

***h*-index: is it necessary?**

Ramasesha and Sen¹ have correctly pointed out the dangers in relying exclusively on scientometric indicators in assessing the scientific worth of individuals. The matter is, however, cloudy because numerical parameters are not always unreliable. There are many Nobel Laureates who have had a high *h*-index before they won the prize. A high *h*-index is neither a necessary nor a sufficient condition for scientific excellence. It is a way of measuring the quality of scientific output and it has the advantage in that it is seemingly more objective than other measures of assessment. But in the end, there is no

alternative to the oldest way of assessing a scientist – a group of knowledgeable peers need to study his or her publications closely and critically, and arrive at an opinion of an individual's worth. I suspect that this is what they are (still) doing in the Nobel committees and this is why we rarely encounter controversies with regard to the highest scientific award.

At the lowest levels, *h*-indices are useful as criteria of eligibility and basic competence. They should be used as criteria of elimination and not as criteria of selection. They will always serve a purpose in Indian science, because it was

possible, in the days before we had scientometric indicators, for committees of wise men to simply declare an incompetent as an outstanding scientist. This is no longer possible.

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1. Ramasesha, S. and Sen, D., *Curr. Sci.*, 2011, **100**, 446.
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What is a low *h*-index?

Ramasesha and Sen¹ point out the caveats of using scientometrics for individual assessment. However, they try to quote a wrong example to justify their 'argument' by claiming that the 2009 Nobel Prize winner, Venkatraman Ramakrishnan has a low *h*-index. Even if one is against scientometrics, there is no need to misrepresent and belittle the publication record of an Indian-born Nobel Prize-winning scientist. A search in the *Web of Science* on 20 March 2011 based on the following parameters: Author = (ramakrishnan, v), refined by: Institutions = (BROOKHAVEN NATL LAB OR MRC OR UNIV UTAH) yields 100 papers, 8932 citations and an *h*-index of 48. At the time of winning the Nobel Prize (October 2009), this read as 89 papers, 7980 citations and an *h*-index of 43. The number of citations places him directly in the top 1% of all scientists in chemistry. Based on the *h*-index, he will be in the top 700 of all chemists, that includes many Nobel Prize winners, in the world (<http://prospect.rsc.org/blogs/cw/2010/11/08/h-index-update-whitesides-still-top-of-the-table/>). His *h*-index is also higher than the mean *h*-index of all

chemists and physicists who have won the Nobel Prize². To put this record in a local perspective, there are only two chemists in India who have a better *h*-index than Ramakrishnan. Further, he has published 13, 8 and 7 papers in *Science*, *Nature* and *Cell* respectively, a record which is not matched by many scientists in the world.

While the argument of the authors¹ is well taken, the *h*-index and the number of citations do work pretty well as a ballpark indicator of a scientist's productivity and impact of the work. For example, qualification in GRE or JEE is not an excellent indicator of potential in college or research. However, considering the number of applications for a given seat, they cannot be individually scrutinized and evaluated. In the case of India, due to the lack of critical mass working in a certain area, this problem becomes even more acute because it is difficult to evaluate each scientist by reading the published work. In these cases, scientometrics works well as a one of the parameters for evaluation, but is never the sole criterion for fellowships or awards. It is just a parameter that can be used judiciously to

look at serious scientists and eliminate applicants with very poor records. Hirsch² states, 'Obviously, a single number can never give more than a rough approximation to an individual's multifaceted profile, and many other factors should be considered in combination in evaluating an individual' and also points out that 84% of Nobel Prize winners have *h*-indices higher than 30. It is unlikely that a scientist whose number of citations is less than 100 is going to win the Nobel Prize. It also does not mean that all scientists with more than 8000 citations are going to win the Nobel Prize.

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1. Ramasesha, K. and Sen, D., *Curr. Sci.*, 2011, **100**, 446.
 2. Hirsch, J. E., *Proc. Natl. Acad. Sci. USA*, 2005, **102**, 16569–16572.
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