Opportunities in 'FAIR'

The special section on FAIR (Facility for Anti-proton and Ion Research in Darmstadt, Germany) in the 10 March 2011 issue of *Current Science* was quite interesting and informative, all the more because of the substantial Indian resource commitment to the project and Indian participation in both the construction and utilization of the facility.

Indian scientists have always been participating in International accelerator facilities, either in their respective individual capacities or in groups, working in diverse fields of scientific research. The Large Hadron Collider (LHC) project at CERN, Geneva is perhaps the first instance where India participates with a firm financial commitment and scientists from across the country belonging to both the Department of Atomic Energy (DAE) and non-DAE institutions are contributing to both machine-building and experiments. India's participation in FAIR is a unique example of the country becoming a share-holding partner in an international mega-science project, opening up new opportunities to Indian scientists, technologists and industries. The articles, while giving a good description of the ongoing efforts in the DAE institutions related to the project, fail to bring out the emerging opportunities for others.

The opportunities are indeed diverse as can be seen from the Project Document in www.gsi.de/fair/.

The first phase of the project relates to the design and construction of the accelerator itself. A facility that is planned to be operational after several years cannot be based on off-shelf technologies. Considerable efforts in the design, fabrication and testing of accelerator components, RF and cryogenic sub-systems and control systems will be required. The Indian contribution to the project being in-kind, FAIR has an obligation to source many of these from India. The engineering research communities in our IITs, IISc and other institutions and industries have a unique opportunity to contribute. The Indian industries already have a track record of supplying components to the LHC facility and can easily rise up to the expectations of FAIR.

FAIR will be the nerve-centre for basic research in many disciplines in the coming decades. The experimental groups across the partnering countries are busy designing new experiments, designing and constructing new detector systems, etc. Many Indian researchers even outside the DAE institutions have shown interest in participating in FAIR-related research activities. For example, I understand that the graduate students and faculty from IIT Kharagpur are already designing a radiation-hard ASIC for high-speed (2 GHz) data transfer for use in FAIR experiments. However, the faculty and students in other educational institutions such as the universities, IISERs and other IITs are yet to discover the new opportunities in FAIR.

The Department of Science and Technology and DAE have made an administrative structure where an Indo-FAIR Coordination Centre (IFCC) has been established at Bose Institute, Kolkata. A Programme Director has been appointed for day-to-day work (Subhasis Chattopadhyay, e-mail: sub@veccal.ernet.in) It is time for the Indian S&T community cutting across institutional boundaries to make full use of this emerging opportunity.

V. S. RAMAMURTHY

National Institute of Advanced Studies,
Indian Institute of Science Campus,
Bangalore 560 012, India
e-mail: vsramamurthy@nias.iisc.ernet.in

Ph D production

The editorial 'Ph Ds: uncomfortable questions'[1] brings out a number of points related to increasing the number of Ph Ds in science and engineering in India. Today, the talk is only about increasing the number and not improving the quality of doctorates we produce. With this clamour, universities have increased enrollment irrespective of whether they have good mentors and facilities. Added to this, the national institutes which were primarily meant to do research have also joined this craze for Ph D production.

As pointed out in the editorial, a doctoral programme is one of internship under a mentor. The internship should include a period of training consisting of advanced courses, seminars, regular interaction with the mentor as well as with others in similar lines of research, an internal assessment and finally a thesis and examination. This is hardly practised, except in the agricultural universities and a few other institutions. In traditional universities, once the student is accepted as a doctoral candidate, he ploughs his own furrow and once he completes his residency requirement (apparently, the residency requirement was introduced to ensure that the student and the mentor are in close contact with each other for a certain period of time). He writes an abstract followed by a thesis which is then sent to the examiners, including a foreign one. There is no course work nor regular seminars and evaluation. The external examiners generally happen to be those who are known to the advisor and hence, things move smoothly. While few students do good research based on their own innovative ideas, others do imitative research and some even try to plagiarize, with or without the knowledge of the mentor. Obviously, most Ph Ds who come out of such mills are unemployable. While some find greener pastures abroad as technicians, others change their lines to make a living.

In some universities, a mentor has one or more dozens of students under him to churn out research and publish papers. Whether a mentor has the ability and facilities to guide such a large number on diverse topics is a matter that needs no discussion.

Now with the CSIR laboratories being encouraged to produce Ph Ds, the number of Ph Ds produced is bound to increase substantially. These laboratories are no doubt well equipped to carry out good research, but most of the mentors in the national laboratories will only use the students to do their work and publish papers so that their progress is not hindered.

The desire to increase the number will only lead to producing more Ph Ds who are mostly incompetent. To assume that India can produce a few Nobel laureates by increasing the number of Ph Ds produced in these 'production mills' is a false dream. That can only happen, if the controlling agencies first improve the quality of mentors and then develop uniform guidelines for the internship. Just giving a few crores of rupees to some institutions, recognizing all scientists as mentors and allowing them to produce Ph Ds will only lead to further deterioration of the existing system.

1. Balaram, P., *Curr. Sci.*, 2011, **100**, 145–146.

P. TAURO

Mangalore Biotech Laboratory,
Embassy Plaza, III Floor,
Mangalore 575 005, India
e-mail: ptauro@rediffmail.com

Good GM crops would flourish in India

The right kind of GM technology would flourish in India, in contrast to the concerns expressed in a recent article in *Current Science*[1]. India has already welcomed GM products in medicine and we have a large number of GM drugs (such as urokinase, erythropoietin and vaccines) currently available. The success of medical biotechnology is due to the fact that it is containable. In agriculture, GM crops relevant to our country like those with drought-, salt-resistant and nutritional quality genes shall be welcomed. The inappropriate GM crops include unrecallable and uncontrollable ones like those with *Bt* and herbicide genes. The inappropriateness of this category of GM crops under Indian farming conditions and the irrelevance of buffer zones between them and non-GM crops have been discussed earlier[2–4]. In this context, the Golden rice is likely to be welcomed, whereas *Bt* rice would be rejected by the public. *Bt* rice could be dumped like pesticides and herbicides banned in the countries of their origin. Unfortunately, the end-users of GM technology were apparently frightened by *Bt* brinjal which went first for approval instead of a beneficial GM crop like the Golden rice. Now we have to work harder to convince the end-users. It is well known that in a market-driven economy, any product unwanted by the consumers would go off the shelves towards burial like the flavour saver tomato[5].

The labelling of GM crops is already debated by the public as reflected in an editorial cited elsewhere[2]. However, implementation of GM labelling would be impracticable under Indian marketing conditions, unless new genes for colour or pattern are introduced into the appropriate GM crops. The Golden rice is an unique example of built-in GM labelling and thus it can be easily distinguished from non-GM crops.

A shift in mindset of both the activists and enthusiastic scientists of GM technology is the need of the hour for successful introduction of GM crops in India. It makes no difference for the activists whether 'cry' or 'smile' genes are incorporated in the GM crops. As a matter of fact, the *Cry* gene has made the activists cry more. Their concern appears to be safety and environmental aspects, in addition to seed security. To address the latter, one way is to develop our own GM seeds in the public sector and leave them in the public domain (without patenting), like what our ancestors did for traditional medicine. This way, the farmers would be benefited and relieved from the trap of multinational companies who will charge exhorbitantly after making the farmers dependent on them. Also, it is necessary to put forth the benefits and risks of GM crops in a simple manner. GM crop activists and enthusiasists seem to highlight the aspects that suit them; the former concentrating on the drawbacks and the latter on the benefits. For example, the enthusiastic scientists often quote countries like USA which have permitted GM crops liberally and conveniently forget countries like Europe, Ireland and Japan which restrict GM crops. History tells that the US used pesticides and herbicides indiscriminately and decades later realized that the residues of these went through water and food, and caused several genetic disorders, including cancer. Recent history shows that India is better off in its economy by not following the US. In conclusion, scientists have greater responsibilities and it is not surprising that they take well-documented environmental impacts of GM crops of the *Bt* category seriously[4–6].

1. Padmanaban, G., *Curr. Sci.*, 2011, **100**, 157–158.
2. Shanmugam, G., *Curr. Sci.*, 2011, **100**, 147.
3. Chokshi, A. H., *Curr. Sci.*, 2010, **98**, 734.
4. Banarji, D., *Curr. Sci.*, 2010, **99**, 1319–1320.
5. Yadugiri, V. T., *Curr. Sci.*, 2010, **98**, 1273–1278.
6. Kesavan, P. C. and Malarvannan, S., *Curr. Sci.*, 2010, **99**, 908–914.

G. SHANMUGAM

Oncophyta Labs,
2/130, Palkalai Nagar East,
Madurai 625 021, India
e-mail: shan1938@yahoo.com