



President of India Dr A.P.J. Abdul Kalam dedicates LaCONES to the Nation

President of India Dr A. P. J. Abdul Kalam visited and dedicated the Laboratory for the Conservation of Endangered Species (LaCONES) to the Nation for the Cause of Conservation on 1 February 2007. He also released the book *You Deserve, We Conserve — A Biotechnological Approach to Wildlife Conservation* authored by Dr M.W. Pandit, Dr S. Shivaji and Dr Lalji Singh and published by I K International, New Delhi.



President of India Dr A.P.J. Abdul Kalam dedicating LaCONES to the Nation.
Seen with him is CCMB Director, Dr Lalji Singh

India is home to enormous biodiversity. However, destruction of forest areas is causing fragmentation of habitats of wild animals and is threatening the very survival of big cats like lions, tigers and leopards, especially because these animals require huge area for sustaining a certain minimum number. Fragmentation is also causing inbreeding of animals, leading to reduction in their genetic diversity, ultimately making them sterile and paving the path to extinction.



After examining various alternatives and working out scientific strategies to tackle this problem with biotechnological intervention, Centre for Cellular and Molecular Biology (CCMB), Hyderabad, is pursuing a major and unique research programme with the Central Zoo Authority of India (CZA), Department of Biotechnology (DBT), Council of Scientific & Industrial Research (CSIR) and the Government of Andhra Pradesh as its partners. The Government of Andhra Pradesh allotted seven acres of land and CCMB constructed LaCONES at Attapur under the leadership of Dr Lalji Singh, Director, CCMB and Dr S. Shivaji, Group Leader, CCMB as its Principal Investigator, essentially to deal with the issues related to the conservation of biodiversity among the wildlife.

LaCONES has already started making its international presence felt and has been honoured as a Member of the International Consortium of the Frozen Ark – an international depository of DNA representing the Indian subcontinent.

Even if a species becomes extinct, the DNA and the viable cells that LaCONES is storing in the Frozen Ark freezers will be of inestimable value in reconstructing the evolutionary history of Indian wildlife.

NATURE AND ITS UNIQUE CREATIONS

Address by President of India Dr A.P.J. Abdul Kalam during dedication of LaCONES to the Nation

Nurture Nature for Future

I am happy to participate in the dedication of the Laboratory for the Conservation of Endangered Species (LaCONES), Hyderabad, which is a unique inter institutional research mission, supported by the Central Zoo Authority of India, the Department of Biotechnology, Council of Scientific and Industrial Research and the Government of Andhra Pradesh. It is apt that the project proposes to deal with conservation of biodiversity among wild life including their preservation through biotechnological intervention. The food system world over uses plant genes as a means to provide quality food. Similarly, the importance of animal genetic resources is also recognized world over and being used for improving the productivity and nutritional value of food and other

products. The need for conserving and preserving wild animals and forest species will be fulfilled by the laboratories like Laboratory for Conservation of Endangered Species. Of course LaCONES is indeed a project of CCMB. Contribution of CCMB is well known in understanding that nature has hidden species and specific codes of signatures in a small fragment of gene. The CCMB scientists have also developed primers to decode molecular signatures from samples and have created database of signatures of over 2000 animal species. I congratulate Dr Lalji Singh and his team of scientists and staff for many achievements in the field of Life Sciences. I would like to share with you few thoughts on “Nature and its unique creations”.

My experience with Olive Ridley Turtle

It was interesting to find from the LaCONES write up, that Olive Ridley turtles are the ancestors to other known Ridley turtle species. I thought of sharing with you about my experience with Olive Ridley turtles in Orissa coast. In my previous assignment, I was leading a missile team and established a launch complex in the Wheeler Islands. While working on the launch complex, I received a message from Prof Padma Hejmadi, a Conservationist saying that the lights in the range created problems in hatching of the Olive Ridley turtle. I invited her. We discussed and studied the problem with our team. To my surprise, we found that the neighbouring wheeler island was full of Olive Ridley turtles which had



come for hatching from thousands of kms. Olive Ridley turtles lay large number of eggs probably with the hope that at least few will survive after the attack from the birds and movement of people on beach! The hatched young ones and mothers go back to sea. We took number of facilitating measures such as controlled lighting whenever needed and reducing the movement of people and vehicles on the beach. This really enabled unhindered propagation of Olive Ridley turtles. Thus I started liking the promotion mission of Olive Ridley turtle. Certain government regulations were also promulgated regarding the type of permissible fishing nets and prohibition of catching Olive Ridley turtles.

We have a dream to generate an experimental turtle rookery that can be used for attracting endangered species such as Olive Ridley turtles or their relatives in one of our islands. This scientific endeavour can be undertaken as a joint venture among LaCONES of CSIR, DRDO, ecologists and biologists involved in conservation of rare and endangered species for promoting an eco-friendly environment with the use of scientific and technological experience. This partnership will enable LaCONES to conduct further research on life pattern of Olive Ridley turtles, movement pattern of thousands of



Dr Lalji Singh, Director, CCMB, explaining the activities of Laboratory for the Conservation of Endangered Species (LaCONES) to President Dr A. P. J. Abdul Kalam

kms for hatching, their navigational abilities and their continued evolution. This will be an important research contribution to the world on turtles.

Phillip Tobias Lecture 2006

Now I would like to discuss another important aspect of conservation and study of human evolution propagated by Prof Philip Tobias, a renowned Paleo-anthropologist from South Africa.

Ancient human history has been revealed beautifully by Paleoanthropology. Life originated 600 million years ago and continental drift occurred 200 million years ago creating five continents. Mammals evolved 140 million years ago, Hominids that is the human type, evolved 26 million years ago but modern man only arrived on the scene some 200,000 years ago. He migrated and colonized the world only in the last 50,000 years. The spoken language

is some 10,000 years old while writing evolved only a few thousand years ago. All this phenomenal progress has been achieved only within the short span of 200 to 400 generations, that is in just 10,000 to 5,000 years.

Such a complex web of evolution of humans had always fascinated the then young Tobias. He was drawn into the study of fossils by Mary and Louis Leakey, who

asked him to write a description of a hominid skull, which they had discovered in the Olduvai Gorge in Tanzania. In 1964, with Louis Leakey and John Napier, he was the co-namer of *Homo habilis*, a new species and the first hominid with a larger brain capacity than *Australopithecus africanus*. Indeed it was the diabetes of his sister that made him to pursue genetic studies. Tobias thus was one among the earliest to provide evidence for the evolution of mankind in Africa and to think of a gene for a disease. These two instances clearly depict that the enquiring mind is ever alert for research and discovery.

Newer DNA technologies have given us better insight in retracing the history of man. 'The DNA of a human being is his history book ever written'. Nowadays intelligence, cognizance, drug response, behavioural problems every thing is related to genes: disease gene mapping is progressing



at a faster pace with new age DNA technology. It is probably during the 50,000-30,000 years of co-existence that societies have evolved adopting newer innovations and cultures.

Thus the 'Nature - Nurture' philosophy holds good even in this Genomic Era: 'Genes' what we inherit from our parents is the basis; a beautiful 'building' is built over it, be it any unique creation, the environment plays a crucial role in shaping the destiny of the individual and leading to excellence. All children when they are born are equally poised to become a great scholar.

After the lecture I was interacting with Prof Tobias and his team at Durban, Johannesburg in South Africa and San Francisco in USA and I realized the important aspects of human evolution and other species. Science is indeed borderless. The specialists of LaCONES may like to interact with

Prof. Philip Tobias. This experience will enable intensive study on conservation of certain types of endangered species and also establish some of the missing species.

My Experience in Gumoria Village

When I think of genetic research, I am reminded of my visit to Gumoria village in Assam where the self help groups members are developing duck rearing practices based on inputs from agricultural specialists from Kerala and with the initiative of the Assam Government. This has resulted in improving the economic conditions of the whole village by improving the duck productivity substantially.

Genetic Engineering

While preparing for this talk, I happened to find the question asked

by the editors of science, celebrating the inauguration of the developmental biology by Wilhelm Roux a century earlier, in the book *Consilience The Unity of Knowledge* by Edward O. Wilson. They asked one hundred contemporary researchers in the field of biology to identify what they consider crucial unanswered questions in the discipline. The responses from the scientists were (1) The molecular mechanisms of tissue and organ development, (2) The connection between development and genetic evolution, (3) The steps by which cells become committed to a particular fate, and (4) The role of cell-to-cell signaling in tissue development and few more. These questions, I am sure, in respect of endangered species, will be answered to the posterity by the scientists of LaCONES.

Tasks for LaCONES

At the national level we are faced with essentially two problems: (i) Poaching of the animals by traders for economic exploitation, and (ii) the problem of inbreeding leading to their possible extinction in future. Both of these problems are of equal concern. Adequate attention is being paid presently to the problem of poaching. LaCONES research will be a major initiative for the second aspect. I am happy that Council of Scientific and Industrial Research has recognized the importance of wild life wealth conservation and has created the laboratory for conservation of endangered species with the



A view of the Laboratory for the Conservation of Endangered Species (LaCONES)



following objectives:-

1. Monitoring of genetic variation through DNA fingerprinting
2. Cryo-preservation of semen, eggs and embryos of endangered species
3. Semen analysis to study the semen quality for selecting animals for breeding purposes
4. Determination of the time of ovulation to achieve successful intra-uterine insemination
5. Standardization of artificial insemination for wild animals
6. *In vitro* fertilization (IVF) and embryo transfer
7. Establishment of cell bank and cloning for rare animals

Scientists of CCMB have a challenging task ahead for developing proper technologies for the conservation of endangered animals. This action will prevent further extinction of wild animals like Cheetah. So far, our Indian Zoological Parks have only been maintaining the wild animals in a traditional way. With the association of scientific teams from CCMB, care, nurturing and preservation of the species by the zoo authorities will be enhanced by valuable scientific inputs. This will be an important contribution of science in conserving, improving and multiplication of endangered Indian species.

Bio-factories

'Plant Genomics' is the new emerging area of research, which

deals with functional and structural definition of genes both in terms of their location in the genome and their expression for defining the precise regulation to control the whole metabolism. Thus this field opens up new avenues to modulate the gene expression in such a way that plants can be converted into proficient genotypes or varieties to be used as the bio-factories producing useful proteins, therapeutic molecules, nutritional compositions, and stress tolerant varieties to meet the current and futuristic requirement of the society in eco-environment friendly manner. Similar experiments can also be conducted with wild animals.

Conclusion

Since CCMB and LaCONES are involved in high level research, a unique trait is essential from experienced scientists in such organizations. I call the unique trait as scientific magnanimity. I would like to narrate an experience.

Nobel Laureate Prof. Norman E Borlaug, a well-known agricultural scientist and a partner in India's first Green Revolution was receiving M.S. Swaminathan Award, at Vigyan Bhavan, New Delhi on the 15th of March 2005. Prof. Borlaug, at the age of 91, was in the midst of all the praise showered on him from everybody gathered there. When his turn came, he got up and highlighted India's advancement in the agricultural science and production and said that the political visionary Shri C. Subramaniam and Dr M.S. Swaminathan were the prime

architects of First Green Revolution in India. He also recalled with pride, Dr Verghese Kurien who ushered White Revolution in India. Then the surprise came. He turned to scientists sitting in the third row, fifth row and eighth row of the audience. He identified Dr Raja Ram, a wheat specialist, Dr S.K. Vasal, a maize specialist, Dr B.R. Barwale, a seed specialist. He said, all these scientists had contributed to India's and Asia's agricultural science. Dr Borlaug introduced them to the audience by asking them to stand and ensured that the audience cheered and greeted the scientists with great enthusiasm. This scene I have not witnessed in our country before. This action of Dr Norman Borlaug, I call it as a Scientific Magnanimity. Friends, if you aspire to achieve great things in life, you need Scientific Magnanimity. It is my experience that great mind and great heart go together. This Scientific Magnanimity will motivate the scientific community and nurture team spirit and lead to newer discoveries. I am sure such environment of scientific magnanimity will prevail in all our scientific research institutions.

I am happy to dedicate the Laboratory for the Conservation of Endangered Species (LaCONES), Hyderabad to the nation. My best wishes to all the members of Centre for Cellular and Molecular Biology and their partners success in their mission of applying science for societal growth.

May God bless you.



Tissue Culture Technique for *Bambusa balcooa* released

The Regional Research Laboratory (RRL), Jorhat, has developed a novel process for large scale production of bamboo plantlets of the *Bambusa balcooa* variety, locally called the Bhaluka bah, by tissue culture technique. This particular variety of bamboo has been in great demand in the region. It has tremendous potential for value addition. *B. balcooa* is considered to be indigenous to the North East India. It is the most durable and strongest bamboo in the Brahmaputra valley of Assam. Having maximum girth of culms and rich in thickness, it is mainly used for building purpose and scaffolding. Young shoots of the bamboo find use in for pickle and other preparations, which have high demand in South-East Asia. However, the seed production of this variety of bamboo after gregarious flowering has not been recorded so far. Also, its natural vegetative propagation has also not been able to keep pace with its demand. Hence an alternative vegetative multiplication for rapid and large scale production of plantlets of this promising native resource through tissue culture method was an urgent necessity for enabling commercial cultivation by various entrepreneurs. With a nominal investment of a few lakhs of rupees the know-how has been destined to fulfill this long felt need of the region. The know-how has been transferred to a Guwahati based firm M/s Azara Biotech.

Prof. Sir Richard Friend inaugurates Venture Center at NCL Innovation Park

The Venture Center, a business incubator for knowledge-based enterprise, was inaugurated by Prof. Sir Richard Friend, Cavendish Professor at the University of Cambridge, UK and Founder of Cambridge Display Technology Ltd and Plastic Logic Ltd on 18 December 2006 at NCL Innovation Park in the presence of Dr R. A. Mashelkar, the then Director General, CSIR, New Delhi, Dr S. Sivaram, Director, National Chemical Laboratory (NCL), Pune, Prof. Ashok Mishra, Director, Indian Institute of Technology, Mumbai and Prof. K.N. Ganesh, Director, Indian Institute of Science Education and Research, Pune. The Venture Center, which is scheduled to rollout its full services through 2007, will begin operations with a mentoring and advisory support programme for NCL related entrepreneurship activities.

Speaking at the inaugural function, Prof. Friend emphasized the need for incubators, support systems and supporting environments to help scientists take their laboratory research to the market in the form of technology ventures in countries such as the UK and India. He said that scientists in UK and India have to work much harder to commercialize technology compared to their counterparts in the USA where the supporting mechanisms are well entrenched and more advanced.

Dr Sivaram provided a background about the genesis of the NCL Innovation Park and Venture Center. He said that he expects that the current ways in which CSIR labs have been interacting are set to change in the next 20 years, and NCL shall use the Venture Center and NCL Innovation Park to experiment new models of interaction with industry. While he was aware of the risks of such experiments, he hoped that the Center would disprove the skeptics wrong by succeeding in building the next generation business for India. "The incubator would facilitate and allow scientists to pursue business ideas related to their research without having to sacrifice their scientific careers," he added. Dr Mashelkar argued that India needs to dispel the myth that India cannot produce spinout companies comparable to the USA. "If Chinese universities and research institutions can produce 2800 spin-out companies providing 80,000 quality jobs, why cannot India?" he asked. Dr Mashelkar suggested that the Venture Center should aim to produce hundreds of Richard Friends. Speaking later in the press conference, Prof. Ashok Mishra said that incubators play an important role by informing scientists, providing guidance and leads for assistance.

In the evening, Prof. Richard Friend delivered the first Innovation and Technology



Enterprise Lecture titled ‘Company start-up in Cambridge: From science to technology to products’. In his highly appreciated talk, Prof. Friend described his journey taking laboratory science of the highest quality to technology and eventually products in the market place. Prof. Friend, who has pioneered the field of polymer-based electronics and flexible displays, has successfully protected his inventions and commercialized these inventions through the formation of two start-up companies, viz., Cambridge Display Technology Ltd and Plastic Logic Ltd. In his talk, Prof. Friend

pointed out that in his field many leading research groups were either in the industry or had strong linkages to industry. Thus, hinting that good basic research and commercial applicable technology can go hand-in-hand. He also noted that academic research could exist symbiotically with complementing start-up company activities enriching both. He highlighted the importance of patenting and having a strategy for defending patents. Prof. Friend pointed out that having great technology is something very different from having a customer. He used the examples of his two

companies to illustrate two very different progress paths in the early stages with respect to funding.

Speaking on the ‘Vision for the Venture Center’, Dr Mashelkar expressed his gratitude to Prof. Friend for giving an excellent talk discussing his journey. He appreciated Prof. Friend emphasizing the need to think about the commercial value of research and seeking patent protection before publishing the results. He talked about the success of Cambridge in doing high-level science while at the same time attracting almost 10% of Europe’s Venture Capital NCL



Prof. Friend inaugurating the Venture Center and addressing the audience



Dr Sivaram providing the background of genesis of NCL Innovation Park and Venture Center (left); and Prof. Ashok Mishra, Dr Mashelkar and Prof. Friend attending to the press queries



NCL Innovation Park (www.innovationpark.org) is a resource center of the National Chemical Laboratory, Pune and aims to promote synergistic and productive relationships between business enterprises and NCL with a clear focus on innovation and technology development for value creation.

Venture Center (www.venturecenter.co.in) strives to nucleate and nurture technology and knowledge-based enterprises by leveraging the scientific and engineering competencies of the institutions in the Pune region in India. The Venture Center is a technology business incubator specializing in technology enterprises offering products and services exploiting scientific expertise in the areas of materials, chemicals and biological sciences and engineering. The Venture Center is the trademark of Entrepreneurship Development Center, a not-for-profit company floated by NCL.

investment. He wished and expressed optimism that India will produce scientist-entrepreneurs like Friend – many more like Chandru (IISc-Bangalore) or Jhunjhunwala (IIT, Madras) or Babu (TIFR, Mumbai). Creating scientist-entrepreneurs will involve work at the local level by units such as the Venture Center but also changes in rules of the government at Delhi. He hoped that the Venture Center will pioneer the nucleation of technology enterprises and serve as a role model for many other Indian institutions.

Dr Premnath, Scientist, NCL, proposed the vote of thanks.-

Asian Symposium on Polymers in Concrete (ASPIC – 2006)

The Structural Engineering Research Centre (SERC), Chennai, hosted the Fifth Asian Symposium on Polymers in Concrete (ASPIC-2006) during 11-12 September 2006 at Vigyan Auditorium, SERC, Chennai.

Dr N. Lakshmanan, Director, SERC and Co-chairman, International Advisory Committee, ASPIC-2006 welcomed the delegates of the symposium and the dignitaries. He felt that the topic of the symposium was highly specialized and of considerable contemporary interest, particularly in the Indian context, when India is embarking on a massive scale of infrastructural development.

Dr C.V. Vaidyanathan, Director Grade Scientist, SERC and Chairman Organizing Committee, ASPIC-2006, traced the genesis of the Asian Symposia series from 1994, with the fourth ASPIC having been held in Korea in 2003. He said that the fifth ASPIC-2006 was set to not only concentrate on the recent contributions made in this field but also focus on the case studies of success of this technology and related achievements.

Dr M. Neelamegam, Deputy Director, SERC and Secretary, Organizing Committee, ASPIC-2006, introduced the Chief Guest of the inaugural function, Dr M.S. Ananth, Director, IIT-M, Chennai and Prof. Yoshihiko Ohama, Nihon University, Japan, who was the Chairman of the fifth ASPIC International Advisory Committee.

In his inaugural address, Dr Ananth said, “Every subject is

becoming inter-disciplinary”. He stressed that the topic of the symposium underscored the tremendous potential and importance of materials sciences and nanotechnology for the innovations that are expected to emerge in the future, including in the field of concrete materials and concrete technologies. He emphasized that case studies of failure are perhaps as much important as the case studies of success.

During the inaugural session, Prof. Yoshihiko Ohama, released *Proceedings of the Symposium*. In his address, he appealed to the student delegates to do more work on concrete-polymer composites and asked the industry representatives to manufacture more useful products by using such composites, which possess superior mechanical and durability related properties.

Around 150 delegated comprising eminent experts, academicians, scientists, young research scholars, from India and abroad, including professionals from construction and cement industries participated in the symposium. Eighty-five research papers were accepted for presentation/publication in the *Symposium Proceedings* and were presented in two keynote sessions and 12 technical sessions.

A special issue of the *SERC Newsletter* was brought out carrying the messages from dignitaries and a summary of technical programme schedule of the symposium.



International Conference on New Bioactive Molecules in Pharmaceutical Research – Contribution of Natural Products

THE Indian Institute of Chemical Technology (IICT), Hyderabad, in association with National Center for Natural Products Research (NCNPR), University of Mississippi, USA, organized a two-day international conference entitled 'New bioactive molecules in pharmaceutical research – contribution of natural products' under the chairmanship of Dr J. S. Yadav, Director, IICT, during 13 and 14 November 2006. This was in a sequel to the MoU signed in October 2005 between CSIR and NCNPR, Mississippi, USA; the only national center in USA dedicated to the field of natural products. This was the third conference in the series, the first one was held in New Delhi in October 2005 and the second one was organized at NCNPR, Mississippi, USA in July 2006.

Over the years, natural products have been the mainstay of drug discovery programme. Although several other systems have come into being, desired results could not be obtained. Hence the focus is again shifted to natural products (NPs). NPs are currently used across the world as herbal drugs, dietary supplements and nutraceuticals. With the increase in demand for the natural products, the big pharma companies from across the globe have once again shifted their attention towards natural products and increased their efforts towards finding new bioactive molecules from them. The main aim of the conference was to organize joint research programmes for bilateral exchange of scientists from

India and USA in the field of natural products and to disseminate this knowledge amongst different groups in conducting research in the area of new drug development.

The conference started with the inaugural lecture entitled 'Ayurveda Materia Medica: A fruitful resource for discovery of new bioactive molecules', delivered by Prof. Sukhdev, an octogenarian scientist and a doyen of natural products chemistry in India. Prof. Goverdhan Mehta, Bhatnagar Fellow and former Director, Indian Institute of Science, Bangalore, spoke on 'Harnessing natural products and organic synthesis for human well being'. Dr J.S. Yadav informed that IICT was establishing a National Facility for Combinatorial Natural Products (NFCNP) with financial assistance of about 25 crores from the Department of Science & Technology to systematically scan the abundant plant wealth in the country and identify the biologically active molecules from them and generate libraries of compounds for biological screening. Further, the libraries of compounds built across the active skeleton will be screened for different activities with the necessary infrastructure for drug development. This facility would be available, both to academia and industry, engaged in natural products research.

Prof. Dr Ikhlas A. Khan, Asst. Director, Director of FDA Programmes from the NCNPR, and one of the Convenors of the conference spoke on 'An overview of natural products

research at NCNPR' where he emphasized that natural products chemists have to work hand-in-hand with botanists, ecologists, marine biologists as well as microbiologists and molecular biologists.

Other important speakers included: Prof. Rene Gree and Dr Nicole Moreau from France; Dr John Rimoldi and Charles Centrell from USA; Dr Kelly Chibale from South Africa; Dr Prabhat Arya from Canada; Dr Dong Soo Shin from South Korea and Dr Hermann Stuppner from Austria.

Dr Larry Walker, Director, NCNPR and the Co-Organizer spoke about natural products research activities at NCNPR. Briefing the media in the Press Conference, called on this occasion, Dr Walker said that NCNPR emphasis was on three areas: The discovery and early development of potential new drugs and agrochemicals from natural products; The understanding and science-based characterization of botanical products used as dietary supplements; And research on medicinal plants, the production and processing of their pharmaceutical activities and their potential for the development of alternative crops. He lauded the efforts of Indian scientists in the growth of NCNPR and said that about 25% of NCNPR scientists are of Indian origin.

About 350 delegates, both from the academia as well as industry participated in the conference. It included about 30 scientists from abroad.



International Conference on Advances in Metrology (AdMet-06)

The International Conference on Advances in Metrology was held from 11 to 13 December at India Habitat Center, New Delhi. Prior to this conference, the National Physical Laboratory (NPL), New Delhi, had organized two satellite events: (i) Indo-Italian Training Programme on Force & Torque Metrology during 5-8 December 2006 and (2) PTB- SAARC Workshop on inter laboratory comparison in the field of length, mass and temperature measurements on 8-9 December 2006.

Forty-eight participants from industries, quality control and accredited laboratories of India and neighbouring countries Nepal, Thailand, Saudi Arabia, Malaysia, etc attended the training programme. During the four day deliberations, lectures were delivered by the eminent metrologists and experts in their fields e.g. from PTB Germany, INRIM, Italy and NPL, India besides the practical training was given to participants. The topics covered included techniques and methods for the realization of force and torque, calibration of force proving and torque transducers, verification of UTMs, evaluation of uncertainty and quality systems etc. [CSIR News 57(2007), (3) 48]

The PTB-SAARC workshop had 15 participants from SAARC countries. Deliberations in the workshop included selection of artifacts, their metrological characterization and long-term stability, preparation of technical protocol, evaluation of uncertainty

as per GUM document, traceability, and procedure of calibration etc.

The conference covered a wide range of topics including physico-mechanical, electrical and electronic standards. The topics covered included latest trends in measurement science, metrology for precision measurement, inspections, quality control, emerging areas of measurement science, development of sensors and actuators and their application in metrology, benefits of MRA, social role of measurement, clinical metrology and inter-laboratory comparisons, etc. Three parallel sessions namely 3rd APMP Pressure and Vacuum, Time & Frequency (ATF-2006), and Chemical Metrology (Chem-Met) devoted to the respective fields were also organized to discuss a wide range of topics to make use of the full potential of modern science and technology to evaluate, update, add value to and utilize the extensive knowledge acquired over a long period of time and to promote the metrology for the benefit of mankind. Thirty invited talks, 75 oral presentations and over 100 poster presentations were made in six technical sessions each and three poster sessions.

Further, two plenary lectures were also delivered: one by Dr Kamal Hossain, Director, NPL, UK and Science Policy Advisor, UK Government. He indicated that NMI's continuing efforts to lower down the uncertainty in measurements in order to meet the rising technology demand may not

come at the expense of ignoring the present day need of the society. The second plenary talk was delivered by Dr Michael Moldover, NIST, USA. He prompted the metrologists to think about new techniques and phenomena to lower down the uncertainty in measurements significantly and gave an example of establishing the pressure standards based on the dielectric measurements.

More than 350 participants representing more than 30 countries attended. The countries included USA, Germany, Italy, Australia, UK, France, China, Malaysia, Hong Kong, South Korea, Singapore, Nepal, Saudi Arabia, Pakistan, Bangladesh, Taiwan, Thailand, Fiji, South Africa, Mongolia etc.

Dr Vikram Kumar, Director, NPL and President MSI (Metrology Society of India), welcomed the delegates. He emphasized the need of continuous research for advancement of metrology as the metrological capabilities of a country have direct bearing on the quality of the products, which directly is a measure of the economic growth of the country.

Dr T. Ramasami, Secretary, Department of Science and Technology, inaugurated the conference. In his address, he summed up the subject of metrology by coining the term PQRS (Precision, Quality, Reproducibility and Standards) which undoubtedly represents the most general way to understand what basically the metrology means. He appreciated



the technical support provided by NPL to NABL, which has accelerated the process of dissemination of the national traceability to the shop floor level through its accredited laboratories.

Dr Ramasami also released a special issue of MAPAN quarterly *Journal of MSI* dedicated to the selected contributions in the field of Time & Frequency.

Dr R.P. Singhal briefly described the importance of the event and gave an overview of the satellite meetings, i.e. Indo-Italian Training Program and PTB-SAARC workshop followed by the 22nd APMP General Assembly and related meetings during 13-16 December 2006. These events were arranged as part of the Golden Jubilee Celebrations of NPL. Dr

Kamlesh K. Jain proposed a vote of thanks and announced the opening of the technical sessions.

On the last day of the conference a half-day symposium was organized. This was inaugurated by Dr Girdhar J Gyani, Secretary General, Quality Council of India and presided over by Dr Vikram Kumar, Director, NPL and President MSI, and followed by a



International Conference on Advances in Metrology (AdMet-06), at India Habitat Centre, New Delhi





keynote address by Dr Robert Kaarls, Chairman, CIPM.

The focal theme of the symposium was 'Benefit of MRA to Economy and Society'. The advantage of accelerating the process of accreditation of the laboratories for electrical and electronic parameters in general and pathological laboratories in particular was well reflected in the inaugural address delivered by Dr Gyani. He emphasized that the process would not only bring the uniformity in measurements but also bring a significant advantage to the society in improving the quality of life. Dr Robert Kaarls in his key note address emphasized a systematic approach to develop the chemical metrology which has a great potential both for standardizing the diagnostic kits and the quality of the clinical tests and finally the society. He also released ten certified reference materials developed by NPL on this occasion. The session ended by proposing a vote of thanks by Dr R.P. Singhal.

Three technical talks were delivered by the world renowned metrologists: (i) Dr Peter J. Mohr, Chairman, CODATA and Head, Fundamental Constants Group, NIST, USA; (2) Dr Ken Fuji, NMIJ, Japan and (3) Dr P.S. Nair, ISRO, India. While Dr Mohr deliberated on possible new international System of Units, Dr Ken Fuji focused on Avogadro constant determination for replacing the kilogram and Dr Nair spoke on role of metrology in space applications.

Seminar on Technology-driven Development — Choices for North Eastern States

A seminar on 'Technology-driven Development - Choices for North Eastern States' was held at the Regional Research Laboratory (RRL), Jorhat on 13 October 2006. The seminar was aimed at formulating the strategies for rapid and all round economic and industrial development of the North Eastern States of India by meaningful utilization of the vast natural resources and harnessing the available technologies. The seminar, it was felt would enable the laboratory to focus on areas where commercial and economic gains can be achieved through value addition with minimum efforts.

The seminar was inaugurated by Dr G. Thyagarajan, former Director and currently Chairman of RRL Research Council, who was the Chief Guest on the occasion. Held at RRL auditorium, the seminar was largely attended by researchers, students, academicians, representatives of the business houses of the region, various national experts, members of the Research Council besides the scientific community of RRL. Terming the seminar as very crucial Dr P. G. Rao, Director, RRL, Jorhat, said that the seminar was aimed at a very focussed deperature from the 10th Five Year Plan towards shaping the ensuing 11th Five Year Plan of the laboratory. The scope was to look beyond the existing identified opportunities.

Inaugurating the seminar, Dr G. Thyagarajan former Director and

presently RC Chairman, RRL-Jorhat, informed that the objective of the seminar was to identify the missing links between the vast natural wealth, biodiversity, etc. of the region and the available technologies with a view to bring about value addition and also to identify the drivers for accomplishing such value additions such as government, policy makers, entrepreneurs, etc. On the occasion, the chief guest also released a booklet and a Video Film on the RRL's activities for economic development of Nagaland entitled 'Nagaland - Aspirations and Achievements'. Dr P. G. Rao, Director, RRL, Jorhat, in his address said that the seminar would help in shaping the 11th Five Year Plan of the lab.

The seminar had three technical sessions followed by a panel discussion. The panelists included experts like Dr G. Thyagarajan; Dr S. K. Jain, President, FINER; Shri Pradyut Bhuyan, Director, FINER; Dr A. R. Balakrishnan, Member, RRL Research Council; Shri Amit Jain, Director, FINER; and Dr V. Prakash, Member, RRL Research Council and Director, Central Food Technological Research Institute, Mysore. Some of the seminar recommendations centred around the development of industrial skills and trained personnel. It emphasized the need to think how sustainably the resources could be used with eco-friendly approaches, and called upon the private sector to play a much larger role.

Workshop on Industrial Perspectives in Bioinformatics

A one day workshop on Industrial Perspectives in Bioinformatics was held on 15 December 2006 at the Indian Institute of Chemical Technology (IICT), Hyderabad, for the fifth batch students of the ongoing Advanced Course in Bioinformatics, jointly organized by IICT, CDAC, and JNTU. The main aim of the workshop was to enlighten the students regarding the importance and role of bioinformatics in industry - today and in the years to come.

The workshop started with the welcome address by Dr J. S. Yadav, Director, IICT. Dr Yadav pointed out that bioinformatics, a challenging and fast progressing field, will play a big role in the coming years in almost all industries.

Discussing the theme of the workshop, Dr U.S.N. Murty, Course Coordinator & Head, Biology Division, IICT, stressed the significance of bioinformatics to be globally competitive. Many of the major research laboratories

overseas have taken up bioinformatics in a big way and the same is being done by Indian industrial giants as well as some of the leading IT companies. The turnover last year from the bioinformatics sector was to the tune of 100 crore and it could double up in the coming years, said Dr Murty.

The workshop had four lectures. The first speaker Dr V. N. Balaji of Jubilant Biosys, Bangalore, delivered his talk on 'Structure-directed discovery solutions to accelerate drug discovery'. He said that bioinformatics was being looked upon as a boon and the future belonged to this area. He highlighted about some of the databases available and also outlined the scope and performance of his company.

The second speaker Dr Sudhir V. Kulkarni of VLife Sciences, Pune, spoke on "Molecular modeling solutions for non-pharma industries". Dr Kulkarni presented the work they had carried out for a

client for developing a biosensor for detecting the herbicides, and also listed out the scope of bioinformatics and the lead role it can play in any of the industries. The third lecture was delivered by Dr (Ms) Usha Deshpande, EVOLVA, Hyderabad on "EGFL6-Therapeutic Target in Cancer - Turning Bioinformatics to Biotherapeutics".

The last speaker Dr Sharmila Mande, TCS, Hyderabad, emphasized the importance of bioinformatics in industry with special reference to Biosuite. She discussed the problems and challenges faced by Bioinformatics and the effective way to screen the huge amount of data which is being generated. She opined that the education of bioinformatics should start from the graduation programme level, pointing out large openings in the area. The presentations were followed by an interactive session where a whole range of queries were raised and answered by the elite panel.



Workshop on Industrial Perspectives in Bioinformatics in progress

Third National Interactive Meet (NIM-2006) at CIMAP

The Third National Interactive Meet (NIM-2006) organized by the Central Institute of Medicinal & Aromatic Plants (CIMAP), Lucknow, was inaugurated on 27 October 2006. The meet was attended by 400 delegates comprising scientists, bankers, policy makers and scholars.

Dr S.P.S. Khanuja, Director, CIMAP, while welcoming the delegates, urged them to turn to cultivation and marketing of Medicinal and Aromatic Plants (MAPs) which will enable India to become a healthier and developed nation by year 2020 as dreamed by Honourable President of India. He stressed on turning of R&D (Research and Development) to R&B (Research and Business). He lamented on the misuse of the term herbal and urged to give a scientific definition to it. He also urged to stop collection of medicinal and aromatic plants from wild sources and start cultivation on large scale according to industrial demand that can turn MAPs to MACs (Medicinal and Aromatic Crops).

Dr Khanuja also announced the formation of abridging platform for MAPs stakeholders in the form of a national level society MAPSI (Medicinal and Aromatic Plants Society of India) which is perhaps the first of its kind in India. He informed that a few main objectives of the society are to act as the 'Knowledge bank' of information on plant derived products, compounds and formulations, being generated through research by various organizations and to provide a

platform that would lead to self employment and help serve as MAPs hub through publications on MAPs' technology. The basic aim was to strengthen the linkages among the key players in the sector through functional value chain.

In his presidential address, Prof. V.L. Chopra, former Director General, ICAR and Member, Planning Commission, emphasized on consolidating the herbal business in India which has great potential. Prof. Chopra said that according to WHO estimates the current market potential of herbal is US\$ 62 billions worldwide. He further said that developed India will emerge from developed villages and there is need to increase herbal business for rural development.

Dr (Smt) Manju Sharma, former Secretary, DBT and presently Chairperson of Research Council, CIMAP, delivered a keynote address on 'Herbal Plants as Social Currency of Happiness for Rural Masses'.

Dr S. Nagarajan, Chairman – PPV-FRA, delivered an address on 'New Opportunities in Plant Breeding and Seed Industry through PPV and FRA'. The other dignitaries present on the occasion included: Dr Chandrika Prasad, Director General, UPCAR and Shri G.D. Kelkar, Kelker Foundation.

The first day of NIM-2006 was marked by the release of new herbal products – 'Herbi Soft', a new hair



Inaugural session of the Third National Interactive Meet (NIM – 2006) in progress

care shampoo; *Haloe Skin* – *Aloe vera* based skin care product; CIM-Paushak and CIM-Phal-Se – ayurvedic food supplements and Calliterpenone – based growth promoting herbal formulation CIM-Upaj (CIMAP has a US patent on calliterpenone).

CIMAP also signed two agreements with a Lucknow based industry Disinfecto Chemicals on *Artemisia annua* cultivation and processing technology that will extend benefits to the nearby farmers.

NIM-2006 concluded with the recommendations for quality production of medicinal and aromatic plants by the farmers and that industry should come forward to procure the materials with the buy back assurance at the remunerative price. The R&D institutes should steer their researches to develop improved plant varieties and processes to economise the cost of production so as to compete in the international market.

Special session titled "Face to



Prof. V.L. Chopra, Member Planning Commission, delivering his presidential address at NIM-2006

CEO; Shri Piyush Arora of Padmavati Herbs, Bareilly; Dr M.R. Uniyal of Maharishi Ayurved; Dr V.K. Tripathi of Sanat Products; Shri Karunesh Agarwal of Disinfecto Chemicals; Dr Ramakant Harlalka of Nishant Aromas. Dr S.P.S. Khanuja stressed upon the need for quality relationship between industry and farmers.

was emphasized that use of improved planting material and technology can give India competitive advantages in the world market.

Dr B.S. Sajwan said that the NMPB is taking all possible steps to promote cultivation of medicinal plants. He stressed upon the need for adopting superior technologies and gain knowledge before attempting to large scale cultivation. Shri D.C. Verma, State Bank of India, said that proper planning of the project should be done beforehand so as to make it viable for economic terms for funding. Dr A.K. Singh, Head, Technology and Business Development Division, CIMAP, Lucknow, proposed the vote of thanks.

Face” sponsored by National Academy of Science, India (NASI) was chaired by Dr P.K. Seth, CEO, Biotech Park and the other panelist who participated in the discussion included Dr S.P.S. Khanuja; Dr R.P. Sharma, IARI; Dr B.S. Sajwan,

The farmers participating in the NIM enquired about the medicinal and aromatic plants required by the industry. Industry representatives gave an overview of the international market of some of the major medicinal and aromatic plants. It

Awards to Dr G.A. Ravishankar

Dr G.A. Ravishankar, Scientist F and Head, Plant Cell Biotechnology Department, Central Food Technological Research Institute (CFTRI), Mysore, has recently received the following awards:

1. Fellowship of International Academy of Food Science and Technology (IAFoST, HQ: Canada) for his outstanding contribution to Food Science and Technology at the hands of Prof. Malcolm Bourne, President of IAFoST, at the 13th World Food Congress at Nantes, France.
2. Fellowship of Indian Society of Agricultural Biochemists. Conferred on him by His Excellency Shri T.V. Rajeswar, Governor of UP and Chancellor of International Conference on Post Harvest Technology held at Kanpur. This is in recognition of Dr Ravishankar's work in the area of Food Biotechnology and Plant Biotechnology with an emphasis on Agri-process technologies for Industrial Applications.
3. Prof. S.R. Vyas Memorial Award of Association of Microbiologists of India, given at the 47th Annual Conference of AMI at Barkatulla University, Bhopal, for his contribution to the area of Microbial biotechnology with reference to use of microbial elicitors for improvement of capsaicin, anthocyanins, betalains and annatto colours and also micro algal technologies for the production of nutraceuticals, viz. β -carotene, astaxanthin, phycocyanin and antioxidant molecules.



Dr G.A. Ravishankar being conferred the Fellowship of International Academy of Food Science and Technology (IAFoST) by IAFoST President Prof. Malcolm Bourne

Dr Ravishankar has published over 150 research papers in peer reviewed journals, 35 reviews and 40 patents. He has guided 18 Ph.D. students in the field of Applied Botany, Biochemistry and Biotechnology.



Honours conferred on Dr J. S. Yadav



The honours conferred on Dr J. S. Yadav, Director, Indian Institute of Chemical Technology (IICT), Hyderabad, in the recent past include the following:

- Prof. V. M. Thakor Award Lecture-2007; it is organized every year in the memory of late Prof. V. M. Thakor, Founder & Head of the Department of Chemistry, Saurashtra University, Rajkot. The earlier recipient of the Award Lecture have been outstanding scientists and professors in the field of chemistry like Prof. Timmerman, The Netherlands; Dr D. J. Triggler, USA; Dr B.K. Trivedi, USA (now in Wockhardt); Dr M. C. Wani, USA; Dr F. A. Kathawala, USA; Dr B. Gopalan; Prof. M. M. Sharma; and Dr Ashok B. Vaidya, etc.
- Pharma+ Biotech 2007 Award for 'Outstanding Achiever in R&D Innovation-Institutional Category'
- 'CDRI-2006 Oration' awarded by the Indian Pharmacological Society

NOMINATIONS INVITED

Shanti Swarup Bhatnagar Prizes in Science and Technology for 2007

The Council of Scientific and Industrial Research (CSIR) invites nominations for the Shanti Swarup Bhatnagar (SSB) Prizes in science and technology for the year 2007. The SSB Prizes are to be given for research contributions made primarily in India during the past five years. *The age of the nominee for the 2007 SSB Prize should not be more than 45 years as on 31 December 2006.*

The SSB Prizes are awarded for notable and outstanding research, applied or fundamental, in the following disciplines: (1) Biological Sciences, (2) Chemical Sciences, (3) Earth, Atmosphere, Ocean and Planetary Sciences, (4) Engineering Sciences, (5) Mathematical Sciences, (6) Medical Sciences, and (7) Physical Sciences. The SSB Prize carries with it a citation, a cash award of Rs 2,00,000 (Rupees two lakh only) and a plaque for each scientist selected for the Award.

Nominations addressed to **Dr Rajesh Luthra, Head, Human Resource Development Group, CSIR Complex, Library Avenue, Pusa, New Delhi 110012** should be sent as per the *prescribed pro-forma (25 copies)* along with one set of reprints of significant publications of the last 5 years' period on or before **31 March 2007**. The details of the SSB Prize and the prescribed pro-forma for nomination may be obtained from the above address or can also be downloaded from the website: <http://csirhrdg.res.in>

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