

Interview with Prof. P. Balaram

CHEMCOS Team (CT): What are the immediate goals and challenges in front of the Indian Institute of Science?

P. Balaram (PB): I have been answering this question all year. The targets for an old institution are that it should do very much better than what it has done in the past 100 years and I think institutions like the IISc, which is primarily a post-graduate research institution, are facing many challenges which did not exist 30-40 years ago. Global competition is very intense and competition within India is also growing. It is very hard for an institution to maintain its position in research unless one really tries hard. Old institutions are also not as flexible as new ones because they have a long history to contend with. IISc has been particularly fortunate in that it has been very flexible in starting new areas. Even this year we have started two new areas – a Centre for Neuroscience which will begin from the 1st May and a Centre for Earth Sciences. Most of these areas are extremely interdisciplinary in nature, and that is something that today's students will have to contend with. It's not like the time when I studied, where subjects were watertight compartments. In Bangalore, science and engineering are more closely linked today than they were 10 years ago. So we have new programs in nanoscience engineering, engineering interfaces with biology that are coming up very quickly. I really think



PERSONALITIES

Prof. P. Balaram

In this edition of Personalities, we speak to Prof. P. Balaram, Professor in Molecular Biophysics Unit and Director Of The Indian Institute Of Science, Bangalore. Prof. Balaram's research interests include Peptide Design and Conformational Analysis, Peptide Natural Products, Mass Spectroscopy of Proteins and Peptides, and Computational Analysis on Protein Structures etc. His 402 Publications Include 4 book Chapters. In conversation with the CHEMCOS Team, Prof. Balaram shares his experiences and the current trends in science with us.

that it is in these interdisciplinary areas that we look forward to.

CT: IISc offers a number of programs that lead to PhD and M Tech degrees. Is there a reason why the Institute has not started undergraduate programs?

PB: Actually, right now we are in the midst of a discussion on whether we should start an undergraduate program. The areas in which people thought of these first were only in science, but slowly even the engineering faculty has begun asking for a similar program. There are already so many undergraduate programs in science and engineering in many institutions, so if we do start one, it will have to be different in some ways from the others. Also, in institutions that have had only post graduate programs and that have grown over a long period of time, there is always a resistance to introducing undergraduates in their midst. So, we do have divided opinion and there is lot of faculty debate going on. I myself am in favor of an undergraduate program. But, we are a very democratic institution, so there is a great deal of debate and I think we shall arrive at a consensus soon.

CT: You have had a firsthand experience of the IIT system, having obtained your Masters from IIT Kanpur. What is your take on the decision of the Government of India to set up many more IITs and IISERs. Do you think that there is a risk of diluting the quality of teaching and research?

PB: (Smiles) you know, sometimes I don't know what to say on this issue. There is a definite need for expansion. I was a member of Sam Pitroda's Knowledge Commission for the last three years. One of the things that Pitroda did was to announce that India needs 1500 universities! I asked

him if this was achievable. His answer was that if we use the number 1500, maybe 50 will get made. So you need to set a large target.

I think India definitely needs many more institutions. We need to worry about quality, but if you worry too much about quality, then we reach a situation where there are so many people wanting to get into the IITs but we have very few of them. So, other institutions are springing up to fill in the gap. Whether the new IITs will have the same quality as the old ones is a very difficult question to answer. This will not happen unless those of you who are doing post graduate and PhD degrees go back to teaching in India. A very large number of our doctoral students go away abroad. The exceptions are the ones you see on the faculty. But I also think that in the past there were not enough opportunities and now these are growing. So, I don't think we should worry too much about quality at the moment. Quality will take care of itself as we go along.

CT: In a recent article in the Hindu, Ramachandra Guha notes, 'Most other institutes enjoy a brief period of glory. This is associated with a particularly inspirational or charismatic leader.' How has IISc managed to maintain a high standard of scientific achievement for a hundred years?

PB: Well, this is something that has always puzzled me. IISc has all the troubles that other institutes have, sometimes more than other

institutions, but at the same time IISc has maintained a certain level of academic ambience that is unique in India. I think this is because, unlike other national labs, we are not a director-centric institution. The faculty is independent and everybody is judged only by the research that they do. There would always be some who do very good research and others who would not do good research, or worse, would not do anything at all; but that kind of distribution is there in all the institutions. At any given time, I think that there are enough good people coming into the institute to replace the good ones who are retiring. I think this flux is crucial to the success of IISc.

The Institute also has a very unique system of canteens; they are an extraordinary strength of the place. There is no other place where you would find so many faculty and students gathered on Saturdays and Sundays in the evenings and nights. That, I think, is quite remarkable. Whenever one of our canteens is closed, there is great pressure on me to revive it quickly, because it is seen as an essential part of the research infrastructure.

CT: What are your views on the role of chemists in natural sciences?

PB: This is an area which interests me personally. Those of you who are studying chemistry should look back on the history of chemistry in India. You will find that in the 1950s and 60s;

India was strongest in natural products chemistry. That was when T R Seshadri had his big school in Delhi University. Govindachari had set up the CEBA centre. Even in places like Presidency College in Madras, excellent work was being done on natural products. That was a very interesting time, all the chemists worked on natural products. They isolated materials, purified them and determined their structures... and the matter ended there. Today, however, natural products research is driven by biology. One is looking for substances that have medicinal activity of some kind. There is a whole battery of biological assays available.

On the other side, no area of chemistry has changed as much as analysis. The driving force for analysis has again come from biology and medicine, because that's where the most complex chemistry is displayed. Unfortunately, what has happened in India is, when all these techniques like HPLC, NMR, XRD, Mass Spec., etc have become available, we don't have natural products chemists in large numbers any more. Synthetic chemistry has displaced natural products chemistry in most institutions. But there still is a huge interest in microbial and marine natural products. So, the fusion of microbiology and chemistry is going to be the area where you will find extraordinary things. If, for example, you look at this year's Nobel Prize for the Green Fluorescent Protein, it's a search for molecules. There is no better place to search for molecules

than the sea, or microbes that one cannot see through naked eye. I think it is somewhat limiting to think of plants alone, as sources of natural products.

CT: You carried out your post doctoral research with Robert B. Woodward. How was the experience?

PB: I wasn't with him for a very long time, just over a year. I went there because he was very famous and everybody wanted to go there. An extraordinary individual, I don't think there were many like him. He was a spectacular speaker, and he did nothing other than read. He used to start working late in the day and proceed through the night. He read all the time and he had a prodigious memory, so he remembered all that he read. And anyone who remembers what he reads has a great advantage over everyone else. I think he influenced organic chemistry in a way that was remarkable for his time.

CT: You have favored open access of all work that is carried out in IISc. Do you feel that this policy would work in today's competitive world?

PB: When I say 'open access', I mean open access to all published work. If your work is already published in a journal, then there is nothing to hide. The publisher may not make the work accessible to other people. On the other hand, putting up PhD theses that contain unpublished work may be

a little bit debatable. But, what I have advocated applies only to published work.

CT: We are slightly unsure of what research area to pursue for our PhD. How did you make this choice during your days as a student?

PB: You don't make any conscious decisions most of the time. You just drift along and something happens. You know, the problem of choice comes when you are admitted into many places. If you are admitted to only one place, there is nothing to choose from, so you are happy. I think today you know much more than what we knew at a comparable stage. We were blissfully unaware of most things and we were happy with anything that came along. I think the driving force was invariably to get a job and I think the research area took a backseat. I won't be very much perturbed if you don't know what to do. In fact, I would be more worried if you knew very clearly what to do.

CT: All this talk of recession hitting the scientific industry has meant that Indian graduate students have found it increasingly difficult to find post doctoral positions in universities abroad. Is it time that Indian institutions start formal post doctoral fellowship programs?

PB: Tremendous efforts are being made to increase the number of post doctoral fellowships in the Institute. The government has done a great deal in this regard. There is a new

fellowship which is operated by the UGC. It is run by a single faculty member at the University of Pune – theoretical chemist Shridhar Gadre. He runs this program online, on behalf of the UGC. Applications for post doctoral fellowships are responded to in six weeks. And a letter from the UGC follows immediately because they act on his recommendation. Recommendation letters are accepted and decisions are conveyed online. Most students who get these fellowships come from various Universities in India, but I think they are available for just about anyone. At the Institute, we have many post doctoral fellowships, but we don't get many people from overseas. It is mostly people who have studied and worked in India.