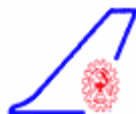
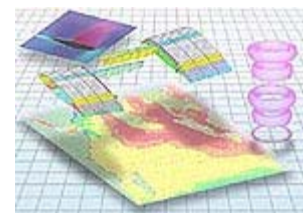


[Gallery: G Prathap](#)



Research Assessment at NAL

Evaluating performance using expected citation rates



Dr R A Mashelkar, Director-General of CSIR, recently wrote in a circular letter that there is "no high technology without high science" and that "there is no use writing papers that nobody read"! The best way to assess the utility of a published work is to find out the number of citations it has received.

Recently, we procured the Institute of Scientific Informations's Institutional Citation Report. Arguably, this allows us to compile an objective assessment of the published literature originating from NAL.

One way of conducting the research assessment exercise is to evaluate the performance of published papers using the expected citation rate (XCR) criteria. The XCR is the average citation per paper based on the journal title, year of publication and type of document. Thus, a paper published earlier should be expected to have more citations than one published later. Categories (i.e. type of document) also matter: A full paper, a note and a letter to the editor may receive different citations. This is why the XCR approach may be better than using the impact factor or citations approach as is usually done.

What I have done is to choose all items which have appeared from NAL in an issue and category where $XCR > 10$ from the ISI database. These can be considered to be the best journals ever used by NAL scientists during this period (1981-97), implying that they have the highest impact factor. However this does not mean that the paper which is fortunate to appear in such a prestigious journal will ever be used. In fact as Table I shows, the 57 papers which belong to this category include many which have 0 and 1 citations since they appeared! My further criteria is to select from this list of 57, only those papers which actually received citations in excess of XCR. This is an extremely strict criterion, especially considering the recent debate in *Nature* which establishes that papers from the Third World are often under-cited, probably from plain bias. Thus, these papers must be extremely good! Only 15 such papers are found now (Table II). Arguably, these are the best papers published from NAL during this period.

TABLE I - The 57 "best" papers from NAL during 1981-97 from the point of view of the quality of the journal in which it appeared.

Cites actually received	Expected citation rate	Name of first author	Name of journal	Year / Type
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1	32.38	Ramani G	PHYS REV B	87 N
1	24.17	Shankar PN	J FLUID MEC	81
4	21.93	Mahadevan S	J NON-CRYST	84
35	21.07	Giridhar A	J NON-CRYST	81
22	21.07	Narasimham PSL	J NON-CRYST	81
5	20.95	Kanakalatha P	POLYMER	83
6	18.93	Pedar A	IEEE COMPUT	83
25	18.7	Mahadevan S	J NON-CRYST	83
0	18.39	Rao MNB	INT J FRACT	81
12	18.2	Giridhar A	J NON-CRYST	82
4	18.19	Singh Ak	J APPL PHYS	83
1	17.19	Shubha V	J PHYS F	81
51	16.73	Mahadevan S	J	86

			NON-CRYST	
16	16.69	Murthy SS	COMPUT METH	86
2	15.65	Divakar C	J APPL PHYS	84
2	15.23	Ramasesha SK	PHYS REV B	91 N
5	15.13	Lakshminarayana HV	J COMPOS MA	84
3	14.76	Lakshminarayanan V	J ELEC CHEM	86 N
0	14.51	Shubha V	SOL ST COMM	87
0	14.25	Parameswaran K	J ACOUST SO	81
3	14.03	Ramesh TG	J PHYS C	82
1	13.66	Divakar C	SOL ST COMM	82
4	13.62	Rao RM NGK	J APPL POLY	81
10	13.48	Satyanarayana KG	J MATER SCI	82
2	12.95	Ramesh TG	SOL ST COMM	82

1	12.95	Shubha V	SOL ST COMM	83
13	12.87	Jeyachandra Bose C	INT J NUM M	85
36	12.87	Prathap G	INT J NUM M	85
21	12.87	Prathap G	INT J NUM M	85
16	12.87	Prathap G	INT J NUM M	85
5	12.87	Prathap G	INT J NUM M	85
10	12.81	Prathap G	INT J NUM M	87
0	12.81	Prathap G	INT J NUM M	87
71	12.76	Prathap G	INT J NUM M	82
4	12.68	Ramachandran BE	J MATER SCI	81
3	12.68	Ramachandran BE	J MATER SCI	81
9	12.66	Kannan R	TALANTA	85

2	12	Devi SU	SOL ST COMM	84
5	11.77	Singh AK	J APPL PHYS	82 N
29	11.7	Prathap G	INT J NUM M	83
2	11.56	Whittenberger JD	J MATER SCI	84
8	11.24	Kulkarni AG	J MATER SCI	83
3	11.19	Shukla A	J APPL POLY	84
0	10.97	Lakshminarayanan V	J ELEC CHEM	91
4	10.79	Narasimha R	ATMOS ENV A	90
2	10.65	Ramasesha SK	PHYSICA C	92
18	10.43	Babu CR	INT J NUM M	86
6	10.43	Babu CR	INT J NUM M	86
26	10.43	Prathap G	INT J NUM M	86

15	10.43	Prathap G	INT J NUM M	86
12	10.43	Prathap G	INT J NUM M	86
0	10.42	Sundaresan NJ	INT J FRACT	84
13	10.3	Prathap G	INT J NUM M	88
2	10.17	Giridhar A	J NON-CRYST	88
9	10.17	Mahadevan S	J NON-CRYST	88
6	10.12	Ming LC	PHYS CHEM M	91
9	10.11	Giridhar A	J NON-CRYS	T 90

Performance of a published article has been evaluated using the expected citation rate (XCR) criteria. The XCR is the average citation per paper based on the journal title, year of publication and type of document. Thus, a paper published earlier should be expected to have more citations than one published later. Categories (i.e. type of document) also matter: A full paper, a note and a letter to the editor may receive different citations. What I have done is to choose all items which have appeared from NAL in an issue and category where XCR > 10. These can be considered to be the best journals ever used by NAL scientists during this period (1981-97), implying that they have the highest impact factor. However this does not mean that the paper which is fortunate to appear in such a prestigious journal will ever be used. In fact as Table I shows, the 57 papers which belong to this category include many which have 0 and 1 citations since they appeared!

TABLE II - The 15 papers from the 57 "best" papers of Table I which have actually received citations in excess of XCR

Cites actually received	Expected citation	Name of first author	Name of journal	Year /
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	rate			Type
35	21.07	Giridhar A	J NON-CRYST	81
22	21.07	Narasimham PSL	J NON-CRYST	81
25	18.7	Mahadevan S	J NON-CRYST	83
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21	12.87	Prathap G	INT J NUM M	85
16	12.87	Prathap G	INT J NUM M	85
71	12.76	Prathap G	INT J NUM M	82
29	11.7	Prathap G	INT J NUM M	83
18	10.43	Babu CR	INT J NUM M	86
26	10.43	Prathap G	INT J NUM M	86
15	10.43	Prathap G	INT J NUM M	86
12	10.43	Prathap G	INT J NUM M	86

13	10.3		INT J NUM M	88
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The criterion here is to select from the list of 57 from Table I, only those papers which actually received citations in excess of XCR. Only 15 papers are found now. Arguably, these are the best papers published from NAL during this period. Again, it turns out that of this 15, 11 are from the Structures Division (10 actually from Prathap's group, and the other by Ramesh Babu, who once belonged to Prathap's group) and the remaining 4 from Dr Sudha Mahadevan's group in the Materials Division. One may well ask, what kind of high science have the other Divisions been doing?

If one were to relax this criteria more generously, so that journals which have $XCR > 5$ are all included, then we find an enlarged number of 150 papers from NAL appearing in such a list. Under this relaxation, about 37 papers from NAL have received citations in excess of the $XCR=5$ stipulation. One paper stands out here, that by T R Shembarkar, which has received 25 citations for a journal article whose XCR was 7.68.

Gangan Prathap

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