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Team CSIR



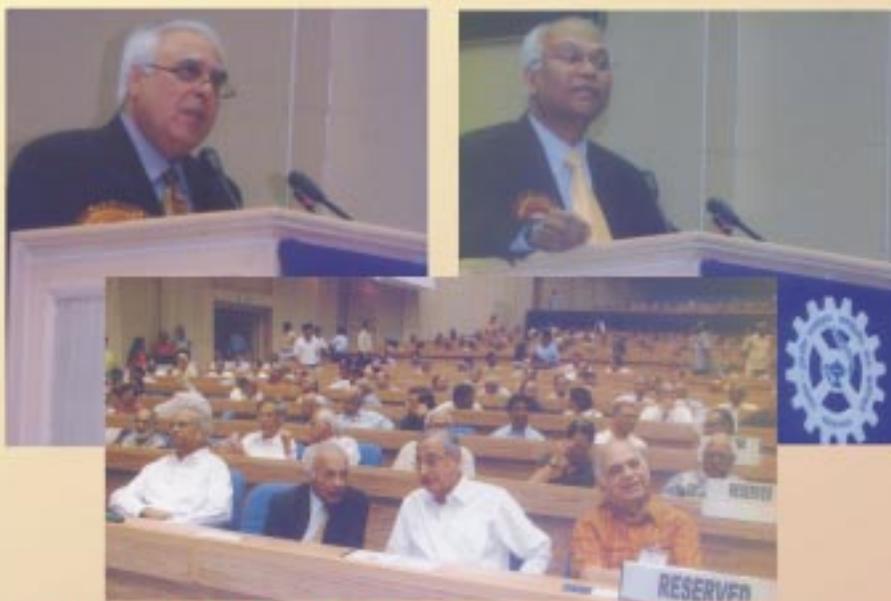
**Prime Minister of India
Dr Manmohan Singh
presents CSIR Diamond Jubilee
Technology Award (2004) and
Shanti Swarup Bhatnagar
Prizes for 2004 and 2005**



"I do believe that if the 21st Century is going to be a 'Knowledge Century' then it is not military power or economic power but 'brain power' that will determine our place in it."

"The challenge before Indian S&T is to generate high technology, creating wealth and prestige for India, while also ensuring that this technology improves the lives of the poor."

— Prime Minister Dr. Manmohan Singh,
CSIR Diamond Jubilee Technology Award and
Shanti Swarup Bhatnagar Prizes Presentation
Function, Vigyan Bhawan, New Delhi,
28 September 2005



Prime Minister of India Dr Manmohan Singh, who is also President of the Council of Scientific & Industrial Research, gave away the CSIR Diamond Jubilee Technology Award (2004) and the Shanti Swarup Bhatnagar Prizes for 2004 and 2005 at a glittering function held at Vigyan Bhawan on 28 September 2005. Shri Kapil Sibal, Minister of State for Science & Technology, and Ocean Development and Vice President, CSIR, presided over the function, which was attended by a galaxy of eminent scientists, technocrats and media personnel. Dr Manmohan Singh also released the 'India Science Report', and handed over a copy to Project Leader and Principal Author, Shri Rajesh Shukla, Senior Fellow, National Council of Applied Economic Research (NCAER).

Dr R. A. Mashelkar, FRS, Director General, CSIR, extended a warm welcome to eminent personalities, the Prize-winners and their families, the distinguished invitees, and the CSIR family. Dr Mashelkar announced the CSIR Diamond Jubilee Technology Award 2004 and read out the citations of the Shanti Swarup Bhatnagar Prize-winners for 2004 and 2005.



He applauded the spirit of entrepreneurship and enterprise that was being rewarded with the CSIR Technology Award 2004, and called it a true celebration of "Techno-preneurship" that blended both technical knowledge and enterprise with the spirit of entrepreneurship. The 'Bhatnagar Laureates (2004) Symposium' was also held at Vigyan Bhawan, New Delhi, on that day, where the Bhatnagar Prize-winners for 2004 highlighted their work.

Covered in this issue are the Award Presentation Function at Vigyan Bhawan and the 'Bhatnagar Laureates Symposium'.

Address by Prime Minister Dr Manmohan Singh at the CSIR Diamond Jubilee Technology Award & Shanti Swarup Bhatnagar Prize Presentation function

I am delighted to be here today as I find myself in the company of scientists. You are the creators of a new India; an India that is free from the shackles of ignorance. It is an India imbued with scientific temper and a liberal outlook. I am happy to recognize the very important role our scientists and technologists have played and will play in the ongoing task of Nation building. It is a pleasure to honour the very best of Indian science and technology today.

Several awards have been conferred today, but let me begin by complimenting CSIR for the good work being done under Dr Mashelkar's



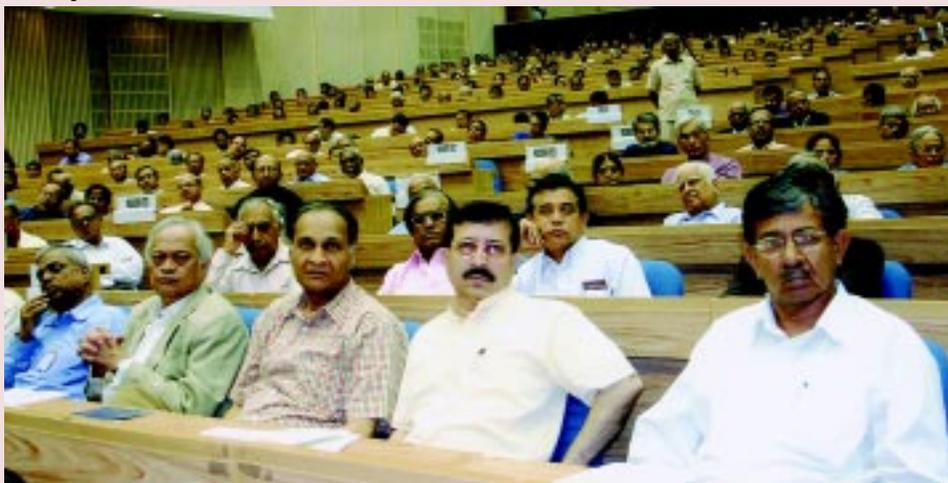
Dr Manmohan Singh at the CDJT award & Bhatnagar prize presentation function

Sciences—the seventh Indian to be so recognized since 1863 — adds one more feather in his distinguished cap.

I also congratulate the winners of our most coveted science prize —the Shanti Swarup Bhatnagar prize for 2004 and 2005. I am particularly happy that this prize is given to young scientists, who are in their prime.

Becoming a Bhatnagar laureate gives you a status that you will undoubtedly enjoy. However, it comes

leadership. His recent election as a Fellow of the U.S. National Academy of



A view of the audience

with many responsibilities, such as the responsibility to engage in good science. You also have the responsibility to serve the best interests of mankind and our natural inheritance.

Most importantly, you will also have the responsibility to improve the quality of life and widen the span of knowledge in India. My very best wishes to you on the exciting journey ahead. I hope it will be a never-ending journey of learning and creativity. I hope each one of you will dedicate your lives to the cause of science, to the welfare of our people and to the growth and development of our country.

Last but not the least, I congratulate the team of Media Communication Technologies, who have won the CSIR Diamond Jubilee Technology Award. I applaud this selection for two reasons.

First and foremost, these technologies can provide affordable solutions for connecting our rural population through internet and voice connectivity. I have often stressed the need for 'reaching the unreached' and 'connecting the unconnected' in India. I am glad that this technology can potentially fulfill this goal. The telecom revolution and the development of road, air and rail linkages have shown that connectivity enhances output and productivity. Connectivity is therefore an important economic asset.

Secondly, I have always believed that India must assume a



Dr Manmohan Singh, Prime Minister of India, releasing the 'India Science Report'

role of leadership among developing countries. Science and technology can be a powerful tool to achieve this. Therefore, I am happy that these technologies have made inroads among larger developing countries. I hope this Technology award will inspire others to develop similarly useful and potentially winning technologies.

Apart from the awards, I am also happy today to release the 'India Science Report'. I congratulate the Indian National Science Academy (INSA) for taking this important initiative. I also congratulate National Council of Applied Economic Research (NCAER) for their excellent work. In fact, I recall when Prof. M.S. Valiathan discussed this with me, I had suggested that INSA should approach NCAER for such a study. I had a chance to go through the report soon after it was printed. The findings of this report are truly revealing.

The Report shows that the proportion of enrolled students in science has gone up from 28.0 per

cent in 1995-96 to 34.6 per cent in 2003-04. This is comforting. However, it also shows that while close to two-thirds of the students in class six to eight are satisfied with the quality of science teaching, this falls to 40% in class 11 and 12! This shows a shortage of good science teachers at higher levels. I would like our HRD Ministry and State Governments to take note of this and act upon it. We must lay increased emphasis on improving the quality of teaching in science and mathematics at all levels.

There are other causes for concern. The report shows that 20 per cent of science graduates and 14 per cent of Ph.Ds in science do not find gainful employment. What is equally worrisome is the finding that many people employed in science-centered jobs are insufficiently qualified. There are lessons for us here. This Report also points to a grave regional imbalance in terms of educational institutions in different states. I am sure the facts and analysis presented here will help our policy planners. I trust our Government at the Centre, as well as State Governments, will take note of these findings and evolve policies to remedy these imbalances.

Ladies and gentlemen,

When I spoke here last year, I had reaffirmed India's commitment to basic science, applied science and the promotion of excellence. I had committed our government to rebuilding the science base in the



Prime Minister's Address

universities. I had also made a commitment to de-bureaucratise our S&T institutions, to restructure our S&T support systems. I had committed our government to create career opportunities to retain talent in the S&T sector. I am happy to say that we have made some progress on these counts.

Firstly, I have always felt that it is a pity that a country of a billion people has only one Indian Institute of Science. To rebuild our foundations in basic science, the government is creating two institutes dealing exclusively with science education and research, one in Pune and another in Kolkata. We hope that these institutes will attain world class standard.

Second, the Ministry of Human Resource Development has already set up a Task Force on rejuvenation of scientific research in universities. The Task Force has set up a target of doubling the number of Ph.Ds coming out of India within the next 5 to 6 years. The necessary budgetary support for this has been promised.

Third, to strengthen our investment in basic science, as well as to improve our processes of funding, a new National Science & Engineering Research Foundation has been approved. It will receive generous funding and it will operate in an autonomous way.

Fourth, we have provided a fund of Rs. 150 crore per year for this specific purpose to Department of Science & Technology. I am keen on pushing forward many meaningful and productive public-private partnerships. Research in pharmaceuticals is particularly critical to us with the change of the

patent regime that our government has ushered in. Other initiatives will follow.

Finally, I had also stated that we would create exciting career opportunities for scientists to retain our talent at home. The recently announced Ramanujam Fellowship, J.C. Bose Fellowship and also Fellowships for Scientists and Technologists of Indian Origin (STIO) are part of our effort to fulfill this promise.

Ladies and gentlemen,

I realize that in a journey of a thousand miles, these are just the first few small steps. We need to do much more. We have, therefore, formed a Knowledge Commission under the chairmanship of Sam Pitroda, and with Dr P. M. Bhargava as deputy chairman. I do believe that if the 21st Century is going to be a 'Knowledge Century' then it is not military power or economic power but 'brain power' that will determine our place in it. We are expecting the Knowledge Commission to come forward with bold initiatives to create excellence in research and teaching, especially in the frontier areas of mathematics, science and technology.

Those of us who are elected to public office in a democracy face the challenge of finding resources for basic human development and the resources for advanced research and technological development. We also face the challenge of addressing the demands of promoting equity and the requirements of encouraging excellence. I do sincerely believe that these need not become contradictory or contending

objectives. I believe that at our stage of development we must learn to "walk on two legs" – fulfilling both these objectives.

The challenge before Indian S&T is, therefore, to generate high technology, creating wealth and prestige for India, while also ensuring that this technology improves the lives of the poor. I compliment CSIR Society for some of their recent breakthroughs in advanced scientific areas that have the potential to meet the basic needs of our people. The high-tech membrane filter, that can remove bacteria as well as viruses from water, has enabled CSIR to install in our villages hand pump based units that do not require electricity. At just 4 paise per liter, this technology makes safe drinking water affordable to all. I salute this effort to combine innovation with compassion. Let me, in conclusion, pose a challenge before our S&T community. I urge you to join a race for reaching science and the benefits of science to every nook and corner of our vast Motherland. You must set targets that are ambitious but do-able to increase the quantity and quality of our scientific manpower. We must aim to improve the quality of text-books and teaching at the school level and to make science an exciting discipline and an attractive career. When people praise Indian science and technology, they invariably imply that some Indians are doing well. I would like to see a day, when people will say India is doing well. Our country needs each one of you to do well for us all to be able to do well. I wish you great success in all your noble endeavours. May your path be blessed.

Thank you.

Presidential Address by Shri Kapil Sibal, Minister of State for Science & Technology and Ocean Development

It is indeed an honour for me this morning to welcome Dr Manmohan Singh, Prime Minister of India to this CSIR Awards function. The scientific community is enthused by his un-flinching support and during the last one year has demonstrated that it is not only capable of producing world class science, but given the opportunities, can produce men of such scientific talent and excellence, who have the potential to be world leader. The mere presence of the Hon'ble Prime Minister today is yet another example of his support for the scientific community.

Today, we celebrate our achievers, our future Navratnas and in yet another sense celebrate the triumph of science. An English Chemist, Sir Cyril Herman Hinshelwood, who received the Nobel prize in 1956 once said "Science is an imaginative adventure of the mind seeking truth in a world of mystery". On this day of celebration, all of us are in some sense participating in that adventure. We thank you Sir, for being on this special day with us.

At the outset, my heartiest congratulations to the Bhatnagar Prize awardees. This is surely



Shri Kapil Sibal delivering his address at CDJT award & Bhatnagar prize presentation function

regarded as India's Nobel Prize. You all have joined the elite club of Bhatnagar Laureates today. This recognition imposes an onerous responsibility on you. You are expected to build on what you have achieved and be role models for our youth. Congratulations to Mr. Purohit, the winner of CSIR Diamond Jubilee Technology Award. I am sure in course of time this award will also come to command the same high prestige as Bhatnagar Prizes do today in science.

I commend CSIR for recognizing the best in Indian

science and technology for decades now. We need to publicize these 'heros' on the national stage. This will inspire, motivate and attract some of our brightest youngsters to science.

I must applaud CSIR for not only recognizing achievements at the 'top of the ladder' but also in spotting and nurturing 'young bright minds' at the first rung too. Like the CSIR Diamond Jubilee Technology Award, CSIR has also instituted a CSIR Diamond Jubilee Invention Award for school children. The intention is to create awareness and arouse interest of school students in Intellectual Property – which

I believe will in course of time be India's major asset and to encourage inventiveness and out-of-the-box thinking. Just two days ago, on CSIR Foundation Day on the 26th September, Dr Mashelkar announced the winners of this year.

I was pleasantly surprised to hear that the top two awardees, children from affluent schools, had inventions that reflected social sensitivity – one was an inexpensive lower limb prosthesis – artificial leg and the other one was for a much improved cycle rickshaw to reduce the pedaling effort.



Address of Minister for S & T and Ocean Development

I was so impressed that I wanted to know more about the past awardees. Dr Mashelkar told me that the first awardee was Madhav Pathak, a Jabalpur school boy who developed an improved Braille slate to make writing and reading easier for the blind. This invention later received an international prize. This reassures me that our future is in the hands of youngsters who have a social conscience and are thinking of improving the quality of life of their unfortunate brethren.

We have seen the wonderful work that Media Communication Technologies has done to connect the unconnected. This has a huge significance for India. When you have to deal with large distances, a huge population and lack of resources, technology is the only tool through which this connectivity is possible. But I also heard stories on how tough they found it to get this technology accepted in India. Surprisingly this technology was first accepted abroad and then here. We need to learn from our past. When Cray denied us the supercomputer, Shri Rajeev Gandhi took the initiative to create our own supercomputers. This 'denial driven' innovation drive finally helped us to join the select club of countries capable of manufacturing teraflop range supercomputers. The same Cray Company wanted to set up shop in India a few years ago. I therefore strongly believe that we need to support indigenous technology at the earliest and not wait for others to embrace it before we do.

I am happy to see 21 Bhatnagar awardees amongst us – they are our super stars – the very best that

science has to offer in India. In turn, I assure you on behalf of my Ministry that you will get the very best we can give you to compete with the best in the world. Indeed the very best must be retained in India and return to India.

The other day, Dr Mashelkar told me about how Mrs Indira Gandhi sent Dr Nayudamma, the then DG, CSIR, abroad to pick up the very brightest and the best and offer them jobs on the spot. No formal interview, no application, no form filling. That is how Dr Mashelkar was brought back. But he lamented the fact that what a Nayudamma could do to a 'Mashelkar', today a Mashelkar cannot do to another Mashelkar. Society has become so litigative. Appearing to be right appears to consume so much energy. I wish to assure you that in science, meritocracy is not only necessary, it is essential. I can assure you that we will leave no stone unturned to bring the very best back to the country. We have started this process by instituting Ramanujam Fellowships. But this is only the first step. We will do a lot more.

I am happy that our Prime Minister is releasing the India Science Report today. I am happy that Indian National Science Academy (INSA) took up this challenge. INSA, with its 750 distinguished Fellows, represent – the very elite – the most accomplished of Indian scientists. I find that in other countries government depends greatly upon the 'academies' for policy advice and other matters connected with science. I have heard that the US

government's thinking is strongly influenced by the study and advice that it receives from the science academies. I believe we need to create a similar 'connect' in India too. To the distinguished fellows of INSA, that are present in this audience, I wish to assure that my Ministry will be most happy to create such a bridge.

The India Science Report, that will be released by the Hon'ble Prime Minister today, is truly revealing of the state of science and technology in the country – it will help quell the many myths that are spread about Indian S&T. At the same time, it has given us ample food for thought and analysis as to what needs to be done either by executive actions or remedial policy measures. May I suggest Sir that to begin with, if you consider it appropriate, remit the report to SAC-PM for their study and recommendations so that we could incorporate their findings in the Eleventh Five Year Plan. We need to act now, and act decisively.

I can assure you that much has happened during the last year to put Indian S&T on the world map. Initiation of much higher levels of funding to basic scientific research through the creation of an overarching NSF like structure, institution of Fellowships, not only to attract the very best talent from abroad but also to encourage talent within India, initiation of the process for creation of new institutes of science, education and research, evolving new policies and strategies for bio-technology, creating new public-private partnerships, facilitating 'hassle-free' regulatory processes, which will help the

creation of enterprises in emerging technologies represents some of the path breaking decisions taken. We have stepped up funding in frontier areas, such as in nano-technology. I assure you that with the unstinted patronage of our Hon'ble Prime Minister for science and technology, we will not be found wanting in supporting any new initiatives to strengthen and safeguard our Science and Technology infrastructure.

Finally, next year we will celebrate the Awards function with yet another set of scientists. We will celebrate their achievements and the triumph of science. As long as the scientific community continues to get the support of extraordinary leaders like Dr Manmohan Singh, the Prime Minister of India, the cause of science will always serve India well.

I welcome all of you and thank you all for being with us today.

CSIR Diamond Jubilee Technology Award 2004

CSIR instituted the CSIR Diamond Jubilee Technology Award, to be given annually, in commemoration of its Diamond Jubilee from the year 2003. This award is instituted to acknowledge the most outstanding technological innovation that has brought prestige to the nation. It is hoped that it will become the hallmark for Indian technological excellence in the years to come.

The award consists of a cash prize of Rs 10 lakh, a citation and a shield. It 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. For the year 2004, CSIR received 117 nominations, out of which 'Midas Communications Technologies Private Limited' was selected for the award.

CITATION

The 'Midas Communications Technologies Private Limited' has been conferred with the CSIR Diamond Jubilee Technology Award 2004 for design, development and commercialization of corDECT WLL (Wireless in Local Loop) access system and optiMA, a Fiber-in-Local Loop (FLL) access system. Midas Communication developed these

products in collaboration with TeNeT (Telecommunication and Computer Network), IIT Madras (Chennai).

The Midas systems provide a flexible solution for extending subscriber service from local exchange to a remote location near subscriber premises. The Fibre-in-the Loop system and the designed architecture carry very high bandwidth to cater to several thousand subscribers cost effectively. The systems have contributed greatly in providing affordable and cutting edge telecom solutions to interconnect the rural population through Internet and voice connectivity. These products have contributed to transform the telecommunication services in India and abroad. These are employed by leading communication service providers in the country. The quality product has enabled the company to make inroads into several countries including Argentina, Brazil, Egypt, Iran, Kenya, Nigeria, Oman, South Africa, Srilanka and Russia. The continued R&D efforts have helped Midas to maintain their lead in the area.



Shri Shirish Purohit, CEO of MCTPL, Chennai, receiving the CSIR Diamond Jubilee Technology Award Shield

Shri Shirish Purohit, CEO of MCTPL, Chennai responds

SHRISHirish Purohit, CEO of MCTPL, Chennai, in his brief response, expressed happiness at receiving the Award. He said, he was 'humbled by the acknowledgement of a grand vision of a technology designed from scratch.' He said, 'Midas has broken new ground to bring broadband to the masses. It is the largest exporter of telecom equipment.' He placed on record his thanks for 'the sustained support received from the S&T community, the policy makers, the visionary leaders and support from all personnel.' His promise to 'Make India a telecom technology powerhouse,' was greeted with enthusiastic response from an appreciative audience.



Shri Shirish Purohit, CEO of MCTPL, delivering his address

Shanti Swarup Bhatnagar Prize For Science And Technology 2004

CITATIONS

Biological Sciences

Dr Gopal Chandra Kundu

Dr Gopal Chandra Kundu of the National Centre for Cell Science, Pune, has made outstanding contributions which have resulted in the molecular dissection of the regulation of metastatic potential of melanoma and breast cancers by a chemokine like, extra-cellular matrix protein – osteopontin. He has further demonstrated the existence of a novel signaling pathway that involves protein tyrosine kinase in regulating the motility of breast cancer cells.

And

Dr Ramesh Venkata Sonti

Dr Ramesh Venkata Sonti of the Centre for Cellular & Molecular Biology, Hyderabad, has made outstanding contributions in the area of plant-pathogen interactions. His work has led to the identification of novel virulence genes which led to a better understanding of pathogenic function of these genes. This has also provided insight into the different ways by which host plant specialization might be achieved. His work on marker-assisted breeding has led to the incorporation of disease resistance

characteristics into the genetic background of the commercially important Samba Mahsuri rice variety.

Chemical Sciences

Dr Vinod Kumar Singh

Dr Vinod Kumar Singh of the Indian Institute of Technology, Kanpur, has made significant contributions to asymmetric synthesis, especially for enantio-selective reactions using rationally designed chiral ligands.

And

Dr Siva Umopathy

Dr Siva Umopathy of the Indian Institute of Science, Bangalore, has made significant contributions to the area of laser spectroscopy, in particular Raman spectroscopy, in the investigation of molecular dynamics.

Engineering Sciences

Dr Subhasis Chaudhuri

Dr Subhasis Chaudhuri of the Indian Institute of Technology, Bombay (Mumbai), has done seminal work in the area of computer vision. He has developed sophisticated techniques for obtaining the super-resolved depth map from defocus. His work has

been used in many different areas, such as cytology, microscopy, material, biomedical and pharmaceutical sciences. He pioneered the research area called motion-free super-resolution.

And

Dr Vivek Vinayak Ranade

Dr Vivek Vinayak Ranade of the National Chemical Laboratory, Pune, has made important contributions in advancing understanding of bubble column, stirred and trickle bed reactors by developing various novel CFD models. The models have helped in predicting unsteady as well as time-averaged flow characteristics of chemical reactors. They have provided new insights about multiphase systems and helped to achieve significant performance enhancements in industrial practice.

Mathematical Sciences

Dr Arup Bose

Dr Arup Bose of the Indian Statistical Institute, Kolkata, has made significant contributions to the second order accuracy of the bootstrap for dependent models. His work on resampling has provided new and robust techniques for a variety of models; these provide deep understanding of the bootstrap from theoretical as well as applied point of view.

And

Dr Sujatha Ramdorai

Dr Sujatha Ramdorai of the Tata Institute of Fundamental Research, Mumbai, has made significant contributions to the areas of Witt groups and levels of varieties, unramified cohomology of quadrics, Hasse principles and Iwasawa theory of p-adic representations.

Medical Sciences

Dr Chetan Eknath Chitnis

Dr Chetan Eknath Chitnis of the International Centre for Genetic Engineering and Biotechnology, New Delhi, has done significant work in identification and mapping of receptor-ligand interactions involved in red cell invasion and cyto-adherence by malaria parasites. He has also used this knowledge to develop novel vaccine concepts for Plasmodium vivax and Plasmodium falciparum malaria that have been taken up for further development.

Physical Sciences

Dr Madan Rao

Dr Madan Rao of the Raman Research Institute, Bangalore's, contributions include non-equilibrium properties of membranes, martensite transformation and important issues in biological physics such as chirality-induced budding and dynamics of intracellular trafficking.



Bhatnagar Prize-winners (2004) with Dr Mannohan Singh, Shri Kapil Sibal and Dr R.A. Mashelkar



Shanti Swarup Bhatnagar Prizes 2005

CITATIONS

Biological Sciences

Dr Tapas Kumar Kundu

Dr Tapas Kumar Kundu of the Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, has done outstanding research in the area of chromatin transcription. He has identified PC4 as a functional component of chromatin and as a unique activator of P53. He has also established the role of acetylation in chromatin transcription and histone chaperone activity, besides using this process for identifying new drug candidates.

And

Dr Shekhar Chintamani Mande

Dr Shekhar Chintamani Mande of the Centre for DNA Fingerprinting and Diagnostics, Hyderabad, has contributed very richly to the area of structural biology of proteins. His studies have thrown light on the unrecognized function of chaperonin-10 of Mycobacterium tuberculosis. His studies have provided unusual insights to the mechanism of action of heat shock proteins and those involved in oxidative stress from M. tuberculosis.

Chemical Sciences

Dr Samaresh Bhattacharya

Dr Samaresh Bhattacharya of the Jadavpur University, Kolkata, has made outstanding contributions to the platinum group coordination compounds and their applications to activation of organic molecules.

And

Dr S. Ramakrishnan

Dr S. Ramakrishnan of the Indian Institute of Science, Bangalore, has made outstanding contributions to the area of design and synthesis of controlled polymer structures with a view to confer on such materials specific property.

Earth, Atmosphere, Ocean and Planetary Sciences

Dr Nibir Mandal

Dr Nibir Mandal of the Jadavpur University, Kolkata, has made fundamental contributions in experimental, theoretical and field-related studies towards elucidating the evolution of geological structures.

Engineering Sciences

Dr Kalyanmoy Deb

Dr Kalyanmoy Deb of the Indian Institute of Technology, Kanpur, has made fundamental contributions to the development of multi-objective evolution algorithms and their applications to a number of complex engineering problems.

And

Dr Valipe Ramgopal Rao

Dr Valipe Ramgopal Rao of the Indian Institute of Technology Bombay, (Mumbai), has made outstanding contributions to the area of silicon CMOS device design and optimization, using single halo (SH) or lateral asymmetric channel (LAC) technologies, and their impact on analog/RF circuits.

Mathematical Sciences

Dr Probal Chaudhuri

Dr Probal Chaudhuri of the Indian Statistical Institute, Kolkata, has made outstanding contributions to diverse areas of theoretical and applied statistics. His work ranges from statistical smoothing in non-parametric estimation and a multi-scale approach in statistical pattern

recognition to the exploratory analysis of large DNA sequences.

And

Dr Kapil Hari Paranjape

Dr Kapil Hari Paranjape of the Institute of Mathematical Sciences, Chennai, has made outstanding contributions to the field of algebraic geometry, especially the theory of algebraic cycles. He has made highly significant contributions in connecting Hodge Theory to the study of Chow Groups. He has also established deep relations between Calabi-Yau varieties and modular forms.

Medical Sciences

Dr Javed Naim Agrewala

Dr Javed Naim Agrewala of the Institute of Microbial Technology, Chandigarh, has made significant contributions in understanding of the bidirectional regulation of Th1 and Th2 cells. He has developed a novel and unique vaccination strategy for inducing protective immunity in Mycobacterium tuberculosis infection.

Physical Sciences

Dr Sandip Parimal Trivedi

Dr Sandip Parimal Trivedi of the Tata Institute of Fundamental Research, Mumbai, has made pioneering contribution towards the resolution in string theory of the cosmological problem of an accelerating universe and providing a credible mechanism for generating a small, positive cosmological constant.



Bhatnagar Prize-winners (2005) with Dr Mannohan Singh, Shri Kapil Sibal and Dr R.A. Mashelkar

Bhatnagar Laureates (2004) Symposium

THE Bhatnagar Laureates symposium is a forum where the best of Indian sci-ence can be glimpsed and heard under one roof. It is therefore not a surprise that in his Welcome Address, Dr R. A. Mashelkar expressed his wish that the young researchers take every advantage of the presentations made here today. It was evident that his concern was that the knowledge of the Shanti Swarup Bhatnagar Prize winners should percolate down and make fertile the impressionable young minds. That echoes of the interaction here today linger on. That today's teachers should open the windows of the minds to show beginners glimpses of new horizons that are waiting to be discovered and explored by the scientists of tomorrow. Referring to Shri Ashok Jhunjunwala, Chairperson for the Engineering Sciences section, Dr Mashelkar said that he was a 'Role model who demonstrated the concept of connecting the unconnected and reaching the unreachd.' Dr Jhunjunwala said that computer vision is an area in which a boom is about to take place shortly.

Dr Subhasis Chaudhuri, IIT-Bombay (Mumbai), presented the first talk of the afternoon. His lecture was distinguished by extreme simplicity of language and lucidity of expression. It effectively masked the sophistication and complexity of his scientific endeavors. Dr Chaudhuri spoke on 'Image Retrieval: From Mining to

Environment Description.'

Dr Vivek Vinayak Ranade, NCL, Pune, spoke on 'Reactor, Process & Product Engineering via Flow Modelling.' He began by pointing out that every field is touched by chemical industry/engineering. The fields are diverse —Energy/power, Automobiles/Aerospace, Materials, Computer chips, Pharmaceuticals/Healthcare/Agrochemicals, Food and Biotechnology being some representative sectors. He said that the final aim could be summed up in one sentence, 'Designing of process equipment to transform cheaper raw material into value-added products without compromising safety, environment and economics'. 'The question was how to have better engineering. Computer models that could predict what could/should happen for a specific design thereby steering the design in promising directions would no doubt be on every engineer's wish list. He detailed the work being carried out at the National Chemical Laboratory (NCL), Pune. He elaborated on the fluid dynamics of multiphase reactors and applications to Industrial practice/products. He explained about Bubble column reactors in detail as also its application in Industry. In continuation, he went on to detail the continuous stirred reactors, gas-liquid stirred reactors, SAN reactors and Trickle bed reactors. He said that multi-scale modelling capabilities were developed and

that there is tremendous potential for creative use of these modes for better reactor, process and product engineering.

In the Physical Sciences section, Dr Madan Rao, RRI, Bangalore presented a talk entitled 'Need for an Interdisciplinary Approach to Cell-Biology.'

Prof. Maithili Sharan chaired the Mathematical Sciences section.

Dr Arup Bose, Indian Statistical Institute, Kolkata, gave an extremely erudite presentation entitled, 'Resampling in Dependent Models.'

Dr Sujatha Ramdorai, Tata 'Institute of Fundamental Research, Mumbai, the only lady winner of the Shanti Swarup Bhatnagar Prizes for the year presented the next talk. It was entitled, 'Elliptical curves and number theory.'

Dr K. N. Ganesh was the Chairperson for the Chemical Sciences section.

Dr Vinod Kumar Singh, IIT, Kanpur, gave the first of the two talks presented in this section. His topic was 'Chirality Transfer in Asymmetric Synthesis.'

Dr Siva Umaphy, Indian Institute of Science, Bangalore, spoke on 'Studies on Possible Routes of Isomerisation in Transazobenzene.' His talk largely centred on Raman spectroscopy and lasers used to study the structural dynamics of a molecule. He briefly touched on solvent effect. He also spoke on the potential applications in Biology of Raman

spectroscopy.

Dr Kanuri V. S. Rao was the Chairperson of the Medical Sciences and also the Biological Sciences section.

Dr Chetan E. Chitnis, ICGEB, New Delhi, presented a talk entitled 'Molecular Interactions in Red Cell Invasion by Malaria Parasites and Vaccine Development.'

Two talks were delivered in the Biological Sciences section.

Dr Gopal Chandra Kundu, NCCS, Pune, delivered the talk entitled 'Deciphering the molecular mechanism of tumour progression, angiogenesis and metastasis by osteopontin, a member of SIBLING gene family.' He dwelt at length on the structure and function of osteopontin and the fact that cancer progression depends on an accumulation of metastasis. The importance of this work became clear as the statistics were quoted. Each year 10 million people are diagnosed with cancer globally and it is expected that by 2020 there will be 15 million people with cancer. There are 6 million deaths a year, about 12 per cent of total deaths worldwide.

Dr Ramesh V. Sonti, Centre for Cellular and Molecular Biology, Hyderabad, delivered the last talk of the evening with great panache. The topic of his talk was 'Attack and Defense in Pathogen-plant Interactions'. Closing Remarks were addressed by Dr Kanuri V. S. Rao.

CGCRI signs Agreement with NeST



Dr H. S. Maiti, Director, CGCRI, and Shri U. M. Shafi, Sr. Corporate Vice President, NeST, exchanging the documents of MoU after signing

THE Central Glass & Ceramic Research Institute (CGCRI), Kolkata, has developed optical amplifier for optical fibre network in collaboration with its industrial partner Network Systems Technology (NeST), Cochin. The amplifier is designed using CGCRI made erbium doped optical fibre.

The amplifier gain block has all the necessary controls and a computer interface commensurate with cable TV (CATV) network. The process developed at CGCRI will help implementing in future Fibre to the Home (FTTH) technology in India.

The amplifier, a key component of CATV networks, is an assembly of a special kind of optical fibre and a series of electronic inputs which, when fitted intermittently along cable lines, restores energy loss during transmission and ensures high quality picture, sound and connectivity. On this process, a commercial agreement has been signed between NeST, Cochin, and

CGCRI, Kolkata. Dr Javad K. Hassan, Chairman, NeST Group of Companies along with his team members were present on this occasion. Shri B Bhattacharjee, Special Adviser to Chairman, Atomic Energy Commission and Chairman, CGCRI Research Council, Shri S N Sharma, Head, R&D Planning Division, CSIR, Shri R S Buttoo, Sr. Director & Head, Photonics Division, Department of Information Technology, Government of India, Shri U. M. Shafi, Sr. Corporate Vice President, NeST and Dr K Suresh Nair, Director, R&D, NeST were also present.

Welcoming the dignitaries, Dr H. S. Maiti, Director, CGCRI expressed that it was a remarkable day for the institute and the MoU will bear a mark of close research-industry linkage in our country conducted in public-private partnership mode. This is a great contribution of CGCRI to industry public-private partnership mode.

"This is a great contribution of CGCRI to industry in a total packaged system," he added. He also narrated the future programmes of the institute on R&D and its applications in industry. Dr Javad K Hassan, Chairman, NeST Group of Companies thanked all who participated in developing this entertainment and information technology indigenously suitable for use in the strategic sectors also. Shri B Bhattacharjee, Special Adviser to the Chairman, Atomic Energy Commission and Chairman, CGCRI Research Council in his deliberation welcomed the team members of NeST. He also congratulated the scientists of CGCRI as well as those of NeST led by their Chief of R&D Dr Suresh Nair, a member of CGCRI Research Council.

First Prof. A. S. Paintal Memorial Lecture at NPL

THE National Physical Laboratory (NPL), New Delhi, and the Society for Scientific Values (SSV) organized the First Memorial Lecture to pay tribute to Prof. A.S. Paintal, FRS, FNA Founder President of SSV and former Director General of Indian Council of Medical Research in the NPL auditorium. The lecture entitled 'Responsibility & Ethics in Science & Technology' was delivered by Prof. M.G.K. Menon, FRS, FNA. Prof. Paintal, a Past-President of the Indian National Science Academy, was a towering figure in Indian science, distinguished for his contribution to the field of physiology.

This memorial lecture was attended by about 450 scientists, technocrats and young researchers, from NPL and also from many other institutions from Delhi and elsewhere. Prof. A.R. Verma, Dr A.P. Mitra, Prof. S.K. Joshi and other distinguished personalities were present on the occasion. Dr R.K. Kotnala, senior scientist, NPL, felicitated Prof. M. G. K. Menon. Then followed the welcome address of Prof. Vikram Kumar, Director, NPL. He laid stress on morality and ethics being practiced judiciously by scientists on their own.

Prof. K.L. Chopra, President of the Society for Scientific Values introduced the distinguished speaker complimenting him on his well-known leading role in science and technology. Prof. K.L. Chopra emphasized that ethical issues were becoming a matter of global as well as



Prof. M.G.K. Menon, FRS, FNA, delivering the Prof. A. S. Paintal Memorial Lecture at NPL

national concern, as the knowledge society and related economic aspects continue to grow. He proposed that a National Science and Technology Ethics Committee be created in the country.

Prof. Menon opened his lecture by stating that the title of his talk was identical to that of the Inter-Academy Committee set up by the Indian National Science Academy, (when Prof. M.S. Valiathan was the President). This Panel consists of representatives of all the three academies of science in India as well as the Academies of Agriculture, Engineering and Medicine. Prof. P.N. Tandon is the Co-Chairman.

Prof. Menon said that the committee was dealing with ethical aspects that come up in a variety of fields in science and technology: agriculture, biological sciences, environment, engineering sciences, education and research, energy, food security, health

care (including medical ethics and drug delivery systems) information technology, space and water. This was somewhat the coverage of areas that was being handled by the Committee on Ethics in Science and Technology (COMEST) constituted by UNESCO. The main difference between what COMEST is doing and what the Inter-Academy Panel has worked on, is that we are approaching these issues from the viewpoint of the developing countries, particularly India which are at a different stage of development and characterized by different cultural traditions. The reason for handling this wide range of subjects is because issues relating to ethics arise in all of these, whereas academics very often think that ethical issues in science are largely those faced in education and research.

Prof. Menon pointed out that ethics covers morals, moral principles and rules of behaviour. It essentially attempts to distinguish right from wrong; this cannot be something absolute and calls for judgments grounded in values. There are aspects of human rights, human dignity, equity, social justice, privacy and confidentiality and distributive justice that have to be kept in view. One has to ensure harmony with nature, culture, traditions and religion, respect for the law, protect the interests of the underprivileged and weaker sections, and ensure that the implications of actions should not be disastrous for the future.

Many of the underlying relevant value systems are essentially embedded in civilizational cultures and religions;

but the latter have often become synonymous with ritual and fundamentalism.

Prof. Menon said that, based on the report of a High Level Committee, President Clinton had given his Presidential finding on research misconduct. In this area we are concerned with issues of fabrication, falsification, plagiarism, credit-not-due, and such aspects. He mentioned that issues of ethics came to the fore in a stark manner after the atomic bombings in 1945; since then, the area of weapons of mass destruction have occupied centre stage. More recently, issues of climate change have arisen which pose issues of equity. In the health sector, there is the need for ensuring the greatest good for the largest number. With increasing commercialization in a market economy, and the advance towards a knowledge society, knowledge is fast becoming intellectual property; this gives rise to many contentious issues that bear on the very conduct of science e.g. openness, transparency etc. It is, therefore, important to look at the fundamental principles underpinning all of this. Prof. Menon gave many examples from different areas to illustrate his

basic thesis relating to the need for inculcating right value systems amongst all – in educational institutions, professional bodies and society at large. Thus, legal sanctions relating to ultrasound clinics, and harassment of those involved, will not stop the abortion of the female child; social values are responsible for this demand by society. Again, drinking water cannot be treated as a commercial activity, since denial of water constitutes denial of life. Prof. Menon emphasized the need for major programmes of awareness involving the public as well as the education system, concerning ethical values, and the need for institutional set-ups at various levels with, a high level National Science and Technology Ethics Committee, as an apex body, as proposed by the society for Scientific Values. These bodies can examine the issues and cases that arise, monitor the developments and see that action is taken where there are blatant violations.

At the end of the illuminating talk, Dr N. Raguram, GGS, IP University, extended the vote of thanks to the speaker, and all present.

NAAS Fellowship for Dr R.K. Jain



DR Rakesh K. Jain, Scientist F, Institute of Microbial Technology, Chandigarh, has been honoured with the Fellowship of National Academy of Agricultural Sciences (NAAS), New Delhi. The fellowship was recently conferred upon Dr Jain by Prof. M.S. Swaminathan, President, NAAS at a special function of the Academy at New Delhi.

**Dr (Smt) Suman Lata Jain,
selected for award of
INSA Medal for
Young Scientist, 2005.**

THIS prestigious award INSA Medal is given by Indian National Science Academy to the brilliant young scientists as adjudged from their outputs. For the year 2005 Dr (Smt) Suman Lata Jain, Research Associate, Indian Institute of Petroleum (IIP), Dehra Dun has been selected for this award which carries a Bronze Medal and a cash prize of Rs 25,000. In addition the recipient is considered for start up research support with seed money. Within five year of receipt of award, the awardee is also considered for a visit abroad with full support for presenting research work at conferences or participating in collaborative training research projects. Dr (Smt) Jain is working in Synthetic Organic Chemistry Area of Chemical and Biotechnology Division (CBD) of the Institute. Earlier she completed Ph.D. Degree on 'Studies on Transition Metal Catalysed Synthetic Transformation' awarded by H.N.B. Garhwal University while working as Senior Research Fellow (SRF) in IIP. During 6 years research tenure at IIP she has published 28 research papers in international journals with total impact factor 62.25 coming to average impact factor 2.22. She has also presented seven papers in various conferences. Dr (Smt) Jain has developed a number of new synthetic methodologies related to oxidations using environ-economic oxidants such as molecular oxygen, hydrogen peroxide etc. and for carbon-carbon and carbon-nitrogen bond formation which have direct relevance to petrochemicals and specialty chemicals. Award will be presented to Dr Jain by the INSA President during the INSA Anniversary General Meeting in December 2005 to be held at Hyderabad.

**Dr Alok Dhawan
awarded
Shakuntala Amir
Chand Award**

DR Alok Dhawan, Scientist, Industrial Toxicology Research Centre (ITRC), Lucknow, has been awarded the Shakuntala Amir Chand Award of Indian Council of Medical Research for the year 2002, for his work on 'Genetic and Neurotoxicology' at a glittering ceremony held at Vigyan Bhawan, New Delhi. This award was instituted in 1953 by late Major General Amir Chand for significant research contributions by young scientists in biomedical sciences. Dr Alok Dhawan has made pioneering contributions in the upcoming area of modern toxicology. His contributions have far reaching clinical applications in monitoring the adverse health effects of drugs and chemicals on human health. In recognition of his work, Dr Dhawan has also been awarded the INSA medal for Young Scientist and CSIR Young Scientist Award.

**Dr Srivari
Chandrasekhar gets
A.V. Rama Rao
Research
Foundation Award**

DR Srivari Chandrasekhar, Scientist E-II, Organic Chemistry-II Division, Indian Institute of Chemical Technology (IICT), Hyderabad, has bagged the prestigious A.V. Rama Rao Research Foundation Young Scientist Award-2004 for his significant contributions to the field of organic synthesis, development of anti-cancer chemicals, etc. The Award carries a cash prize of Rs 25,000 and a memento. Dr Chandrasekhar's research interests include: Total synthesis of biologically important natural products, Development of new methodologies, Multi-component reactions in polyethylene glycol, Solid supported and solid state organic chemistry, Combinatorial chemistry, etc. He has published 113 research papers and five students have been awarded Ph. D. under his guidance. He is also the recipient of a number of other prestigious awards and fellowships such as the INSA Medal for Young Scientist (1996), CSIR Young Scientist Award (1997), Alexander von Humboldt Fellowship (2000) and the B.M. Birla Science Prize (2001).