The eroding trust of scientific publishing

The thorny issue of scientific misconduct, which is increasing in recent years, has been powerfully highlighted by Balaram[1]. He concludes with a strong statement on the need for effective mentoring critical to the future success of science. Then, how do we promote effective mentoring of our young scientists?

Humanity warrants not only scientific solutions but also spiritual guidance in the path of mentoring our younger generations to pursue science and education ethically. First, scientists can learn more about ethics of work from India's ancient Sanskrit scriptures of Vedanta that emphasize work to be done dutifully and selflessly without compromising on ethics. The Vedanta philosophy describes it eloquently as *yajya* ('yaj' meaning worship, harmonious association and charity). While performing the duties, ego and selfish desires associated with name, fame, wealth and material values should not predominate. The benefits obtained from selfless work should be shared with others. Selfless work or *karma yoga* will lead people on the path to purification of mind.

Secondly, it is not only essential but also absolutely necessary to start with a course on how to conduct scientific research ethically with a background to preserve scientific integrity. Such a course should be mandatory for all undergraduates in colleges, universities and research institutions across India. Furthermore, post-graduate and doctoral students must go through a detailed course on how to conduct research ethically by promoting original thinking, analysis and writing. The course should also review all the cases of scientific misconduct that have occurred over the last few decades to understand the problems associated with unethical acts.

Finally, the most important character of a scientist is to maintain integrity, which represents intellectual honesty and responsible conduct. In 2008, the *Nature* news item stated that the Government of India was considering a national body to investigate misconduct in science after a series of high-profile frauds in an academic institution[2]. No nation is immune to misconduct in science since the foundation of wrongdoing lies within the individual scientist's choice. We were often told in high school history class that history repeats itself. So scientists ought to learn from past mistakes on scientific misconduct, and avoid making them again. Then only, the success of science will have a smooth ride in future.

1. Balaram, P., *Curr. Sci.*, 2010, **98**, 5–6.
2. *Nature*, 2008, **452**, 15.

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National academy contributions to national science: a iCE map representation

Recently, Ye[1] presented a 'data reflection' on the contribution of three national academies towards the research base of their respective countries. Using data from the ISI-ESI (Essential Science Indicators) database (http://esi.isiknowledge.com/home.cgi/) from 1 January 1996 to 31 December 2006; 1 January 1997 to 31 December 2007; 1 January 1998 to 31 December 2008, the international scientific output and impact indicators[2,3] of the Chinese Academy of Sciences (CAS), the Max Planck Society (MPS) and the Russian Academy of Sciences (RAS) were compared to those of China, Germany and Russia respectively. In the analysis that followed[1], the output (papers) and impact (citations) of the three academies as a percentage of output and impact of their respective countries was tabulated. It was seen that these ranged from 15% (MPS' impact in Germany) to 45% (RAS' impact in Russia), with the Chinese experience taking a middle path[4,5].

Here, we propose that another way of projecting such performance assessments

Table 1. Output (papers *P*), outcome (citations *C*) and impact (*i* = *C*/*P*) of CAS, MPS and RAS in China, Germany and Russia

	Papers (*P*)			Citations (*C*)			Impact (*i*) = citations/papers		
Statistical unit	1996–2006	1997–2007	1998–2008	1996–2006	1997–2007	1998–2008	1996–2006	1997–2007	1998–2008
CAS	94,913	108,745	121,093	424,949	545,093	704,267	4.48	5.01	5.82
MPS	69,797	72,087	73,454	1,261,131	1,346,597	1,460,238	18.07	18.68	19.88
RAS	122,508	125,956	127,872	446,214	475,991	510,738	3.64	3.78	3.99
China	422,993	508,561	604,041	1,646,673	2,147,166	2,920,922	3.89	4.22	4.84
Germany	742,917	769,257	698,869	8,014,317	8,609,811	9,381,860	10.79	11.19	13.42
Russia	286,194	286,153	283,603	1,082,164	1,140,087	1,210,338	3.78	3.98	4.27

Table 2. Exergy (defined as $E = iC = C^2/P$) of CAS, MPS and RAS in China, Germany and Russia

	Exergy = impact * citations		
Statistical unit	*E* 1996–2006	*E* 1997–2007	*E* 1998–2008
CAS	1.90E + 06	2.73E + 06	4.10E + 06
MPS	2.28E + 07	2.52E + 07	2.90E + 07
RAS	1.63E + 06	1.80E + 06	2.04E + 06
China	6.41E + 06	9.07E + 06	1.41E + 07
Germany	8.65E + 07	9.64E + 07	1.26E + 08
Russia	4.09E + 06	4.54E + 06	5.17E + 06
CAS/China	2.97E – 01	3.01E – 01	2.90E + 01
MPS/Germany	2.64E – 01	2.61E – 01	2.30E – 01
RAS/Russia	3.97E – 01	3.96E – 01	3.95E – 01

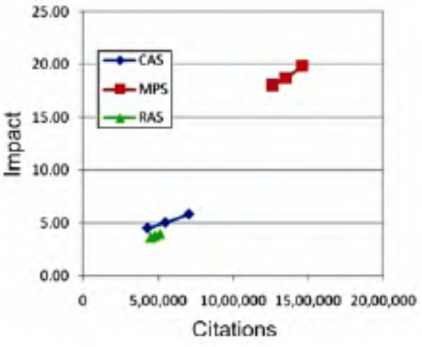

Figure 1. An impact–citations–exergy projection of performance of three national academies.

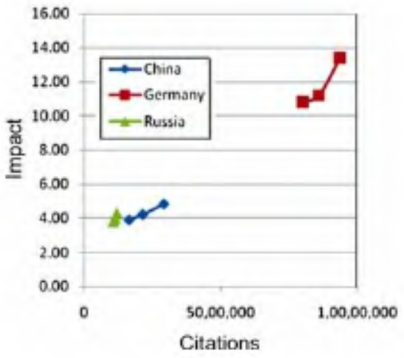

Figure 2. An impact–citations–exergy projection of performance of the respective countries.

is to use the following distinction: papers as output, citations as outcome and citations/papers as impact. The datasets shown in tables 1 and 2 of Ye[1] can be re-arranged as shown in Table 1. An energy like term (we call it exergy, defined as $E = iC = C^2/P$) is computed for CAS, MPS and RAS in China, Germany and Russia respectively and displayed in Table 2. In exergy terms (a measure that combines quality and quantity), CAS accounts for approximately 30% of China's research output, while MPS and RAS account for approximately 25% and 40% of the output of their respective countries. The variation from year to year can be easily and gainfully projected in what we call iCE (impact–citations–exergy) map and Figures 1 and 2 show this for the national academies and for their respective countries. The trajectories that emerge give a visual picture of the way science activity evolves.

1. Ye, F. Y., *Curr. Sci.*, 2010, **98**, 469.
2. van Raan, A. F. J., *J. Am. Soc. Inf. Sci. Technol.*, 2006, **57**, 408.
3. Ye, Y., *J. China Soc. Sci. Tech. Inf.*, 2007, **26**, 711.
4. Xin, H. and Normile, D., *Science*, 2008, **319**, 148.
5. Ye, F. Y., *Curr. Sci.*, 2009, **97**, 744–745.

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Setback to *Bt* brinjal will have long-term effect on Indian science and technology

February 9, 2010 was indeed a sad day for Indian biotechnology. The Union Minister of State for Environment and Forests took a far reaching decision to clamp the moratorium on the commercialization of the first genetically engineered vegetable crop *Bt* brinjal. It was not based on any compelling scientific evidence but based on the nationwide protests by anti-biotechnology activists, environmental and developmental NGOs and certain farmer groups. It was astonishing to see how the minister was able to collate, review, analyse and develop decision options within 48 h to announce his unfortunate decision a day before promised. By his own assertion, the buck stopped with him and the decision was only his and nobody else's. It seems he took a single-handed decision without bothering to consult other ministries and organs of the government that share a jurisdiction on the development of modern biotechnology. It should be obvious that the minister had arrived at his decision long before he concluded the last of public consultations in Bangalore on 6 February 2010. It seems that he just went through the motions of consultation to fulfill the formality. It is equally perplexing that the Union Ministers of Agriculture and Science and Technology have both strongly differed from the environment minister in his decision. The former minister of science and technology said that decisions affecting science and technology are best left to scientific experts without resorting to such public consultations which will only turn out to be a public farce.

Irrespective of the fate of *Bt* brinjal, the moratorium on GM food crops will have a telling effect on the future of modern biotechnology in India. Scientific organizations, their funding, collaborations, education and training, and private investment in technology development will all take a beating and set the clock backwards by decades. The minister succumbed to the shouting brigades of the anti-biotech lobby. This anti-biotech