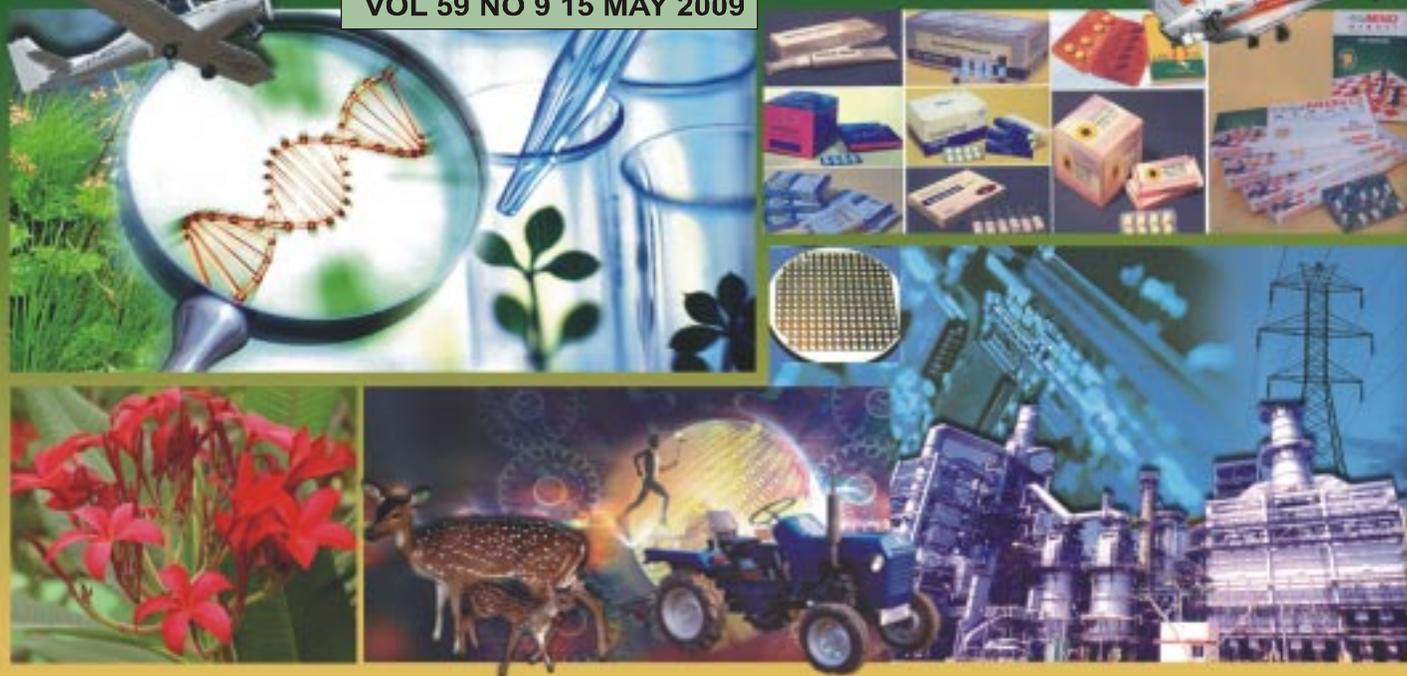




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NEERI signs with IWA, London

The National Environmental Engineering Research Institute (NEERI), Nagpur, and International Water Association (IWA), London, signed an MoU with the following objectives:

- The capabilities and technical expertise of both organizations to be used that will allow a more efficient and effective sharing of ideas and information between the respective constituencies;
- To enhance knowledge development and integration of research, practice and policy towards the overall goal of improved water and sanitation for all, with specific emphasis on un-privileged or poor people in developing countries;
- Co-hosting technical events and workshops;
- NEERI's participation in IWA's task force;
- Support of IWA in Technology Park at NEERI;
- Opportunities for NEERI scientists to be in editorial board of IWAP Journals;
- NEERI as a collaborating centre of IWA.

IWA's mission is to connect water professionals worldwide to lead the development of effective and sustainable approaches to water management, and to create and foster a global network of leading-edge water professionals through the provision of services and products to members, including conferences, publications and support for member groups; and in addition, to represent the views of members in international forums and to project key messages to the sector at large, aimed at advancing best practice in sustainable water management.



IHBT signs Agreement with M/s Ethio Agri-CEFT, Addis Ababa

The Institute of Himalayan Bioresource Technology (IHBT), Palampur, signed an agreement with M/s Ethio Agri CEFT PIC, a member of the MIDROC group of companies from Ethiopia on 27 June 2008. Dr P.S. Ahuja, Director, and Dr Anil Sood, Scientist, IHBT, visited Addis Ababa, Ethiopia in January 2008 on an invitation of the company to acquaint themselves with the activities of the company and to explore the areas of collaboration. In June, Mr Yilma Yemane-Berhan, Gen. Manager and Dr Tadele Worku, Sr Expert of Ethio Agri-CEFT visited IHBT to sign the agreement.

IHBT would provide technical support for promoting cultivation of rose, geranium, stevia and some herbs in Ethiopia and also set up processing facilities for extraction of essential oils. The institute would also facilitate establishing a state-of-the-art facility for quality analysis of essential oils and pesticide residue analysis. It would also train the company trainers both at IHBT and Ethiopia.

Germplasm Registration and National Identities for Novel Rootstocks of *Rosa*

At the Institute of Himalayan Bioresource Technology (IHBT), Palampur, evaluation of domesticated wild roses was done for their rooting performances, compatibility and flower production. Based on this study, four potential IHBT accessions have been awarded national identity nos viz., IHBT-WR-24 (IC549905), IHBT-WR-16 (IC549906), IHBT-WR-23 (IC549907) and IHBT-WR-21 (IC549908) at the XVII meeting of

National Germplasm Registration Committee, National Bureau of Plant Genetic Resources of ICAR, New Delhi, on 16 February 2008. These strains have the potential to be utilized as rootstocks and for breeding as these are easy to multiply, compatible to scion and produce higher number and better height of flowering shoots as compared to *R. indica* var. *odorata* (standard rootstock) under Palampur conditions.



IHBT-WR-24: *Rosa multiflora* INGR 08066



IHBT-WR-16 : *Rosa brunonii* INGR No. 08067



IHBT-WR-23 : *Rosa cathayensis* INGR No. 08068



IHBT-WR-21 : *Rosa alba* INGR No. 08069

Regeneration of Waste-pottery Gypsum at CBRI

There are several pottery or ceramic industries in India which produce pottery wares or sanitary wares. In making of these ceramic materials, lot of gypsum plaster is used to make pottery moulds. After few castings the pottery moulds are discarded and stockpiled near the ceramic plants. At present, the pottery moulds have no use or little amount is consumed in cement manufacture. The mould waste is available to the extent of half a million tonne per annum in India. The Central Building Research Institute (CBRI), Roorkee, made concerted efforts to make value-added plasters/building materials from the pottery mould wastes.

During the studies two samples of gypsum waste were collected for the purpose from pottery industries from Gujarat. The gypsum crystals are a jumble of subhedral to euhedral prismatic, needle and tabular shaped crystals with presence of occasional twinning (Figs 1-2). On wet sieving of the

gypsum samples (60 mesh), the impurities present in gypsum waste were reduced and the purity of gypsum was improved by CBRI researchers.

Regeneration through Hemihydrate Route

The ground gypsum samples (passing 150 micron IS sieve) were calcined at 150-160°C to form Plaster of Paris (β -hemihydrate). It was found that after beneficiation, the setting and strength values of plasters are improved as per standard requirements.

Regeneration through Anhydrite Route

Regeneration of pottery gypsum has been also studied through anhydrite route by calcinations of pottery gypsum lumps (0.25-0.50") at 500°C, 700°C and 900°C. At CBRI, the calcined gypsum samples were ground to the fineness of 400-430 m²/kg (Blaine), blended with chemical activators and compressive

strength of the plaster was determined up to the period of 28 days. It was found that with 2% sodium sulphate activator, the anhydrite cubes develop compressive strength of 10.7 MPa (500°C), 30.8 MPa (700°C) and 40 MPa (900°C) after 28 days of hydration, respectively. The bulk density of cubes was 1.5, 1.72 and 1.875 g/cc at 500°C, 700°C and 900°C after 28 days of hydration, respectively. DTA showed an increase in endotherms of double dehydration of gypsum and exotherm for inversion of soluble anhydrite into insoluble anhydrite with increase in curing period. The endotherms at 620-630°C and 760-780°C are due to lattice change of clay mineral and decomposition of CaCO₃ present in pottery gypsum as the earthly impurities. The intensity of endotherms was more pronounced at 900°C. The findings, based on studies made at CBRI, showed that 900°C is the optimum temperature of inversion of pottery gypsum into anhydrite.

The pottery gypsum regenerated by hemihydrate and anhydrite routes has great potential as building material. The β -hemihydrate plaster is eminently suitable for ceramic grade plaster, dental, cement manufacture or building applications. The anhydrite plaster is suitable for use in plastering (base and finish coat) in place of 'Neeru or Birla putty' or as high strength plaster for use in kitchen slabs and building blocks. These studies are entirely new and will help in utilization of gypsum of ceramic industry procured from waste pottery moulds.

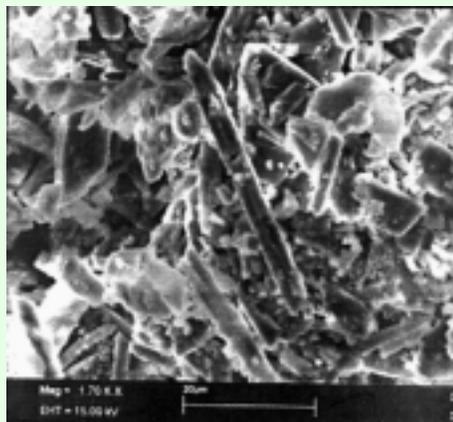


Fig-1: SEM of Pottery Gypsum Samples Madhusudan Ceramics, Gujarat

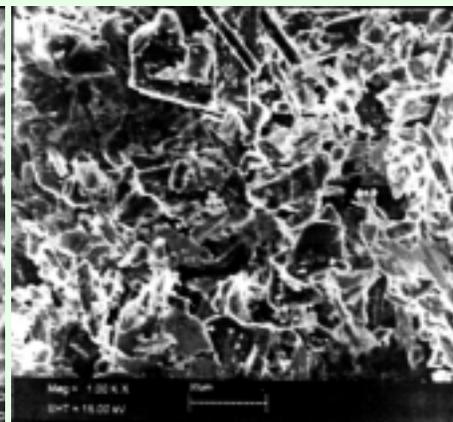


Fig-2: SEM of Pottery Gypsum Samples Mondavi pottery, Gujarat



Dressing-up Nanoparticles with Antibiotics & their Concurrent Bimodal Growth at Infancy

Serendipitous discovery of penicillin marked the beginning of the development of anti-bacterial compounds, saving countless lives ever since. The 'prolonged use', 'excessive use' and 'misuse' of antibiotics have given birth to a rising fearsome species of multi-drug resistant microorganisms. After-all, *'Nature finds its way!'*

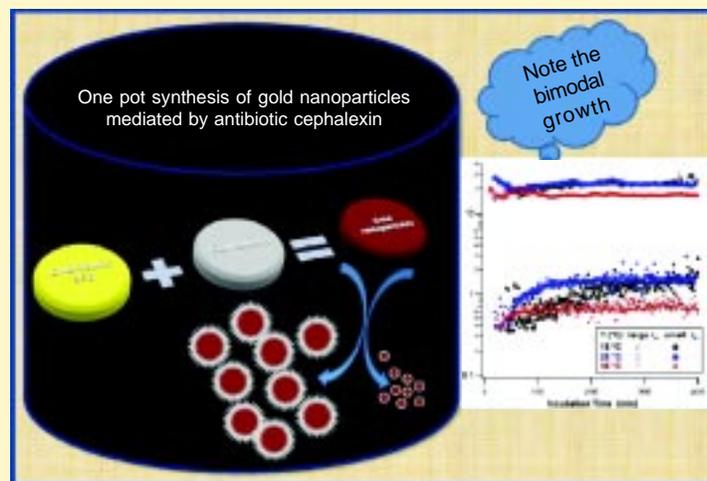
In an effort to control and overcome this problem of antibiotic-resistance, scientists from National Chemical Laboratory (NCL), Pune, (www.ncl-india.org) employed nanoscience and nanotechnology to devise a new path of delivering antibiotics. Thus, they used the idea of dressing up or capping nanoparticles with antibiotics. Cephalexin, a broad-spectrum beta-lactam antibiotic was used for the *in situ* reduction and capping of gold nanoparticles. Amine and thiols are known to have greater affinity to gold surface. An NCL team led by Pankaj Poddar from Physical and Materials Chemistry Division, found that the sulphur moiety of the antibiotic is involved in the reduction and binding to the gold surface using NMR and XPS studies. They also found that the morphology is bimodal and dependent on a narrow window of concentration of chloroauric acid. This led them to further probe the nucleation and growth stages during synthesis, which fortunately provided a slow-enough reaction time to capture the nanocrystals at birth and infancy.

According to Dr Poddar, "it is a

nightmare for chemists and physicists to capture the ultrafast nucleation and growth events *in situ* by using the available experimental technique with accuracy. Owing to these time-scales, so far, the study of chemical pathways and the physics involved in the formation of nanoparticles in the solution phase have been most challenging and often unsuccessful." To capture the growth events at an early stage, the antibiotic mediated synthesis approach adopted by NCL team proved to be an excellent model system due to its inherent slow reaction kinetics unlike most of the nanoparticle synthesis approaches where the reaction rate is quite fast and experimentally it becomes difficult to follow the growth of the nanoparticles. In view of the potential of one-pot synthesis method adopted for the antibiotic capped gold nanoparticles, the NCL researchers used the *in situ* dynamic light scattering (DLS) technique. Their initial DLS studies gave them quite surprising results on the growth of bimodal distribution which hinted the existence of both the size regimes starting from the early stage of the

reaction. The NCL researchers went ahead to collaborate with Prof. Martin Muschol's group at the Department of Physics, University of South Florida, (USF) USA, to use their advanced DLS set-up. Working with Prof. Muschol and graduate student, Mr Avanish Singh Parmer at USF, the DLS equipment at USF could validate the previous observation of NCL team of the unusual nucleation and growth kinetics of gold nanoparticles synthesized in the presence of the antibiotic cephalexin at different temperatures. The *in situ* DLS studies in conjunction with *in situ* UV-vis absorption measurements and transmission electron microscopy (TEM) gave some remarkable results where they observed the concurrent growth of two different sizes for the first time in solution phase.

Gold nanoparticle is a very well studied sol-system since the time of Michael Faraday. However, a concurrent growth of bimodal



distribution has not been reported before in solution phase; a unique two populations of gold nanoparticles, throughout the growth period, at different temperatures. One population is small, comprising of 1-3 nm particles in size and the other comprises large particles, 25-30 nm. Also within each temperature range, the scientists made unique and different observations using different techniques.

As the total number of particle size increases for both of the size regimes, their mean size and relative frequency remained essentially constant. The coupled growth of two distinct populations of nuclei, their tight control of size but rapid increase in overall numbers present novel and intriguing facets of this antibiotic-mediated solution growth of gold nanoparticles. Also, the size evolution of the Mie-frequency exhibits a noticeable blue-shift in the UV-Vis spectrum as the temperature increases, correlating with the roundness of the particle/bimodal distribution.

This study can be an excellent model system to relook at the growth of the nanocrystals in solution phase. Apart from this, the antibiotics capped gold nanoparticles can be further used in biomedical applications and cellular biology where the desired target molecule can be tagged on the surface through the chemical moieties present. This is a green approach, providing easy to use nanoparticles for bio-applications.

This work was highlighted at the *Nature India* online.

For further information, contact:
Dr Pankaj Poddar / Dr Asmita Prabhune

Determination of Sugars and Picosides in *Picrorhiza* species Using Ultrasonic Extraction and High-performance Liquid Chromatography

Sugars play a critical role in regulating overall cellular metabolism in plants growing at high altitude. These plants have been found to have high levels of sugars which enhance their tolerance to abiotic stresses such as drought and freezing temperature i.e. at the time when little or no growth occurs in these plants. The sugars and sugar alcohols help to maintain the favourable ionic and osmotic balances in these plants. Pamita Bhandari, Neeraj Kumar, Bikram Singh, and Vijay K. Kaul of the Institute of Himalayan Bioresource Technology (IHBT), Palampur, developed and validated a simple, sensitive, selective and reliable HPLC-ELSD method based on ultrasonic extraction and evaporative light scattering detection for simultaneous determination of important sugars (xylose, xylitol, mannitol, glucose and sucrose) and picosides (picoside-I and picoside-II) in two species *P. kurroa* and *P. scrophulariiflora*. The method was validated for accuracy, precision, limit of detection and quantification according to the guidelines provided at International Conference on Harmonization (ICH). The method showed good reproducibility for the quantification of seven analytes in *Picrorhiza* species with intra-and inter-day variation of less than 2.0%. Their work has been published in the : *Journal of Chromatography A* (2008)- 1194: 257-261.

The study shows that in all the six samples of *Picrorhiza* species in which the developed HPLC method was applied to analyze seven analytes, glucose was recorded in large amount (1.32-3.57%) followed by sucrose (0.50-1.68%), xylose (0.33-1.39%) and mannitol (0.24-0.48%). However, xylitol was not detected in any of the samples. The total picosides content showed significant variation in both *Picrorhiza* species. *P. scrophulariiflora* was found to contain larger amount of total picosides (4.38-5.49%) than that present in *P. kurroa* (2.16-3.76%). *P. scrophulariiflora* collected from North Sikkim (4000m) showed the higher amount of picoside-II (4.76%) and total picoside content (5.49%). It was found that in *P. kurroa* picoside-I was present in higher amount (1.21-1.34%) as compared to picoside-II (0.88-1.36%). *P. kurroa* collected from Kangra, Himachal Pradesh (4100 m) was found to contain larger amount of picoside-I (2.40%) and total picosides content (3.76%) along with highest amount of glucose (3.57%), xylose (1.39%) and sucrose (1.68%). The simplicity of the proposed method allows for application in laboratories that lack sophisticated analytical instruments, such as LC-MS or GC-MS.



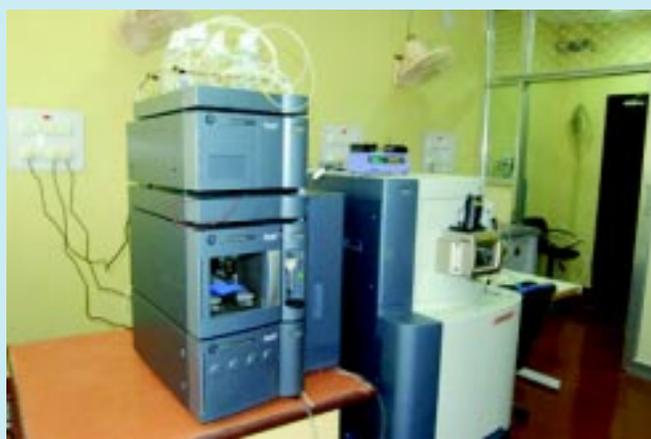
UPLC Coupled SYNAPT MS System installed at IMMT

In an endeavour to meet the International standards for development and commercialization of herbal and Indian Ayurvedic drugs, biomolecules and a wide range of organic compounds, a highly sophisticated and advanced LC/MS/MS facility has been created at the Institute of Minerals & Materials Technology (IMMT), Bhubaneswar. The system is consisting of two components viz. Ultra Performance Liquid Chromatography and a high resolution SYNAPT Mass Spectrometer. The instrument is the most powerful tool as of today for finger printing, quantification, exact mass determination, elemental

composition, characterization of molecules and pharmacological applications.

The facility is open for competitive collaborations with reputed R&D organizations and Industries.

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Second National Symposium on Analytical Sciences

The Indian Society of Analytical Scientists (ISAS) – Delhi Chapter and Institute of Himalayan Bioresource Technology (IHBT), Palampur, organized the Second National Symposium on Analytical Sciences (NSAS) on the theme 'Analytical Innovations for Process and Technology Development' at IHBT, during 23-25 November 2008.

ISAS – Delhi Chapter is a very dynamic scientific forum with its headquarters at Indian Oil Corporation Ltd, R&D Centre, Faridabad. The sponsoring agencies of the symposium were: Indian Oil Corporation Ltd, IHBT, Authentix (UK), Blue Star Limited, Advance Scientific Equipments Pvt Ltd, Labindia Instruments Pvt Ltd, and National Physical Laboratory (NPL), New Delhi. The symposium was organized with the aim to bring analytical experts dealing with the diverse aspects of analytical sciences in various research disciplines of Science & Technology together, and provide a common platform for the academicians, researchers and technologists.

The symposium was inaugurated by Shri Anand Kumar, Director, Indian Oil Corporation R&D. Dr P.S. Ahuja, Director, IHBT, delivered the welcome address.

Dr O.P. Sharma, Scientist-in-Charge, IVRI Centre at Palampur, delivered the keynote address on the emerging area of nanoparticles. Shri S. Makhija, Chairman, ISAS-DC delivered the welcome address on behalf of ISAS-DC. The activities of ISAS-DC were briefed by Dr A.S. Sarpal, Secretary, ISAS-DC and DGM R&D. Dr Ahuja inaugurated the Poster session. The vote of thanks was proposed by Dr Bikram Singh, Convener of the symposium.

Six posters were adjudged best by the panel of experts comprising Dr O.P. Sharma, Dr Ashu Gulati, Dr V.K. Kaul and Dr K.A. Suri, and were given certificates along with cash prize of Rs 2000/- each. The symposium had nine invited lectures, 100 poster presentations and 13 oral presentations.

National Seminar on Conservation and Restoration of Lakes (CAROL – 2008)

The National Institute of Hydrology (NIH), Roorkee, organized a National Seminar on Conservation and Restoration of Lakes (CAROL – 2008) in collaboration with the National Environmental Engineering Research Institute (NEERI), Nagpur, during 16-17 October 2008 at NEERI, Nagpur. The seminar was inaugurated by Shri Satish Chaturvedi, the then Minister for Textiles, Government of Maharashtra.

Speaking at the inaugural function, Shri Chaturvedi said that as lakes play an important role in ecosystem, scientists should work collaboratively to conserve and restore the lakes. Citing examples of various lakes located at Nagpur, he urged the scientists to work for the betterment of these lakes for improving the quality of life of the people living in their vicinity, in Nagpur. Shri Chaturvedi reiterated that Nagpur is famous for its many lakes. He informed that a Mumbai based non-government organization (NGO) is conducting an ecological study of the city's water bodies. The study has been commissioned by the Nagpur Municipal Corporation (NMC) as part of the city's storm water drain master plan. "A three-dimensional digital map of the city's water bodies is being prepared by the NGO," he added. Shri



Shri Satish Chaturvedi, the then Minister for Textiles, Government of Maharashtra, speaking at the inaugural function

Chaturvedi said that the study covers six lakes—Ambazari, Telangkhedi, Sonegaon, Gorewada, Sakkardara and Gandhisagar and Nag and Pili rivers. It is not limited only to the water bodies but also their catchment areas, he said. The NGO will not only suggest ways for the NMC to beautify water bodies in an eco-friendly way and increase their accessibility but also identify the spots where people could access the water bodies, and the time of their visit.

Speaking on the occasion, Dr S.R. Wate, Head, Environmental Impact and Risk Assessment Division, NEERI, said that lakes and coastal wetlands play a vital role in the global ecosystems. Their importance has been recognized in the maintenance of biodiversity, ecology, hydrology and recreation.

He said that "lakes provide habitat for the wide variety of flora and fauna and help maintain the life cycle of many species. Many of world's lakes and coastal wetlands have deteriorated owing to exploitative use and improper management, causing irreparable damage to the existing ecosystems and the life and culture of people living around," he added. In such grim scenario, Dr Wate emphasized, that there is an urgent need to conserve and restore lakes for the improvement of life and he assured that this seminar would be immensely helpful in this direction.

Er P.S. Kelkar, Head, Geo-Environment Management Division, NEERI, said that fresh water quality deterioration and scarcity are threatening many forms of life and may have serious consequences for humans. "Realizing the ongoing and impending threats to the lakes in the Asian region, region-wise initiatives, such as 'Asian Wetland Inventory and Asia Pacific Migratory Waterbird Conservation Strategy', have already begun," he informed. However, it has been recognized that the human and financial resources currently allocated for the conservation of lakes and wetlands in the Asian region are not sufficient and need to be strengthened," he



added. Er. Kelkar said that successful conservation of lakes, and wetlands greatly depends on the proper management of their watersheds, but there are conflicting interests in the use of their resources. Therefore, it is very important to have involvement of all of those concerned in the process of restoration, conservation and management of lakes," he added. He said that there is an imminent need to promote regional linkages, develop strategic partnership and follow good practices in the conservation and management of lakes. It is also essential to establish new, and strengthen ongoing regional and international cooperation, linkages and strategic partnership between governments, international agencies, universities, research institutions, non-governmental organizations, local communities, private sectors and individuals, he added.

Dr V.K. Choube, Scientist F, NIH, Roorkee, said that the increasing demand for fresh water owing to ever growing population calls for proper conservation and management of all the available fresh water resources, including lakes. "Lakes need special attention as they are quite often the catalysts in the development of the region by supplying water for variety of uses, such as drinking and civil water supply, industrial supply, irrigation, aqua-culture, recreation and

tourism etc.," he added. Dr Choube informed that many lakes in the country have undergone quantitative and qualitative degradation in the last few decades. They are under increasing stress to growing demands, urbanization and human interference in the catchments. Dr Choube cautioned that many lakes are showing impact of elevated levels of pollution and, as a result, nutrients from these waters are becoming highly unsuitable for many uses. "Since behaviour of the lake ecosystem depends to a large extent on its hydrological regime, understanding the hydrological regime of the lakes is very significant for developing strategies for their conservation, restoration and management," he said. Dr Choube said that CAROL - 2008 is very important as it would pursue the issues related to conservation, restoration and management of lakes and the views and ideas would be exchanged on different aspects of lake hydrology, limnology, etc. by bringing together of various researchers/scientists, academicians/scholars, engineers, bureaucrats/policy makers, planners, managers and non-governmental organizations (NGOs), on single platform.

Shri Omkar Singh, Scientist EI, NIH, and Dr P.R. Pujari, Scientist C, Geo-Environment Management Division, NEERI, also spoke on the occasion. They said that the main objective of the seminar is to provide

a platform for all concerned to work together to conserve and wisely use lakes for the present and future benefit of mankind. They also threw light on various hydrological aspects related to conservation and restoration of lakes.

During the two-day seminar, scientists/engineers from various organizations delivered their lectures in different technical sessions. The lectures were delivered under the following major themes: science of lakes/basic hydrological and limnological processes in lake ecosystems; lake water quality problems: monitoring, assessment and remediation; role of new technologies in lake studies (isotope application, remote sensing and GIS, modeling and DSS, etc.); impact of human interference in lakes/catchments on their ecosystems (land use changes, industrialization, urbanization, agricultural activities); conservation, restoration and management strategies for lakes and social and economic aspects, people participation/mass awareness, etc. for sustainability of lakes.

Issues relating to common lake problems, impaired uses, and possible causes of the problem, the importance of lake and its watershed relationship, best management practices, various lakes restoration techniques, etc., were discussed in the seminar citing various problems.

Seminar to Felicitate Dr P. Nema at NEERI

The National Environmental Engineering Research Institute (NEERI), Nagpur, organized a one-day seminar on 31 October 2008 to felicitate Dr P. Nema, Scientist G and Head, Air Pollution Control (APC) Division, who retired on superannuation on the same day. Dr S.S. Gokhale, Director, Visvesvaraya National Institute of Technology (VNIT), Nagpur, and Dr V. A. Mhaisalkar, Professor, Department of Civil Engineering, VNIT, delivered the lectures on this occasion.

Dr Gokhale's lecture was on 'Computational Fluid Dynamics (CFD) Modelling and Its Space Applications'. He said that Computational Fluid Dynamics is the science of determining a numerical solution to the governing equations of fluid flow whilst advancing the solution through space and time to obtain a numerical description of the complete flow field of interest. There has been considerable growth in the development and application of CFD to all aspects of fluid dynamics leading to CFD becoming a standard modelling tool widely utilized within industry. There is a considerable demand for specialists in the subject, to apply and develop CFD methods throughout engineering companies and research organizations, he added. Dr Gokhale covered all aspects of fluid



Dr S.S. Gokhale, Director, VNIT, Nagpur, delivering his lecture

dynamics, particularly those relevant to aerospace applications. He also briefed about basic research and development to applied and advanced technology, including novel experimental and computational observations. He also gave information about theoretical, experimental, and numerical approaches and also stated about innovative concepts and analyses, especially new insight into flow physics. Dr Gokhale urged scientists to carry out novel research related to low and high speed flows, instability, transition, turbulence, vortex dynamics, and various aspects of flow control. He also emphasized on the need of close synergism and interaction between a broad range of research disciplines in fluid dynamics. Dr Gokhale said that CFD is a tool for engineering applications, providing excellent career opportunities. He informed that CFD covers various areas, such as from aerospace, turbo machinery, multi-phase flow and heat transfer, to microflows, environmental flows and fluid-structure interaction problems.

Speaking on air-space pollution, Prof. Gokhale expressed concern regarding it and explained the phenomenon of space pollution, technologies available for counteracting the space pollution and air traffic management. He said that the space has become crowded owing to unlimited launches of remote sensing satellites, communication satellites, weather satellites, increasing air traffic and various space missions. This situation has created the space pollution posing impacts on our environment. Prof. Gokhale emphasized the need for setting-up an effective action plan for various launches so as to minimize the space pollution. He urged the scientists to advance science and technology to combat the space pollution, and advised the scientists to develop such spacecrafts that can use hydrogen as the fuel, which would be effective in reducing space pollution. Prof. Gokhale said that the exhaust gases released by spacecrafts may cause hazards to the earth; even these gases may form acid rain after reacting with water vapour. This kind of pollution has not been frequently noticed in our country, since there have been very few launches and take-offs in the country compared to the developed countries, he added. To save the ozone layer, Prof. Gokhale stressed the development of such eco-friendly



combustion devices for spacecrafts as are being widely used in automobiles to reduce the pollution level. He further informed that the particulate matter present in the exhausts of spacecrafts can interact with the passage of sunlight and promote cloud formation. To resolve this problem, scientists are making efforts to develop eco-friendly propellents that will be able to reduce the particulate matter in the exhausts of spacecrafts. Prof. Gokhale advocated that noise pollution related to the space activities should also be minimized by using appropriate technologies in the spacecrafts. He suggested that certain ecological indicators i.e. population, flora and fauna should be taken into consideration while launching the space missions. It should be ensured that the space mission gets capsized in the sea in case of an accident, Prof. Gokhale alerted.

Delivering his lecture on 'Optimization of Environmental Management Systems', Dr Mhaisalkar said that it is very important to comply with laws and regulations, and other requirements stipulated to protect the environment. Even regular environmental monitoring is very much required to take preventive measures in the country, he added. Dr Mhaisalkar emphasized on the need to promote the protection activities related to the environment at national and global levels. While briefing about environmentally

sound technologies, he said that it is necessary to create new eco-friendly products using environmentally sound technologies only. Industries should realize environmentally compliant business, he added. Dr Mhaisalkar said that there should be appropriate control of chemical substances in products and there should be reliable compliance with global environmental regulations. He advocated that there is need to make the existing environmental



Dr V.A. Mhaisalkar,
Professor in Environmental
Engineering, VNIIT,
delivering his lecture

management system more effective. He reiterated that such products should be manufactured which are useful for the people and environment. He spoke about promoting the plans to prevent global warming. Dr Mhaisalkar urged scientists to enlighten, educate and create awareness among the people for environment protection.

Earlier, in his welcome address, Dr T. Chakrabarti, Acting Director, NEERI, mentioned about the significant contributions made by Dr P. Nema during his tenure at NEERI. He said that under his able guidance, NEERI maintained and updated the national database on air quality of ten major Indian cities from the last two decades. The



Dr T. Chakrabarti, Acting
Director, NEERI delivering
the welcome address

institute developed an inventory of evaporative emissions of hydrocarbons (methane and VOCs) from various sources in Delhi, Kolkata, Mumbai and Chennai to assess the portion of evaporative emissions of total ambient hydrocarbons and to design suitable control measures, he added. Dr Chakrabarti informed that to assess the contribution of vehicular emissions to total air emissions, ambient air quality monitoring and emission source apportionment studies for Delhi were carried out under his leadership. During the tenure of Dr P. Nema, NEERI made important contributions to minimize air pollution from industries and power stations, Dr Chakrabarti said.

On this occasion, various scientists from Air Pollution Control Division and other Divisions of NEERI expressed their views about R&D contributions of Dr P. Nema for society and industry. Dr P. Nema also spoke on this occasion. He briefed about his R&D experiences achieved while working in various capacities at NEERI and thanked the entire staff of NEERI for cooperation. Dr C.V. Chalapati Rao, Director Grade Scientist, proposed the vote of thanks.

Workshop on Development of National Implementation Plan in India on Unintentionally Produced Persistent Organic Pollutants (POPs)

The National Environmental Engineering Research Institute (NEERI), Nagpur, organized a one-day UNIDO-MoEF sponsored stakeholders workshop on 'Development of National Implementation Plan in India on Unintentionally Produced POPs Dioxins and Furans Covering Western and Central States of India' in the recent past. The workshop was inaugurated by Dr Tapan Chakrabarti, Acting Director, NEERI. Representatives from various Organizations/Institutes/Units, such as UNIDO, Ministry of Environment and Forests (MoEF), Central Pollution Control Board (CPCB), State Pollution Control Boards (SPCBs), National Institute of Oceanography (NIO), Goa, Conservator of Forest, Nagpur, Government Medical College, Nagpur, Biomedical Disposal Facility, Hazardous Waste Incinerators, NGOs and related industries of cement works, ferrous and non-ferrous, textiles, copper etc. attended the workshop.

In his welcome address, Dr Chakrabarti, emphasized on the use of chlorine dioxide instead of chlorine in pulp and paper industries. There is a need to address the problems associated with control of dioxins and furans emitted by cement kilns, he added. Dr Chakrabarti stated that the study related to implications of Persistent Organic Pollutants (POPs)



Workshop in progress: Dr Y.P. Ramdev giving the opening remarks; Dr Tapan Chakrabarti, Acting Director, NEERI (in middle), and seated on his left: Dr (Mrs) N.P. Thacker and Dr (Mrs) Asha A. Juwarkar

should be undertaken right at those places where these are generated. He also suggested to the MoEF representatives that these issues need to be incorporated in policy making and a comprehensive epidemiological study needs to be carried out for dioxins and furans, since POPs have pernicious toxic qualities and may cause endocrine disruption. The release and formation of such compounds are restricted in many countries including India under Stockholm Convention, which is effective since 17 May 2004, Dr Chakrabarti informed.

During the workshop, representatives from various Organizations/Institutes/Units expressed their views on the subject. In the national interest, it was opined that since India is a party to the Stockholm Convention on Persistent Organic Pollutants (POPs), in order to meet the requirements under this

Convention, the Government of India will have to prepare and submit the National Implementation Plan to the Secretariat of the Convention. It was informed that MoEF is the nodal agency of the Government of India for the Stockholm Convention, which is executing the project titled 'Development of National Implementation Plan in India on Unintentionally Produced Persistent Organic Pollutants'. It was also mentioned that under this project a database on

unintentionally produced POPs is being prepared for the country. For this, three organizations, viz. CPCB; NEERI, Nagpur and National Institute for Interdisciplinary Science & Technology (NIIST), Thiruvananthapuram, have been assigned the tasks of sampling and data collection for preparing a database on industrial and non-industrial sources of dioxins and furans.

Dr Y. P. Ramdev, Asstt Regional Coordinator, UNIDO, gave a brief introduction to Stockholm Convention on POPs and development of national implementation plan in India. During the workshop, Dr Anupam Sarkar, Scientist, NIO, talked about POPs in environment and their toxicological aspects. Dr Neeta Thacker, Scientist and Head, Analytical Instruments Division, NEERI, mentioned about the role of stakeholders for preparing national inventory on POPs and coordinated the proceedings of the workshop.



National Science Day

National Science Day (NSD) is celebrated every year, through out the country, to commemorate the discovery of the “RAMAN EFFECT” by Sir C. V. Raman. As in the past, this year also several CSIR institutes organized special programmes on this occasion.

National Science Day celebrations at CIMAP, NAL, NCL, NEIST and NGRI:

Central Institute of Medicinal & Aromatic Plants (CIMAP), Lucknow

On the occasion of the National Science Day at the Central Institute of Medicinal & Aromatic Plants (CIMAP), Lucknow, a debate competition on ‘Role of Science in the Context of Economic Recession’ was organized in which about 20 Research Students, Project Fellows and Graduate Trainees participated. The winners of the debate competition are : Graduate Trainees Category: Archana (First), Abhinav

Trivedi (Second), and Rishi Raj Shukla (Third). Shiv Shankar Pandey and Stuti Sinha got the Consolation Prizes.

In the Research Fellows Category: Shikha Upadhyay Mishra (First), Sudhakar Tiwari (Second), and Gaurav, and Raj Dwivedi (Third), Vishal Singh got the Consolation Prize.

In the forenoon CIMAP observed ‘Open Day’ for general public including students. On the

occasion, students of various colleges including IT College, Amity University, Rameshwaram College and other visitors went around the various labs of the institute and got themselves acquainted with the various ongoing research activities. The poster exhibition in the Expression Gallery and live demonstration of experiments and instruments were the major attractions.



Clockwise: (top left) Panel of the Judges (from left) Dr Seema Javed, Dr G. C. Uniyal and Dr U.C. Lavania; and Visitors at the Expression Gallery

National Aerospace Laboratories (NAL), Bangalore

The National Aerospace Laboratories (NAL), Bangalore, celebrated National Science Day by organizing the National Conference on Recent Advances in Surface Engineering (The conference was a part of NAL's Golden Jubilee celebrations) at the S R Valluri Auditorium, on 27 February 2009. Dr M. R. Nayak welcomed the gathering and introduced the Chief Guest Prof. H. P. Khincha, Vice Chancellor, Visvesvaraya Technological University (VTU),

Belgaum.

Prof. Khincha delivered the National Science Day Lecture on 'Creativity and Entrepreneurship in Education'. His lecture focused on creativity, inspiration for innovations and entrepreneurship culture. He said that higher education is the market place of ideas. We need to hunt for new science, new technology, new innovation processes, new technology transfer and connect science and technology.

Earlier, Dr A. R. Upadhyya,

Director, NAL, in his Presidential remarks said that Prof. Khincha is at the helm of affairs of the largest technological university so he is the right person to talk about Creativity and Entrepreneurship in Education. He further said that the University is a store house of knowledge where the creativity and innovation spirit builds up.

The programme concluded with a vote of thanks by Dr M. N. Sathyanarayana, Jt. Head, KTMD.

National Chemical Laboratory (NCL), Pune

At National Chemical Laboratory (NCL), Pune, Prof. N. Kumar, Homi Bhabha Distinguished Professor, Raman Research Institute, Bangalore, delivered a lecture on 'Viewing Raman Through His Effects' on the occasion of the National Science Day.

Prof. Kumar initiated his lecture by briefing the audience on the phenomena of scattering of light and on Raman Effect. He conveyed the spirit and excitement associated with the work of Prof. C. V. Raman, a Nobel Prize winner in 1930 for his work on the scattering of light. Sir C. V. Raman made the epoch making discovery on the "Molecular Diffraction of Light," on 28 February 1928, a date permanently etched in the annals of the Indian Science.

Prof. Kumar described Prof. Raman as a person for whom the real inspiration of science came from the love of Nature. He said that

Prof. Raman could sense science in everyday life. He was curious on questions like 'why is the sky blue', 'why is the deep sea blue' etc., and this was what led Prof. Raman into his exploration of the study of interaction of light with matter. According to Prof. Raman's findings the blue colour of the sea was due to the light scattering from the molecules of water and the blue colour of the sky was due to the scattering of light by the different molecules present in the atmosphere. Prof. Kumar discussed Raman's work on the polarization effects and on fluorescence. He said that it was possible to see the stars through a polarizer at a particular angle from the Sun's rays. Prof. Kumar briefed the audience on Prof. Raman's paper of light scattering and viscosity of light that was published in *Nature* in 1938. Prof. Kumar also highlighted Prof.



Prof. N. Kumar, Homi Bhabha Distinguished Professor, Raman Research Institute, Bangalore, delivering a lecture on 'Viewing Raman Through His Effects' on the occasion of the National Science Day

Raman's work on the acoustics of musical instruments. Prof. Raman was the first to investigate the harmonic nature of sound of the



Indian drums like *tabla* etc. Prof. Kumar ended his lecture with a dramatic illustration of a phenomenon for which he said there is no satisfactory explanation as yet. He spun a small coin on a glass plate. As the coin slowly came to a halt, the sound caused by spinning reached a high pitch (crescendo). The question was why was the pitch of sound increasing when the rate of spinning was reducing.

Earlier, Dr S. Sivaram, Director, NCL, in his welcome remarks introduced Prof. Kumar to the audience and gave his credentials. Prof. Kumar, former Director, Raman Research Institute, Bangalore, and a distinguished physicist, has a number of awards to his credit including the Bhatnagar award in 1995 in Physical sciences. Dr Sivaram pointed out that

Prof. Kumar is a distinguished alumnus of NCL, having worked as a Scientist and doing his doctoral research at NCL under the supervision of Prof. K. P. Sinha.

On the occasion, posters on topics of interest were displayed by research scholars and project assistants. There were more than 140 posters on display for two days, out of these 18 posters were awarded.

The award for best research paper published during 2008 and Science Day Posters awards, were announced by Dr Sourav Pal, Chairman, Students Academic Committee and Head, Physical and Materials Division. Prof. Kumar distributed the awards. Keerthi Sangoram Endowment Awards for "Best Research Scholars" for the year 2008 was given to seven

students; Nanai Natu Award for 'Best Publication' in organic chemistry with the highest impact factor for the Scientists to Dr V.R. Pedireddi, scientist, Organic Chemistry Division for his paper and Dr Rajappa Award for 'Best Publication' in organic chemistry with the highest impact factor for the research scholars to Mr Amit Delori.

Maneckji & Shirinbai Neterwala Foundation NCL RF Scientist of the Year Award Lecture was delivered by Dr P. A. Joy, Scientist, Physical and Materials Chemistry Division, and Dr C. Ramesh, Scientist, Polymer Science & Engineering Division. Dr R. A. Mashelkar Endowment Fund NCL RF Scientist of the Year Award Lecture was delivered by Dr B. L. V. Prasad, Scientist, Physical and Materials Chemistry Division.

North East Institute of Science & Technology (NEIST), Jorhat

The North East Institute of Science & Technology (NEIST), Jorhat, celebrated the National Science Day on 2 March 2009 (instead of usual 28 February on account of it being a holiday). The celebration function was presided over by Dr R. C. Barua, NEIST. The Chief Guest Prof. Kankan Bhattacharyya of Indian Association for Cultivation of Science, Kolkata, delivered the National Science Day lecture on '*Rise of Modern Science in India*'. The function was largely attended by invited dignitaries, distinguished scientists, students, teachers, science fans and others besides the scientific fraternity of NEIST, both old and new.

Welcoming the Chief Guest Dr P. Sengupta, Scientist, NEIST spoke about the importance of the day. Dr Barua, in his Presidential Address mentioned some of achievements of the NEIST in recent times.

Prof. Bhattacharyya in his lecture recalled the devotion, dedication and patriotism of the Indian Scientific geniuses like Dr Mahendralal Dutta, Dr J. C. Bose, Dr P. C. Roy and Dr S. A. Ramanujan, who against all odds, steadfastly pursued research, established themselves as world class scientists and built the foundation for the Indian Science. He implored the young scientists to be patriotic, dedicated and devoted

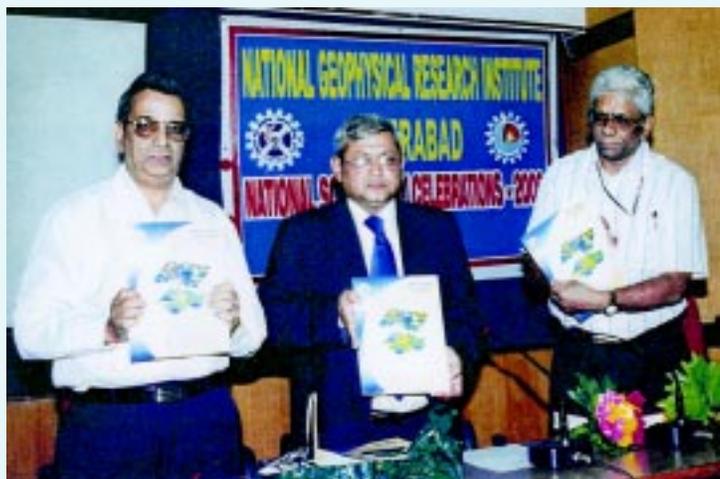
to the research work and make the country proud. He also mentioned about the remarkable achievement made in India by way of Green Revolution, White Revolution, Medicine, Poultry, Diamond Cutting by Laser, Textile, Software and 'Nano' car of the present day. Towards the end he mentioned about the progress of research on LASER, chemical reaction dynamics, breaking and movement of chemical bonds and estimation of the dynamics in femtosecond. The function concluded with the vote of thanks by Dr Puja Khare, Scientist, NEIST.

Earlier, the day was declared as 'Open Day'. Nearly 1000 students



from various nearby schools and colleges along with teachers visited the laboratory and interacted with the scientists.

National Geophysical Research Institute (NGRI), Hyderabad



Shri P.K. Bhowmick, releasing one of the publications of NGRI on the occasion

Shri P.K. Bhowmick, Group General Manager and Head, KDMIPE, ONGC, Dehra Dun who was the Chief Guest during National Science Day function at the National Geophysical Research Institute (NGRI), Hyderabad, delivered the Science Day Lecture on 'Search for New Hydrocarbons in Natural and Semi-natural basins'. Shri Bhowmick stressed on the need of oil recovery and alternative energy sources such as Coal Bed Methane and Gas Hydrates while reviewing the present scenario of oil and gas exploration in the Indian context.

On this occasion, the Annual Report 2007-08 of NGRI, *the Research Output 2008* and *Contributions of Gravity and Magnetic Studies Group 1997-2006* were also released by the Chief Guest.

Earlier, Dr V.P. Dimri, Director, NGRI, welcomed the distinguished gathering.

Dr Y.J. Bhaskar Rao, Director Grade Scientist, proposed a vote of thanks.

Dr Sudesh Kumar Yadav Conferred INSA Medal-2008

Dr Sudesh Kumar Yadav, Scientist, Institute of Himalayan Bioresource Technology (IHBT), Palampur, has been conferred by the Council of the Indian National Science Academy, the INSA Medal for Young Scientist-2008 for his



outstanding contributions in measuring methylglyoxal (MG) in plants for the first time and demonstrating the importance of MG detoxification by glyoxalase pathway in conferring stress tolerance in plants. Methylglyoxal (MG), the primary substrate of glyoxalase pathway, is produced through various routes inside the cell of living organisms including plants. However, a certain level of MG that varies from species to species is important for the normal development and growth of plants. Under abiotic stresses, MG levels increase resulting in cellular toxicity. To overcome this, genetic engineering of glyoxalase pathway comprising two enzymes glyoxalase I and glyoxalase II, has been found to be an important strategy in ameliorating the effect of abiotic stresses. Overexpression of glyoxalase enzymes protect plants from oxidative damage through direct degradation of increased MG as well by maintaining GSH redox homeostasis which otherwise gets disturbed in plant cells upon their exposure to environmental stresses. The work was carried out at ICGEB, New Delhi, as a part of his postdoctoral work under DBT Fellowship.

Dr Sudesh joined IHBT as Scientist C in 2004. He is a BOYSCAST Fellow. He has 25 publications so far in journals of international repute.



Prof. S.K. Brahmachari selected for Shri Om Prakash Bhasin Award for Science and Technology (2008)

Prof. Samir K. Brahmachari, Director General, CSIR, has been selected for Shri Om Prakash Bhasin Award for Science and Technology for 2008, in the field of Biotechnology. The Award carries a cash prize, a citation and a plaque. The awards are given every year, by Shri Om Prakash Bhasin Foundation for Science and Technology, in the fields of: Agriculture and Allied Sciences (including Animal Husbandry, Horticulture, Forestry, Fisheries, Bio-mass Production); Biotechnology (including Modern Biology, Microbiology and Immunology); Electronics and Information Technology; Engineering (including Energy and Aerospace); and Health and Medical Sciences.



The Awards are given for significant contributions of a pure or applied nature or outstanding scientific leadership in various fields of Science and Technology. The work should have made (or have the potential to make) a significant impact on national development, or bring renown to the country.

The Award will be formally presented at an Awards Presentation Ceremony, later this year.

Dr M. O. Garg elected a Fellow of INAE

Dr Madhukar Onkarnath Garg, Director, Indian Institute of Petroleum (IIP), Dehra Dun, has been elected a Fellow of the Indian National Academy of Engineering (INAE) in recognition of his distinguished contribution to "Engineering". His fellowship will become effective from 1 January 2009.



Founded in 1987, INAE comprises India's most distinguished engineers, engineer-scientists and technologists covering the entire spectrum of engineering disciplines. It functions as an apex body to promote and advance the practice of engineering and technology and the related sciences and disciplines in India and their application to problems of national importance. INAE also encourages inventions, investigations, and research in pursuit of excellence in the field of Engineering. The Academy is registered under the Societies Registration Act 1860 and is an autonomous institution supported partly through grant-in-aid by Department of Science & Technology, Government of India. It is the only engineering Academy in India and is recognized as a Scientific and Industrial Research Organisation (SIRO) by the Department of Scientific and Industrial Research, Government of India. INAE is a Member of the international Council of Academies of Engineering and Technological Sciences (CAETS). INAE honours Indian and foreign nationals who are elected by peer committees in recognition of their personal achievements in engineering which are of exceptional merit and distinctive eminence in new and developing fields of technology. The fellows on election to the Academy are entitled to use abbreviated title "FNAE". Upto 50 Fellows from Academia, Research & Development, Industry, Government and others may be elected each year from nominations made by Fellows of INAE affiliated to various Engineering Sections. The total number of Fellows at any one time may not exceed 800. The Academy as on 1 January 2008 had 589 Fellows from India and 44 Foreign Fellows on its rolls divided into ten Engineering Sections.