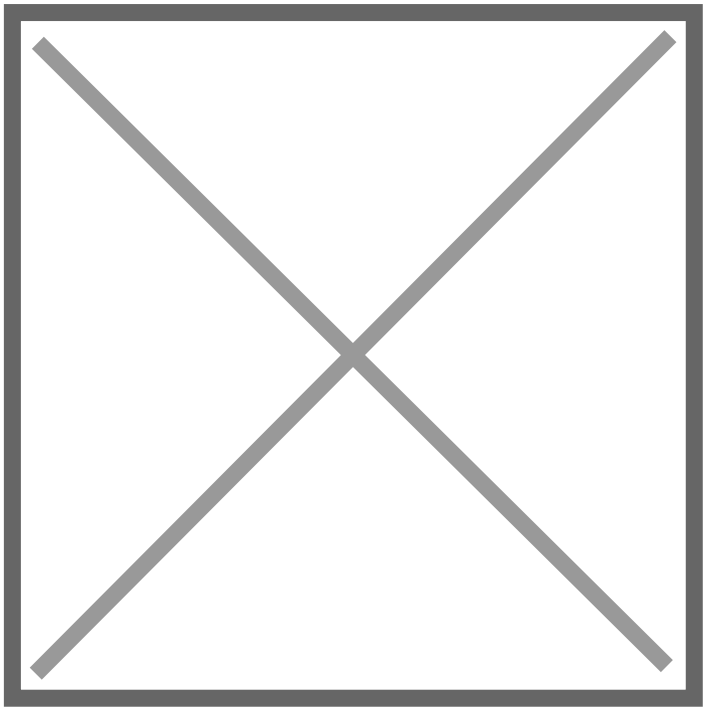
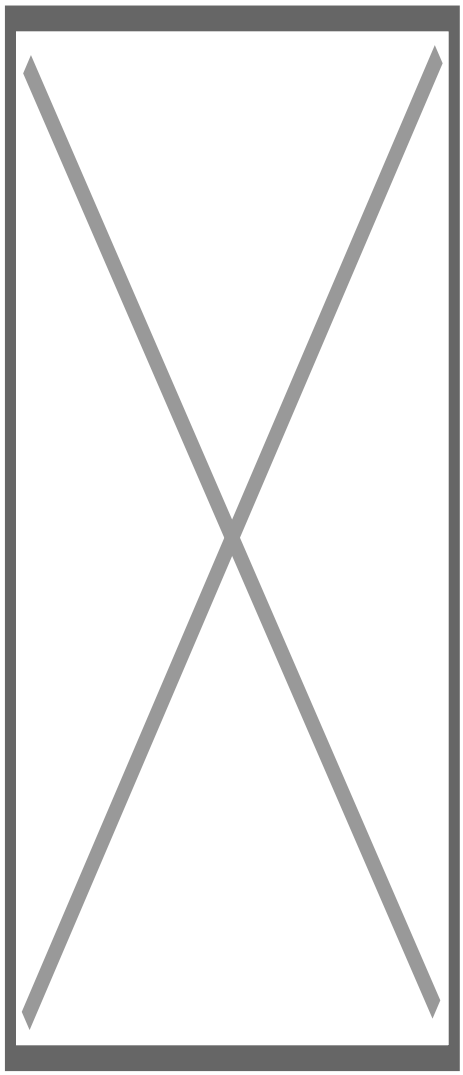
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Leading Indian science onto the world map

05 December 2008 | News



Leading Indian science onto the world map



He is passionate about Indian science and its future and is poised to take India onto the global map with his efforts such as the Open Source Drug Discovery project and the Indian Genome Variation Consortium.

"I do not know what I may appear to the world; but to myself I seem to have been only like a boy playing on the seashore, and diverting myself in now and then finding of a smoother pebble or a prettier shell than ordinary, whilst the great ocean of truth lay all undiscovered before me."

-Sir Isaac Newton (1642-1727), English physicist

I was reminded of the lines above looking at the unbundled enthusiasm and almost infectious child like curiosity of my interviewee, Prof. Samir Brahmachari, the Director General of CSIR (Council of Scientific and Industrial Research). Greatly influenced by, well another scientist, noted American Physicist, Richard Feynman, and his book titled "What do you care what other people think", he said the book helped him see what it takes to be a scientist. With such a bent of mind towards science, I should have expected the probable, when I asked him what would he have been had he not been a scientist. Well, he would have been one either ways.

As a student, he always found science fascinating and was academically inclined at school. He confessed, " I was a voracious reader and read too many books. When people read notes, I preferred to read books, so much so that people read a chapter on a subject and I would go ahead and read a book on that." No wonder then that he got the NSTS scholarship in school at the age of 16, that further propelled him to take up Chemistry (Hons) from St. Xavier's College, University of Calcutta, despite the fact that he was good at cracking numbers. What was mathematics' loss was biology's gain, though he might not agree with the statement, the proponent of integrative biology that he is. He believes that it's a synergy of the sciences that can bring about breakthrough research in the dynamic environment that exists today. Prof. Brahmachari went on to do an MSc in Physical Chemistry from Calcuttta University, but it was not where he intended to pursue further research or rather fate had different things in mind.

IIScÃ¢â?¬â??"A place where I grew up"
Getting admission into the Indian Institute of Science those days and even today is something that every scientist worth his salt aspires for, and Prof. Brahmachari was not an exception. "I was keen to get into the Indian Institute of Science, Bangalore. The lush sprawling campus of the institute was like a breath of fresh air from the crowded streets of Kolkatta." But he had a lurking fear-the fact that he had a shortfall of 0.3 percent from first class to do a PhD at IISc. "I recall August 7,1974, when I was wondering whether or not I could pursue my research, standing there all day for the interview. I gave the interview, after which not only did the registrars agree to my admission but so did CSIR, so I am still clueless as to who was this unknown officer who made a dream of mine come true by letting me be a part of a prestigious institute like Indian Institute of Science, from where I have learned a lot. I realize today, sitting here as the director general of CSIR, how tough it would have been for that officer at CSIR who had the courage to overlook the 0.3 percent shortfall."

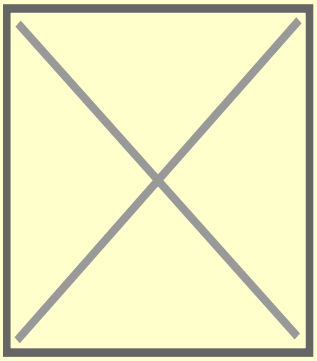
Life's lessons

"I had exceptional teachers. What I learnt at Indian Institute of Science was that, knowledge is more important than learning just for marks and that the objective of research is not to do studies, but to solve a puzzle or a problem. I also realized that great institutions are great because they have an inherent ability not to lose sight of their larger objectives and also the flexibility to overcome bureaucracy. Then I was extraordinarily lucky that I was with Prof. GN Ramachandran and other galaxy of scientists who actually demonstrated that sitting in this country one can have their own niche and can be globally recognized. I imbibed the confidence that an Indian scientist doing research in India can do it globally. I feel fortunate to have these teachers who guided my path and I owe my success to these great mentors who shaped my potential."

Perhaps this was the best shortfall that anyone could have ever had to raise to the highest rank of a scientific office in the country. Prof. Brahmachari went on to do his PhD in Molecular Biophysics from IISc. IISc as he said was populated with budding young talent, wonderful teachers and legendary figures, so much so that he recounts that one of his teachers Dr Balaram was only a few years older to them that time, a man with enchanting oratory skills as he puts it. IISc gave this tall, lanky, hesitant Bengali boy, the confidence to be in his skin and aspire for higher skies. It was a tremendous demand of professionalism from Dr G N Ramachandran (his assignments) and the rigor of it that instilled a scientific temper in him. Thus began an unending tryst to solve puzzles in science and celebrate science. "I never bothered what paper will I write or where, I just wanted to solve a problem."

A man of action
An avid reader of Rabindranth Tagore's poems, which he considers as a source of inspiration to him, Prof. Brahmachari has always been driven by action led research. Proof lies in the fact that he has over 134 publications in leading international journals and 10 patents and 14 software copyrights to his credit. He has guided 17 PhD scholars and over a hundred research students, postdoctoral fellows and project associates. He is also the elected fellow of all the three National academies of Sciences in India and the recipient of several National and International awards. After completing his PhD, and a short postdoctoral stint in France, he joined IISc's Molecular BioPhysics unit as a research associate in 1979. He underlines the role that his teachers have played in shaping who he is today. "I was very fortunate that I was given a place across the office of Dr G N Ramachandran, a legendary figure and I read all his books and papers. I had the privilege of being taught by people like Dr Ashima Chatterjee, Prof. Mihir Choudhary and Prof. Sadhan Basu in Kolkatta and I exchanged my notes with my friend in IIT Kanpur, where Prof. CNR Rao and Prof. D Balasubramaniam were teaching. I count myself to be fortunate to have got an opportunity to study under such extraordinary teachers."

He went on to become a Professor of Molecular Biophysics Unit and Genetic Engineering at IISc, a role that he fulfilled till 1997. During his tenure at IISc, he demonstrated the structural flexibility of DNA and the role of repetitive sequences in DNA transactions much before the repeats association with genetic markers. His work on the structural flexibility of telomeric repeat sequences is one of his well-cited contributions. Prof. Brahmachari then served as the director, IGIB, Delhi for the next 10 years (1997-2007). He was the first to establish a close clinical network to address genetics of complex disorders and demonstrated association of two genes with schizophrenia and bipolar disorder and identified several SNPs and other markers associated with various neurological disorders. "Its not worth doing science if you are not asking difficult questions, hence my selection of working on repetitive DNA was when no one believed that it would have any function. I think it is important in science to look for a niche which others haven't thought about," he commented.



"When Prof. Samir Brahmachari was given the position of director general (DG), CSIR (after a completely unwarranted delay in the process) my immediate reaction was `Samir will be ten times better as a DG in comparison to me! I have said this publicly again and again.

Samir combines a rare blend of brilliance, creativity and enterprise. When I was DG, CSIR, I witnessed each of these attributes time and again - and indeed, CSIR and I benefited from these. As the director of the Centre for Biochemical Technology (CBT), he transformed CBT to Institute of Genomics and Integrative Biology (IGIB), created The Centre for Genomic Application (TCGA) as a unique public private partnership, took CBT to new heights in term of world class science, forged powerful international partnerships and in general did CSIR proud."

-Dr R A Mashelkar, former DG, CSIR, and winner of BioSpectrum Life Time Achievement Award in 2006

Genomics: His Passion

"When others were learning to use what they knew, I was learning to differentiate what I knew," said Prof. Brahmachari. And this differentiation has certainly led him to be an authority in the area of functional genomics with special emphasis on molecular genetics of neurological and psychiatric disorders and functional genomics in silico. Prof. Brahmachari recognized very early the importance of genomics in the world and organized a genome analysis workshop with American molecular geneticist, Charles Cantor in 1987 at IISc, he recalled. He was one of the earliest members of the Human Genome Organization, which was formed in 1988. India was nowhere on the genomic map then. And today 20 years down the line, when he is at the helm of decision making at CSIR, he has left no stone unturned to place India on the world genomic map. 2008 saw, Human Genome Organization (HUGO) hold its 13th Human Genome Meeting in Hyderabad as it turned 20 years old, thus recognizing the importance of India and its scientific capabilities in genomics. The event saw a galaxy of scientists from India and abroad delivers lectures, workshops and symposia on various aspects of genomics.

Not only this, CSIR, also launched the Open Source Drug Discovery programme in global partnership to combat the scourge of infectious diseases that afflict the developing world. Tuberculosis (TB) will be the first disease target for the project that has been allotted a sum of 500 crore and aims to provide a platform for collaborative research thus targeting affordable health. And last but not the least, Prof. Brahmachari leads the Indian Genome Variation Consortium, which has developed a database of over 1,000 genes related to disease and drug response, exploring human genome variation in multi-ethnic, multi-lingual populations of India to develop a national resource: the genetic profile of the people of India.

"The objective was to create a basal data for disease profile and not to map genetic diversity. This is the first time anywhere in the world that a single country has been mapped to this extent," added Prof. Brahmachari. Put simply, it would help us know which populations stand the risk of a particular disease, thus help us not only predict the diseases as well as the effectiveness of drugs for these diseases thus making the management of that disease much easier. With such developments behind us, the future sure sounds exciting for Indian science.

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"21st century is the century of biology in an integrated fashion"

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-Prof. Samir K Brahmachari, Director General, CSIR

You are cited as a proponent of integrated biology. Your comments?

Today if one looks at integrated biology and genomics, these are all nothing but very large bandwidth subjects. They involve the understanding of biology, molecular biology, structural biology, genetics and cell biology. So, I believe that the 21st century is the century of biology in an integrated fashion. Today we are moving into synthetic biology, systems biology, where all disciplines of science get merged. Having a biased attitude towards a particular discipline of science is not what is needed today, but it is something that people develop over a period. I see myself as a free-floating individual who takes whatever is needed to solve a problem, be it blending of scientific disciplines. It is permitted as long as it helps us get answers to scientific problems.

How has the role of CSIR changed over the years?

CSIR is an organization that is 67 years old and I believe that it has played its role pretty well in all the years of its existence. People who have been here before me have taken it where it is today. CSIR today produces 4,000 papers and trains over 3,000 scientists including 400-500 PhDs. Today we have a portfolio of 3,000 patents, whose utilization is about 6.7 percent, which is comparable to what happens in other parts of the world. Patent realization per patent is very low, because we do a lot of non-exclusive licensing.

As the country was a closed economy during the initial years, CSIR's focus was to create industrial competitiveness and make the Indian industry self reliant by manufacturing tractors, agro-products, pesticides, baby food, generic drugs, structural engineering to build bridges, catalysts for petroleum refineries and chemical industries thus providing science and technology (S&T) support for our strategic sector. But now as we are increasingly a part of the globalized economy, CSIR's objective is to create new Intellectual Property Rights (IPR) and inventions. In the last 10 years, CSIR has done incredibly well in high science and intellectual property. Our aim is to take this forward to a new level and at the same time ensure science and technology intervention for the rural development.

What were the achievements of CSIR in the last one-year?

We had set ourselves a goal of launching a completely new initiative called Open Source Drug Discovery. We believe that the infectious diseases market is low; pharma companies don't invest in it. This is a paradigm shift on the part of the CSIR, where we have moved ahead with the project and have got tremendous response both nationally and internationally. We are focusing on affordable health and sustainable energy. In sustainable energy, we have tried to look at how we can use solar energy operated transport, which led to the launch of a rickshaw on the same principle called-Soleckshaw that was developed within the stipulated time target of nine months. The most satisfying project this year was the Indian genome project. The results that have come out of it have been promising and catapult India onto the global genomics map.

What is your vision for CSIR?

I want to utilize the machinery of CSIR, for creating a constructive change in science and technology of the nation, building next generation leaders and using S&T for the benefit of the rural poor and also get global respect for Indian science. I think today we need leaders in integrative science that involves the convergence of all disciplines and this is where CSIR has to lead the way. We want to spin off companies and commercialize our IP so that scientists can also be a part of the process. We are also looking at having a CSIR Advanced Institute of Science and Technology university (AIST), like a research university that can create new generation of interdisciplinary scientists and also give degrees in the line of Chinese Academy of sciences.

Shalini Gupta