

CSIR NEWS

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CSIR signs MoU with Alcoa: Innovation Council formed for collaboration in research focusing on areas of energy, environment and material science

The Council of Scientific & Industrial Research (CSIR) has signed a Memorandum of Understanding (MoU) with Alcoa on 15 December 2006. The MoU as part of the Alcoa's open innovation policy is to partner in collaborative research projects that address critical global issues such as energy efficiency, alternative and renewable energy sources, environmental technologies as well as multi-material engineered solutions. The MoU establishes the CSIR/Alcoa Leadership Innovation Council that will steer and support innovations that generate value for both organizations.



Dr D. Yogeswara Rao, Head, Technology Networking and Business Development Division, CSIR and Mohammad Zaidi, Executive Vice President, Market Strategy, Technology and Quality, Alcoa, exchanging the CSIR-Alcoa MoU documents in the presence of Dr R.A. Mashelkar, the then Director General of CSIR



“We are excited to partner with the research community in India and leverage our combined capabilities to develop solutions for some of the most difficult problems that face governments and business,” said Dr Mohammad Zaidi, Executive Vice President, Market Strategy, Technology and Quality, Alcoa. “We are anxious to begin working on projects with CSIR that we have identified as areas of mutual interest.”

Both CSIR and Alcoa will each have four standing members on the council, which will be co-chaired by Dr Swaminathan Sivaram, Director, National Chemical Laboratory of CSIR, and Dr Ashok Nayak, Director, External Innovations & Technology Strategy, Alcoa.

Some of the areas of initial focus include energy innovations to ensure long-term sustainability of operations, environmental innovations that use nano-technology and biotechnology to

convert waste to products, packaging innovations that provide next-generation solutions to customers, and multi-material engineered solutions for a number of markets.

About CSIR

Council of Scientific & Industrial Research is a premier R&D organization of India, with a chain of 38 research laboratories spread all over the country. CSIR covers a wide spectrum of science and technology. It carries out research of value not only to industry, but also to the other vital sectors of economy. Several national and international companies have strategic linkages with CSIR to jointly develop a new knowledgebase.

About Alcoa

Alcoa is the world's leading producer and manager of primary

aluminum, fabricated aluminum and alumina facilities, and is active in all major aspects of the industry. Alcoa serves the aerospace, automotive, packaging, building and construction, commercial transportation and industrial markets, bringing design, engineering, production and other capabilities of Alcoa's businesses to customers. In addition to aluminum products and components, Alcoa also markets consumer brands including Reynolds Wrap® foils and plastic wraps, Alcoa® wheels, and Baco® household wraps. Among its other businesses are closures, fastening systems, precision castings, and electrical distribution systems for cars and trucks. The company has 129,000 employees in 44 countries and has been named one of the top most sustainable corporations in the world at the World Economic Forum in Davos, Switzerland.

REGEN-D Treatment for Diabetic Foot Ulcer and Burn Injuries

PARTNERSHIP between the Institute of Genomics and Integrative Biology (IGIB), and Bharat Biotech International Limited (BBIL) has led to successful development and commercialization of the indigenous technology for recombinant human Epidermal Growth Factor (rhEGF). The product, being commercialized under brand name REGEN-D™, is for the treatment of diabetic foot ulcer and burn injuries. BBIL is the



Products developed by IGIB and BBIL for treatment of Diabetic Foot Ulcer and Burn Wound

first Indian company to receive the approval of the Drug Approval Agency for use of rhEGF for treatment of diabetic foot ulcers. For this development and commercialization, IGIB and BBIL were given the National Technology Award by the Technology Development Board this year.

This pioneer work was done at IGIB by a team led by Dr G.S. Khatri.



NBRI develops New Varieties of Chrysanthemum

The National Botanical Research Institute (NBRI), Lucknow, has been working on multidisciplinary research programme for the improvement of chrysanthemum for the last three decades. Chrysanthemum is cultivated as cut flower on commercial scale as well as for its aesthetic value in gardens. More than 250 living collections are being maintained at NBRI comprising almost all bloom types and colours, which are being used as base line material for further increase of genetic variability and improvement through intervarietal hybridization, induced mutagenesis and selection.

Mini chrysanthemum, developed at NBRI, is unique of its kind. It requires neither 'pinching' nor 'staking'. It is a unique genetic strain with dwarf, bushy, compact round shaped, profuse blooming habit. The plant habit and shape is most attractive. A number of mini varieties have been developed by NBRI from open pollinated seedlings and selective crossing and

released for commercial exploitation after repeated and rigorous screening in subsequent generations. Some important mini varieties are: 'Aparna', 'Arun Kumar', 'Bindya', 'Cameo', 'Haldighati', 'Peet Singar', 'Suhag Singar', 'Sweet Singar', 'White Charm', 'Hellow Charm', 'NBRI Diana', 'NBRI Little Darling', 'NBRI Mini Jessie', 'Kusum', 'Mother Teresa', 'Y 2K', 'Sadbhawna', 'Kargil '99', etc. 'Mother Teresa' has been patented by NBRI in USA (Patent No. PP13678).

Recently, the Floriculture Division of NBRI has developed two varieties from open pollinated seedling selections on the basis of their performance. These varieties were released during 'Annual Chrysanthemum & Coleus Flower Show 2006' in the presence of a team of distinguished scientists, comprising a Task Force, Chaired by Dr Vishnu Swarup, Director, R&D, Indo-American Hybrid Seeds (India) Pvt. Ltd., New Delhi. The Task Force was deputed to NBRI by

Protection of Plant Varieties and Farmer's Right Act, Government of India, to study the floricultural facilities at the institute. Important traits of the newly released varieties are as follows:

Mini Queen: It is a seedling selection from 'NBRI Little Darling'. The original colour of Little Darling is Terracotta with distinct orangish yellow ray florets and terracotta disc florets. The flower colour of Mini Queen is dark terracotta. The variety is under mini chrysanthemum group. Plant habit medium, bushy, compact, round shaped profuse blooming habit.

Rangoli: This is a seedling selection from 'NBRI Diana'. The original colour of *Diana* is red and flower is anemone type. The flower colour of *Rangoli* is dark red and the flower is double Korean type. The variety is under small flower chrysanthemum group. Plant habit dwarf, bushy, compact, round shaped, profuse blooming habit.



Chrysanthemum Variety 'Mini Queen'



Chrysanthemum Variety 'Rangoli'



Chrysanthemum and Coleus Show

The show organized at the Open Air Theatre of NBRI, had swaying blooms of vast array and splendid varieties of chrysanthemums and coleus. Dr Vishnu Swarup, Director (R&D), Indo-American Hybrid Seeds (India) Pvt Ltd, New Delhi, presided over the prize distribution function and presented prizes to the successful competitors. On this occasion, members of Taskforce on Floriculture, Protection of Plant Variety and Farmers' Rights Act (PPV&FRA), namely, Prof. G. L. Kaul, former Vice Chancellor, Assam University; Dr N.K. Dadlani, Managing Director, DAKSH Hortitech, New Delhi and Dr Devi Prasad, Senior Scientist, IARI, New Delhi, were also present and took part in distribution of the prizes/shields/cups to the winners. A total number of 331 prizes in addition to 23 running challenge cups, shields and trophies were awarded to the successful competitors.

Headquarters, Central Command, Lucknow, got first place by bagging as many as seven trophies/running challenge cup/shields. Shri Surendar Kumar Sharma, Seiko Cables of India, Lucknow, bagged second position by

winning 4 trophies/shields/cups in the show. Assistant Engineer, Headquarters, U.P. Power Corporation Limited, Shakti Bhawan, Lucknow, secured third place by winning 3 trophies/shields/cups. Director, Central Institute of Medicinal and Aromatic Plants, Lucknow, won two running trophies/cups. The other winners each bagging one trophy/shield/cup are: Shri Mohd.Yunus Ali Khan of Shahjahanpur, Shri Pramod of Lucknow, Major Gen. J.J. Manavalan of Cantt. Lucknow, Col. Anil Kumar Jaggi, G.M., Balarampur, Lucknow, Shri Akhla Ali Khan of Shahjahanpur and Lt.Gen. O.P. Nandrajog of Lucknow. Assistant Engineer, U.P. Power Corporation Limited, Lucknow and Shri Shivam, Vikas Nagar, Lucknow, were the joint winners of the Qazi Syed Hasan memorial running challenge trophy for the highest score in Class-F for coloured photographs of chrysanthemum.

Shri Surendra Kumar Sharma, Seiko Cables, Lucknow, won the Ranjit Singh Memorial trophy for the 'King of the Show' and Quazi Syed Masood Hasan Running Challenge Trophy for the 'Prince of

the Show'. Smt Ranjit Singh Memorial Trophy for the 'Queen of the Show' and Ram Kishore Sharma Memorial Trophy for the 'Flower of the Year' were lifted by Headquarters, Central Command, Lucknow. In the thematic arrangements there were attractive and inviting themes like 'Ham Sab Ek Hain', 'Puspa Yukata Pradushan Mukta', etc were on display.

The new varieties of chrysanthemum and coleus developed by NBRI through different traditional and modern methods were displayed. The general public was explained how chrysanthemum flowers can be commercially exploited by programmed blooming. Public got a unique opportunity to interact with scientists of NBRI directly and get the first hand information on agro-technology, techno-economics, commercial cut flower varieties and many other cultivation practices. NBRI released two new varieties of chrysanthemum "Mini Queen" and "Rangoli" this year. It is pertinent to mention that NBRI is maintaining more than 250 germplasm collections of chrysanthemum comprising almost all colours and



'Flower of the year'



'King of the show'



'Prince of the show'



'Queen of the show'

types.

Dr R.K. Gupta, Senior most Scientist, NBRI, in his welcome speech underlined the importance of floriculture and ongoing activities of the institute. Dr S.P. Singh, Senior Scientist, NBRI, introduced the chief guest.

Dr Vishnu Swarup in his address said that beauty of flowers has captivated people of all classes and generations. "Flowers bring happiness to each and everyone. The significance of flowers has been known since ancient times; however, its market potential has been realized only in the 80s and 90s. Today there is a tremendous potential for flowers both in national and international market. States like Tamil Nadu, Andhra Pradesh, Karnataka, Rajasthan, Madhya Pradesh and Bihar are well known for increased volume of flower sales, however, U.P. especially Lucknow has enormous potential in this area," he said. He eulogized the role of NBRI in promoting floriculture especially in the Avadh region both through R&D and promoting awareness to public through flower shows. He exhorted that 'Chrysanthemum' should be called as "Avadh Ki Rani" as a mark to promote its cultivation.

Dr S. K. Datta, Senior Scientist, NBRI, proposed the vote of thanks.

Supercapacitors and Nanobimetallics Shanti Swarup Bhatnagar Prize-Winner Dr Srinivasan Sampath's Work



important issues related to various interfaces such as solid / liquid; liquid-like / liquid and solid / solid interfaces. His research can be broadly classified as, Interfacial Chemistry - Nanostructures, Electrochemistry and Materials Science.

Dr Srinivasan Sampath of Indian Institute of Science, Bangalore, has been awarded along with Dr K. George Thomas of Regional Research Laboratory, Thiruvananthapuram, the Shanti Swarup Bhatnagar Prize in Chemical Sciences for the year 2006 for his outstanding contributions to the development of supercapacitors and nanobimetallics and their novel applications. [CSIR News, 56 (2006), 297]

Dr Sampath's group at the Department of Inorganic and Physical Chemistry, IISc, Bangalore, initiated research involving surfaces and interfaces. The uniqueness of his research lies in the development of novel materials and to follow their interfacial characteristics and subsequently demonstrate new applications. The main interest revolves around understanding

Solid/liquid interface

A novel material called exfoliated graphite, which can be covalently functionalized to yield binderless matrices for sensing applications has been developed. (Bio)Sensing of various analytes such as neurotransmitters (dopamine), alcohol, glucose, NADH and direct electron transfer of redox active proteins have been achieved using this material. The second aspect in the direction of solid-liquid interfaces is related to the synthesis of nanobimetallic particles of Pt-Pd, Ag-Pt, Au-Pd and Au-Ag in sol-gel based silicates. The Au-Ag alloy clusters have been shown to yield a detection limit of several molecules in the solution phase using Surface Enhanced Raman Scattering (SERS) technique. The nanoparticles have also been used to demonstrate



'single electron events' in the solution phase analogous to the 'coulomb blockade effect' observed in the solid phase.

Solid/solid interface

Extensive spectroscopy and electrochemistry studies on PEG – silicate composites containing magnesium and zinc salts with various anions such as triflate, nitrate and chloride have led to their use in secondary magnesium- and zinc-based batteries. Supercapacitors based on solid and gel-based electrolytes (polyacrylonitrile, polymethylmethacrylate and sol-gel matrices) and high-density graphite electrodes or exfoliated graphite / composites are found to yield high capacitance values coupled with good charge – discharge characteristics.

Liquid-like/liquid interface

A molecular electronics device (molecular rectifier) was conceived and assembled based on quinone – methylene spacer – ferrocene on gold. Using a similar assembly, thermal intramolecular electron transfer has also been demonstrated within constrained systems. Interfacial water structure has been probed at a hydrophobic SAM-water interface and the variation of dielectric constant of water as a function of distance has been deduced using force microscopy.

The impact of Dr Sampath's research work both basic and applied, is unique. The fundamental

understanding of interfacial properties is used to develop various applications.

Dr Srinivasan Sampath obtained his Ph.D degree from the Indian Institute of Technology, Madras, in the year 1990. Subsequently, he carried out post doctoral research work in Japan and Israel before returning to India to take up a position at the Indian Institute of Science, Bangalore, in the year 1997. His basic training is in the areas of electrochemistry, materials and surface chemistry. At the Department of Inorganic and Physical Chemistry, IISc, Dr Sampath initiated an important and interesting discipline of research involving surface and interfacial chemistry. His research work has been recognized and appreciated by the international community. Many news items have appeared in various international scientific journals elaborating his research findings. Recently, he has initiated a program on the synthesis of carbon nanotubes by the exfoliation process without the use of a metal catalyst. His work on supercapacitors has resulted in devices and the process of fabricating supercapacitors is being patented. He has completed several sponsored projects from various funding agencies like, DST, CSIR, MHRD, India-Israel collaboration etc. His contributions have also been recognized by the Chemical Research Society of India as well as the Materials Research Society of India.

International Conference on Structural Analysis of Historical Constructions

The Central Building Research Institute (CBRI), Roorkee, is pursuing a project on 'Improving Seismic Resistance of Cultural Heritage Buildings in India' under EU-India Economic Cross Cultural Programme. Under the project, four world emblematic case studies, including the one on Qutb Minar in New Delhi, have been taken up for detailed. The project is an investigation. Research & Development endeavor to exchange the experience and knowledge gained in Europe and India and would help in generating useful data and document on improving the earthquake resistance of our heritage buildings on scientific basis.

In this direction, CBRI organized an international conference on 'Structural Analysis of Historical Constructions' in association with European Commission and other collaborators namely University of Minho, Portugal; Technical University of Catalonia, Spain and University of Padua, Italy. The conference was held in New Delhi during 6-8 November 2006. The conference proceedings in three volumes covering 240 technical papers have been published by MacMillan India Ltd.



National Seminar on Materials and Minerals



Seen on dais during the National Seminar on Materials and Minerals (from left) are: Dr S. Bandopadhyay, Scientist, CGCRI; Prof Arun Chattopadhyay, Head, Technology Centre, IIT, Guwahati; Dr M.S. Iyengar, former Director, RRL-Jorhat and Dr P.G. Rao, Director, RRL-Jorhat

A national seminar entitled 'Materials and Minerals : Past, Present and Future' was organized at the Regional Research Laboratory (RRL), Jorhat. The seminar had key note addresses by eminent speakers like Dr M.S. Iyengar, former Director, RRL-Jorhat and Prof K. A. Natarajan, Professor, Department of Metallurgy, Indian Institute of Science, Bangalore, in the areas of Coal and Minerals and Biotechnology in Mineral Processing and four invited talks by Scientists namely Prof Arun Chattopadhyay, Head, Technology Centre, Indian Institute of Technology, Guwahati, on Nano particles, Dr S. Bandopadhyay, Scientist, Central Glass & Ceramic Research Institute, Kolkata, on Ceramic membrane; Dr K. M. Parida, Scientist, Regional Research Laboratory, Bhubaneswar, on Heterogeneous catalysts. The focal theme of the seminar was devoted to (i) Coal and minerals, (ii) Biotechnology in mineral processing, (iii) Nanoparticles, (iv) Heterogeneous catalysts, (v) Ceramic membranes and (vi) Technology extension. Inaugurated by Dr M. S. Iyengar, the seminar was attended by invited guests, students, members of press and media and members of the scientific fraternity of RRL, Jorhat.

International Symposium on Building Leadership Skills in Food and Nutrition Essential for National Development



Seen during the inauguration of the Symposium (from left) are: Dr Ricardo Uauy, President, International Union of Nutritional Sciences; Dr V. Prakash, Director, CFTRI; Prof M.S. Swaminathan, Founder Director & Chairman, M.S. Swaminathan Research Foundation, Chennai; Prof. Nevin Scrimshaw, President, International Nutrition Foundation, USA.

The Central Food Technological Research Institute (CFTRI), Mysore, in the recent past organized an international symposium on 'Building Leadership Skills in Food and Nutrition Essential for National Development™' in collaboration with United Nations University, Japan; International Nutrition Foundation, USA; International Union of Nutritional Sciences; Capacity Strengthening in Nutrition in Asia; United Nation Children™s Fund; Tufts University, USA and Government of Karnataka as the partner state. The event was also co-sponsored by a number of industries and scientific bodies.

Prof. M.S. Swaminathan, Founder Director and Chairman, MSSRF, Chennai, inaugurated the event. He also released the abstract book of posters and presentations. The keynote address was given by the renowned nutritionist, Prof. Nevin Scrimshaw, President, International Nutrition Foundation, USA. Dr Ricardo Uauy, President, International Union of Nutritional Sciences inaugurated the poster session in which young



researchers in the area of nutrition and capacity building participated. Dr V. Prakash, Director, CFTRI presided over the function.

The international event evinced a lot of interest among nutritionists. A large number of national and international delegates participated in the deliberations. The presentations focussed on Training and Leadership, Regional Experiences & Training Needs, Issues in Capacity Building, National, Global and Industry Perspective of Capacity Building. In the poster session, young researchers exhibited nutritional capabilities of their respective regions. The topics included: biofortification, well-being of health and nutrition enhancement to the population.

The symposium concluded with a panel discussion and the recommendations were brought out as Mysore Declaration for capacity building in nutrition globally. The awards were also presented to the best poster in the concluding session.

Dr Mukesh Saxena participates in ACFA Seminar at Philippines

Asian Clean Fuels Association (ACFA) supports and promotes the use of clean fuels for cleaner air, while furthering the protection of soil and groundwater resources through proper automotive fuel management. ACFA fully endorses the chemical industry's global Responsible Care initiative under which individual companies and their national associations work together to continuously improve their health, safety and environmental performance.

The Asian Clean Fuels Association and the Philippines DOE's Oil Industry Management Bureau (OIMB) jointly held a vehicle fuel quality workshop in the recent past. This widely attended event took place at the Culture Hall at Petron Mega Plaza in Manila and included representatives from the oil industry, auto manufacturers, government agencies, academia and trade groups.

The workshop's main purposes were to continue the exchange started last year about the development of clean fuels in the region and provide a forum to discuss the existing Philippines's fuel specifications. In addition to ACFA and DOE/OIMB, invited speakers included representatives from the European Fuel Oxygenates Association, Indian Institute of

Petroleum and the Japan Automobile Manufacturers Association.

Dr Mukesh Saxena, Head of Automotive Fuels & Lubricants Application Division in the Indian Institute of Petroleum (IIP), Dehradun presented on 'Biofuels for the Transport Sector – An Asian Perspective'. He traced the development of gasohol in India starting in 2002 with mandatory E5 blends in certain states, followed by its revocation in 2004 because of inadequate ethanol supply.

He noted the barriers and limitations associated with gasohol use in India, including reliance on single feed stock (molasses) with fluctuating production; limited feed stock supply (molasses can only support up to 7.5% blend); control, use and price of sugar cane; and competing ethanol demand for potable and industrial use. Also, he observed that questions remain about sustainability and energy conversion efficiency of gasohol.

He presented data from IIP showing that hydrocarbon (HC) emissions from two stroke scooters increase with the use of gasohol and NOx emissions rise for fuel injected cars.

The seminar has been covered in *ACFA News*. Vol 4 Issue 7 and full presentation material is available through ACFA's online library.

International Workshop on Sustainable Plastics in India and Asian Countries

The National Chemical Laboratory (NCL), Pune, organised an International Workshop on Sustainable Plastics in India and Asian Countries during 14-16 December 2006 under the aegis of ICS-UNIDO, based in Trieste, Italy. About fifty participants comprising scientists and technologists from 12 countries including USA, Germany, Thailand, Italy, India, Japan, Malaysia, Poland, Kuwait, Indonesia, Nepal, and Iran attended the workshop. They were drawn from academia as well as industry.

The aim of the workshop was to establish close cooperation between the academic and industrial sector either through direct interaction or through the provision of services by national and regional R&D institutions. Sustainability of materials is the key to technological development. Sustainable plastics are an important factor in technological development, but then also come the issues of sustainability of raw materials, waste disposal problems, and so on. In this respect, the production of environment friendly polymeric materials is the most logical option for the management of plastics waste. Degradable plastics

should replace the conventional commodity plastics in those segments in which recycling is difficult or economically not feasible.

The workshop covered recent developments in the field of sustainable environmentally degradable polymers, especially those based on renewable resources, along with status reports of represented Asian countries. National and international standards and test methods were discussed, which take into account life cycle analysis of the polymeric materials. Industrial sector was

represented by Reliance Industries (Mumbai), Harita-NTI (Chennai), and BIOS (Germany). Scientists from various countries spoke about the scientific developments in their countries in this field and on the problems of waste management, and the views of their societies and governments. The industrial participants elaborated on the technologies being adopted by them to overcome the problem of sustainability of raw materials and environmental issues. There were several presentations from NCL pertaining to ongoing activities in



Dr A.J. Varma giving welcome remarks



Prof. S. Miertus speaking on the goals of ICS-UNIDO



Prof. Emo Chiellini delivering the keynote address



A view of the audience



the area of sustainable plastics from biomass.

Prof. S. Miertus of ICS-UNIDO, Trieste, Italy, spoke about the goals and programmes of ICS-UNIDO in promoting environment-friendly polymers and cooperation amongst various countries. Prof. Emo Chiellini of the University of Pisa, Italy, in his keynote address, presented an overview of environment-friendly sustainable polymers, both from natural sources as well as from renewable sources, and informed that, “about 200 million tonnes of plastics are produced worldwide, and we cannot wish away plastics, but future developments must recognize the pros and cons of all materials”. Hybrid materials have a good scope for further developments. In the first session of the inaugural day, Dr U. Saroop of Reliance Industries, Mumbai, presented a paper on the benefits of plastics for mankind. He said that plastics present the most favorable cost benefit ratio amongst comparable materials. Plastics consume lesser energy than paper for manufacturing and emit lesser toxic gas emissions. He said plastics help improve the quality of life by helping preserve land, water, and forest resources, and being inert materials, they are non-polluting, and because of these reasons plastics are integral to sustainable development. He stressed that a holistic view of all materials should be taken.

On the next day, Dr. A.J. Varma, Polymer Science and Engineering Division, NCL and convener of the workshop, presented the NCL work on developments on conversion of sugarcane bagasse to value-added

cellulose and cellulose acetate plastics, lignin and hemicellulose. He also elaborated on the wide range of chemicals that can be obtained from cellulose and starch as platform for chemicals. Shri Sanjany Nene, NCL, described the NCL work on sugarcane juice to lactic acid and polylactic acids, a promising plastic material for packaging applications. Dr Katerina Moraweitz of Biopolymer Technologies (BIOP), Germany, gave an interesting presentation on the industrial developments in Europe on various types of bioplastics such as Ecoflex, Mater-Bi, Bioplast, Bionelle, etc., and elaborated on a new material BIOPAR based on potato starch mixed with a synthetic biodegradable plastic Ecoflex, which is an aliphatic polyester. She exhibited samples of the products, which showed their immense potential as packaging materials for shopping bags, garbage bags, mulch films, geotextiles, and molded pots and trays, if the economics become more attractive. Dr K. Suchiva, Mahidol University, Bangkok, Thailand spoke about the programmes they have in collaboration with ICS-UNIDO, and about the technology roadmap for biobased materials based on starch, chitin, jute, coir, etc. from 2006 onwards. Dr Hitoshi Takagi Tokushima University, Japan, described his researches into “Green Composites” based on natural fiber reinforcements, and showed that such products can even go into automobiles and mobile phones.

On the concluding day, Dr S. Sivaram, Director, NCL, spoke of

the need to develop biomass resources for plastics, polymers, chemicals, and fuel. He said that carbohydrates can be the ‘new oil’ for generations to come. Dr Ramani Narayan, Michigan State University, USA, gave a thorough exposition of the science behind setting standard testing protocols for biodegradable and compostable plastics. There were several other talks on the national programmes of various countries e.g. Iran, Nepal, Poland, Kuwait, etc. The deliberations based on these lectures were very useful to all the delegates in understanding the current international state-of-the-art research and the possible future directions, potentials, and limitations.

The workshop culminated with a round table conference session to make firm conclusions and suggestions for further developing this field and enhancing cooperation between various participating countries. Strong interest was shown by all participating countries in further developing materials from renewable resources and waste biomass, and by the use of biotechnology, in addition to improving current systems. It was agreed that a holistic attitude has to prevail in deciding the issues of sustainability and environment degradation. This workshop also enabled the formation of a useful network of scientists under the aegis of ICS-UNIDO who can discuss and cooperate with each other in bringing the results of their work into useful, sustainable, and environment-friendly products.



CSIR participates in G-8 Energy and Innovation Workshop in Brazil

Dr S.K. Srivastava, Acting Director, Central Fuel Research Institute (CFRI), Dhanbad; Dr M.R. Gandhi, Head, PD EC, Central Salt & Marine Research Institute (CSMCRI), Bhavnagar; and Shri S.M. Nonoti, Scientist, Indian Institute of Petroleum, Dehra Dun, participated in the G-8 Energy and Innovation Workshop as members of the Indian team led by Shri H. Purushotham, Advisor, DST, New Delhi. Held in Brazil from 18 to 20 September 2006, this workshop had the participation of five other countries, including India. The other Indian team members included: Shri Deepak Bhatnagar, Advisor, TIFAC; Dr A.R. Shukla, Director, Ministry of Non-conventional Energy Sources; and Dr K.S. Dhathathreyam, Head, Centre for Fuel Cell Technology, Chennai. Presentation by the Indian team were highly appreciated and international collaboration is expected in the areas of Bio-fuel, Gasification, Hot gas cleaning ICFC, etc., as a result of this participation.

Prof. Higgins delivers Sterling Group Lecture at NCL

PROFESSOR Dame Julia S. Higgins, FRS, Department of Chemical Engineering and Chemical Technology, Imperial College London, UK, delivered the lecture titled "Tangling with long molecules" at the National Chemical Laboratory (NCL), Pune, on 5 September 2006. The lecture, organised by British Council as part of the Sterling Group Lecture 2006, was supported by Sterling Group — a consortium of 23 prestigious UK universities with excellence in Engineering. One of the aims of the Sterling group is to promote international excellence in engineering research and teaching. Prof. Higgins runs an active research programme studying the molecular basis of properties in polymeric materials. As Foreign Secretary and Vice President of the Royal Society, she also oversees the Society's international relations programme.

Prof. Higgins presented an introduction to the fascinating world of macromolecules and how they move and organize themselves. She narrated historical milestones for the discoveries of viscoelastic materials such as rubber and other polymers starting from 1770 to 1971. She discussed the effect of molecular weight of macromolecules on their flow behaviour and its implication on the phenomenon of polymer interdiffusion. She also presented how the reptile-like diffusional motion of macromolecules across an interphase can be characterized using neutron scattering technique.

Prof. Higgins was accompanied by Dr Richard H. Scott, School of Engineering, Durham University and Professor Stuart Blackburn, School of Chemical Engineering, University of Birmingham.



Prof. Higgins delivering the Sterling Group Lecture titled 'Tangling with long molecules'



Nutrition Literacy Programme

THE Central Food Technological Research Institute (CFTRI), Mysore, along with the Nutrition Society of India, Mysore Chapter, organized a 'Nutrition Literacy Programme' at CFTRI on 3 September 2006 to mark the National Nutrition Week (1-6 Sept.). House-wives, children, teachers and nutrition practitioners participated in the programme.

Dr V. Prakash, Director, CFTRI, in his inaugural address urged scientists and practitioners to look into positive aspects of traditional foods and make efforts to understand age-old practices in the context of current advancements in Science and Technology.

A special informative poster in Kannada and English was released for distribution to public, for generating the awareness regarding importance of nutrition towards a healthy life. Later, Prof. G. Saraswathi, Department of Studies in Food Science & Nutrition, University of Mysore Manasagangothri, gave a talk 'Nutrition in health' and Dr T.P. Krishnakantha, Scientist, CFTRI, spoke on 'Malnutrition'. The session was followed by a panel discussion.

Prizes were distributed to winners of the essay and drawing competitions held for school children as part of the celebrations.

Dr P.V. Salimath, Head, Biochemistry & Nutrition Department, CFTRI, introduced the theme and Shri K.K. Bhat, Head, Sensory Science Department, CFTRI, wrapped up the session.

Indo- Italian Training Programme on Force and Torque Metrology

THE National Physical Laboratory (NPL), New Delhi, organized a training course on Force and Torque Metrology jointly with Italian Trade Commission (ITC), New Delhi Branch and Metrology Society of India during 5-8 December 2006.

The targeted participants were the middle level managers, quality assurance personnel, technical managers, etc. from accredited calibration laboratories, manufacturing and other industries both from public and private sectors, who are directly responsible for the implementation of the quality system in their organizations. In all 42 participants from India and one each from Nepal, Malaysia and two each from Thailand, Saudi Arabia attended the course.

In the inaugural session, Dr Kamlesh K. Jain, Convener of the programme, briefly described the importance of the present training programme and achievements of the training programmes organized earlier by NPL.

Dr Vikram Kumar, Director, NPL, in his welcome address emphasized the relevance of the training course in the present scenario of globalization and highlighted the importance of the metrology of force and torque in industry, particularly the automobile industry, in improving the quality of products and processes. He also highlighted the excellent work being done by

the Force & Hardness Group of NPL, which has direct relevance to the present day need of the society, i.e. to improve the quality of the life and to safe guard the interest of the consumer.

Dr Carlo Ferrero, Head, Force & Torque Laboratory, Istituto Nazionale Di Ricerca Metrologica (INRIM), Italy, an international authority in the area, delivered the key note address on 'A multi-component load cell – Key to detect parasitic components, which is very important to monitor 3-D force components in force standard machines'. He gave an overview of the recent developments in force measurements at INRIM, Italy, in general and in multi-components load cell in particular.

The technical programme comprised invited talks by the experts in the forenoon and hands-on training in the afternoon. Training was provided on calibration of force transducers against dead weight, hydraulic multiplication force machine, and calibration of torque transducers against the dead weight lever type torque standard machine. The programme generated a lot of enthusiasm among the participants.

Ten invited talks including those from eminent speakers such as Dr Konrad Herrmann, Head, Hardness Standard Laboratory and Dr J. Illeemann,



Force Standard Laboratory, both from PTB Germany; Dr Carlo Ferrero, Head, Force & Torque Laboratory, INRIM, Italy, Shri Girdhar J Gyani, Secretary General, Quality Council of India, were delivered during four day deliberations. The presentation given by Dr Carlo Ferrero on design aspects and technical problems faced during the operation of force and torque standard machines, uncertainty evaluation in calibration of force and torque transfer standards, calibration of material testing machines, etc. were specially meant for the force and torque calibration service providers. The other invited talks covered the wide range of topics such as quality

management system and its implementation; need to establish accredited force and torque calibration laboratory and the evaluation of BMC of reference machines. The comparison of different written international standards to calibrate the force and torque transducers, etc. was also discussed.

Finally, at the end of the training programme, D. Caruso, Italian Trade Commission, Rome and Dr Giancarlo Lamio, Italian Trade Commissioner, commended the organizers for the excellent course contents and arrangements. Participants appreciated the organizers particularly for the training materials and the close

interaction they had with well known experts in the field of Force and Torque measurements. The organizations such as Regional Testing Centres, National Test House, Sushma Industries, etc took keen interest and enquired if NPL could help them in establishing accredited laboratory. Dr R.P. Singhal, Head, Physico-mechanical Standards, thanked the Italian Trade Commission, Dr Carlo Ferrero and all the participants for their keen interest and support throughout the training course and agreed to their demands to hold such training programmes frequently.

Dr C. Caruzo, Dr Giancarlo Lamio and Dr Carlo Ferrero, distributed the certificate to the participants.



Clockwise from top left: Demonstration on calibration of force; Participants working on Torque Measure; Dr Vikram Kumar, Director, NPL, welcoming the participants and a view of the Technical Session



Honours/Foundation Day Celebrations

Dr B. G. Unni represents India at IFA Meeting, Morocco



Nominated by United States Educational Foundation in India (USEFI), New Delhi, Dr B. G. Unni, Area Co-ordinator, Biotechnology Division, Regional Research Laboratory (RRL), Jorhat, represented India at the International Fulbright Alumni Development Project Technical Assistance Conference held at Marrakech, Morocco on 4 November 2006. More than 75 countries participated in the conference. This is for the first time a scientist from North East region as well as CSIR represented India at this international meeting. Dr Unni has been Secretary of the NE Chapter of the Fulbright Alumni Association for the last 15 years, and has been providing information about the activities of USEFI and various Full bright fellowships in the region. Also, the reachout programme for the students organized with the help of USEFI regional office is benefiting a lot.

ITRC celebrates Foundation Day

The Industrial Toxicological Research Centre (ITRC), Lucknow, celebrated its 41st Foundation Day on 4 November, 2006. On the occasion 10th Prof S.H. Zaidi oration was held in the ITRC auditorium. Prof. P.K Seth, CEO, Biotech Park, Lucknow, delivered the lecture on 'Environmental Health: Challenges and Opportunities'. Dr Seth pointed out that environmental health is a major concern today as several ailments like respiratory and cardiovascular disorders, neurological disturbances, reproductive and immune dysfunctions, developmental defects and cancer have been linked to exposure to chemicals. Environment is a key contributor to human health and disease, and most of the diseases of public health significance are linked to environmental factors. He further said that the old dictum of Paracelsus "All substances are poisons; there is none which is not a poison. The right dose differentiates a poison from a remedy" is no longer true. The external genetic make up and pre-existing infection also influences the outcome of exposure to chemicals. The new technologies offer newer opportunities in research, e.g. with stem cells, one can develop liver and other organs and use them for studying the mechanism of toxicity of chemicals and toxicity potential of chemicals.

Complimenting Dr Seth for the excellent lecture, Prof. Hari Gautam, Vice Chancellor, King George's Medical University, Lucknow, in his presidential address remarked that it would have been a good opportunity if such a lecture by Prof. Seth could have been organized at KGMU so that the faculty and staff of his University could



Dr C.M. Gupta, Director, ITRC, delivering his welcome address during the ITRC Annual Day. Seated (from left) are: Dr D.K. Saxena, Chairman, Organizing Committee; Prof. A.K. Mahapatra, Director, SGPIMS, Lucknow and Dr T. Ramasami, Secretary, DST

have been benefited from the lecture of an eminent toxicologist of the country.

Dr Poonam Kakar, Scientist, ITRC proposed a vote of thanks.

Later in the afternoon, the Foundation Day programme was held. Dr C.M Gupta, Director, ITRC, welcomed the Chief Guest, Dr T. Ramasami, Secretary, Department of Science and Technology, New Delhi; Prof. A.K. Mahapatra, Director, Sanjay Gandhi Post Graduate Institute of Medical Sciences, Lucknow; distinguished guests and members of the electronic and print media. Highlighting the achievements of the centre during the last one year, he said that in addition to the on-going networked and externally funded projects, the Research Council of the centre has approved five new areas, namely, Systems Toxicology and Risk Assessment, Environmental Toxicology, Toxicogenomics and Predictive Toxicology, Food Drug and Chemical Toxicology and Assessment, Mapping and Remediation of Groundwater in Kanpur region.

He informed that ITRC has



developed facility for detection of two genetically modified (GM) crops RR Soybean and Maize. Methods have been developed to detect as low as 0.1% of GM concentration by using PCR. Transgenic protein in the range of nanogram can be detected by indirect ELISA assay. Scientifically validated herbal formulations are being developed. Over thirty plant extracts were screened for antioxidant, neuro active and anti hypelipedemic activities, and some formulations were selected for further development. The selected three preparations are being further developed by Nicholas Piramal as Positive Health Promoters (PHP) under GMP norms.

A constituent of ginger, 6- gingerol promotes apoptosis under *in vitro* conditions in prostate cancer cells, and Lupeol, a triterpene, present in mango and other fruits has been shown to possess hepato-protective and cancer chemopreventive activities. Epidemiological studies in Malihabad district of U.P. revealed a significant increase in the level of DNA damage in the lymphocytes of pesticide sprayers when compared to the controls.

A study to investigate the levels of metallic contaminants in food grade silver foil was undertaken. Out of the 178 foils analyzed, 161 (90%) contained silver, while 10% were fraudulently made up of aluminium. In case of silver foils, 54% samples had lower silver content, the metals found in silver foils were nickel, copper, chromium, cadmium and manganese.

The institute published about 88 papers in reputed national and international journals, filed two patents and could generate an external cash flow of about Rs 274

lakh. Six scientists were honoured/awarded for their R&D achievements during the year.

In his lecture, Dr T. Ramasami traced the history of ITRC and said that the people who had thought of establishing a centre on toxicology had a vision because the country was moving from an agro based economy to industrial economy. In an industrial economy, the number of industries would be on the rise and hence the pollution load on the human population would increase resulting in the need to establish a centre which could help in monitoring the risks owing to chemicals. Stating that ITRC had crossed several milestones since its inception, Dr Ramasami hoped that by the fiftieth year ITRC would be partnering with various industries in several areas of toxicology. He pointed out that the word toxicology should be understood as an integrated discipline and not as small entities. Dr Ramasami also released the Annual Report and a report entitled 'Assessment of Environmental Status of Lucknow City — Post Monsoon Survey'.

In his presidential address, Prof. A.K. Mahapatra, said that toxicology can be classified into three disciplines, viz individual, community and preventive toxicology. He appreciated the role of ITRC in preventive toxicology by undertaking various mission programmes for the benefit of the society. He also emphasized on the need to establish toxicologist-clinician partnership.

On this occasion Prof. Mahapatra released the in-house Rajbhasha patrika entitled *Vish Vigyan Sandesh*.

Dr D.K. Saxena, Chairman, Organising Committee, proposed the vote of thanks.

CAE Delegation visits NAL

A high-level Chinese delegation from Chinese Aeronautical Establishment (CAE) visited the National Aerospace Laboratories (NAL), Bangalore, during 6-8 December 2006 to attend the 10th Joint Committee Meeting (JCM) and discuss on-going/new joint projects/proposals under the CAE-NAL bilateral cooperation in Civil Aeronautics. During the period of cooperation, nearly 10 projects had been successfully completed. Dr J.R. Raol, Chairman ISTAG, NAL, gave a brief presentation on the cooperation programme and NAL Director made a presentation on the research and development activities being carried out at NAL.

An overview of the CAE activities was presented by Prof. Yang Yuzhong, Honorary President, CAE. He mentioned the major technical areas being pursued and various R&D facilities available at CAE. He also commented on the contribution of CAE in the design and development of some major commercial aircraft produced by China. Prof. Zhou Ju, Vice President, CAE, made a presentation on one on-going project under CAE-NAL co-operation, the current status, the benefits derived and future areas of interest. He informed that Aviation industry has been listed in priority development under the 11th Five Year Plan in China. He mentioned that the S&T Minister of China had earlier commented upon the NAL/CAE programme as a good model for S&T



cooperation. This should open up more opportunities for co-operation and scientific development. He also stated that the cooperation could expand in the following directions: a) + 2 model, b) establishing joint lab/facility, c) joint venture. Joint Ph.D. presentations were made by NAL scientists on the on-going project on structural health monitoring (SHM) and two new proposals in the area of materials. Several future areas for co-operation were also discussed.

A meeting between the CAE delegates and the Civil Aviation Programme (CAP/CCADD/NAL) team followed. Prof. Yang made a

presentation on the ARJ-21 aircraft programme. This was followed by a brief presentation by Dr Kota (of CAP team) on the requirements for a 50/90-seater commercial aircraft. He emphasized that despite the progress made in aircraft design and development, much needs to be done in the areas of composites with SHM, FBW system, controls, avionics, propulsion and actuation system. He also mentioned that India and China join hands to have a joint centre with participation from other organizations and academia for the development of new technologies and create R&D support for the D&D of a transport

aircraft. Dr T.S. Prahlad from CAP team mentioned that organizing a joint symposium would be a good idea to bring the working scientists together, especially in the area of civil aircraft development programme. Dr B.R. Pai mentioned that a beginning can be made for joint venture in aircraft development by having jointly certified instruments for use in light aircraft. Dr Kota said that there is a need to initiate a major Indo-China joint programme with funding of the order of \$ 25 million from each side for the civil aircraft programme.



Meeting of CAE and NAL teams

Dr Manjit Singh gets Bharat Excellence Award



DR Manjit Singh, Scientist F, Central Building Research Institute (CBRI), Roorkee, has been awarded 'Bharat Excellence Award', comprising a Gold Medal and Certificate of Excellence, by the Friendship Forum of India during a one-day seminar on "Economic Growth and National Unity" held in New Delhi. The award is given by the Forum for outstanding achievements by the individuals in the field of cultural, educational, social and scientific technical areas. Dr Singh has been given this award for his achievements on the work "Utilization of phosphogypsum and industrial wastes in making value-added eco-friendly building materials" and for the activity and services rendered to promote friendship and cooperation.

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