Genesis of IISERs

In a recent Guest Editorial, Ganesh[1] has highlighted the higher education scenario in India. Here I summarize the genesis of the Indian Institutes of Science Education and Research (IISERs) that are important institutions, but unfortunately are outside the university system.

A detailed proposal was sent by me in April 1995 to Vasant Gowarikar (Vice Chancellor, University of Pune (UoP)), to start a 5-year educational course after the 10+2 schooling, leading to M Sc degree at UoP. The idea was to integrate teaching and research with subject specialization in the first four years, but with the fifth year being devoted to a research project. Later, a formal proposal was prepared by the (late) V. G. Bhide (former Vice Chancellor, UoP) for establishing an autonomous Advanced Centre for Science and Technology (ACST) at Pune, with a total budget of Rs 65 crores over 5 years, having a close linkage with UoP. The objective was to improve the university education to provide well-trained manpower to the scientific establishments and industries of India. The proposal received strong support from Y. K. Alagh (the then Minister for Science and Technology (S&T)) and so the Planning Commission wrote to the DST Secretary in January 1997 to allocate Rs 5 crores to UoP for initiating work on ACST. In December 1997, the Union Government led by I. K. Gujral got defeated and the BJP government came to power. In a meeting held by the Ministry of Human Resource Development (MHRD) in October 1999, ACST was renamed as Advanced Centre for Science and Technology Education (ACSTE). Despite considerable follow-up by the Pune group during 1999–2002, the then MHRD minister, Murali Manohar Joshi remained lukewarm to the idea, although later discussions between him and Arun Nigvekar (the then Chairman, UGC) in early 2003, did result in a decision to establish four National Institutes of Science (NISc), at Allahabad, Bhubaneswar, Chennai and Pune under Clause 12 (ccc) of the UGC Act. However, the MHRD opined that this was not permissible under the UGC Act. Finally, after the UPA Government took over in August 2004, the Pune group wrote to Arjun Singh, the then MHRD Minister and also to Kapil Sibal, the minister for S&T, requesting an early approval for the ACST. On 12 October 2004, in a meeting at New Delhi, chaired by Arjun Singh to discuss the plans for the ACST, it was agreed to set up several Centres of Excellence in Basic Sciences. Finally, on the advice of C. N. R. Rao (the then Chairman of the Scientific Advisory Council), the Union Cabinet gave approval in March 2005 for two new institutions for science education and research, to be located at Pune and Kolkata and named NISER (later named IISER). The entire correspondence is being scanned for keeping in the library of NCRA-TIFR, Pune.

Presently, there are five IISERs and another three are coming up at Tirupati, Berhampur and Nagaland. Also, a NISER exists at Bhubaneswar. It is noteworthy that a Centre for Excellence in Basic Sciences (CBS) has been set up at the University of Mumbai for a 5-year programme, in collaboration with the Department of Atomic Energy. Another CBS is being planned at the University in Raipur. As from the IITs, a large percentage of students graduating from IISERs, perhaps the brightest, go abroad for Ph D. Only some join scientific and industrial research organizations in India. India needs large manpower trained in science and technology to realize its innovation potential. Hence new educational institutions should have an active partnership at least with better-off universities. Without lifting Indian universities from the present morass, the long-term impact of the various educational initiatives on Indian economy will be limited.

1. Ganesh, K. N., *Curr. Sci.*, 2015, **108**(12), 2135–2136.

GOVIND SWARUP

10 Cozy Retreat,
Road No. 3, Sindh Society, Aundh,
Pune 411 007, India
e-mail: gswarup29@gmail.com

Comparison of citations received by a research publication

It is indeed heartening to know that the citation of the first scientific research paper[1] authored completely by Indian researchers working in India has crossed the 5000 mark[2]. The most crucial factor for judging the importance of a research publication is possibly the number of citations it has received over the years, apart from the impact factor of the journal where it has been published. Last year *Nature* published an article[3] on the top 100 papers on the basis of the number of citations they had received. The record of the number of citations received by a paper is now much better maintained by the different bodies like Thomson Reuters, *Scopus*, and *Web of Science*, with the help of the right kind of computer software. However, the exercise is now going on for 50 years and has taken into account the papers published from circa 1900. In fact, the article in *Nature* was published to mark the 50 years of this exercise initiated by Eugene Garfield in 1964 through the publication of *Science Citation Index* (*SCI*). Now one can find that the database contains the citation information for more than 58 million research papers and publications from various branches of knowledge.

The most cited papers from different research areas have received different number of citations and there is large variation in the paper with the highest citation in say condensed matter physics compared to that in genetics. The proliferation of research journals covering more and more specialized fields and the increase in the number of publications thereby have actually enhanced the research activities in virtually all branches of science. This has led to wider number of publications and hence the scope of a larger number of citations for a publication. In fact, now it appears that the fields that were considered to be quite esoteric, like those in the domain of fundamental physics, have really pushed down possibly because of the demand on the technology and application-oriented research with the targeted goal for the industry and business. Research activities and publications are not necessarily driven by the urge for knowledge, but for the targeted business interest of the funding bodies that are often the private sources. Interestingly, the two famous papers of Albert Einstein published in his 'miracle year' of 1905, one introducing the special theory of relativity[4] and the other with the equation $E = mc^2$ (ref. 5), were not only considered as classics, but were the two most cited papers for quite a long time. It is accepted that once a particular scientific idea published in a paper gets identified as of fundamental importance and becomes textbook material people stop referring to the original publication. However, this really does not explain the top spot for the most cited paper[6] published in 1951 that is considered as a 'method paper'. It continues to get cited as the original paper and not as a textbook material well after 60 years of its publication. In fact, the full list[7] has more such examples.

There are papers in the top 100 list with a large number of authors, where one is likely to find authors of Indian origin. But they belong to a large group working abroad and, in a way, one may not like to consider that as an Indian paper. Moreover, some of the papers like the one occupying the top slot are there for more than 30 or 40 years. It is indeed more likely that an older important paper gets wider opportunity to get cited more number of times. But an older paper in this case needs to maintain its importance for a long period of time. If a paper gets cited 50 years after its publication, particularly if we keep in mind the immense change in the research scenario after the introduction of computers and suitable software in last 30 years or so, we have to appreciate the importance of the publication. On the other hand, a not-so-old paper from Indian researchers[2] that has crossed the 5000 mark in citation is indeed an important event. For a paper that was published barely 13 years ago in 2002 on genetic algorithm, a field where new things are forthcoming, this achievement is indeed immense. In fact, many feel that the comparison of the citations received by a paper should be done against the backdrop of its year of publication. This implies that one must also look at its year-wise citation, citations in the first five years and so on. In fact, this analysis has been done for the Indian paper[2] and it shows a steady trend for the paper that has remained uniformly important for more than a decade.

One more interesting fact has been spelt out in the article in *Nature*[3]. More than 43% of the papers published receive no citation. And about 31.5% papers receive citations that stand between 1 and 9. Does that indicate that the publication of research papers with real significance has become difficult? In fact, this is also indicated by the fact that among these 58 million papers, less than 15,000 papers and publications have received more than 1000 citations.

1. Kumar, N., Panwar, Y. and Mahesh, G., *Curr. Sci.*, 2015, **108**, 1580.
2. Deb, K. *et al.*, *IEEE Trans. Evol. Comput.*, 2002, **6**(2), 181–197.
3. Van Norden, R. *et al.*, *Nature*, 2014, **524**, 550–553.
4. Einstein, A., *Ann. Phys.*, 1905, **17**(10), 891–921.
5. Einstein, A., *Ann. Phys.*, 1905, **18**(13), 639–641.
6. Lowry, O. H. *et al.*, *J. Biol. Chem.*, 1951, **193**, 265–275.
7. www.nature.com/news/top-top-100-papers

BHUPATI CHAKRABARTI

Indian Association of Physics Teachers,
23, Ibrahimpur Road,
Kolkata 700 032, India
e-mail: bhupati2005@yahoo.co.in

Angria Bank: an ecologically or biologically significant marine area of the northwest Indian Ocean

Conservation and sustainable use of biodiversity in marine areas beyond national jurisdiction is one of the central issues of the United Nations General Assembly. Therefore, the Convention on Biological Diversity (CBD), in 2008, adopted a resolution to identify 'Ecologically or biologically significant marine areas (EBSAs)' using scientific criteria in need of protection in open-ocean and deep-sea habitats[1,2]. CBD has identified seven scientific criteria largely focusing on ecological or biological values[1] such as: (i) uniqueness or rarity; (ii) special importance for life-history stages; (iii) importance for threatened, endangered or declining species and/or habitats; (iv) vulnerability, fragility, sensitivity, or slow recovery; (v) biological productivity; (vi) biological diversity, and (vii) naturalness of the site.

The coastal and marine ecosystems of peninsular India have been surveyed to identify and prioritize the 'important coastal and marine biodiversity areas (ICMBAs)' to improve the management of these areas[3]. Peninsular India has a vast coastline of about 5423 km, spanning 13 maritime states and Union Territories, with diverse coastal and marine ecosystems, supporting nationally and globally significant biodiversity[4].

The criteria used to identify ICMBAs were inclusive of the EBSAs criteria. The ICMBA site identification exercise began with six different criteria that are often considered important features for safeguarding coastal habitats and their biodiversity[3]. Conservation-related targets were picked up from standard global approaches and designated 'conservation amplifiers' because they improve the opportunities for consideration or simply to allocate more weight to protection measures[3]. The tool was developed with six different criteria as conservation amplifiers and 26 subunits as indicators or goals respective to each criterion. A total of 350 potential sites were surveyed all along the coasts of peninsular India. Of these, 106 sites were identified and prioritized as ICMBAs[3,4]. Angria Bank is one among them.

The Angria Bank is a submerged plateau that exists around 105 km west of Malvan in Maharashtra, India, in the Arabian Sea (16°69′27.55″N, 72°06′19.15″E). The to-