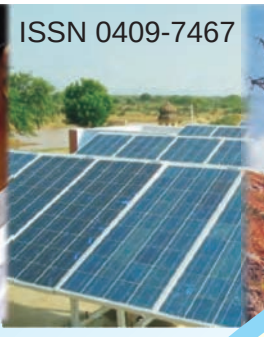
ISSN 0409-7467



OPEN SOURCE DRUG DISCOVERY FOUNDATION

CSIR NEWS

Progress, Promise and Prospects

"When it comes to health, we need to have a balanced view between health as a right and health as a business"

Prof. Samir K. Brahmachari
Chief Mentor OSDD,
Director General, CSIR

VOL 62 NOs 19 & 20 OCTOBER 2012

C O N T E N T S

website: http://www.csir.res.in

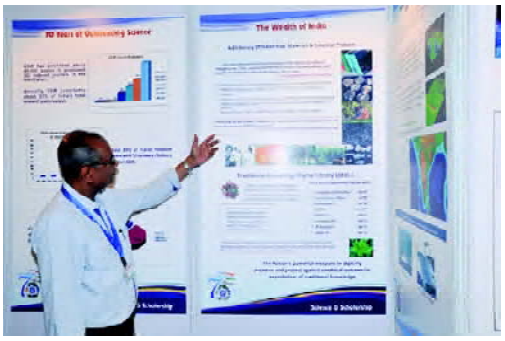
70TH CSIR FOUNDATION DAY CELEBRATIONS

70th CSIR Foundation Day Celebrations, 26 September 2012

Seen on the dais during the CSIR Shanti Swarup Bhatnagar Prize Distribution Function at Vigyan Bhawan, New Delhi (*from right*) are: Prof. Samir. K. Brahmachari, Director General, CSIR; the Hon'ble Prime Minister of India and President CSIR, Dr Manmohan Singh and Shri Vayalar Ravi Hon'ble Minister for Science & Technology and Earth Sciences and Vice President, CSIR

Founded in 1942, the Council of Scientific and Industrial Research (CSIR) completed seventy years of dedicated service to the nation on 26 September 2012. The occasion was celebrated by the entire CSIR family, comprising of 37 institutes spread all over the country, with great enthusiasm. It was an occasion to celebrate the accomplishments of the year that has gone by and plan for the future to serve the nation with still greater dedication. It was also an occasion to accord recognition to excellence in scientific research through the presentation of various awards. The main function of the CSIR Foundation Day this year was held at Vigyan Bhawan, New Delhi. The function, attended by the distinguished gathering of scientists and technologists, was presided over by Minister, Science & Technology and Earth Sciences and Vice President, CSIR, who gave away the various awards.

The main function of the CSIR Foundation Day this year was held at Vigyan Bhawan, New Delhi. The function was attended by the distinguished gathering of scientists and technologists and crowned by the presence of the Honourable Prime Minister Dr. Manmohan Singh, along with Shri Vayalar Ravi, Minister, Science & Technology and Earth Sciences and Vice President, CSIR. An exhibition was held on CSIR's *70 best papers, 70 best patents, 70 best wealth creating technologies, 70 best societal interventions and 70 scientific leaders*. This exhibition was well attended by the dignitaries and other guests.



Vignettes of the exhibition

Welcome Address by Director General, CSIR Prof. Samir. K. Brahmachari

Our beloved Hon'ble Prime Minister and President, CSIR Society, Dr. Manmohan Singh, our own Minister of Science and Technology and Vice President CSIR, Shri Vayalar Ravi, Foundation Day Speaker, respected Prof. C.N.R. Rao, the beacon of Indian science, Chancellor of AcSIR, Dr. R.A. Mashelkar, former DGs' of CSIR, distinguished Champions of CSIR, guests from academia, industries and institutions, Awardees and their proud families, members of electronic and print media, members of my CSIR family, ladies and gentlemen, those who are present in Vigyan Bhawan Hall and those who are watching this programme through the webcast.

It is indeed a rare honour and privilege for me to extend a very warm welcome on behalf of the CSIR family. I thank all of you for joining us on this happy occasion.

CSIR has completed 70 years of the service to the nation. This 70th Foundation Day is thus of added significance to all of us.

I am of the belief that to craft a masterpiece there has to be a dream, courage to stand by it, passion and determination to realize it. A group of Indian scientists dared to have this dream of creating CSIR as R&D hub of India. Hence, we were born in 1942.

The visionaries and foot soldiers of CSIR worked tirelessly to create institutions founded on science and technology which were ahead of its time in birth, withstood the vagaries of time through the seven decades and continue to flourish and be relevant even today.

Hon'ble Prime Minister, Sir, your presence today in this function to honour the outstanding young scientists of this country testifies to your commitment to science and technology and the priority you attach to scientific excellence, be it for breaking the frontiers of science or its application to nation building. It is extremely gratifying to note that the legacy of giving away the SSB award by the Prime Minister set by Pandit Nehru and is being continued by you even today. Sir, we thank you for your gracious presence.

DG CSIR, Prof. Samir. K. Brahmachari delivering the Welcome Address

We are happy to welcome our S&T Minister and VP, CSIR Shri Valayar Ravi, who has given us immense support and confidence at the time when we needed it most after the sudden demise of Shri Vilasrao Deshmukhji, who brilliantly steered the AcSIR Bill in the Parliament. For this, he will be fondly remembered, not only today, but for generations to come.

CSIR 'Foundation Day' is an occasion which many young and not so young scientists across India, keenly wait for. They look forward to the most coveted Shanti Swarup Bhatnagar Prize, Young Scientists awards, CSIR Diamond Jubilee Technology Awards and CSIR awards for S&T Innovations for Rural Development. It is thus also the day to celebrate the achievements of Scientists and Technologists. I welcome all of them and congratulate them on their achievements.

Today being the day to mark a long journey of seven decades, it is the day to thank our past leaders and distinguished champions, visionaries and scientific leaders. CSIR recognizes that an infusion of young and bright scientists is imperative if India is to forge ahead in the global science and technology arena. And so, innovating from the conventional education system, Sir on your advice, CSIR has now leveraged the infrastructure and scientific strengths of CSIR, to form a self-sustaining organization – the "Academy of Scientific and Innovative Research (AcSIR)". Today afternoon, 71 Engineers will receive their M.Tech degree under AcSIR banner, where 68 of them have received distinction. They all want to continue research in CSIR for their Ph.D (like the 52 M.Tech. of the previous batch) instead of leaving for abroad; a dream come true.

Innovation is the ability to see change as an opportunity. CSIR changed with changing opportunities and recent years created opportunities to change. CSIR is poised to lead in this Indian decade of innovation benchmarking itself globally. CSIR has recently fostered a major strategic partnership with the setting up Cluster Innovation Centres to promote innovation at the grass root level particularly in Micro, Small & Medium

70TH CSIR FOUNDATION DAY CELEBRATIONS

Felicitation of Former Director Generals of CSIR and Eminent Scientists

One of the highlights of the 70th Foundation Day Celebrations at Vigyan Bhawan on 26 September 2012 was the felicitation of former Director Generals of CSIR and other eminent Scientists.

CSIR has always had far-seeing and gifted leaders at its helm who have steered it not only through the turbulent times immediately after Independence of India, but also through changing times, and in the face of challenges that appeared almost insurmountable.

The 70th Foundation Day of CSIR was thus the most appropriate time to acknowledge the huge debt of gratitude CSIR owes to these leaders and to publicly acknowledge the appreciation and esteem in which they are held.

Former Director Generals of CSIR

1. Dr. S.S. Bhatnagar (Director) (1942 - 1954)
2. Prof. M.S. Thacker (3.8.1955 - 1.8.1962)
3. Dr. S. Husain Zaheer (1.9.1962 - 21.8.1966)
4. Prof. S.R. Mehra (Officiated during deputation abroad of DG.)
5. Dr. Atma Ram (22.8.1966 - 21.8.1971)
6. Dr. Y. Nayudamma (27.8.1971 - 27.7.1977)
7. Dr. A. Ramachandran (27.7.1977 - 9.10.1978)
8. Prof. M.G.K. Menon (9.10.1978 - 4.5.1981)
9. Dr. G.S. Sidhu (5.5.1981 - 4.5.1984)
10. Prof. P .K. Jena (5.5.1984 - 21.6.1984) and (28.1.1986-25.2.1986)
11. Dr. S. Vardarajan (22.6.1984 - 27.1.1986)
12. G. Thyagarajan (Officiated for 7 days in 1986)
13. Dr. A.P. Mitra (26.2.1986 - 16.4.1991)
14. Prof. S.K. Joshi (18.4.1991 - 30.6.1995)
15. Dr. R.A. Mashelkar (1.7.1995 - 31.12.2006)
16. Dr. Maharaj Kishan Bhan, (Additional Charge) (05.01.2007 - 06.03.2007)
17. Dr. .T.Ramasami (Additional Charge) (07.03.2007-11.11.2007)

www.csir.res.in/external/heads/aboutcsir/dglist/dglist1.html

Champions of CSIR

To the sound of thunderous applause from the audience Prof. M.G.K. Menon, Dr. S. Vardarajan and Dr. R.A. Mashelkar were honoured with shawls and mementoes by the Hon'ble Minister Shri Vayalar Ravi, in the presence of the current Director General Prof. S.K. Brahmachari.

It was a rare, emotional and evocative moment in time, when the present embraced the past to be frozen as golden memory in the minds of all who were present on the occasion. Among the distinguished Scientists to be honoured were Prof. R.Kumar, Prof. M. M. Sharma (in absentia), Dr. P. Pama Rao (in absentia), Dr. V. S. Ramamurthy, Prof. N.Vijayan, Prof. Asis Datta and Dr. N. K. Ganguly.

Each 'Champion of CSIR' was presented with a shawl and a citation printed on especial parchment-like leather created by CSIR-Central Leather Research Institute (CSIR-CLRI), Chennai, as a token of CSIR's deep appreciation for their sustained contribution to CSIR.

Enterprises (MSMEs) sector. Through this initiative, we are providing innovative S&T solutions to small industrial clusters such as the Krishnagiri cluster in Tamil Nadu, which is the largest producer of mangoes to brass cluster at Muradabad, touching the life of millions of people.

CSIR is committed to create hamlets of technology-enabled villages, called CSIR TECHVILs in the 12th Plan, which will typically have 40,000 inhabitants where more than 50% live below the poverty line. We have identified 24 such locations across the country. TECHVIL will go much beyond mere demonstration of technology and gauge the needs of the villagers and map these needs against the technologies already in CSIR's portfolio or will source all sectors of society such as NGOs, universities and entrepreneurs to suggest solutions.

Fifteen years ago, Sir, I moved from Bangalore to Delhi as the Director of the Centre for Biochemical Technology, CSIR with a dream to place India on the genomics map of the world. The same small Centre today, is the Institute of Genomics in India

and known worldwide. Hon'ble Prime Minister, Sir, we express our gratitude for inaugurating a futuristic International Campus for CSIR-IGIB recently which was a dream come true.

Sir, this is a sign that CSIR is changing…transforming itself to embrace all sections of the society, while at the same time exploring the unexplored frontiers of science. While on the one hand, with the setting up of AcSIR we are creating the next generation human resource that would be truly interdisciplinary, on the other hand, as an organization, CSIR is moving from creating to collaborating, from isolated laboratories to innovation complexes, from creating wealth for a few large industries to creating wealth for many. We have created a happy CSIR…an organization that is young at heart even after 70 years…an organization that strives to work for the happiness of the bottom of the pyramid.

We will be showcasing in an exhibition at Vigyan Bhawan (and subsequently this will move) CSIR's best 70 papers; 70 best patents; 70 best technologies that created wealth; 70 best societal interventions and 70 scientific leaders who made a difference. We herald the awakening of a new CSIR equipped with sensitivity and skills, the tools and the drive to succeed, the vision and the mission to take the country to great heights.

That's the new CSIR for a new India I present to you, President Sir, on this your eightieth birthday.

Welcome again and thank you all.

Address by the Hon'ble Prime Minister Dr Manmohan Singh

I am delighted to join you on the 70th Foundation Day of the Council of Scientific and Industrial Research. Dr. Brahmachari just reminded me of a personal attribute that I happen to share with the Council - we were both born on 26th September. I can think of no better company than this illustrious gathering of men and women of science, with whom to have my first public engagement on this very special day.

With your indulgence, I could stretch my association with the Council fraternity even farther. Dr. Shanti Swarup Bhatnagar, the man whose memory we cherish today, came to this city from Lahore with a dream to build the chain of CSIR's national Laboratories. I followed him with a more modest dream of my own, to make a fresh beginning in free India, though in the tragedy and chaos of Partition that forced this choice upon my family, to dream was indeed to dare!

Partition was, of course, in many ways a national tragedy far more poignant than our personal losses. In those days of horror, it was easy to write off India, with its deep-rooted poverty, widespread ignorance, frequent epidemics and an economy that had remained stagnant in the five preceding decades.

But we were fortunate to have in Jawaharlal Nehru a leader who saw science and technology as an elixir for India's development, and in Dr. Bhatnagar a scientist of extraordinary organizational capacity and caliber to implement this vision of Jawaharlal Nehru.

Recognizing the potential of scientific research, Jawaharlal Nehru placed the Council under his personal charge, thereby beginning a tradition that successive Prime

The Hon'ble Prime Minister of India and President CSIR, Dr Manmohan Singh addressing the gathering

Ministers have continued. Science has always commanded the utmost priority of our policymakers. I consider it a privilege to preside over this hallowed organization in the seventh decade of its outstanding service to our nation.

I glad that the Council has proven its professional worth in every phase of India's growth, in line with prevailing national policies and national priorities. In the early days of Independence, it was a champion of import substitution, rebuilding our industrial base in the face of shortages and resource crunch. When India became a victim of technology denial, CSIR laboratories created advanced products and technologies, such as India's first super computer, radiation shielding glasses and components for aerospace and satellites, emerging as a credible partner for our strategic sector. During this time, the Council also catapulted India as the top generic drug producer.

After India embraced globalization, introduced economic reforms and joined the WTO, the CSIR quickly emerged as the flag bearer of the Intellectual Property

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Presentation of a memento to the Hon'ble Prime Minister Dr. Manmohan Singh, by DG-CSIR, Prof. Samir K. Brahmachari

movement in our country and became the single largest holder of US and European patents. The Council, in recent years, has also become a world leader in specific domains of biotechnology and recombinant DNA products.

I would like to particularly compliment the Council on its unique attempt to make healthcare affordable by exploiting the power of open source drug discovery. As a concept, this is a global first and the world has turned from skepticism to partnership. I am happy to learn that the Council has opened its patent chest for accelerated drug discovery for hitherto neglected diseases like tuberculosis and malaria.

While we aim for global excellence and competitive advantage for our country in science, the Council must not lose sight of the mandate of science in our country that Jawaharlal Nehru spoke about while addressing the Indian Science Congress in 1947.

He said, "Science must think in terms of the 400 million persons in India". I am glad that the Council has remained firmly rooted in the social milieu of our country while selecting and implementing projects. I commend the recent CSIR 800 programme which aims at affordable scientific interventions to improve the quality of life of the people at the base of the economic pyramid. The Council's thrust on research and innovation in renewable energy, water, environment and waste management also reflect its awareness of contemporary challenges that our country faces.

In recent times, conventional scientific disciplines and approaches are proving unequal to dealing with complex developmental challenges. New disciplines are emerging at the interface of traditional boundaries. The newly created Academy of Scientific and Innovative Research promises to train our young scientists and engineers in trans-disciplinary skills by tapping into the entire resources and infrastructure of the CSIR fraternity. This is a good initiative and I look forward to early results.

Last week, while inaugurating a new campus of the Council's Institute of Genomics and Integrative Biology, I was impressed by the power and potential of public-private partnership in scientific research. I am told that across CSIR laboratories, new ecosystems like Innovation Complexes are being created to foster innovation through partnership with industry, academia and other R&D institutions. Mechanisms have been put in place to identify needs of India's industries and to tap bright ideas of the CSIR's young talent. The Council has announced policies to encourage scientists to create spin offs and new ventures. It is also partnering with the National Innovation Council to provide focused technology assistance to small and medium enterprises.

However, with all our achievements, we cannot rest on our laurels. As a nation, we have not succeeded in mobilizing enough private investment into science to raise our investment in scientific research to 2% of GDP. We need to recognize that excellence has not percolated across all our research and academic institutions. We have not been able to make an impact on a world scale commensurate with our large scientific manpower pool. CSIR, therefore, will need to devote itself to these national challenges in the years to come. It will have to take up national leadership in science, engineering and technology.

In this journey, young people like many of those gathered here are our nation's hope and future. I congratulate the awardees for their talent, for their devotion to duty and for their aspirations for Indian science. Young scientists must dream big and refuse to despair. I would like to remind them of the exemplary determination and selfless patriotism of Dr. Shanti Swarup Bhatnagar that led to the establishment of one of the finest scientific institutions of our great country – the Council for Scientific and Industrial Research.

With these words, I wish you all success in your endeavours.

Jai Hind.

A view of the audience

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Speech of Hon'ble Shri Vayalar Ravi, Minister of Science & Technology and Earth Sciences and Vice President, CSIR

Hon'ble Prime Minister, Dr. Manmohan Singh, DG, CSIR Prof. S.K. Brahmachari, distinguished scientists, awardees, ladies and gentlemen.

At the outset, I congratulate CSIR Family on this eventful day, the 70th anniversary of founding CSIR. My congratulations to all those who have been associated with this great organisation over the years, and contributed to its success. CSIR is an organization known for several accolades.

I wish Hon'ble Prime Minister and President, CSIR, Dr. Manmohan Singhji a very happy birthday –wish you many many happy returns of the day.

I congratulate all the awardees and their families. They have done us proud. I am sure the awards they have received, would motivate them, to enhance their R&D efforts, so as to create newer and newer innovations, benefiting our society.

The distinguished journey of CSIR - how its constituent laboratories were established, how CSIR repositioned itself time to time to deliver high quality innovation, benefitting the society, is worth learning.

CSIR performed as per its assigned mandate, promoted scientific and industrial research through its laboratories, provided fellowships, transferred technologies and disseminated research and industrial information.

Prof. Samir K. Brahmachari, DG-CSIR, presenting a memento and shawl to the Hon'ble Minister Shri Vayalar Ravi

Dr. Bhatnagar at the helm of CSIR had glimpsed what he had once described as, "...the dim lights of a new dawn." His dynamic leadership gave the new nation its first eleven laboratories in the years spanning 1950-1953.

CSIR did not look back. It was an uphill climb, struggling with a lack of resources. Yet…from chemicals to glass and ceramics, from physics to metallurgy, from tractors and food products to fuel research…CSIR was everywhere; meeting the needs of the people of a new nation.

Most importantly it also began to build trained human resource, which in the final analyses, is the deciding factor transcending every other resource. Today too, the schemes of CSIR cover a wide spectrum, ranging from 15 years to 65 years of age. Perhaps, there is hardly a scientist anywhere in India who has not benefited from at least one of these schemes.

This great heritage you have inherited.

Our nation has been lucky that CSIR was founded at the right juncture. We had a great visionary in Pandit Jawaharlal Nehru, our first Prime Minister, who alongwith Dr. Shanti Swarup Bhatnagar nurtured CSIR in its formative years and put it on a well thought out path which CSIR treads dedicatedly, even today. This path is the unique one and is driven by the philosophy of "challenge oneself". CSIR has followed it in letter and spirit and has challenged itself to do better and better and thus it moved further and higher. The significant role of subsequent Director Generals in enhancing CSIR's S&T prowess in their

The Hon'ble Minister of Science & Technology and Earth Sciences and Vice President, CSIR Shri Vayalar Ravi, addressing the gathering

respective regimes is praiseworthy. I thank them, some of them are present here. I also thank CSIR Leadership Team on this occasion.

Today we remember, Pandit Nehru and Dr. Bhatnagar and pay our tribute.

Respected Prime Minister, CSIR have been fortunate that you always went out of the way to find time, out of your busy schedule and guided CSIR. Your advice and directions have not only challenged the CSIR system but motivated it to achieve the unachievable. Sir, as you are aware, CSIR has put in place the CSIR@80: Vision & Strategy 2022 as per your direction and scientists in the system are committed to achieve the performance targets for CSIR@80.

One can speak for hours about CSIR, the outputs and outcomes, it has achieved. I remember, CSIR had brought out the encyclopedia named *Wealth of India*. Aptly named, this publication covers all of India's raw material resources be it plants, animals or minerals. Pandit Jawaharlal Nehru wrote and I quote: "I have no doubt that this book...

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will be of great value to the builders of new India. It should be of value also in educating the average citizen, who should take interest in this fascinating land and its enormous potentialities".

Even in the 21st century this publication is an authentic source to establish India's biodiversity and traditional knowledge. It played a major role in backing up India's claim against the US patent on turmeric; the case that paved the path for the globally appreciated Traditional Knowledge Digital Library (TKDL) project.

CSIR has been a partner in the nation's industrial development for indigenous capacity creation after India's independence. With the change in policy regime, CSIR endeavored since 1990s and successfully developed patent protected technologies. Beyond 2005, it focused on the development of niche creating globally competitive technologies.

CSIR is granted 90% of US patents granted to any Indian publicly funded R&D organization and has a wide portfolio of patents in its armoury. About 9% of its patents are licensed, a number which is above the global average. Amongst its peers in publicly funded research organizations in the world, CSIR is a leader in terms of filing and securing patents worldwide.

Major industry houses of India and innumerable MSMEs have benefitted from CSIR. CSIR's contribution to the development of North- Eastern States is commendable. CSIR is documenting economic impact of many of its technologies through a systematic effort.

CSIR has pursued cutting edge science and advanced knowledge frontiers. The scientific staff of CSIR only constitute about 3-4% of India's scientific manpower but they contribute to 11% of India's scientific outputs.

CSIR is the fountainhead of innovation in the country. In the present economic scenario, its efforts are of immense value. I would like to see CSIR connecting to international innovation systems more and more, for the benefit of the society. I am glad to see that CSIR and National Innovation Council (NInC) have come together to make an economic difference for the MSME clusters. Also, CSIR through its CSIR-800 programme is putting concerted efforts to improve the quality of life of people at the bottom of economic pyramid through desired S&T interventions.

DG, CSIR Prof. Samir K. Brahmachari, is an outstanding scientist, an ardent visionary, a perfect executor and achiever. CSIR in no way can fall behind to achieve the targets set for it, I would like CSIR to achieve all what it has planned through its vision document much before 2022. That is the pledge CSIR Scientists and Staff should take today.

Jai Hind.

Brief Biodata of Professor C.N.R. Rao

Prof. C.N.R. Rao is the National Research Professor as well as Honorary President and Linus Pauling Research Professor at the Jawaharlal Nehru Centre for Advanced Scientific Research. He is also an Honorary Professor at the Indian Institute of Science. His main research interests are in solid state and materials chemistry. He is an author of over 1400 research papers and 45 books. He received the M.Sc. degree from Banaras, Ph.D. from Purdue, D.Sc. from Mysore universities and has received honoris causa doctorate degrees from 53 universities including Purdue, Bordeaux, Banaras, Delhi, IIT Bombay, IIT Kharagpur, Northwestern, Notre Dame, Novosibirsk, Oxford, Stellenbosch, Grenoble, Uppsala, Wales, Wroclaw, Caen, Liverpool, Calcutta, Sri Venkateswara and Desikottama from Visva-Bharati.

Prof. Rao is a member of many of the major science academies in the world including the Royal Society, London, the National Academy of Sciences, U.S.A., the Russian Academy of Sciences, French Academy of Sciences, Japan Academy as well as the American Philosophical Society. He is a member of the Pontifical Academy of Sciences, Foreign Fellow of Academia Europaea and the Royal Society of Canada. He is on the editorial boards of several leading professional journals and is a distinguished visiting professor of the University of California and Cambridge University.

Among the various medals, honours and awards received by him, mention may be made of the Marlow Medal of the Faraday Society (1967), Bhatnagar Prize (1968), Padma Shri (1974), Centennial Foreign Fellowship of the American Chemical Society (1976), Royal Society of Chemistry (London) Medal (1981), Padma Vibhushan (1985), Honorary Fellowship of the Royal Society of Chemistry, London (1989), Hevrovsky Gold Medal of the Czechoslovak Academy (1989), Blackett Lectureship of the Royal Society (1991), Einstein Gold Medal of UNESCO (1996), Linnett Professorship of the University of Cambridge (1998), Centenary Medal of the Royal Society of Chemistry, London (2000), the Hughes Medal of the Royal Society, London,

CSIR Foundation Day Lecture

Celebration of Science: Glorious Past and Challenging Future by

Prof. C.N. R. Rao

—A Report

The 2012 CSIR Foundation Day Lecture was delivered by Prof. C.N. R. Rao who provided an astonishingly personal account of doing science against the global backdrop of the work done by scientists through the centuries. It was an amazing blend of personal experiences, which in Prof. Rao's case are formidable indeed, with the trend in science through the ages.

Against the backdrop of the scientific and technological developments of the last century, Prof. Rao led the audience on an enthralling tour of the advances of science. He began by highlighting just what a wonderful period of time this is.

The year 2011 was the centenary of the discovery of atomic structure by Nobel laureate Ernest Rutherford . Although the Rutherford atomic model proposed in 1911 turned out to be not quite correct, the image of electrons forming ellipses around a central nucleus is used across the globe as a symbol for atomic and nuclear items and institutions.

2011 was the also centenary of the discovery of superconductivity by Kamerlingh Onnes, whose mentor was the celebrated scientist Van der Waal. Thus science is not only linked by the continuum of time but also by an unbroken chain of *guru-shishya parampara*. Prof. Rao illustrated this point by showing archival photographs of the Solvay Conferences of 1901 and 1927. As is well known, the 1911

Prof. C.N. R. Rao delivering the CSIR Foundation Day Lecture

Conseil Solvay is considered a turning point in the world of physics..and a century has passed since then. The Solvay Conference marks the passage of classical physics to quantum mechanics; the passage

for original discovery in physical sciences (2000), Karnataka Ratna (2001) by the Karnataka Government, the Order of Scientific Merit (Grand-Cross) from the President of Brazil (2002), Gauss Professorship of Germany (2003) and the Somiya Award of the International Union of Materials Research (2004). He is the first recipient of the India Science Award by the Government of India and received the Dan David Prize for science in the future dimension for his research in Materials Science in 2005. He was named as Chemical Pioneer by the American Institute of Chemists (2005), Chevalier de la Légion d'Honneur by the President of the French Republic (2005) and received the Honorary Fellowship of the Institute of Physics, London (2006) and St. Catherine's College, Oxford (2007). He received the Nikkei Asia Prize for Science, Technology and Innovation (2008). He was awarded the Royal Medal by the Royal Society (2009) and the August-Wilhelm-von-Hoffmann Medal for his outstanding contributions to chemistry by the German Chemical Society (2010). He received the Ernesto Illy Trieste Science Prize for materials research in 2011 and was Albert Einstein Professor of the Chinese Academy of Sciences in 2012.

Prof. Rao is Chairman, Scientific Advisory Council to the Prime Minister, immediate past President of The Academy of Sciences for the Developing World (TWAS) and Member of the Atomic Energy Commission of India. He is Founder-President of both the Chemical Research Society of India and of the Materials Research Society of India. Prof. Rao was President of the Indian National Science Academy (1985-86), the Indian Academy of Sciences (1989-91) and the International Union of Pure and Applied Chemistry (1985-97). He was the Director of the Indian Institute of Science (1984-94), Chairman of the Science Advisory Council to Prime Minister Rajiv Gandhi (1985-89) and Chairman, Scientific Advisory Committee to the Union Cabinet (1997-98) and Albert Einstein Research Professor (1995-99).

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of old science to new science. Showing a close-up of the scientists who had participated in the two conferences, he said that students of science must know the faces of scientists. It was important to know how ideas are born and how science happens, he said.

2011 is also the centenary of the second Nobel Prize of Madame Marie Curie, who despite all her contributions to science, had to fight prejudices, sexism and chauvinism all her life. It is beyond belief, said Prof. Rao ,that she was never admitted into the French Academy of Science.

2011 was the International Year of Chemistry and huge developments have taken place in the last century. Prof. Rao pointed out that in 1911, X – rays had just been discovered; as had radioactivity,noble gases and atomic structure. At around this time, scientists had worked out the secrets behind chemical bonds (1916) and quantum chemistry (1930). Today, chemistry has advanced tremendously.

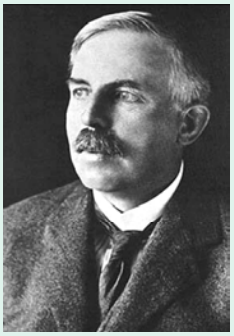
Prof. Rao elaborated on the contributions of Antoine Laurent Lavoisier, Michael Faraday, G. N, Lewis, and Sir William Lawrence Bragg to name a few. Thanks to the efforts of Lavoisier, the science of Chemistry progressed by leaps and bounds. Sadly, he was beheaded during the French revolution. Michael Faraday was multi- faceted and multi- talented scientist who, using the most simple and almost primitive instruments, designed elegant experiments that have stood the test of time. He did not belong to an elite family; rather he had to start earning quite young when he was apprenticed to a book binder at age of fourteen. Faraday educated himself by reading books on a wide range of scientific subjects. In 1812, he had the good luck of being given tickets to attend the lectures given by the chemist Humphry Davy at the Royal Institution. Faraday subsequently wrote to Davy asking for a job as his assistant. Although initially Davy turned him down but finally, he did get a job with Davy…and science gained a master Scientist. To the amusement of the audience Prof. Rao revealed that Faraday's first job in the laboratory had been as "Chief Bottle Washer." Then, this young boy, with just three years of formal schooling, went on to author 451 research papers and carve his name in Science's Hall of Fame. He is "..the hero of every thinking person," said Prof. Rao.

Prof. Rao further spoke about the contributions of Sir William Lawrence Bragg, the youngest ever Nobel laureate who shared the Nobel Prize with his father, Sir William Henry Bragg. Laurence Bragg was only 25 when he got the Nobel Prize.

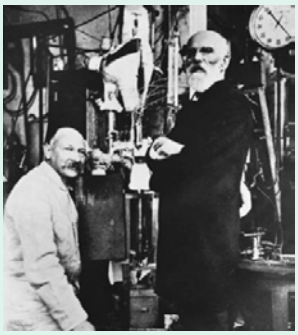
Prof. Rao said that "Modern chemistry is only about two hundred years old but Chemistry is an old subject." He substantiated this statement by analyzing Dmitri Mendeleev's seminal contributions to Chemistry; the Periodic Table. In the 1st century only about seven elements were known;, the number reached a double figure (ten) in the 16th century , and by the 18th century this figure doubled to reach twenty known elements. By the 20th century, 114 elements were known to us. Prof. Rao said that modern chemistry began when chemical bonds began to be understood. It was the contribution of Gilbert Newton Lewis that made this possible when he elucidated the structure of the covalent bond. . Prof. Rao said that Dr. Lewis was nominated 23 times for the Nobel Prize but did not get it although he was perhaps the greatest chemist of the 20th century. Lewis died in 1946 and interestingly, the years spanning 1930 to 1970 were dominated by chemical bonds.

In 1951, Linus Pauling discovered the structure of the alpha helix in proteins. He won the Nobel prize in chemistry for this in 1954. After the structure of the alpha helix was deduced, so was the structure of the DNA double helix in 1953. James Watson and Francis Crick shared the Nobel Prize in Physiology or Medicine with Maurice Wilkins in 1962 for this feat. However, no less an achievement was the deduction of the triple helix or the structure

The Rutherford atomic model proposed in 1911 turned out to be not quite correct. However, it is the image of electrons forming ellipses around a central nucleus which is used across the globe as a symbol for atomic and nuclear items and institutions.



The Nobel Prize in Chemistry for 1908 Was awarded to Ernest Rutherford, U.K. "for his investigations into the disintegration of elements, and the chemistry of radioactive substances".



Onnes with his mentor Van der Waal standing in front of the helium liquifier developed by him.

70TH CSIR FOUNDATION DAY CELEBRATIONS

X-RAY DIFFRACTION
1912

W. L. BRAGG

2012
Centenary of the discovery
of X-ray Crystallography

LAVOISIER
(1743-1794)

What is chemistry ?

DALTON
(1766-1844)

200th anniversary of
atomic theory

of collagen by Gopalasamudram Narayana Ramachandran (GNR) who published his findings in Nature in 1956. Unfortunately no Nobel Prize was forthcoming for this discovery.

Science progressed through the eighties and nineties and now, the progress (particularly in organic chemistry) is so swift that if one does not read research journals for two or three years one will find it impossible not just to keep up but even to understand what has been written, said Prof. Rao. We in India are slow and find it difficult to keep up but we have to learn to progress faster, he cautioned the young scientists in the audience.

He elaborated on the shared legacy of science when the mantle passes from one scientist to another as they carry forward the work. He compared the science spending in the USA and the nationalistic pride that characterizes Chinese citizens and implored the audience to be "Proud to be Indians and to choose the right problem to work upon."

Why do science he queried. Because science gives you generosity and makes you fearless and makes you forget trivialities and become unselfish, he answered.

To the young scientists his advice was simple. "Be determined to succeed. Give your best to India." In a lighter vein he said, "If you become famous, your institute becomes famous. Your country becomes famous."

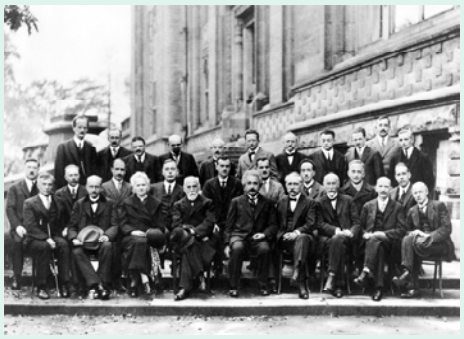
Prof. Rao's lecture ended with an invocation that reminded the audience that science is a stream that flows ever onwards; and the mantle of the teacher descends on the disciple's who carry the work forward.

Prof. Rao quoted Rabindranath Tagore

"I have got my leave. Bid me farewell, my brothers!
I bow to you all and take my departure.
Here I give back the keys of my door
—and I give up all claims to my house.
I only ask for last kind words from you.
We were neighbors for long,
but I received more than I could give.
Now the day has dawned
and the lamp that lit my dark corner is out.
A summons has come and I am ready for my journey."

Marie Curie, nee
Sklodowska

The Nobel Prize in Chemistry 1911 was awarded to Marie Curie 'In recognition of her services to the advancement of chemistry by the discovery of the elements radium and polonium, by the isolation of radium and the study of the nature and compounds of his remarkable element".



Attendees of Solvay Conference in 1927

Chemistry is an old subject, but
modern chemistry is 200 years old.

ELEMENTS		
		Lavoisier
1st Century:	7	Today
16th Century:	10	
18th Century:	20 ←	
20th Century:	114 ←	

(includes artificial ones)
SEABORG

Noble gases

Shanti Swarup Bhatnagar Prize for Science & Technology

Shanti Swarup Bhatnagar (SSB) Prize for Science and Technology was instituted in the year 1957, in the memory of late Dr (Sir) Shanti Swarup Bhatnagar, FRS, the Founder Director of the Council of Scientific and Industrial Research (CSIR). The SSB Prize is awarded each year on the basis of conspicuously important and outstanding contributions to human knowledge and progress, made through work done primarily in India during the five years, preceding the year of the prize.

Any citizen of India engaged in research in any field of science and technology up to the age of 45 years is eligible to be nominated for the SSB Prize. Overseas Citizen of India (OCI) and Persons of Indian Origin (PIO) working in India are also eligible to be considered.

The SSB Prize, comprising a citation, a cash award of ₹ 5,00,000/- (Rupees five lakh only) and a plaque, is given to each person selected for the award in the following disciplines:

- Biological Sciences
- Chemical Sciences
- Earth, Atmosphere, Ocean and Planetary Sciences
- Engineering Sciences
- Mathematical Sciences
- Medical Sciences
- Physical Sciences

Till 2011, 474 scientists have received the prestigious Shanti Swarup Bhatnagar Prize for Science and Technology. Majority of SSB Awardees have remained in the country and contributed immensely to Indian Science and Technology.

The Hon'ble Prime Minister of India presented the Shanti Swarup Bhatnagar Prizes to 11 awardees for the year 2011.

Shanti Swarup Bhatnagar Prizes 2011 CITATIONS

Biological Sciences

Dr Amit Prakash Sharma
International Centre for Genetic Engineering and Biotechnology, New Delhi

Dr Sharma has made seminal contributions to the delineation of principles governing structure function relationships of key proteins involved in malaria parasite biology. This work may lead to the design of inhibitors targeting critical stages of the parasite in the human host.

Dr Rajan Sankaranarayanan
CSIR-Centre for Cellular and Molecular Biology (CSIR-CCMB), Hyderabad

Dr Sankaranarayanan, has made outstanding contributions in the area of structural biology of protein biosynthesis. He has advanced new concepts about how protein biosynthesis achieves extraordinarily high levels of fidelity, which is essential for cell survival.

Chemical Sciences

Dr Balasubramanian Sundaram
Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore

Dr Sundaram has made outstanding contributions based on realistic models to supercritical carbon dioxide, ionic liquids and several other molecular systems.

Dr Garikapati Narahari Sastry
CSIR-Indian Institute of Chemical Technology (CSIR-IICT), Hyderabad

Dr Sastry has made outstanding contributions to the understanding co-operativity in non-bonded interactions, cation-pi interactions and computational design of enzyme inhibitors.

Earth, Atmosphere, Ocean & Planetary Sciences

Dr Shankar Doraiswamy
CSIR-National Institute of Oceanography (CSIR-NIO), Goa

Dr Doraiswamy has made outstanding contributions to our understanding of the dynamics of the Indian Ocean through observations and mathematical modelling.

Engineering Sciences

Dr Sirshendu De
Indian Institute of Technology, Kharagpur

Dr De has made fundamental contributions to innovative membrane

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separations, membrane fabrication and electrokinetics. This has found direct applications in dialysis and in water and food purification.

Dr Upadrasta Ramamurty
Indian Institute of Science, Bangalore

Dr Ramamurty has made breakthrough contributions in the understanding of deformation behavior of complex and novel materials, including amorphous alloys and metallic foams, explaining the phenomena at multiple length scales.

Mathematical Sciences

Dr Mahan Mj
Ramakrishna Mission Vivekananda University, Howrah

Dr Mahan Mj has made outstanding contributions in low dimensional manifolds and geometric group theory, and in particular for his work on Cannon-Thurston maps leading to a proof of local connectivity of limit sets of Kleinian groups.

Dr Palash Sarkar
Indian Statistical Institute, Kolkata

Dr Sarkar has made significant contributions to cryptology including fundamental results on Boolean functions, best known constructions of several modes of operation of a block cipher and hierarchical identity based encryption.

Medical Sciences

Dr Kithiganahalli Narayanaswamy Balaji
Indian Institute of Science, Bangalore

Dr Balaji has made significant contributions to the characterization of fundamental principles of plasticity associated with signaling transduction mechanism in immune cells. Utilizing mycobacteria as a model, he has demonstrated the cross talk between Notch signaling and nitric oxide.

Physical Sciences

Dr Shiraz Minwalla
Tata Institute of Fundamental Research, Mumbai

Dr Minwalla has made fundamental contributions in establishing a connection between Einstein's equations of general relativity and equations of hydrodynamics, for discovering new terms in the equations of superfluid dynamics and for providing influential insights into an understanding of relativistic hydrodynamics.

Hon'ble Prime Minister Dr. Manmohan Singh , Hon'ble Minister of Science & Technology and Earth Sciences Shri Vayalar Ravi and DG CSIR Prof. S.K. Brahmachari with the awardees of the Shanti Swarup Bhatnagar Prizes 2011

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Shanti Swarup Bhatnagar Prize for Science & Technology 2012

Eleven scientists, listed below, have been selected for the Shanti Swarup Bhatnagar Prizes for the year 2012.

Biological Sciences

Dr Shantanu Chowdhury
CSIR Institute of Genomics and Integrative Biology (CSIR IGIB)
Mall Road, Delhi - 110007

and

Dr Suman Kumar Dhar
Special Centre for Molecular Medicine
Jawaharlal Nehru University
New Delhi 110 067

Chemical Sciences

Dr Govindasamy Mugesh
Department of Inorganic & Physical Chemistry
Indian Institute of Science
Bangalore 560 012

and

Dr Gangadhar J Sanjayan
Division of Organic Chemistry
CSIR-National Chemical Laboratory (CSIR NCL)
Pashan Road, Pune 411 008

Earth, Atmosphere, Ocean and Planetary Sciences

No Award

Engineering Sciences

Dr Ravishankar Narayanan
Materials Research Centre
Indian Institute of Science
Bangalore 560 012

and

Dr Y Shanthi Pavan
Dept of Electrical Engg
Indian Institute of Technology Madras
Chennai 600 036

Mathematical Sciences

Dr Siva Ramachandran Athreya
Theoretical Statistics and Mathematics Division
Indian Statistical Institute
8th Mile Mysore Road,
Bangalore 560 059

and

Dr Debashish Goswami
Stat-Math Unit
Indian Statistical Institute
203, B T Road, Kolkata 700 108

Medical Sciences

Dr Sandip Basu
Radiation Medicine Centre
Bhabha Atomic Research Centre
Tata Memorial Center Annexe
Mumbai 400 012

Physical Sciences

Dr Arindam Ghosh
Department of Physics
Indian Institute of Science
Bangalore 560 012

and

Dr Krishnendu Sengupta
Department of Theoretical Physics
Indian Association for the Cultivation of Science, 2A & 2B Raja S C Mullick Road, Jadavpur, Kolkata 700 032

Science @70: A new Award is announced

In keeping with the belief that age cannot dim scientific passion, Prof. Samir Kumar Brahmachari, DG- CSIR announced the creation of a new award by CSIR.

Christened ***Science @70***, this Award will be open to all Shanti Swarup Bhatnagar Prize (SSB Prize) awardees who are actively pursuing science and pushing back the frontiers of knowledge even after attaining the age of seventy.

Announcing this on the 70th Foundation Day of CSIR, DG-CSIR said that he expected the young Scientists who received the 2011 SSB Prize, and those whose names were announced as winners of the SSB Prize for 2012, to keep this new award in mind as they pursue their scientific careers.

Details would be announced later, he said.

CSIR Young Scientist Awards 2012

Instituted in 1987, CSIR Young Scientist Awards seek to promote in-house excellence in various fields of science and technology. CSIR scientists upto 35 years of age, as reckoned on 26 September (CSIR Foundation Day) of the preceding year, are eligible for the award. These awards are given annually in the following fields:

- Biological Sciences
- Chemical Sciences
- Earth, Atmosphere, Ocean and Planetary Sciences
- Engineering Sciences
- Physical Sciences (including instrumentation)

Each award consists of a citation, a cash prize of ₹ 50,000/- and a plaque. CSIR Young Scientist Awardees are also entitled to a research grant of ₹ 5 lakhs per annum for a period of five years.

Till 2011, 147 scientists (including 17 women scientists) have received the CSIR Young Scientist Awards. Out of these 16 scientists have been conferred with the prestigious Shanti Swarup Bhatnagar Prize. For the year 2012, an advisory committee consisting of eminent scientists recommended the following ten scientists for the CSIR Young Scientist Awards.

The recipients of the CSIR Young Scientist Awards for the year 2012 are as follows:

Biological Sciences

Dr Avinash Mishra of CSIR-Central Salt and Marine Chemicals Research Institute (CSIR-CSMCRI), Bhavnagar, for his research on understanding adaptation of microalgae and plants to salt stress and towards development of potential biotechnological applications.

and

Dr Vinod Scaria of CSIR-Institute of Genomics and Integrative Biology (CSIR-IGIB), Delhi, for his outstanding contributions in the field of micro RNA biology and for developing computational tools for the analysis of genomic data.

Chemical Sciences

Dr Dipti Prakasini Das of CSIR-Institute of Minerals and Materials Technology (CSIR-IMMT), Bhubaneswar, for her excellent contributions in the design of novel photocatalysts and their applications in the area of solar energy conversion.

and

Dr N Lakshminarasimhan of CSIR-Central Electrochemical Research Institute (CSIR-CECRI), Karaikudi, for his excellent contributions in understanding structure-

Hon'ble Prime Minister Dr. Manmohan Singh , Hon'ble Minister of Science & Technology and Earth Sciences Shri Vayalar Ravi and DG CSIR Prof. S.K. Brahmachari with the CSIR Young Scientist Awardees.

property relations of inorganic oxides and their use in energy systems.

Earth, Atmosphere, Ocean and Planetary Sciences

Dr Pawan Dewangan of CSIR-National Institute of Oceanography (CSIR-NIO) , Goa, for his significant contribution towards understanding the gas hydrate system in Krishna-Godavari offshore basin (which is distributed along the fault system due to shale tectonism).

and

Dr R Ebhin Masto of CSIR-Central Institute of Mining and Fuel Research , (CSIR-CIMFR) Dhanbad, for his outstanding contributions to the study of soil quality in coal industrial areas, fly ash and soil carbon sequestration through biochar.

Engineering Sciences

Dr Mugdha Chetan Gadgil of CSIR-National Chemical Laboratory (CSIR-NCL), Pune, for her contributions in the general area of enhanced protein production including development of novel hydrogel-based systems for animal cell culture.

and

Dr Priyanka Heda Maheshwari of CSIR-National Physical Laboratory (CSIR-NPL), New Delhi, for her exceptional contributions in developing carbon based advanced materials for future clean energy requirements of the country.

Physical Sciences (including instrumentation)

Dr Poonam Arora of CSIR-National Physical Laboratory (CSIR-NPL), New Delhi, for her crucial contributions to the Cesium Fountain Frequency Standard bringing together a variety of scientific and technological skills in a unique effort in the country.

and

Shri Umesh Tiwari of CSIR-Central Scientific Instruments Organisation (CSIR-CSIO), Chandigarh, for his innovative and significant contributions in the area of optical fiber based sensors particularly in developing fiber grating sensors for novel applications in industrial and medical areas.

CSIR Technology Awards 2012

Instituted in 1990 , *CSIR Technology Awards* seek to foster and encourage multidisciplinary in-house team efforts and external interaction for technology development, transfer and commercialization. These awards include awards for: (i) Life Sciences; (ii) Physical Sciences including Engineering; (iii) Innovation; (iv) Business Development and Technology Marketing; and (v) Most Significant CSIR Technology of the Five-Year Plan Period (awarded once in five years, coinciding with the plan period, to such technology which has proven in the marketplace atleast for five years). Each Technology Award comprises of a cash prize of ₹ 2 lakh, except the award for the *Most Significant CSIR Technology of the Five-Year Plan Period*, which has a cash prize of ₹ 5 lakh. Besides, a plaque and a citation is also given to the awardees.

Hon'ble Minister of Science and Technology and Earth Sciences and Vice President, CSIR, Shri Vayalar Ravi, on the occasion of CSIR Foundation Day, gave away CSIR Technology Award 2012.

CSIR-Central Institute of Medicinal and Aromatic Plants (CSIR-CIMAP)

CSIR-CIMAP has won the award for development and commercialization of anti-malarial drug plant *Artemisia annua* technology package facilitating industrial growth, societal health and rural prosperity. A unique Pharma- Farm value chain linkage in Public-Private Partnership (PPP) mode through *CSIR-CIMAP Biovillage* approach was established resulting in not only enhancement and self reliance of drug production for the deadly malaria but also enhancement of the farmers income.

CSIR-Central Institute of Mining and Fuel Research (CSIR-CIMFR)

CSIR-CIMFR has won the award for developing nonnitroglycerine based explosive-cord system suitable for use in blasting gallery

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Hon'ble Prime Minister Dr. Manmohan Singh , Hon'ble Minister of Science & Technology and Earth Sciences Shri Vayalar Ravi and DG CSIR Prof. S.K. Brahmachari with the CSIR Technology Award 2012 winners.

method in underground coal mines. The explosive system developed is first of its kind. So far the only nonnitro- glycerine based explosive-cord system recommended for use in Blasting Gallery method in underground coal mines by the Directorate General of Mines Safety (DGMS).

CSIR-Institute of Genomics and Integrative Biology (CSIR-IGIB)

CSIR-IGIB has won the award for developing Biochemical Oxygen Demand (BOD) Biosensor. The developed BOD Biosensor provides quick and precise estimation of pollution load of waste water. It helps in conducting desired study in just two hours as against three to five days in conventional methods. The developed technology has been transferred to M/s Forbes Marshall Pvt. Ltd, Pune for commercialization.

Anti-Arthritis Herbal Drug developed by CSIR-NEIST Launched

A safe and efficient Herbal Drug for Arthritis Treatment "Anti-Arthritis" which is pharmacologically and clinically assured for arthritis treatment with proven relief developed in collaboration with Visva Bharati University was released under CSIR-NEIST affordable healthcare by Sri Vayalar Ravi in presence of Prof. Samir K. Brahmachari. Most of the inventors from CSIR-NEIST viz., Dr. Mantu Bhuyan, Scientist, Dr. P.R. Bhattacharyya, Chief Scientist, Dr. P.K. Baruah, Medical Officer, Dr. N.C. Barua, Chief Scientist, Dr. P.G. Rao, Director, CSIR-NEIST were present at the function.

Shri Vayalar Ravi, Hon'ble Minister of Science & Technology and Earth Sciences, releasing 'Anti-Arthritis' in the presence of Prof. Samir K. Brahmachari , DG CSIR, and Dr. P.G. Rao, Director, CSIR-NEIST *(left)*

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CSIR-North-East Institute of Science and Technology (CSIR-NEIST)

CSIR-NEIST has won the award for significantly enhancing the business and markets for their knowledge base by reaching out to people in the rural and tribal areas of North East Region.

CSIR-Central Glass and Ceramic Research Institute (CSIR-CGCRI)

CSIR-CGCRI has won the award for developing completely packaged commercial grade C-Band Erbium-Doped Fiber Amplifier (EDFA) for CATV and Telecom Networks. The developed product has found place in India and US markets.

CSIR Award for S&T Innovations for Rural Development (CAIRD)

CSIR instituted CSIR Award for S&T Innovations for Rural Development (CAIRD) in 2006 to recognize the honour those outstanding S&T innovations that have helped transform the lives of rural people or alleviated the drudgery of the rural people.

The award is given to an innovation that has created a paradigm shift in standards of quality of life of the rural people or demonstrated competitive advantage and positive user response or helped in generation of rural employment in the country and shown a new way of conducting business to achieve social and economic transformation in the domain of rural development. The award consists of a cash prize of ₹ 10 lakh, a citation and a shield.

CAIRD-2010

CSIR Award for S&T Innovations for Rural Development(CAIRD) for the year 2010 was conferred on Defence Institute of High Altitude Research (DIHAR), Leh ladakh for the *Development of cold arid agro-animal technologies for rural development in Ladakh region (J&K)*. Through its multidimensional R&D efforts , DIHAR has brought about qualitative and quantitative changes in agriculture, animal husbandry and cold desert flora of Ladakh. It has identified suitable varieties and developed agro-practices of 78 types of vegetables and 30 types of high altitude medicinal and aromatic plants to boost local production in cold desert region of Ladakh.

DIHAR has developed and successfully commer-cialized seabuckthorn products. The seabuck-thorn berries had no commercial value in Ladakh region till the year 2001. Howver, after setting up the first seabuckthorn processing unit in Leh, seabuckthorn collection has been taken up as an important activity and additional source of income for farmers.

The contributions of DIHAR has helped enhance the availability of fresh foods such as vegetables, fruits, milk, meat, eggs, supplementary herbal products and medicinal and aromatic plants to troops through local farmers in Ladakh, which has helped Ladakh to achieve self-sufficiency.

Hon'ble Prime Minister Dr. Manmohan Singh , Hon'ble Minister of Science & Technology and Earth Sciences Shri Vayalar Ravi and DG CSIR Prof. S.K. Brahmachari with the awardees of the CSIR Awards for S&T Innovations for Rural Development (CAIRD)-2010

CAIRD-2011

CSIR Award for S&T Innovations for Rural Development (CAIRD) for the year 2011 was conferred on Directorate of Agriculture, Govt of Uttar Pradesh and CSIR-National Botanical Research Institute (CSIR-NBRI), Lucknow for the *Plant Growth Promoting Microbial Bioinoculants for Enhanced Crop Productivity*. This innovation relates to the development of environment-friendly

bioinoculants, which have been gainfully used for enhancing the crop yield. These have been used successfully for several economic crops like Urad, Arhar, Mung, Soybean, Groundnut, Gram, pea, Lentil etc. Promising results have also been obtained in trees, floricultural crops, spices, medicinal and aromatic crops through employment of these products.

The bioinoculants developed by CSIR-NBRI and produced by Biofertiliser manufacturing units of the UP Govt. have been used in approximately 26 lakh hectares of agricultural land in UP during the last six years. This innovation has resulted in total fertilizer savings up to the tune of 31,997 MT for nitrogenous and 52,708 MT for phosphatic fertilizers during these years in U.P. The synergistic efforts of Directorate of Agriculture and CSIR-NBRI have helped transform the agricultural scenario of UP in terms of economic and ecological benefits.

Hon'ble Prime Minister Dr. Manmohan Singh , Hon'ble Minister of Science & Technology and Earth Sciences Shri Vayalar Ravi and DG CSIR Prof. S.K. Brahmachari with the awardees of the CSIR Awards for S&T Innovations for Rural Development (CAIRD)-2011

CSIR Diamond Jubilee Technology Award

CSIR instituted the CSIR Diamond Jubilee Technology Award (CDJTA) in commemoration of its Diamond Jubilee from the year 2003. The award acknowledges the most outstanding technological innovation that has brought prestige to the nation.

The award is given to a technology that is developed in the country by Indian innovators and meets the highest global standards. Technologies leading to commercially successful products, processes and services, which give India a sustainable competitive advantage, are considered for the award. The award consists of a cash prize of ₹10 lakh, a citation and a shield.

CDJTA-2011

CSIR Diamond Jubilee Technology Award for the year 2011 was conferred on Tejas Networks Ltd., Bangalore for developing and commercialising the TJ1600, a high density core optical transport platform. TJ1600 is ideal for the core network location where large amounts of data and voice traffic from different sources have to be groomed and switched at wire speed.

Designed for optical backbone, high-speed point-to-point links and high-density digital cross-connects, TJ1600 accommodates a wide range of traffic modules, PDH tributary protection, Carrier Ethernet functionalities and support for DWDM interfaces. The platform is suitable for metro aggregation locations where complete equipment protection as well as tributary protection is needed. The TJ1600 enables several traffic interfaces and supports ASON which facilitates dynamic control of transmission networks through an automated management of network resources.

Hon'ble Prime Minister Dr. Manmohan Singh with recipients of CSIR Diamond Jubilee Technology Award

Successfully deploying its transport solutions, such as TJ1600, in the key telecom networks in India and across the world, Tejas have emerged as a leading Indian technology company.

The success of Tejas has demonstrated the redoubtable technological and engineering capabilities of India and the competitive spirit of the nation. CSIR recognises and honours Tejas Networks Ltd. for the outstanding innovation TJ1600.

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CSIR Innovation Awards for School Children 2011

In order to enhance creativity amongst school children, CSIR announced Diamond Jubilee Invention Award for School Children on 26 April 2002, the day celebrated as World Intellectual Property Day, for the first time. The objectives of this competition are to capture creativity and innovativeness amongst school children and create awareness about IPR. The competition in the year 2011 was renamed *CSIR Innovation Award for School Children*.

During the last ten years, i.e. from 2002 to 2011, 3694 proposals were received for these Awards from various parts of the country and 60 innovations were selected for various prizes by a High Level Awards Selection Committee.

During the year 2011, eleven innovations were selected out of 370 proposals for various categories of prizes, out of total number of 30 prizes to be given. In the year 2011, no first prize was given. On 26 September 2012, 22 children were awarded *CSIR Innovation Award for School Children 2011*.

The winner gets a cash prize, trophy and a certificate. The prizes are as follows:

First Prize (₹ 1,00,000/-)
No. of prizes : Nil

Second prize (₹ 50,000/-)
No. of prizes : One

Master Sanat Anand of Class 10 of Welham Boys School, Dehradun for his invention *Stand alone GPS system*.

This innovation relates to a GPS system device which does not require any external support from medium like GPS satellites. This innovation is based on rotation of earth and its magnetic field. To harness this, two devices have been used, namely Foucault's pendulum and a dip needle. The present innovation displays a non working dummy of GPS system which includes a pendulum pivot which pivots the string of the pendulum to the device without having any effect on its oscillation. The string is attached to the equipment through a bolt and glue which gives the string equal pressure from all sides; an electromagnet which is placed on a wooden piece and kept on one extreme end of the pendulum's oscillation such that it touches the bob when it oscillates. This device will work in any place and time irrespective of its remoteness, terrain of its location, electromagnetic jamming and connectivity problems.

Third Prize (₹ 30,000/-)
(No. of prizes : Three)

Master Aditya Arun of Class 9 of Gear Innovative International School, Bangalore, for his invention *A novel idler gear for non-planar application.*

Hon'ble Minister of Science & Technology and Earth Sciences Shri. Vayalar Ravi and
DG CSIR Prof. Samir K. Brahmachari with the winners of CSIR Innovation Award for School Children 2011

70TH CSIR FOUNDATION DAY CELEBRATIONS

This innovation provides a method of allowing engagement between the driver gear and driven gear that need to engage in different planes and transmit motion with minimum losses and backlash by introducing the idler. A non-planar motion and alignment of gear train by interleaving the idler gear comprising of T-shaft with hub and shaft coupled with a pair of pins balls in it holding the ring gear. The bolt is connected with hub and hollow shaft and the ring plate affixed with the ring gear. The pins allow the movement of ring gear in shifting the movement of driver gear by changing the angle of the plane in which the gears shifts.

Master Sailesh Patra of Class 11 of D.A.V. Public School, Bharatpur, Orissa for his invention *Wind o' nova-an innovative wind farm*.

This innovation provides a windmill designed exclusively to harness wind energy by the use of equation of continuity. This innovation comprises two models; for domestic and s commercial purposes. In domestic wind farms, two funnel like structures were joined at two ends of hollow cylindrical tunnel which is pivoted on a stand and series of wind turbines along with generators were placed in the tunnel structure. The outputs of generators were combined to obtain greater power output. Dual tunnel configuration is used to harness wind energy from four directions. For commercial purpose, wind farms in which at the junction of all the tunnels electrically operated shutter system of low energy were installed. This wind mill extracts wind energy from four directions without using any further energy for rotation.

Master G.Brahadees of Class 12 of The Velammal International School, Panchetti, Tamilnadu for his invention *All in one air treatment machine*

This innovation relates to a working model of a portable, energy efficient, light weight, compact and multi speed All in one air treatment machine, which performs all the air related functions like air cooling, air heating, air purification, air blowing etc. Existing air conditioners and air coolers are responsible for growth of microorganisms, if not cleaned and maintained properly. In view of these problems, localized spot cooling/heating concept has been used through compact air pipes with air jet nozzles which will protect from mosquito biting and also from various diseases. Compact recirculation air pipe sucks the air around the treated healthy air zone and feeds it into the air filter unit. The machine provides treated healthy air which ensures good health all the time and can be used as a year round air conditioner.

Fourth Prize (₹ 20,000/-)
(No. of prizes : Four)

Master Yash Kothari, Master Gulshan Sahu, Master Ayush Sharma, and Master Saransh Tiwari of Class 9 of Kendriya Vidyalaya, Dhamtari, Chhattisgarh for his invention *Energy converter system*

This innovation provides a method to generate electricity in rural areas with the help of washer men. The innovation particularity is a system, which converts mechanical pressure into electricity. When the washer man hits the pad with cloth to wash, the pad pressure is captured by the spring. This spring is attached to the axel of dynamo. With the help of the motion of the spring, axel of dynamo rotates and the rotation of dynamo produces electricity.

Master Monawwer Mahfuz, Anjaney Kumar, Abhishek Anand, and Master Rahul Kumar of Class: 10 of Jawahar Navodaya Vidyalaya, Saharsa, Bihar for his invention *Multi-purpose and eco-friendly shoe*.

This innovation provides a method to design a multipurpose and eco-friendly shoe with help of garbage materials like a sole, a zip and waste clothes. The advantages of this shoe is that it is cheaper than other footwear's and a single sole can be used in multiple footwears like leather shoe, P.T shoe, slipper and sandal. This pair of shoes is interchangeable. By removing upper part of shoes with the help of zip, a sandal can be made by tying straps with buttons. Anybody can easily carry these shoes during traveling.

Master Abhijit Pal of Class11 of D.A.V. Model School, Durgapur, West Bengal for his invention *Solar energy calculator: Agriculture and Technology*

This innovation provides a way of calculating the amount of solar energy in any given area , which can be helpful in the field of agriculture as well as technology. In the present innovation, two styrofoam cups were filled with equal amount of ice and the cups were covered with plain aluminium and black painted aluminium sheet respectively . This set-up was then kept under direct sunlight for some time. The amount of solar energy is computed by calculating mass of ice melted in black painted aluminium sheet and mass of ice melted in plain aluminium sheet.

Miss Pallavi Sharma of Class 11 of Sacred Heart Senior Secondary School, Chandigarh for his invention *Water purifiers*

In this innovation, two types of water purifiers are prepared. First is the Phyto filters, which employs plant parts having the capability to purify water. Plant fibers used for the filtration purpose used are coconut fiber, maize husk, rice husk. Simple water purifiers are prepared by using materials those are cheap and easily available such as water cone, PVC tap using activated carbon and cotton in tap. The student has tested the filter for purification of water sample at various industries.

70TH CSIR FOUNDATION DAY CELEBRATIONS

Fifth Prize (₹ 10,000/)-
(No. of prizes : Three)

Master Amit Kumar of Class 10 of Rajkiya Sarvodaya Bal Vidyalaya, Kondli, Delhi for his invention *Designer pen (Lekhni)*

This innovation aims to develop a designer pen, which is useful for writing or drawing in a designer or creative fashion. The designer pen consists of a motor from a CD-ROM drive, and a ball pen/ refill/ sketch pen/marker installed on the upper part of the motor. While designing, the nib of the pen must be in a slanting position (by turning down the nib) and the length of pen or refill should not be more than 4 centimeters. There is a button on the motor for its working and the motor can be charged by using
any of the charging appliances like mobile charger, 1.5 volt Nippo battery, 9 V battery or an adaptor. One can utilize this designer pen to write on hard paper, plastic, wood, wall, cloth and can enhance one's creativity.

Miss Aditi Raj, Miss B J Sadhana, Master C Shrijanand, Master Kartik Mathur, Master T Sai Praneet and Master Vaghul K V of Class 10 of Bhartiya Vidya Bhawans Public School, Hyderabad for his invention *Turning a turn buckle*

The innovation relates to a new and useful improvement in turnbuckles. Turnbuckle is a device for adjusting the tension or length of ropes and consists of two threaded eyelets or screws. In the present innovation, instead of using two screws in the turnbuckle, turn buckle was itself used as a part of nut and bolt ensemble. One screw from the instrument was removed and soldered to the body of the turnbuckle to the top of the iron core. The body of the turnbuckle and the iron core together formed the effective core. Then, the other screw was vertically fixed to the base and the first screw was inserted through it. Thus, when the screw was turned in the permanent base, the body of the turnbuckle attached to the iron core would get displaced in the desired direction.

Master Rohit Patel of Class 10 of Delhi Public School, Bhilai, Chattisgarh for his invention *Innovative car*

This innovation relates to the device named toy car which can solve the problems of parking. This car comprises of four extra wheels more than the normal car which are attached by hydraulics. These four wheels are placed perpendicular to the rest of the wheels. Moreover, this prototype has been designed so as to make an innovative toy in which the wheels attached to the motor have been made using wheels from two remote controlled cars and the hydraulics is made using syringes and tubes. This car includes a gear system, switches and a remote.

AcSIR Convocation Ceremony

Established in 2011 as an 'Institution of National Importance', the Academy of Scientific & Innovative Research (AcSIR) is committed to creating and training some of the best of tomorrow's S&T leaders through a combination of innovative and novel curricula, pedagogy and evaluation.

On 26 September 2012, and coinciding with the 70th Foundation Day of CSIR, AcSIR held its Second Convocation. Incidentally, the first Convocation of AcSIR had been held on 15 September 2011 (during interim mode) for 52 Students of PGRPE-2009 batch.

Prof. Gautam Biswas, Acting Director, AcSIR and Chairman of the Senate and Director, CSIR-CMERI delivered the Welcome Address.

Prof. Gautam Biswas and Dr. Nagesh Iyer, Acting Associate Director AcSIR and Member-Secretary of the Senate and Director CSIR-SERC conducted the degree awarding ceremony and admitted the successful candidates to the M.Tech degree of AcSIR.

In his Convocation address to those graduating, Prof. Samir K. Brahmachari, Vice Chairman AcSIR and Director General, said, "You have done well… since 94 per cent have got distinction, therefore all the graduates with distinction are eligible to participate in CSIR's PhD programme." In a lighter vein he said that the students graduating today held the passport to enter the world of science and that the young scientists would create a new CSIR with new aspirations. He exhorted them to develop sensitivity to the needs of others, who are less fortunate. He said that there was a need for those with high intellectual ability coupled with high sensitivity in the new CSIR. He said, "You will make a difference and then you will have inner happiness."

Speaking on the occasion Dr. R. A. Mashelkar, Chairperson, AcSIR said that what was needed was innovation, passion and compassion. Innovation is associated with the brain, passion is the fire in the belly and compassion lies in the realm of the heart. Acknowledging the role that Late Shri Vilasrao Deshmukh had played in steering the AcSIR Bill through the Parliament, he said that a special AcSIR Special Fellowship would be created to commemorate his name.

70TH CSIR FOUNDATION DAY CELEBRATIONS

He said that the creation of AcSIR had taken seven long years and that it owed a lot to the conviction and vision of Prof. Brahmachari. Today with its distributed campuses spanning the distance from Kashmir to Kanyakumari, AcSIR is emerging not only as a centre of distributed learning, but also integrated learning.

His inspirational message was that AcSIR was a new institute and it carried no "baggage". Whatever AcSIR did was novel. It was free from the need to conform to hidebound traditions; free to experiment with new pedagogy of learning. "We are in the business not just setting up best practices but NEXT practices," he said.

Awardees of M.Tech Degree, AcSIR 2012

CSIR-Central Building Research Institute, Roorkee

Engineering of Infrastructure and Disaster Mitigation

1 Anindya Pain
2 Micky Mecon Dalbehra
3 Piysush Mohanty
4 Randhir Chaudhary
5 Siddharth Behra
6 Tarannum Meraj

CSIR-Central Electronic Engineering Research Institute, Pilani

Advanced Semiconductor Electronics

7 Aniruddha Kushwaha
8 Mridula Madhusudan
9 R. Ganesh Raj
10 Sumit Khandelwal
11 Dheeraj Kharbanda
12 Rahul Prajesh
13 Sanjeev Kumar

CSIR-Central Electronic Engineering Research Institute, Pilani

High Power Microwave and System Engineering

14 Parul Gupta
15 Sushil Shukla
16 Om Ranjan
17 Purushothaman N

CSIR-Central Mechanical Engineering Research Institute, Durgapur

Mechatronics

18 Anirudh Kumar
19 Mohd. Afroz Akhtar
20 Saikat Kr. Shome
21 Sidharth Pradhan
22 Soumen Mandal
23 Swarn Singh Rathour
24 Jagat Jyoti Rath

CSIR-Central Road Research Institute, New Delhi

Engineering of Infrastructure and Disaster Mitigation

25 Mr. Ashutosh Arun
26 Mr. Gagandeep Singh

CSIR-Central Scientific Instrumentation Organisation, Chandigarh

Advanced Instrumentation Engineering

27 Deewakar Sharma
28 Manoj Kumar Patel
29 Mohd Mansoor Khan
30 Mukesh Kumar
31 Neha Khatri
32 Nishtha Panwar
33 Prashant Kumar
34 Ravi Dhawan
35 Shashi Poddar

CSIR-Institute of Minerals and Materials Technology, Bhubaneswar

Material Resource Engineering

36 Abhishek Pandey
37 Amulya Bihari Pattnaik
38 Meenal Mohindra
39 Pallishree Prusti

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40 Sachida Nanda Sahu
41 Shubhra Bajpai
42 Sikha Swaroopa
43 Swagatika Dash
44 Debidutta Debasish

CSIR-Indian Institute of Petroleum, Dehradun

Advanced Petroleum Science and Technology

45 Jayati Trivedi
46 Madhvi Gera
47 Neelam Naidu
48 Shashank Suman

CSIR-National Aerospace Laboratories, Bangalore

Engineering of Flight Vehicles

49 Akshara P
50 Ashwin Kumar Subramanyam
51 Balaji S
52 Anbarsi J
53 Niranjana C K
54 Sahil Bansal
55 Sanketh Ailneni
56 Shikhar Jaiswal
57 Tahzeeb Hassan Danish

CSIR-National Chemical Laboratory, Pune

Chemical Engineering - Modeling & Simulation/ Materials & Processes

58 Vikash Kumar
59 Neetu Kumari
60 Indhupriya S
61 Akash Arora
62 Nupur Bansal
63 Abhishek Gupta
64 Rashmi

CSIR-National Environmantal Engineering Research Institute, Nagpur

Environmental System Design

65 Ankit Gupta
66 Rakesh Kadaverugu
67 S.A. Praveen

CSIR-Structural Engineering Research Centre, Chennai

Engineering of Structures

68 B.S. Sindu
69 M. Surendran
70 Rohit
71 Prabhat Ranjan Prem

Out of 71 graduating students, 63 were present at the Convocation. 8 students could not make it to the Convocation.

G N Ramachandran Gold Medal for Excellence in Biological Sciences & Technology 2012

CSIR instituted a Gold Medal in 2004 in the fond memory of Prof. G N Ramachandran, a pioneer of protein chemistry and the founding father of structural biology in India, for recognising excellence in the interdisciplinary field of Biological Sciences and Technology.

Till the year 2011, eight scientists have been bestowed with this prestigious award: Prof. M. Vijayan (2004), Prof. P. Balaram (2005), Prof. T. P. Singh (2006), Prof. C. Ramakrishnan (2007), Prof. M. R. N. Murthy (2008), Prof. R. V. Hosur (2009), Dr Dinakar M. Salunke (2010), Prof. Jayant B. Udgaonkar (2011).

For the year 2012, the Advisory Committee recommended Prof. Dulal Panda of Indian Institute of Technology Bombay for G N Ramachandran Gold Medal.

Prof. Dulal Panda

Prof. Dulal Panda of Indian Institute of Technology Bombay has done highly original work on the mechanism of bacterial cell division which has led to the development of promising antibacterial agents. Additionally, his studies on cancer cell division have led to identification of anti-cancer agents that act by destabilising microtubules.

Printed and Published by

Deeksha Bist on behalf of CSIR-National Institute of Science Communication And Information Resources
Dr K.S. Krishnan Marg, New Delhi -110 012 and printed at NISCAIR Press, Dr K.S. Krishnan Marg, New Delhi -110 012
Editor: Dr Sukanya Datta; **Editorial Assistance:** Neelima Handoo & Vrishali Subramanian
Design: Neeru Sharma, Sarla Dutta; **Production:** Supriya Gupta
Phone: 25848702; **Fax:** 25847062; **E-mail:** csirnews@niscair.res.in; sukanya@niscair.res.in; **Website**:http://www.niscair.res.in
Please direct all Subscription-related queries to:
Sales & Distribution Officer, NISCAIR; E-mail: sales@niscair.res.in; Phone: 25843359
Annual Subscription: Rs 500; Single Copy: Rs 50.00
RN 4512/57