paper
 - Measures long term impact of a paper
 - Similar to Google PageRank but uses citations, not clicks



EFFICIENCY

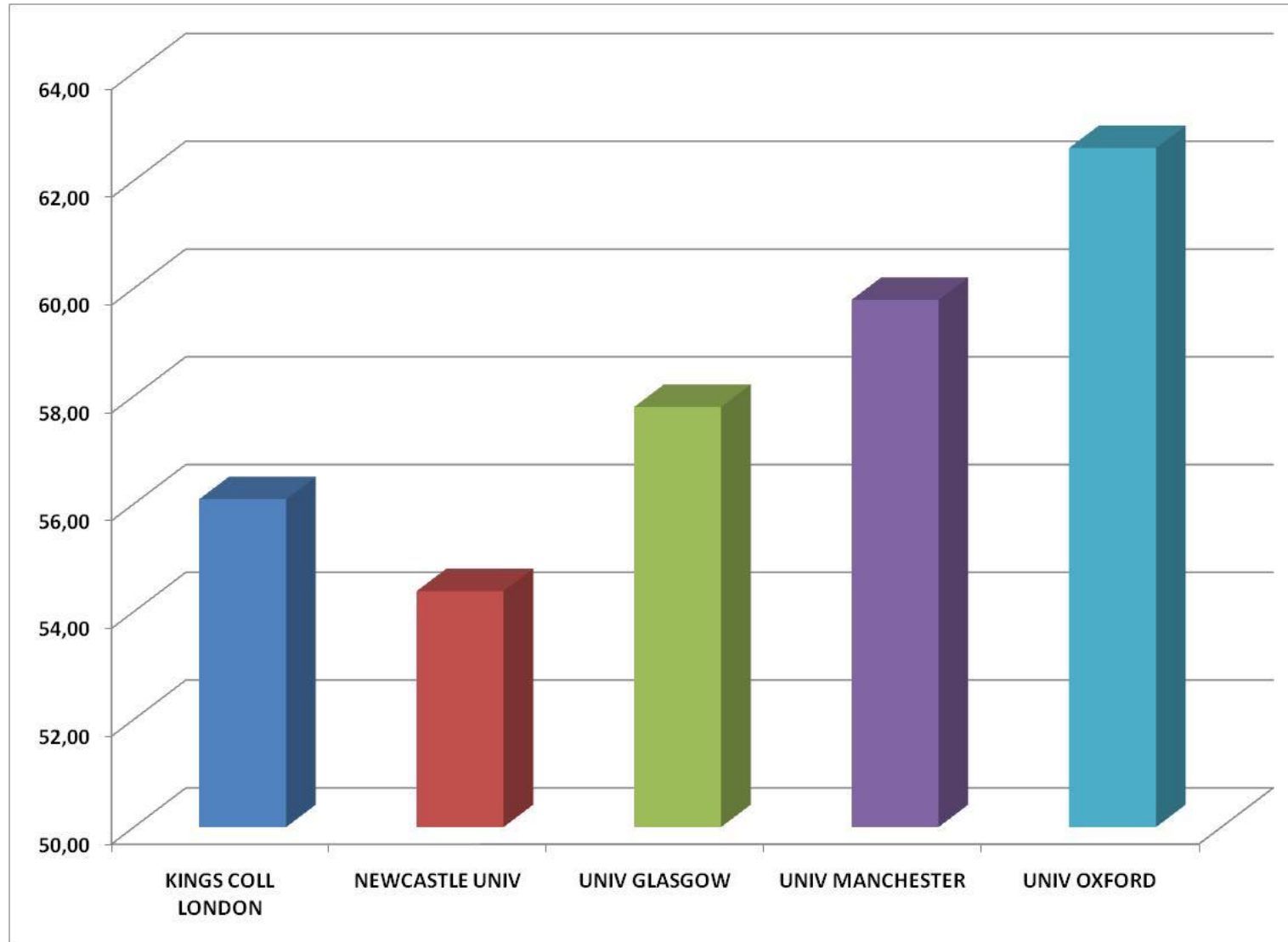
H-INDEX

- Distribution based indicator
 - Attempt to reflect productivity and influence
 - Does not control for time period and field



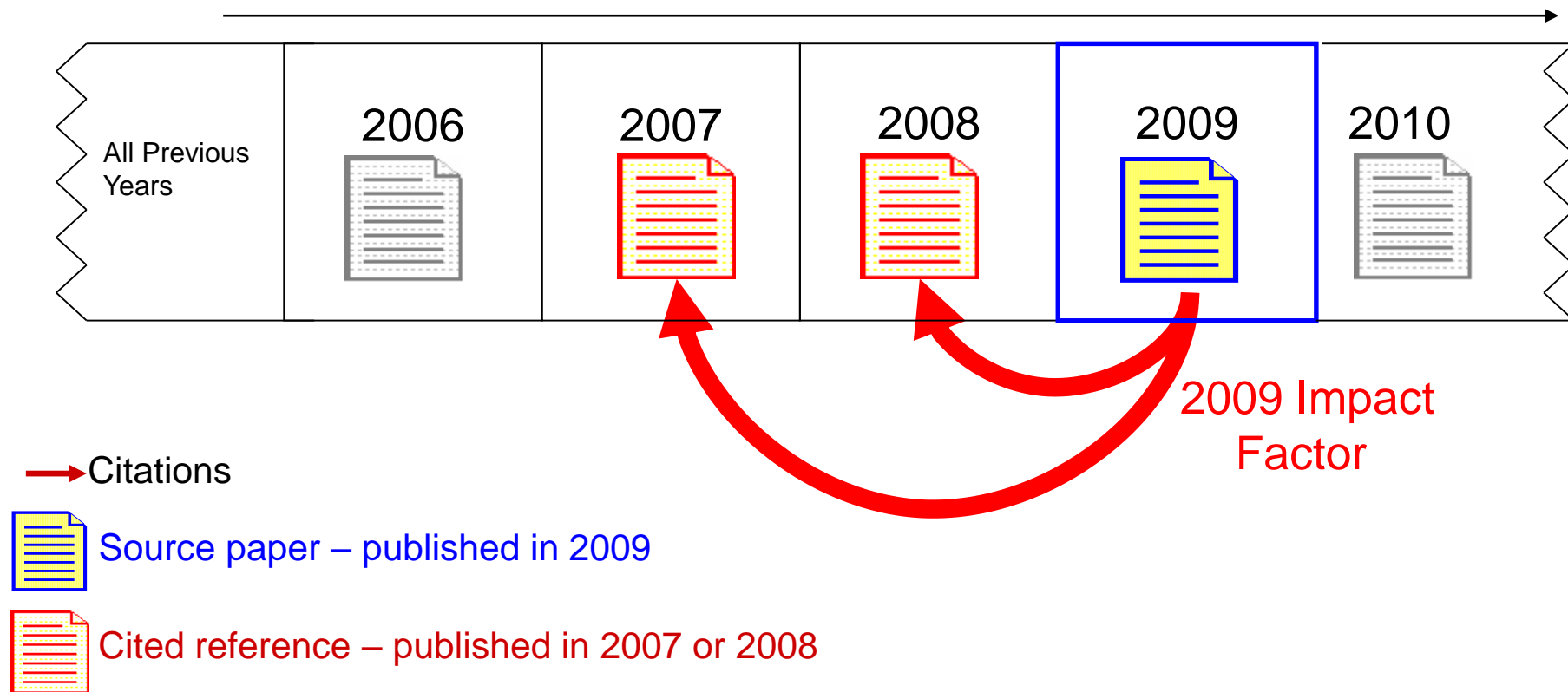
EFFICIENCY

% PAPERS CITED — COMPUTER SCIENCE



EFFICIENCY

JOURNAL IMPACT FACTOR



CALCULATING 2009 JOURNAL IMPACT FACTOR HEALTH ECONOMICS

Citations in 2009

To items published in 2008 = 156

To items published in 2007 = 210

Sum = 366

366

Number of items

Published in 2008 = 97

Published in 2007 = 85

Sum = 182

182

= 2.011

EFFICIENCY

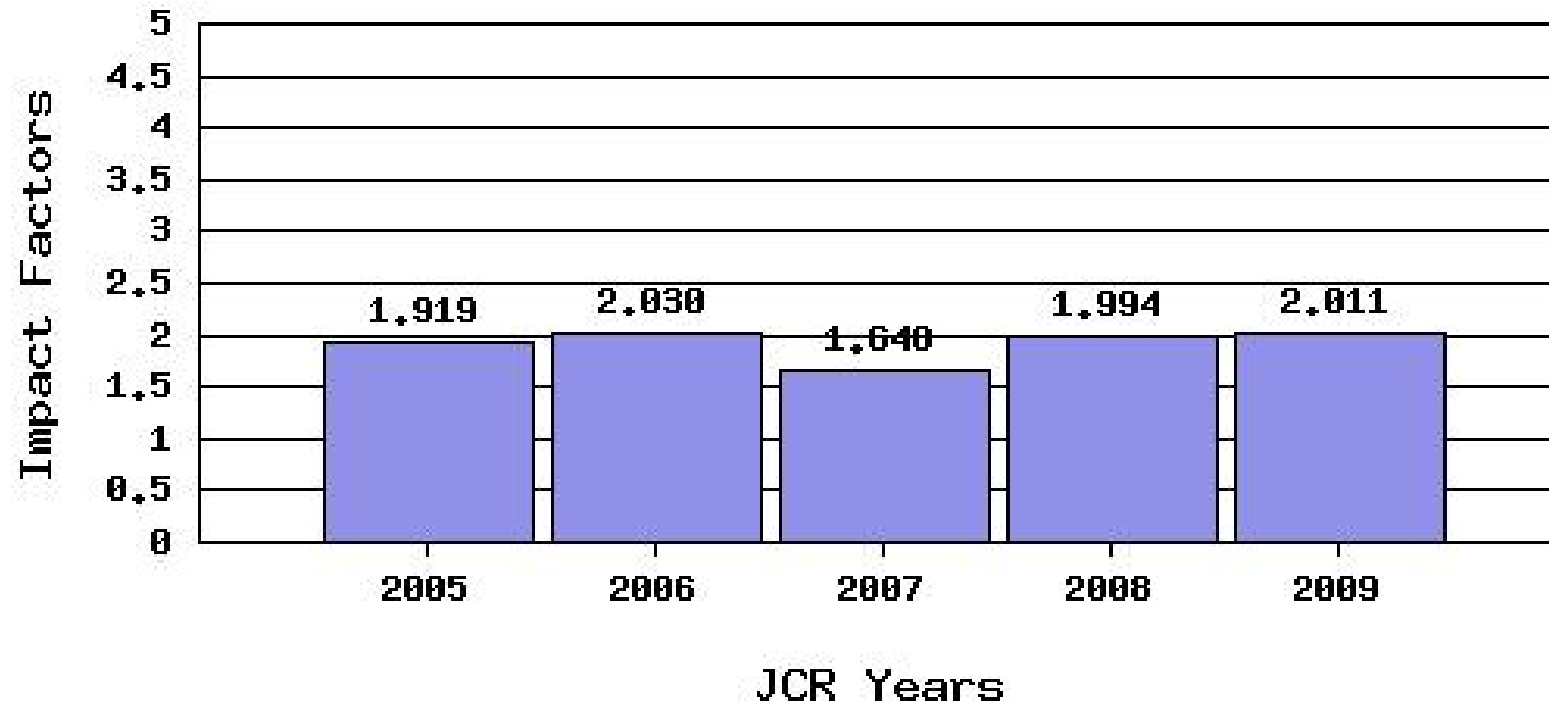
JOURNAL IMPACT FACTOR

Mark	Rank	Abbreviated Journal Title (linked to journal information)	ISSN	JCR Data ⁱ			
				Total Cites	Impact Factor	5-Year Impact Factor	Immediacy Index
<input type="checkbox"/>	1	NAT REV MOL CELL BIO	1471-0072	24057	42.198	38.260	6.307
<input type="checkbox"/>	2	NATURE	0028-0836	483039	34.480	32.906	8.209
<input type="checkbox"/>	3	NAT REV IMMUNOL	1474-1733	17895	32.245	31.037	4.753
<input type="checkbox"/>	4	LANCET	0140-6736	152843	30.758	29.443	10.211
<input type="checkbox"/>	5	NAT REV CANCER	1474-175X	22298	29.538	34.983	5.903
<input type="checkbox"/>	6	NAT MATER	1476-1122	24465	29.504	28.507	5.910
<input type="checkbox"/>	7	NAT REV DRUG DISCOV	1474-1776	12276	29.059	28.000	4.723
<input type="checkbox"/>	8	NAT REV GENET	1471-0056	15425	27.822	25.583	6.627
<input type="checkbox"/>	9	NAT REV NEUROSCI	1471-0048	18553	26.483	29.814	4.361
<input type="checkbox"/>	10	NAT NANOTECHNOL	1748-3387	6461	26.309	27.670	3.937
<input type="checkbox"/>	11	NAT PHOTONICS	1749-4885	3468	22.869	23.215	5.402
<input type="checkbox"/>	12	CHEM SOC REV	0306-0012	17601	20.086	19.953	5.314

INTRODUCTION TO THE IMPACT FACTOR

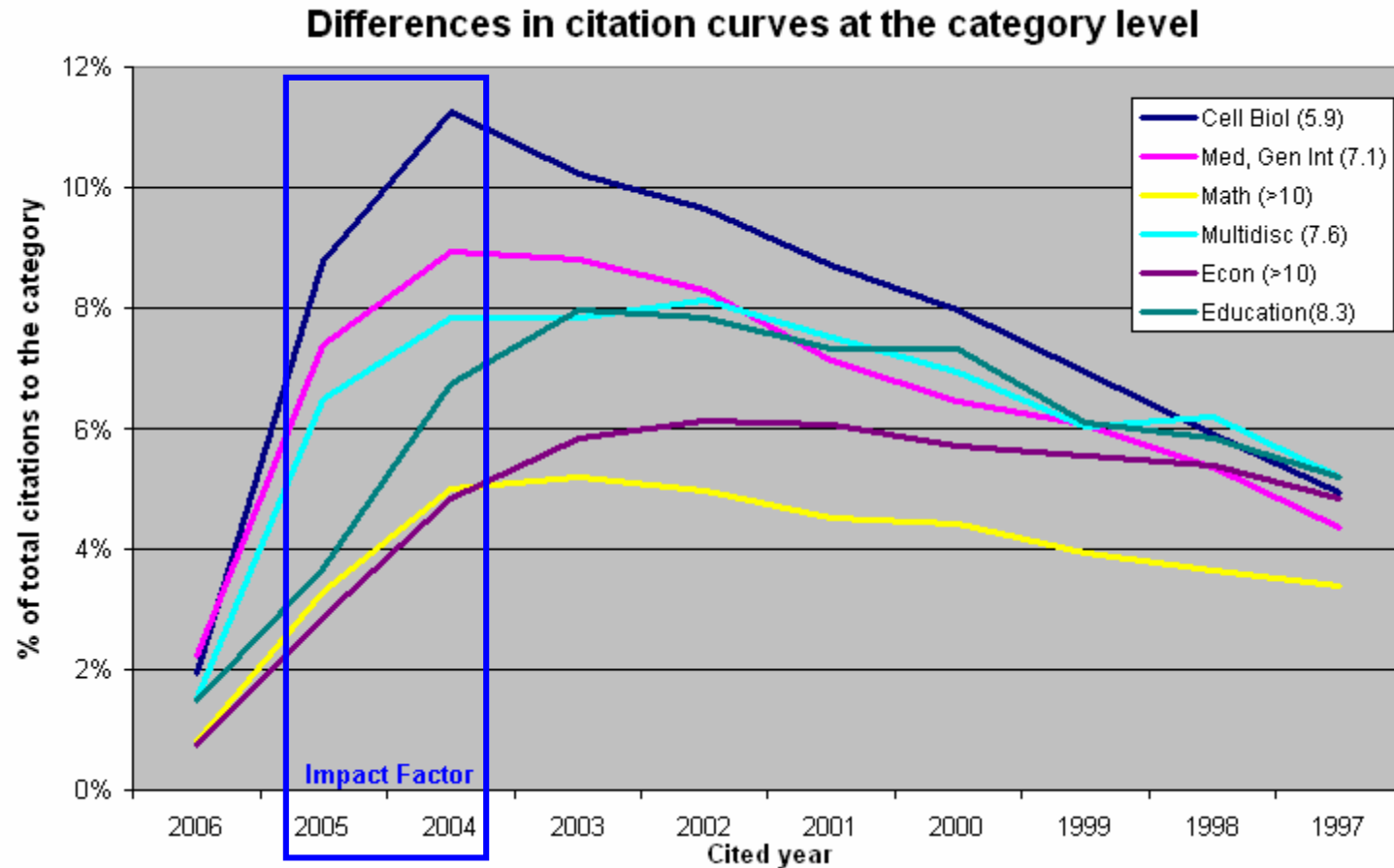
NATURAL FLUCTUATIONS OVER TIME

HEALTH ECONOMICS



EVALUATING RESEARCH

LIMITATIONS OF THE IMPACT FACTOR



EFFICIENCY

5-YEAR IMPACT FACTOR

Mark	Rank	Abbreviated Journal Title (linked to journal information)	ISSN	JCR Data ⓘ					Eigenfactor™ Metrics ⓘ		
				Total Cites	Impact Factor	5-Year Impact Factor	Immediacy Index	Cited	Eigenfactor™	Article	
<input type="checkbox"/>	1	ULTRASOUND OBST GYN	0960-7692	4870	2.672	2.430	0.6				
<input type="checkbox"/>	2	ULTRASON SONOCHEM	1350-4177	1722	2.434	2.688	0.5				
<input type="checkbox"/>	3	ULTRASCHALL MED	0172-4614	761	2.303	1.643	0.4				
<input type="checkbox"/>	4	IEEE T SPEECH AUDI P	1063-6676	1893	2.291	2.341					
<input type="checkbox"/>	5	ULTRASOUND MED BIOL	0301-5629	5534	1.922	2.457	0.341	214	7.0	0.01491	0.695
<input type="checkbox"/>	6	IEEE T ULTRASON FERR	0885-3010	4608	1.654	1.810	0.239	301	7.4	0.01460	0.618
<input type="checkbox"/>	7	J ACOUST SOC AM	0001-4966	25428	1.587	1.836	0.256	738	>10.0	0.04615	0.632
<input type="checkbox"/>	8	J ULTRAS MED	0278-4297	3035	1.151	1.284	0.161	242	6.4	0.00910	0.361
<input type="checkbox"/>	9	ACOUST RES LETT ONL	1529-7853	136	1.083			0	3.5	0.00138	
<input type="checkbox"/>	10	ULTRASONIC IMAGING	0161-7346	723	1.062	1.671	0.083	12	>10.0	0.00118	0.619
<input type="checkbox"/>	11	J SOUND VIB	0022-460X	11254	1.024	1.239	0.162	636	9.2	0.03567	0.533
<input type="checkbox"/>	12	WAVE MOTION	0165-2125	914	0.869	1.136	0.357	42	9.6	0.00472	0.766

Citation rates to journals ‘Acoustics’ category a maintained thus increasing 5-year Impact Factor relative to its 2-Year counterpart

Citation rates to journals in the 'Acoustics' category are maintained thus increasing the 5-year Impact Factor relative to its 2-Year counterpart

EFFICIENCY

5-YEAR IMPACT FACTOR

Mark	Rank	Abbreviated Journal Title (linked to journal information)	ISSN	JCR Data ①					Eigenfactor™ Metrics ①		
				Total Cites	Impact Factor	5-Year Impact Factor	Immediacy Index	Articles	Cited Half	Eigenfactor™	Article Transitivity™
<input type="checkbox"/>	1	NAT. GENET.	1061-4036	57100	25.556	24.416	8				
<input type="checkbox"/>	2	NAT. REV. GENET.	1471-0056	10943	22.399	22.227	5				
<input type="checkbox"/>	3	ANNU. REV. GENET.	0066-4197	4889	18.302	17.991	0.318	22	7.0	0.03083	11.429
<input type="checkbox"/>	4	TRENDS ECOL. EVOL.	0169-5347	15166	14.797	17.950	1.596	89	6.9	0.06932	8.718
<input type="checkbox"/>	5	GENE DEV.	0890-9369	50192	14.795	15.487	2.389	298	6.9	0.31684	10.109
<input type="checkbox"/>	6	GENOME RES.	1088-9051	18495	11.224	10.974	1.858	197	4.6	0.13866	5.349
<input type="checkbox"/>	7	AM. J. HUM. GENET.	0002-9297	31921	11.092	11.711	2.311	222	6.5	0.14925	5.381
<input type="checkbox"/>	8	ANNU. REV. GENOM. HUM. G.	1527-8204	1328	10.722	10.512	0.688	16	4.2	0.01189	6.088
<input type="checkbox"/>	9	CURR. OPIN. GENET. DEV.	0959-437X	7620	10.150	9.636	1.436	78	5.3	0.05719	5.490
<input type="checkbox"/>	10	TRENDS GENET.	0168-9525	10104	9.729	10.317	1.657	102	5.7	0.06028	5.238
<input type="checkbox"/>	11	PLOS GENET.	1553-7390	2634	8.721	8.733	1.569	218	1.7	0.03429	5.629
<input type="checkbox"/>	12	HUM. MOL. GENET.	0964-6906	25423	7.806	7.724	1.100	320	5.5	0.14603	3.573

The opposite picture in ‘Genetics and Heredity’ demonstrates a shorter citation lag

The opposite picture in 'Genetics and Heredity' demonstrates a shorter citation lag

USING THE IMPACT FACTOR EVALUATING JOURNALS

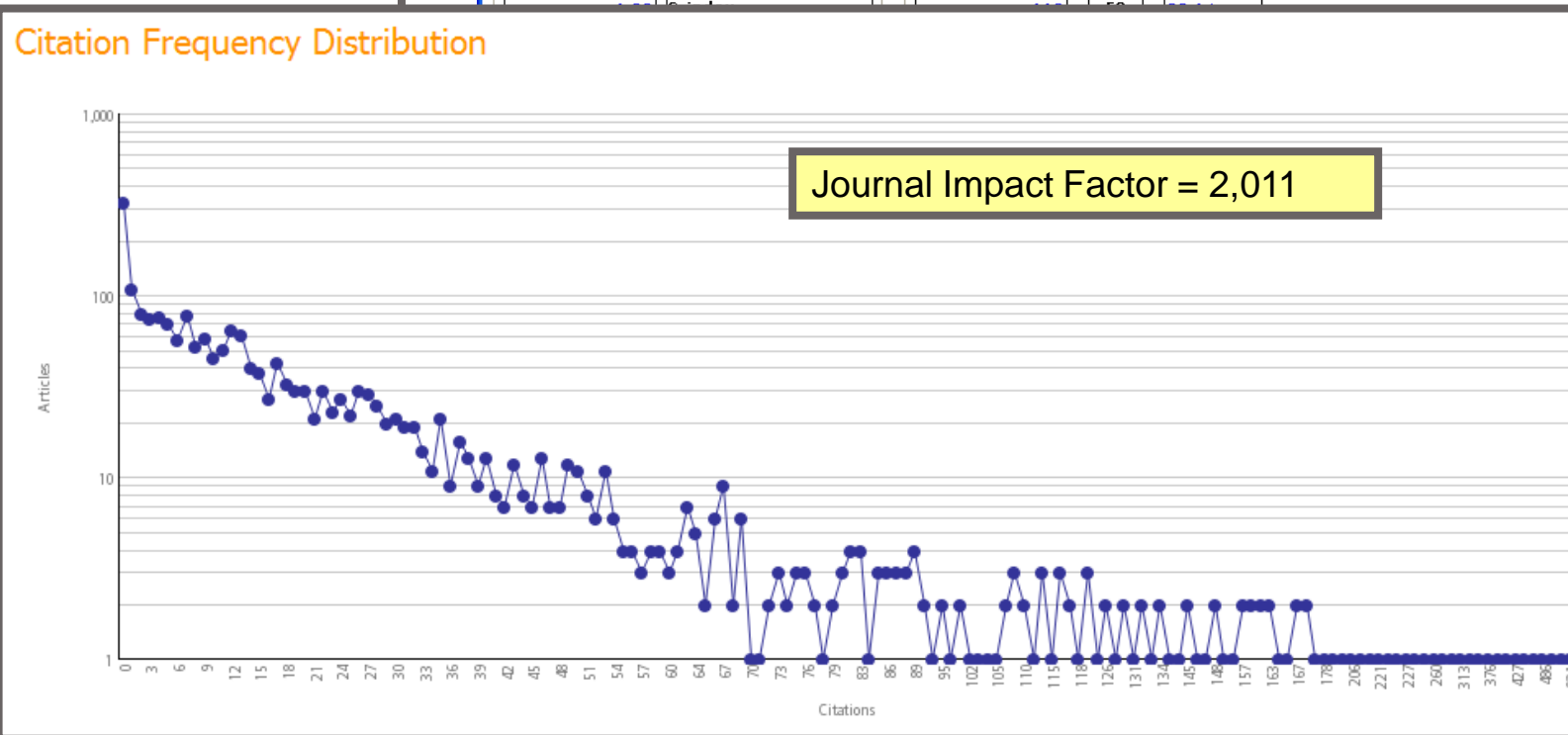
- Appropriate use
 - To evaluate journals
- Misuse
 - Evaluation of individual articles
 - Evaluation of institution or researcher

USING THE IMPACT FACTOR MISUSE: EVALUATING INDIVIDUAL PAPERS

30% of articles in
Food Policy were
not cited at all

Summary Metrics		
File		
Summary Metrics		Number of Papers at Various Percentiles
		Number of Papers % Percent of Papers
304	Total Papers	1 1 0,33
1.138	Total Cites	11 5 3,62
3,74	Avg. Cites per Paper	23 10 7,57
2	MEDIAN times Cited	59 25 19,41
13	H-index	

Citation Frequency Distribution



BENCHMARK YOUR PAPERS AGAINST GLOBAL AVERAGES — IS THIS A HIGHLY CITED PAPER?

Total Citations	2nd Generation Citations	2nd Generation Citations per Citing article	Journal Expected Citations (JXC)	Category Expected Citations (CXC)	Percentile in Field	Journal Impact Factor	Publication Year	Field View Ranking	Article Type View Ranking	Author View Ranking	Journal View Ranking	Article Title
40	776	19.40	34.30	18.83	12.92	10.90	2004	HEMATOLOGY	ARTICLE	CALLE, Y	BLOOD	WASp deficiency in mice results in failure to form osteoclast sealing zones and defects in bone resorption

Articles published in 'Blood' from 2004 have been cited 34,30 times

This paper has received $40/34,30=1,17$ times the expected citations for this journal

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WASp deficiency in mice results in failure to form osteoclast sealing zones and defects in bone resorption

Full Text +Links NCBI Print E-mail Add to Marked List Save to EndNote Web Save to EndNote RefMan ProCite more options

Holdings Go

Author(s): Calle Y, Jones GE, Jagger C, Fuller K, Blundell MP, Chow J, Chambers T, Thrasher AJ

Source: BLOOD Volume: 103 Issue: 9 Pages: 3552-3561 Published: MAY 1 2004

Times Cited: 44 References: 36 Citation Map

Abstract: No defects related to deficiency of the Wiskott-Aldrich Syndrome protein (WASp) have been described in osteoclasts. Here we show that there are significant morphologic and functional abnormalities. WASp-null cells spread over a much larger surface area and are highly polyploid. In their migratory phase, normal cells assemble clusters of podosomes behind their leading edges, whereas during the bone resorptive phase multiple podosomes are densely aggregated in well-defined actin rings forming the sealing zone. In comparison, WASp-null osteoclasts in either phase are markedly depleted of podosomes. On bone surfaces, this results in a failure to form actin rings at sealing zones. Complementation of WASp-null osteoclasts with an enhanced green fluorescent protein (eGFP)-WASp fusion protein restores normal cytoarchitecture. These structural disturbances translate into abnormal patterns of bone resorption both in vitro on bone slices and in vivo. Although physiologic steady-state levels of bone resorption are maintained, a major impairment is observed when WASp-null animals are exposed to a resorptive challenge. Our results provide clear evidence that WASp is a critical component of podosomes in osteoclasts and indicate a nonredundant role for WASp in the dynamic organization of these actin structures during bone resorption. (C) 2004 by The American Society of Hematology.

Document Type: Article

Language: English

KeyWords Plus: WISKOTT-ALDRICH-SYNDROME; SYNDROME PROTEIN; ACTIN DYNAMICS; CELLS; PODOSONES; RHO; ORGANIZATION; CYTOSKELETON; MACROPHAGES; ACTIVATION

Reprint Address: Calle, Y (reprint author), Kings Coll London, Randall Ctr Mol Mech Cell Funct, New Hunts House,Guys Campus, London SE1 1UL, England

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2. St George Hosp, Sch Med, Dept Cellular Pathol, London, England
3. UCL, Inst Child Hlth, Mol Immunol Unit, London, England

E-mail Addresses: yolanda.calle@kcl.ac.uk, a.thrasher@ich.ucl.ac.uk

Publisher: AMER SOC HEMATOLOGY, 1900 M STREET, NW SUITE 200, WASHINGTON, DC 20036 USA

Subject Category: Hematology

Cited by: 44
This article has been cited 44 times (from Web of Science).

Bouma G, Burns SO, Thrasher AJ Wiskott-Aldrich Syndrome: Immunodeficiency resulting from defective cell migration and impaired immunostimulatory activation IMMUNOBIOLOGY 214 9-10 Sp. Iss. SI 778-790 SEP 2009

Chelliah MA, Schaller MD Activation of Src Kinase by Protein-Tyrosine Phosphatase-PEST in Osteoclasts: Comparative Analysis of the Effects of Bisphosphonate and Protein-Tyrosine Phosphatase Inhibitor on Src Activation In Vitro JOURNAL OF CELLULAR PHYSIOLOGY 220 2 382-393 AUG 2009

Bosticardo M, Marangoni F, Akuti A, et al. Recent advances in understanding the pathophysiology of Wiskott-Aldrich syndrome BLOOD 113 25 6288-6295 JUN 18 2009

[view all 44 citing articles]
Create Citation Alert

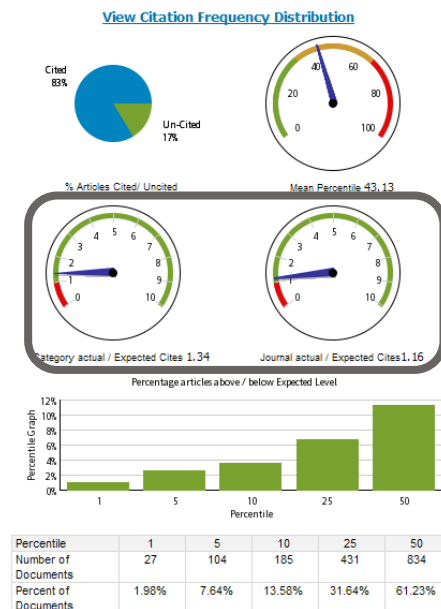
Related Records:
Find similar records based on shared references (from Web of Science).
[view related records]

References: 36

This article is ranked in the 12,92nd percentile in its field by citations

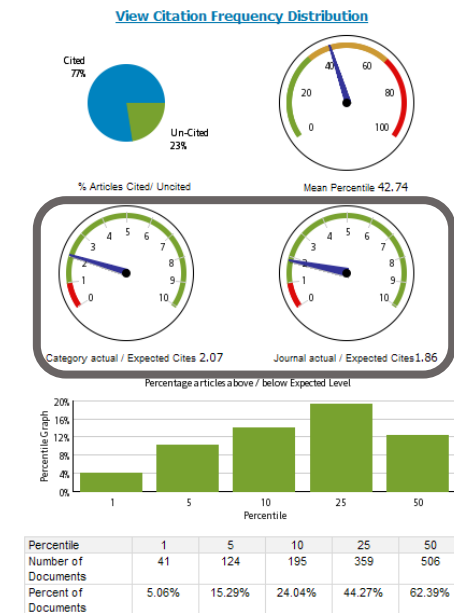
WHICH ARE OUR CENTRES OF EXCELLENCE?

Citation Metrics	
Times Cited	31,896
Web of Science Documents	1,763
Cites per Document	18.09
h-index	71
Median Cites	7
2nd Generation Citations	492,531
2nd Generation Citations per Citing Document	20.17
Disciplinary Metrics	
Disciplinary index	0.05
Interdisciplinarity index	0.59
Collaboration Metrics	
Unique Authors	2,620
Average Authors per Document	6.37
Unique Institutions	613
Average Institutions per Document	2.67
Average Countries/Territories per Document	1.95



Dept. Medicine

Citation Metrics	
Times Cited	10,352
Web of Science Documents	892
Cites per Document	11.61
h-index	47
Median Cites	4
2nd Generation Citations	51,059
2nd Generation Citations per Citing Document	7.43
Disciplinary Metrics	
Disciplinary index	0.02
Interdisciplinarity index	0.79
Collaboration Metrics	
Unique Authors	642
Average Authors per Document	2.99
Unique Institutions	214
Average Institutions per Document	1.99
Average Countries/Territories per Document	1.39

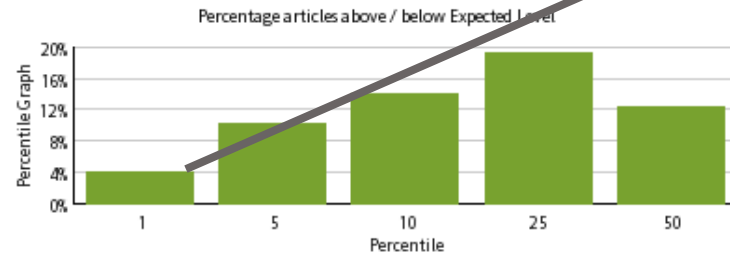


Dept. Mechanical Engineering

PERCENTILE INDICATORS

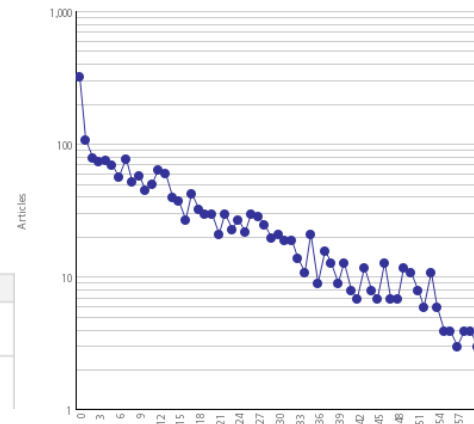
■ Paper percentile

- Determine percentage of papers at each level of citation



Percentile	1	5	10	25	50
Number of Documents	41	124	195	359	506
Percent of Documents	5.06%	15.29%	24.04%	44.27%	62.39%

Citation Frequency Distribution



Times Cited	2nd Generation Citations	2nd Generation Citations per Citing Document	Journal Expected Citations (JXC)	Category Expected Citations (CXC)	Percentile in Subject Area
66	19	0.29	1.36	1.04	0.01
10	3	0.30	0.37	0.17	0.01
49	97	1.98	16.00	6.39	0.03
24	16	0.67	1.64	0.77	0.03
78	308	3.95	3.99	3.22	0.04
88	447	5.08	6.45	5.09	0.06
82	693	8.45	7.27	6.93	0.07
203	421	2.07	8.01	4.46	0.08
73	133	1.82	27.60	14.75	0.09
22	41	1.86	3.21	1.66	0.09

QUESTIONS ?