PM's speech at the Shanti Swaroop Bhatnagar Awards ceremony

September 13, 2004

New Delhi

"I am happy to be amongst you at a function to honour some of the most creative and dedicated people in the field of science and technology.

Let me begin by congratulating the winners of the Shanti Swaroop Bhatnagar Prize for 2003. I am confident that the recognition implicit in receiving the nation's most prestigious prize in the field of science will inspire the awardees to still greater achievements in future. Many distinguished winners of this award have gone on to achieve new laurels. Therefore, I have full confidence that today's winners will realise the great responsibility placed upon them to continue to climb on the limitless ladder of excellence and creativity.

I am also happy to congratulate Mr. Ratan Tata and his entire team, who have won the CSIR's first Diamond Jubilee Technology Award. The design, development, fabrication and launch of *Indica* was a major milestone in Indian auto industry. It is a matter of great pride for all of us today that an Indian *Indica* is being sold in the British market as *City Rover!* Tata's *Indica* achievement is a tribute to Indian creativity, enterprise and team spirit, as well as to the dynamism of the Tata Group, led by Mr. Ratan Tata.

Our technological prowess on the ground, as it were, is now being matched in the air: the inaugural flight of an indigenously designed and built civilian aircraft, SARAS, took place only last month. This is a great moment for our domestic civil aircraft industry. I am sure and hope that house of Tata will be in the forefront of national efforts to put us on the map of civil aviation industry as well. To me, SARAS is not an aircraft, just as *Indica* is not a car. Both stand for India's determination to win in the global technology race. It is this spirit that must propel us forward.

As I look around us, I am concerned that ours is a country of sharp contrasts and contradictions. On the one hand, we take satisfaction from the fact that over 100 global companies have come to India to set up R&D Centres, affirming the intellectual capital of our scientific and engineering community. But at the same time, it is saddening to note that science is no longer an automatic choice for our best and brightest students. Even amongst those who do opt for the science stream at the University level, many do not pursue a career in science. We must redouble our efforts to make science an attractive career for our young people.

There are other contrasts. I find that whereas we pride ourselves in launching the most advanced satellites, thousands of our villages continue to lack drinking water. While we see ourselves as an IT superpower, 200 million of our people remain illiterate. The great challenge facing us is to make high technology work for the poor. For this, we need a concerted efforts combining the creativity and energy of all sections of our society.

Indian science and technology must make a greater difference to the lives of our people. This requires not just more Government investment in science and technology, though it is a must, but also more private investment in R&D and innovation. The visible changes in a variety of sectors, from pharmaceuticals and biotechnology to the automotive industry, are of course very refreshing. They are indications of shape of things to come. These efforts should be multiplied manifold.

Last week, I was informed of a breakthrough discovery, of a new molecule to treat a dreadful disease like Tuberculosis. I am told this is the first new molecule to appear since 1963. This achievement is entirely due to a unique public-private partnership between manufacturing firms and public institutions, through CSIR's New Millennium Technology initiatives. Since tuberculosis takes a toll of 5 lakh lives each year in

our country, this discovery could be of immense social & economic significance. We need more partnerships that create leadership for industry while helping the nation combat problems of the common man, such as disease.

I assure you that in so far our government has a role, our Government is fully committed to give science and technology a place of pride in all our national endeavours. I wish to take this opportunity to share with you a few specific thoughts and our Government's ideas on contemporary science, technology, medicine and agriculture in India.

Let me recall what Louis Pasteur said in 1871. He said, "There does not exist a category of science to which one can give the name applied science. There are science and the applications of science, bound together as the fruit of the tree which bears it". This has historically been characteristic of our approach in India, as exemplified by the work of J.C. Bose, Satyen Bose, P.C. Ray, C.V. Raman, Birban Sahni, P. Maheshwari, S. Ramanujam, P.C. Mahalanobis, C.R. Rao, G.N. Ramachandran or S.S. Bhatnagar, in whose names the prizes awarded today have been instituted. These men of learning have carried forward, in an unbroken chain, the true intellectual heritage of our country – the quest for knowledge. In my view, where there is good science, good applications follow. It is fundamental chemistry that gave us catalysts, polymers, semiconductors and nanomaterials. It is good biology that gave us the green revolution and the hepatitis vaccines. Therefore, I wish to set at rest today the debate about what our priority should be – basic or applied science. I think the answer is both. We need to have both basic and applied knowledge, and the ability to utilise them to the best advantage of our national effort. It will be our endeavour to promote good science, and useful applications will emerge from it.

I am told the Rand Corporation has classified 22 of 192 nations of the world as scientifically advanced, 24 as scientifically proficient, 40 as scientifically developing and the rest as deficient. India is ranked among the scientifically proficient nations. We must ask ourselves how we move from the 'scientifically proficient' category to the rank of scientifically advanced nations. Jawaharlal Nehru said fifty-one years ago, 'The modern world is a world of science. Whatever the sphere of life we examine, we find we cannot live without science. That is why we have determined that our country should progress in science. We should produce high-class scientists. We require them in thousands. Only then our country will progress'. It is clear that Nehru's dream of 'scientists by the thousands' must be realised if we are to become a scientifically advanced nation. What will make India so? More funding and less restrictions. This is what our Government aims to do.

Science must grapple with the key challenges facing the country today. These include the pressures of increasing population, greater health risks, changing demographics, degraded natural resources, and dwindling farmlands. We need new science and technologies, new priorities and new paradigms to address these fundamental challenges. We in India are practising new physics and new chemistry to make new materials. These are of direct relevance to the Millennium Development Goals of the United Nations. We need to underline and emphasise our priorities in all these areas.

Ultimately, all research efforts require not just policy statements and encouragement, but funding. I am keenly aware that we must commit more resources to science and technology to emerge as a scientifically advanced nation by the year 2020. As Jawaharlal Nehru said in 1961, 'It is science alone that can solve the problems of hunger and poverty, insanitation and illiteracy, of superstition and deadening custom and tradition, of vast resources running to waste, of a rich country inhabited by starving people…Who indeed could afford to ignore science today? At every turn we have to seek its aid…the future belongs to science and to those who make friends with science'.

Yet due to the deteriorating health of our Universities in the past two decades, our scientific research base has not grown fast enough, commensurate with our need. While a few good scientific institutions have come up in recent years, they cannot be a substitute for the spread, vitality and vibrancy of the university system. Reconstruction of our university system must be a top priority and the issue has to be addressed comprehensively, not in a piecemeal fashion.

New strategies need to be developed to induct, nurture and retain young talent in the science stream. In particular, science and education at 10+2 and undergraduate levels need special attention. Approaches that harmonise the professional satisfaction of a creative endeavour with reasonable financial compensation must be put into shape. Every effort should be made to broad-base career opportunities in private and public R&D as well as in the university system. A provision for creating special positions and giving monetary incentives should be made, to retain high quality talent in S&T.

Many S&T initiatives in the past seem have grown in isolation, due to limitations that prevent the university system from absorbing them. We need to have a fresh look at the linkages between our national laboratories and the university system. As far as possible, future S&T programmes and initiatives should seek to strengthen the base, that is, our university system. We must also modernise many of the instruments, which support research, to make them relevant to our present context. There is an urgent need to either drastically restructure them or create new, responsive, independent and forward looking entities.

Issues related to sustainable development offer challenges in the form of 'new science and technology' for the 21st century. It provides a great opportunity for bringing synergy between various S&T disciplines and can be a forum for confluence of different knowledge streams. A holistic, research driven approach to 'science for sustainable development' can be of great benefit in addressing issues of poverty, employment, energy and environment that are very relevant to our country.

Finally, there is an under-explored international dimension to S&T in our country. This pertains to engaging with the developing world. Developing countries seek to benefit from our experience in building a good base in R&D. There is a great opportunity for us to increase our presence, influence and future trade prospects in the developing world by strengthening S&T linkages through cooperation and networking. These can be achieved through a mix of governmental outreach and academic and non-governmental contacts. Special attention should be given to forging new collaborative programmes and research links, particularly with countries in Africa, Central Asia and our neighbourhood.

Let me conclude by making a few specific commitments for our government.

- I reaffirm of India's commitment to basic science, applied science and the promotion of excellence.
- A commitment to rebuild the science base in the universities. This will include creating synergy between new initiatives in S&T and our university system.
- A commitment to promote public-private partnerships vigorously, to increase funding for frontier areas of scientific research.
- A commitment to the assurance of autonomy, accountability and de-bureaucratisation of S&T institutions.
- A commitment to restructure our S&T support systems.
- A commitment to create career opportunities and the potential for retaining talent in the S&T sector.

Science and technology is an area of special concern for our Government. I want to renew the commitment that our great leaders like Jawaharlal Nehru and Indiraji made to the development of science and technology in India. We have had a rich tradition of building a modern world-class knowledge economy in an economically developing country. Perhaps in recent times we have not done enough. But I am convinced that our country's future and the prosperity of our people are vitally dependent upon the development of science and technology and the harnessing of the gains of S&T for development. Equally, we must renew our commitment to fostering a scientific temper among the people so that we are able to deal with the challenges at hand in a rational and reasonable manner. In this context, I propose to constitute a Science Advisory Council to the Prime Minister, to be headed by a very distinguished scientist. The SAC will advise us on strategies, policies and programmes for the development and utilisation of science and technology as an essential input for all our developmental processes.

With these words, let me conclude by wishing you well. I hope that with your commitment and scholarship, you will take our country to greater heights of excellence through creative endeavour."