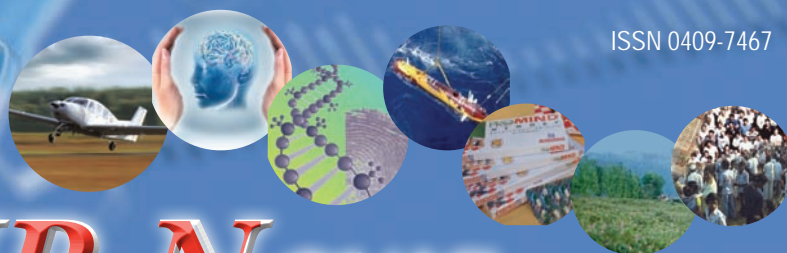




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In The News

CSIR-CDRI's New Herbal Preparation Takes Care of Bone Health

SCIENTISTS at the Lucknow-based CSIR-Central Drug Research Institute (CDRI) have come up with a new herbal medication that keeps bones healthy. The product was launched for marketing on 17 February 2016.

Extracted from the leaves of *Dalbergia sissoo*, commonly called Indian Rose Wood or Sheesham, this herbal medication could prove to be a boon for victims of bone fracture,

pain and swelling of joints caused by sprain and injury. It could also provide optimum bone health to the victims of osteoporosis after menopause. Sheesham leaves contain flavonoids making it rich in antioxidants, which are beneficial for the human body.

Sheesham is a large deciduous perennial tree, growing widely in lowland regions throughout India, Pakistan, Bangladesh, Nepal and Afghanistan.



The medicine, thus, apart from improving bone health, could also provide a new avenue for the sheesham growers who would be required to greatly increase the plantation of Sheesham tree to cater to the requirement of their leaves for the preparation of this drug.

Drugs available at present are given through the intravenous route, have a number of side effects and are quite expensive. CSIR-CDRI's new drug is to be given orally and is expected to be comparatively very cheap.

The team, consisting of Dr. Naibedya Chattopadhyaya, Dr. Rakesh Maurya, Dr. Ritu Trivedi, isolated 16 compounds from the standardized extract, out of these four compounds were active. One novel compound was identified which is

present in abundance. It has exhibited osteogenic activity. The compound was evaluated in mice in post-menopausal model for osteoporosis and rapid fracture healing model.

The technology was licensed to Pharmanza Herbal Pvt. Ltd., Gujarat in April, 2015. Thereafter, clinical trial on standardized extract was registered on 3 June 2015 and clinical trial on accelerated fracture healing by standardized extract started from July 2015 at Karandikar Hospital and Research Center, Nasik, Maharashtra. The clinical trial on preventing post-menopausal osteoporosis started from September 2015 at the Nanavati Hospital, Mumbai and Tanvir Hospital, Hyderabad.

CSIR-IIIM Jammu Organises National Seminar-cum-Exhibition

The CSIR-Indian Institute of Integrative Medicine (IIIM), Jammu in collaboration with the Department of Floriculture, Jammu recently organised a National seminar-cum-exhibition on Kisan Mela, entrepreneurship programme and a flower show.

Organised on 13 March 2016 at the IIIM farm Chatha, the occasion showcased the cultivation and processing of medicinal and aromatic plants, Farmer-Entrepreneurs-Scientists interaction and the most awaited flower show for the general public. The Institute invited farmers, entrepreneurs, school children, flower growers, flower lovers and the general public to participate.

Speaking on the occasion, Director, CSIR-IIIM, Jammu Dr. Ram Vishwakarma informed about the aims and objectives of the national seminar-cum-exhibition and also highlighted the achievements of CSIR-IIIM, Jammu in

the J&K Aroma Arogya Gram (JAAG) project. He informed that this event is organised annually to disseminate information about the latest advancements in the area of medicinal and aromatic plants aiming at improving the socio-economic conditions of the State in general and farming community/growers in particular. Dr. Vishwakarma said that J&K is ideally suited for the cultivation of high value medicinal and aromatic plants, nutraceutical flowers, bulbs and seeds throughout the year.

The event was inaugurated by Chief Guest Mr Parvez Dewan, Advisor to the Governor. Mr Dewan stressed on adopting improved varieties of cash crops in agriculture, horticulture, floriculture, cultivation of medicinal and aromatic plants to increase the yield and quality.

Dr. K.K. Sharma, Director, Department of Floriculture Jammu also

appreciated the efforts of the CSIR-IIIM, Jammu in creating awareness among farmers and providing them an opportunity to interact with the scientists and progressive growers besides providing quality planting material of

these high value cash crops from IIIM's experimental farms. Detailed presentations and demonstrations were held for the farmers and progressive growers in the area of cultivation of medicinal and aromatic plants.



R&D Highlights

Evaluation of Durability and Response of FRP Strengthened Reinforced Concrete Beams at CSIR-CBRI

As cities across the world revise their master plans to permit higher floor-area ratios and join the trend towards vertical growth, architects and engineers are faced with new challenges in the strengthening and repairing of concrete structures.

Until recently, the accepted methods of strengthening were concrete jacketing, guniting or steel-plate bonding, all cumbersome, labor intensive and problematic. These techniques add to the size of members and increase deadweight. Composite fibre wrapping is one of the most popular techniques in use today. This novel technique of rehabilitation is very effective and fast for earthquake-affected structures and also for retrofitting of structures against possible earthquakes.

Globally, composite technology and its applications have made tremendous progress during the last two decades or so. A serious matter relating to the use of Fibre Reinforced Polymers (FRP) in civil applications is the lack of design codes and specifications. For nearly a decade now, researchers from Canada, Europe and Japan have been putting in efforts in the hope of developing such documents to provide guidance for engineers in designing FRP structures as

well as their utilization in repair and rehabilitation projects all over the world.

A large number of field application results where FRP has been used are still awaited. Research work is continuing to assure the suitability of these materials under different loading and environmental conditions. Durability and long term performance of strengthened structures is a crucial element which governs the life-cycle cost of FRP applied reinforced concrete (RC) structures and is important for structural members requiring a very long design life.

In view of this, R&D work was initiated at the CSIR-Central Building Research Institute (CBRI), Roorkee, which could prove beneficial for the construction and repair society. The project is directed towards characterization of FRP strengthened RC structural members with ongoing damages in terms of their durability, structural integrity and performance. The study is expected to contribute to guidelines for FRP-strengthened concrete members, to ensure better long-term performance under service loads and environmental effects.

Concrete mix designs were carried out for two target strengths. Concrete beams were structurally designed for

desired failures. For this study a number of RCC beam specimens of size 100mm x 150 mm x1220 mm and 100 mm x 100 mm x 500 mm and PCC beam specimens of size 100 mm x 100 mm x 500 mm were cast. A sustained loading system was designed and installed for performing corrosion studies on RC beams. The system is shown in Fig. 1. This system was used in one of the experimental phases of this project.

The accelerated corrosion set-up is schematically shown in Fig. 2. The procedure followed for FRP application on beams and different FRP strengthening schemes adopted on beams for up-gradations is shown in Fig. 3 and Fig. 4. The procedure for gravimetric testing adopted was as per ASTM procedure and is clear from Fig. 5.

These beams were structurally tested particularly for flexural study phase in

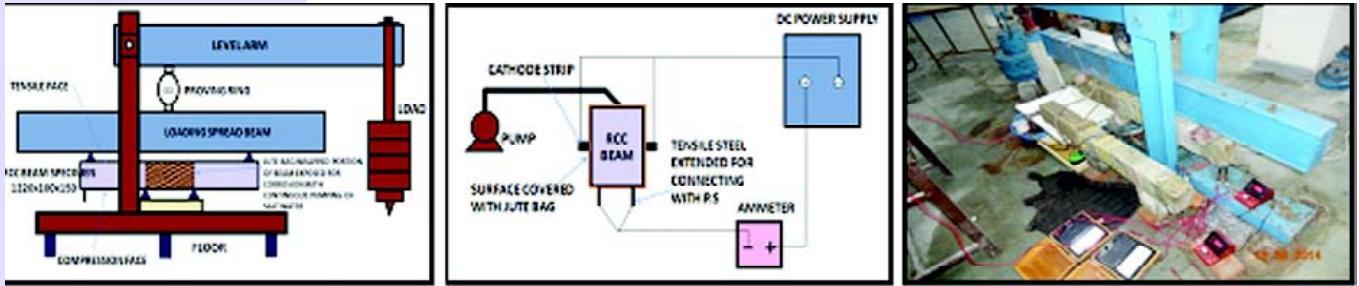


Fig. 1: Schematic view of sustained loading test set-up, corrosion scheme and corrosion tests during sustained loading on beams



Fig. 2: Scheme for corrosion acceleration and beams corrosion in progress



Fig. 3: Procedure for FRP application

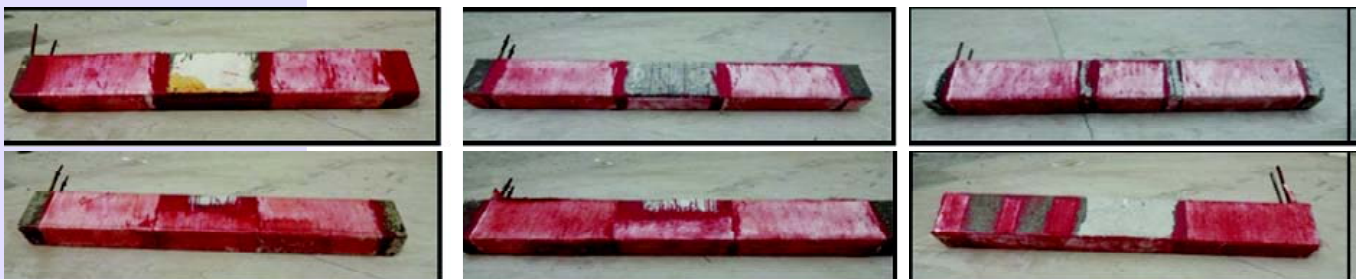


Fig. 4: FRP strengthening schemes for beams

this project. The structural test set up used for testing of beam specimens is shown in Fig. 6.

The rate of corrosion was specifically found to be dependent on the area of the structure exposed for corrosion. As un-strengthened beams have more surface area in contact with the electrolyte (saline water), the corrosion was found more in this case as compared to those in strengthened beams. Importantly, in strengthened beams also, the orientation and way of laying the GFRP sheets play a crucial role. More the area covered with GFRP sheets, lesser

was the rate of corrosion. Thus, the GFRP sheets act as corrosion inhibiting agent in structures. Also, due to the preloading done, cracks were introduced in the beams which resulted in higher rate of corrosion. Proper quantification was attempted with respect to the both the strengthening ratio on surface of concrete beams and the cracks (or loading amount) presence. A few of the results are shown in Fig. 7.

The flexural strengths and the performance of the beams were found to vary with different parameters such as grade of concrete used, amount of

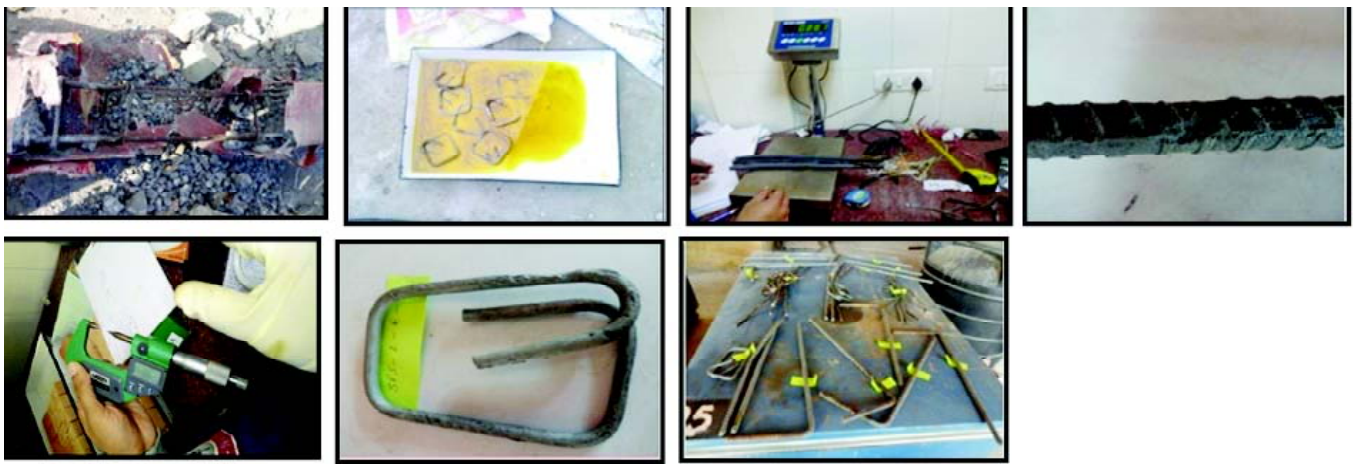


Fig. 5: Gravimetric testing procedure (breaking of beams for rebars extraction, cleaning of rebars, weight/depth measurements & bars identifications)



Fig. 6: Structural test set up and beams testing in progress

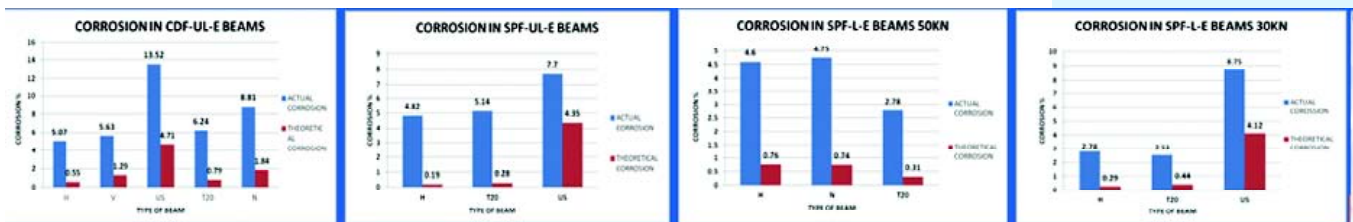


Fig. 7: Corrosion in strengthened v/s un-strengthened and unloaded versus loaded beams

corrosion, type of strengthening technique and the loading condition (Fig. 8 & Fig. 9).

The results indicate that the unexposed beams have more strength than exposed beams in all cases. FRP strengthened beams could bear from 76.1 kN to 110.2 kN for different FRP patterns for even M30 beams, whereas the unstrengthened beams could take maximum of 53.8 kN for M30 and 67.4 kN for even M50 beams.

The preloading reduces the strength of the beam. Further, if the preloaded beam was exposed to corrosion the ultimate capacity further reduces. These

results also indicate that the strength of the beam is highly influenced by the pattern of strengthening of the beam, the orientation of fibers of GFRP sheets and the exposed area.

Also, in strengthened beams, the same amount of preload was observed to have lesser effect on beams as the crack formations were less in those cases. If both exposure and preloading is taken into consideration, the strength further reduces. The results are more closely applicable for field conditions as comparison to unloaded exposed beams because the structures exposed at site are always susceptible to various loading.



Fig. 8: Different failure types observed during structural testing of beams

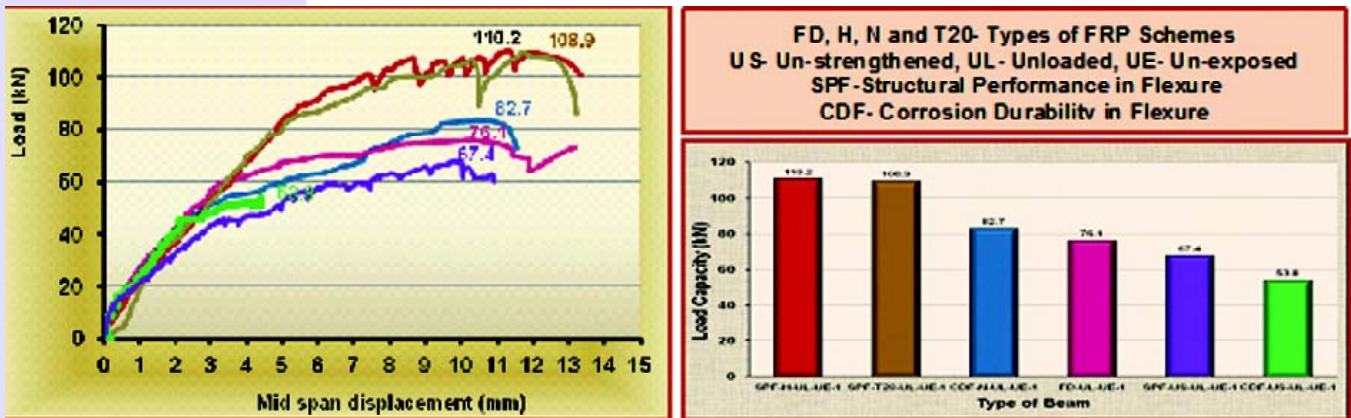


Fig. 9: Comparative structural performance of beams (Un-strengthened and strengthened beams)



Fig. 10: Beams behavior during sustained loading and during unloaded conditions (Flexure and Shear study phase)



The results obtained during corrosion of both beams i.e. sustained loaded and unloaded are as shown in Fig. 10. The experimental study shows that for beams under sustained loading, the rate of corrosion as well as actual corrosion held during equal time-period of exposures increases as comparison to beams in unloaded condition. This ultimately leads to decrease in ultimate capacity of the sustained loaded beams.

Detailed analyses from the enormous experimental data collected are being attempted for proper quantification with respect to the effect of individual parameters. The output is expected to arrive at the guidelines and suitable strength reduction factors for the environment condition considered. These factors are anticipated to be applicable at the design stage itself.

Harish Chandra Arora
CSIR-CBRI, Roorkee

Handheld Embedded System for Fruit Quality Inspection Developed by CSIR-CEERI, Pilani

A handheld embedded odor-vision sensing system (HEOVS) using artificial olfactory (e-nose) and image processing techniques (e-vision) has been developed by scientists of the CSIR-Central Electronics Engineering Research Institute (CEERI), Pilani. The system helps in estimating optimal harvest time for plucking of fruits. The HEOVS system was tested with 100 orange (local market) samples.

Traditional e-vision systems predict ripeness with an accuracy of $97 \pm 06\%$; the HEOVS system predicts with an accuracy of $92 \pm 04\%$, and gives additional information about shelf-life and storage time. This system could be used for other fruit samples like grapes and mangoes with minimal changes in training and testing algorithms.

In some of the applications, e-vision

technique would not give significant value addition. To meet such requirements, a handheld electronic nose (e-nose) was developed consisting of sampling chamber, a dc fan for extraction and purging of aroma, and

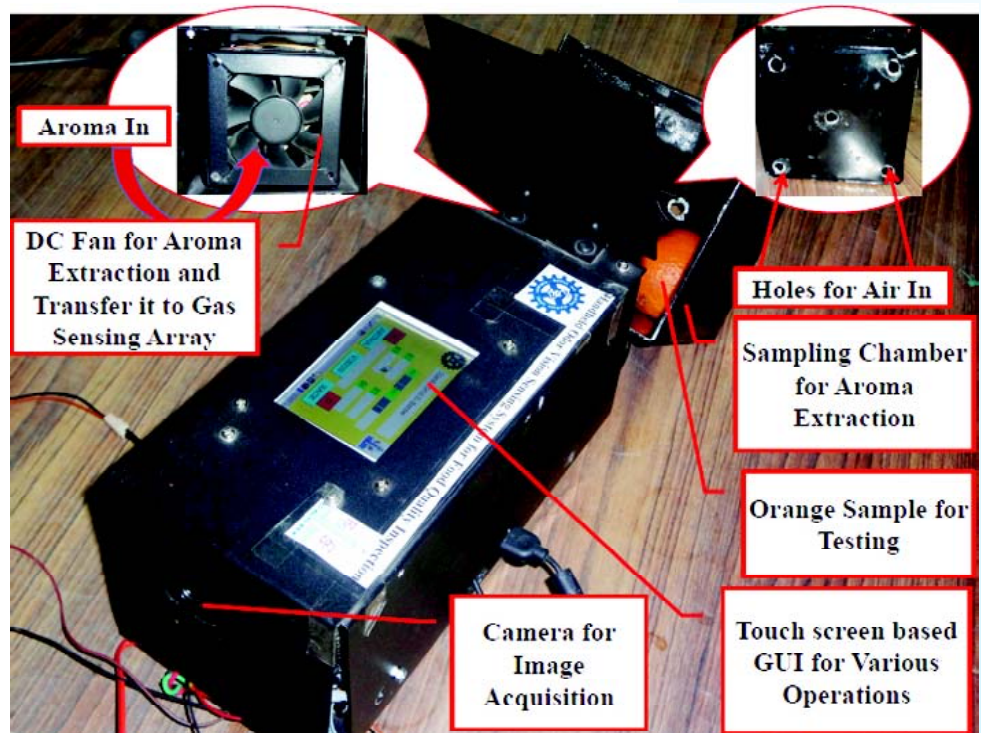


Fig. 1: Handheld electronic odor vision sensing system (HEOVS)

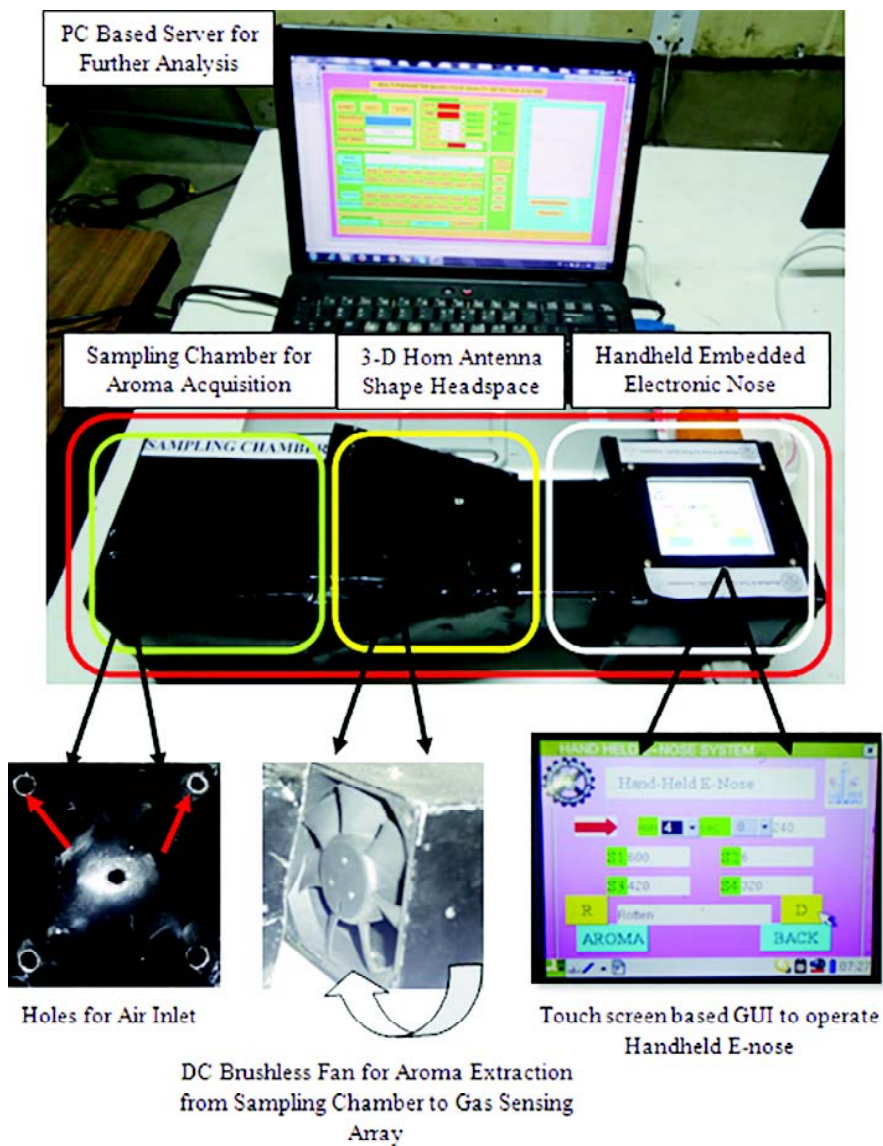


Fig. 2: Handheld electronic nose (HE-Nose) system

gas sensing array electronic system. For further extraction, a 3-D Horn Antenna shape aroma head space was also developed (Fig. 2).

Embedded Sensor Node for Measuring Water Quality (WQ) Parameters Developed by CSIR-CEERI, Pilani

A real-time wireless embedded multi-sensor system (sensor node) for monitoring WQ parameters has been designed and developed at the CSIR-Central Electronics Engineering

Research Institute (CEERI), Pilani. The system was tested and demonstrated at CSIR-NEERI, Nagpur as a sensor node for measuring WQ parameters viz. pH, DO, TDS and ORP. The system

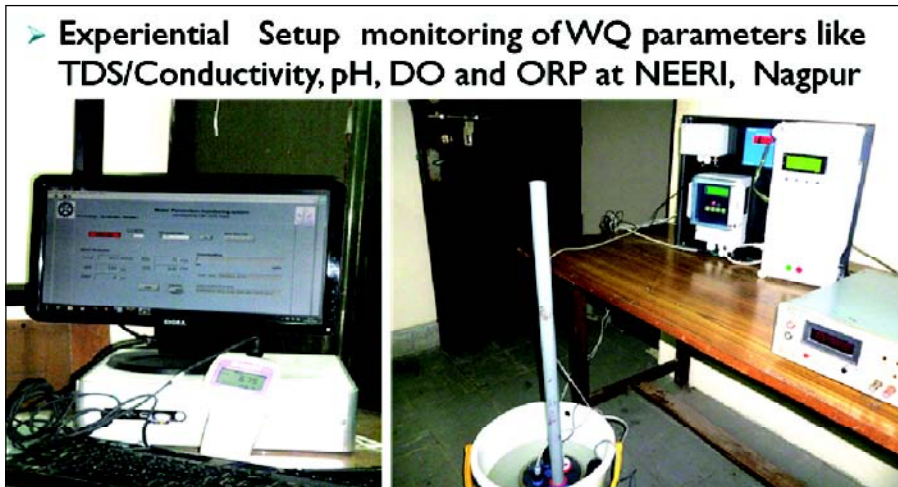


Fig. 1: Sensor Node and Base Station

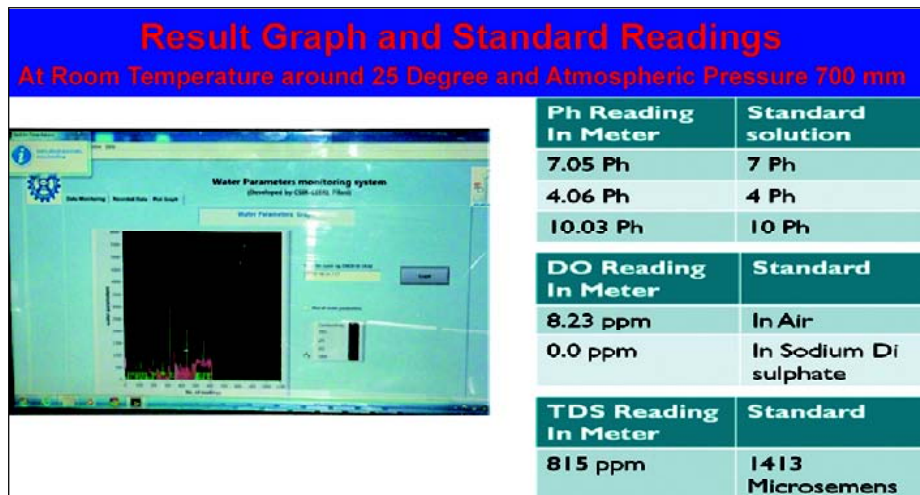


Fig. 2: Test result at CSIR-NEERI

has self-diagnostic features like battery status, sensor calibration, due communication status with base station, etc.

MoUs

CSIR-NAL and TASL sign MoU for indigenous Mission Computer

The CSIR-National Aerospace Laboratories (NAL), Bangalore and Tata Advanced Systems Limited (TASL) have signed a memorandum of understanding (MoU) to collaborate on the Integrated Global Bus Avionics Processing System (IGAPS), popularly called Mission Computer.

The IGAPS is a core aircraft computing platform with features like ARINC 664 global bus, ARINC 818 fibre channel video bus and ARINC 653 compliance.

This sophisticated state-of-the-art onboard computing system has been successfully designed, developed and

integrated for the first time in India by CSIR-NAL for civil avionics requirements in line with the 'Make in India' initiative.

The MoU is aimed at taking this development further to the Indian and worldwide market incorporating application-specific upgrades and airworthiness approvals resulting in a certified product.

Mission Computer, a key electronic system on air and defence platforms for subsystem integration and control, and its variants will be manufactured in India and cater to the Indian and global markets. It will be used for wide-ranging applications across various aerospace and defence platforms.

The MoU is a landmark achievement for CSIR-NAL in realising commercialisation of developed technologies enabling Indian industries to compete globally and achieve self-reliance in a high technology strategic area. IGAPS is one of the most technologically challenging aircraft core computing platforms to be ever designed within the country for civil avionics requirements. The avionics architecture whose life-cycle costs are currently estimated to be approximately in millions of dollars is an architectural change which will enable it to keep up with the growing demand of low operating cost and high performance requirements demanded by industry today.

Symposia

Materials Research Society of India (MRSI) Symposium at CSIR-NEIST, Jorhat

The four-day program of Materials Research Society of India (MRSI) Symposium on "Advanced Materials for Sustainable Applications" began with a glittering inaugural programme held at

the Dr. J.N. Baruah Auditorium, CSIR-NEIST. The event that ran concurrently with the Annual General Meeting of MRSI during 18-21 February 2016 was hosted by CSIR-NEIST in collaboration with the Tezpur University and IIT, Guwahati.

The inaugural function on 18 February 2016 witnessed a full-packed auditorium graced by the presence of eminent personalities, stakeholders, council members of MRSI, dignitaries, student participants and researchers from various parts of the country besides CSIR-NEIST fraternity.

Dr. G. Sundararajan, Professor, IIT-Madras & Distinguished Emeritus Scientist, ARCI, Hyderabad and Dr. Vijayamohan K. Pillai, Director, CSIR-CECRI, Karaikudi & Acting Director, CSIR-NCL, Pune graced the occasion as Chief Guest and Guest of



Dr. G. Sundararajan delivering his address as Chief Guest in the inaugural programme

Honour respectively. Dr. D. Ramaiah, Director, CSIR-NEIST & Chairman-Organizing Committee delivered the welcome address wherein he spoke briefly about CSIR-NEIST and the background of the Symposium. Challenges and solutions triggered by innovation in the field of Materials was something he stressed upon.

Prof. S.B. Krupanidhi, Vice-President & General Secretary-MRSI spoke about MRSI and said that it is dedicated to attract and foster young scientists and researchers by exposing them to the world of Materials Science and the various advancements taking place by holding such events.

In his address, Dr. Vijayamohan K. Pillai spoke about the impact of MRSI in the scientific community in stimulating Materials Science & Engineering in India. He said that the current theme of the Symposium finds relevance with today's need of the hour, which is to identify critical areas that need attention like energy, water, etc. with affordable materials.

Dr. G. Sundararajan encouraged the young participants to take full benefit of the event and interact with the experts and others for knowledge gain.

Dr. Suresh Das, President, MRSI & Executive Vice President, Kerala State Council for Science, Technology and Environment Thiruvananthapuram spoke in detail about MRSI and its activities in his Presidential Address. Making a strong reference to the 'Valley of Death', Dr. Das stressed on the gap that exists between a Basic Researcher's interests and the interests of an Industrialist. He commented that the lack of interaction or simply put, the Death Valley that exists in spite of a healthy research invention in India and the potential industries interested in advanced materials can be addressed only by bridging the gap between these two

mindsets. He pointed out the importance of applications of R&D to address problems like Energy. "Harnessing of Solar Energy needs to be increased substantially in India," he said while presenting figures that show only 0.9% utilization of Solar Energy in India to produce power while 22.8% is from Renewable Sources, 16.6% from Hydro projects, etc. He urged everyone to play a role in addressing these gaps by developing materials having actual markets.



Dr. Vijayamohan K. Pillai, Director, CSIR-CECRI, Karaikudi & Acting Director, CSIR-NCL, Pune delivering his Address as Guest of Honour



Dr. Suresh Das, President, MRSI & Executive Vice President, Kerala State Council for Science, Technology and Environment Thiruvananthapuram delivering his Presidential Address

Later, the Souvenir of the Symposium was released by the Chief Guest. The inaugural programme concluded with

vote of thanks delivered by Dr. P. Sengupta, Convenor-cum-Organizing Secretary, CSIR-NEIST.

Besides the scientific fraternity of CSIR-NEIST, the Symposium was attended by around 350 participants from various institutes, organizations, universities, etc. of the country.

The four-day Symposium comprised nine Technical Sessions covering Award, Medal & Thematic Lectures by eminent scientists & subject experts besides two Poster Sessions covering Poster Presentation by students, researchers and scientists. The speakers addressed subject areas like Superconductivity & Materials Science, Theoretical/ Computational Material Sciences, Nano-Materials & Devices, Fine Chemicals & Soft Materials, etc.



Release of the Souvenir by the dignitaries (from left), Dr. D. Ramaiah, Prof. S.B. Krupanidhi, Dr. Suresh Das, Dr. G. Sundararajan, Dr Vijayamohan K. Pillai, and Dr. P. Sengupta

National Science Day Celebrations

CSIR-Central Glass and Ceramic Research Institute, Kolkata

The CSIR-Central Glass and Ceramic Research Institute, Kolkata (CSIR-CGCRI) marked the National Science Day 2016 by arranging a special lecture delivered by Dr. Shyamal Kumar Bhadra, Chief Scientist of the Institute on 29 February 2016.

The title of his talk was “Wonders of Raman Scattering and its Importance in Optical Fibers”. It was an especially befitting topic because not only was Dr. Bhadra demitting office as Head, Fiber Optics and Photonics Division, he was one of the chief architects behind the broadband reflective confocal microscope and broadband supercontinuum light source – a much-

appreciated product from CSIR-CGCRI. Dr. H.S. Maiti, Former Director, CSIR-CGCRI, chaired the event and introduced the speaker.

Dr. K. Muraleedharan, Director, CSIR-CGCRI in his brief, but warm welcome address summed up the path that CSIR-CGCRI should take in the immediate/near future to realign itself in keeping with the scientific strategy of the country. He emphasized the need to swiftly deliver products that are almost ready; low-hanging fruits that can with a minimum of effort be put to the service of the people. The confocal microscope is one such product from CSIR-CGCRI, he said. He underlined the

need to identify other similar low-hanging fruits and to take those projects forward in a strong manner so as to realize the potential. Photonics is an area that is in the national spotlight. Thus, a national photonics programme was another exciting proposal that could see CSIR-CGCRI in a lead role. He urged the scientists and staff of CSIR-CGCRI to become part of at least one mission-mode programme and to work together towards a common goal.

Dr. Bhadra's talk was delivered in three parts – historical context, present and future of research in this field, and an encapsulated account of the Fiber Optics and Photonics Division (FOPD) at CSIR-CGCRI. The personalized account of how the FOPD grew from an acorn to a large oak tree was a fascinating story of development and growth.

Dr. Bhadra began his talk by providing a historical context to the understanding of "Scattering of Light." He traced the evolution of the scientific discoveries of Raman, highlighting the impediments faced by him because of the lack of sophisticated instruments in those days. However, a superb power of observation helped Raman overcome this shortcoming to a great extent and helped his vigorous pursuit of science.

Raman's journey into the light, as Dr. Bhadra put it, owes a lot to the city of Calcutta (now, Kolkata). Everyone knows that Raman carried out his research in Calcutta. However, the interesting coincidence is that the platform and the backdrop seem to have been laid out for Raman. Dr. Mahendra Lal Sircar (1833–1904) established the Indian Association for the Cultivation of Science (IACS). It was inaugurated on 29 July 1876 at 210, Bow Bazar Street, Calcutta. It was at IACS that C.V. Raman worked during 1907 to 1933. It may be pertinent to mention in this

context that he was elected Fellow of the Royal Society, UK in 1924 and that it was in 1928 that he discovered the secrets of Raman scattering. Thus, the importance of an Indian institute such as IACS can easily be demonstrated. At a civic reception, Nobel laureate C.V. Raman acknowledged the fact. He said, "...It was the late Dr. Mahendra Lal Sircar, who, by founding the Indian Association for the Cultivation of Science, made it possible for the scientific aspirations of my early years to continue burning brightly."



Dr. Bhadra delivering the talk

It is a little known fact that was highlighted in Dr. Bhadra's talk that C.V. Raman, along with Dr. Krishnamurthy set up the Travancore Chemical Manufacturing Company Ltd. in 1943 at Kundara, Quilon District in Kerala to produce Potassium Chlorate. Potassium Chlorate was required to make matches and colonial India did not have any facility to produce it. This illustrates the fact that even a Nobel laureate in science did not hesitate to work with the industries and to respond to a national

need. Renamed TCM Ltd. is one of the leading companies in India that manufactures quality chemicals.

Sir C.V. Raman's association with CSIR-CGCRI goes beyond his association with the city. He was an honoured guest at the inauguration of the Institute in 1950. Dr. Bhadra then elaborated on the types of Raman Scattering (Elastic or Rayleigh scattering and Inelastic or Raman scattering). Then he proceeded to discuss this in the context of optical amplification. It is well known that attenuation losses occur in the fibre when signals are transmitted over large distances. The Raman amplifier is an optical amplifier based on the effect of stimulated Raman scattering.

Thus, Raman effect is an important mechanism for signal amplification, he said. He elaborated on Raman amplification in optical communication systems and also the dynamics of Raman soliton during supercontinuum process in photonic crystal fiber. After discussing the many commercial applications of the Raman effect (for example, confocal microscope and Raman detectors at the airport), he summed up the history of the FOPD with rare archival photographs of great historical merit, which was greatly appreciated by the audience.

Dr. P. Sujatha Devi, Principal Scientist & Head, Sensor and Actuator Division served as the anchor and delivered the Vote of Thanks.

CSIR-Indian Institute of Toxicology Research (CSIR-IITR), Lucknow

CSIR-Indian Institute of Toxicology Research celebrated the National Science Day on February 29, 2016. The institute celebrated the day as an Open Day, throwing open its doors to the students and common citizenry to experience cutting edge science first hand.

Cataloging of human mutations, use of genetically engineered animal models and rapid evolution of genomic science has tremendously impacted translation of basic research outcomes to effective clinical care. This fact was elucidated by Professor Mone Zaidi MD, PhD, FRCP, FRCPI, FRC Path and Professor of Medicine and Structural & Chemical Biology, Mount Sinai School of Medicine, New York. He was delivering the CSIR-IITR Golden Jubilee Lecture as a part of the National Science Day Celebrations at the institute. Citing the

example of Osteoporosis, a crippling disease of public health importance, Professor Mone Zaidi explained how the discovery of new therapeutic targets has led to the use of improved clinical management of the disease. A new connection, between the bone and Pituitary gland through the pituitary hormones, hitherto thought to be acting only through master endocrine glands was instrumental in achieving this.

Professor Zaidi also highlighted, in a very simple and lucid language, a new concept in drug discovery, viz., repurposing old drugs for new uses. Data from complimentary genomic, computational, biophysical and mouse based technologies have revealed how bisphosphonates, commonly used drug for osteoporosis can be redirected towards primary treatment of certain types of cancers.

Earlier, welcoming the gathering, Professor Alok Dhawan, Director, CSIR-Indian Institute of Toxicology Research, said that it was indeed a momentous occasion for the institute to be celebrating the success of Indian Science and its own Golden Jubilee with five generations of scientists in the audience.

Delivering his presidential remarks, Padma Shri Dr Nitya Anand, former Director, CSIR-Central Drug Research Institute, Lucknow stressed upon the importance of a greater synergy between scientific institutions in the city to achieve their vision. Indian science has a rich repository of traditional medicines and methods and the need of the hour is to tap that resource for translational research, he said.

The Guest of Honour, Padma Shri Professor Ravi Kant, Vice Chancellor, King George Medical University opined there should be no barriers to research to achieve effective transfer from the laboratory to the patients bed side.

Dr. Poonam Kakkar, Chairperson, National Science Day Celebration Committee introduced the speaker and Dr. N. Manickam, Convener of the committee proposed the vote of thanks.

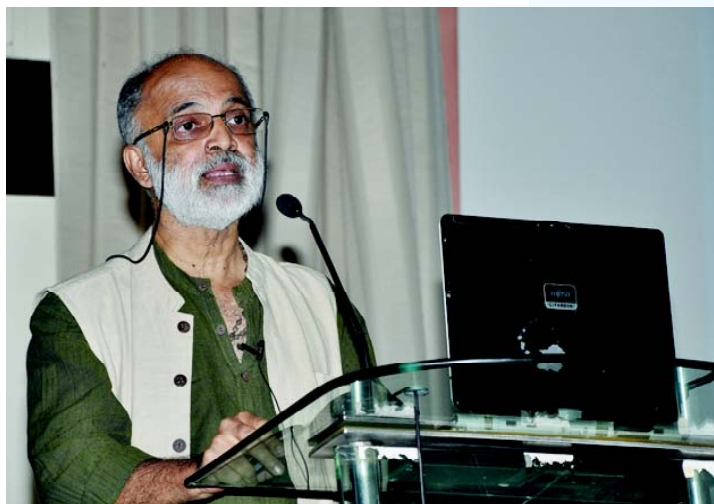
Undergraduate students from five city based universities were invited to visit the laboratories of the institute and interact with the scientific staff. Speaking to the students, Professor Alok Dhawan emphasized the relevance of basic research to achieve cutting edge technological breakthroughs.



CSIR-National Chemical Laboratory (CSIR-NCL), Pune

CSIR-National Chemical Laboratory (CSIR-NCL), Pune celebrated the National Science Day by organizing several programmes such as Poster Presentation Program by research students, various award lectures by scientists and meritorious students. As a part of the celebration Prof. A.B. Pandit, Institute of Chemical Technology, Mumbai delivered the National Science Day lecture on the topic “Chemical Engineering Forays in Rural India”.

Prof. Pandit started his talk reminding the mandate of the CSIR which is to develop technologies that can be universally implemented and applicable. He discussed the perception about the chemists and the chemical engineers in the society. They are the people who are responsible for the petroleum refineries, plastics, synthetic



Prof. Pandit delivering the talk

fibers, rubbers, memory chips, etc. They are also badly perceived for the emission of carbondioxide, oil spills, accidents, etc. He said that chemical engineering has many achievements to its credit with rural benefits and relevance such as fertilizers

and pesticides, improved crop varieties, food preservation, jaggery production, sugar mill, compost making, drinking water purification, medicine, biomaterials, wastewater treatments, etc.

Prof. Pandit talked about the uniqueness of chemical engineering, which includes unit processes like oxidation, nitration, alkylation, halogenation, polymerization, etc. He said that chemical engineering has crucial roles in nation building. Many social, rural, national issues can find quantitative and timely solutions if these are approached using chemical engineering principles. The issues are mainly soil productivity, crop/fruit storage, water cleaning, Waste Management and Swachh Bharat Abhiyan.

Prof. Pandit said that about 40% of energy in India is consumed in cooking that covers 14% of commercial fuels, gas, kerosene, etc. and 86% non-commercial fuels like wood, biomass and cow-dung. He talked about the solid fuel burning stoves focusing on problems like inefficient combustion with high emissions. He also showed some of the novel stove designs. He talked about the eco-cooker and solar dryers and talked

about the combination of four principles in chemical engineering utilized for it. The four principles are the flame to base ratio, early shut-off of heat supply, reduction in heat loss to the surroundings and multiple effect evaporators. He also discussed some solar-based applications.

Prof. Pandit talked about the production of bio-oil and bio-char from biomass using chemical engineering. He also mentioned about the cavitating hand pump for safe drinking water and problems related with it in the rural areas. Towards the end, he gave a message to the students that they should look for the satisfaction of working for the rural development cause.

Later, Prof. Pandit and Dr. Vijayamohan gave away awards to research scholars and PhD students in the categories of: Best research fellows, Best research papers with highest impact factors, Best thesis award, and Best poster awards.

Earlier, Dr. Vijayamohan Pillai, Director CSIR-NCL, while introducing the speaker Prof. A.B. Pandit to the audience, talked about the relevance of the National Science Day and how science has the solutions to most problems.



Award recipients with Prof. Pandit, Prof. Ashwini Kumar Nangia and Dr. Vijayamohan

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



CSIR-North East Institute of Science & Technology (NEIST), Jorhat celebrated the National Science Day on 29 February 2016. Prof. Gautam Biswas, Director IIT, Guwahati and Prof. Challa Vijaya Kumar, Professor, Dept. of Chemistry, University of Connecticut, USA graced the function as Chief Guest and Guest of Honour, respectively. The programme was attended largely by CSIR-NEIST staff members, invited guests and former CSIR-NEIST employees.

In his Welcome Address, Dr. D. Ramaiah, Director, CSIR-NEIST spoke about the significance of the day in the Indian science context.

Delivering the Science Day Lecture on “Manifesto for Future: Knowledge Economy, Some Concerns and Suggestions”, Prof. Gautam Biswas spoke at length about how knowledge and its applications can lead to rapid growth of economy in the country. Citing an example he mentioned the invention of the Steam Engine by James Watt which not only was a key point for the industrial revolution but also dramatically changed the economic scenario of the nation. He also talked about the rich scientific thoughts and approaches of early Indian scientists such as C.V. Raman, J.C. Bose, Meghnad Saha, Homi J. Bhabha, S. Chandrasekhar, M.S. Swaminathan, etc. and their scientific achievements, which catapulted Indian science in the realm of international importance. He presented a comparative analysis of research work done in India and abroad and focussed on major issues like quality of research work, importance of patenting, job opportunities, R&D funding, etc. Prof. Biswas mentioned that knowledge

economy education should start right from the school level and that the education system should focus on nurturing academics and research for innovation for upliftment of the poor and the downtrodden.

Prof. Challa Vijaya Kumar spoke on “Nano Science and Technology in Everyday Life”. He provided an insight into understanding the meaning of “Nano” and the significance and



Dr. D. Ramaiah, Director, CSIR-NEIST; Prof. Gautam Biswas, Director IIT, Guwahati and Prof. Challa Vijaya Kumar, Professor, Dept. of Chemistry, University of Connecticut, USA (from left) at the programme



Prof. Challa Vijaya Kumar delivering his lecture on “Nano Science and Technology in Everyday Life”

applications of nanotechnology in the field of science and our everyday lives. He said that nanotechnology has been

widely implemented in USA for production of various improved products. Nanomaterials applications in wide range of products such as in food, clothes, cosmetics, flooring and medicines, etc. were further illustrated in his lecture. "Nano can open new doors for Clean, Green and Sustainable future for all," he said.

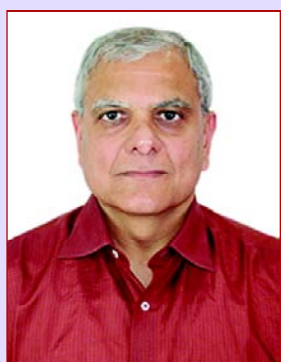
The program concluded with the vote of thanks delivered by Dr. Pranab Barkakati, Chief Scientist, CSIR-NEIST & Coordinator of the programme.



Prof. Gautam Biswas delivering the National Science Day Lecture on "Manifesto for Future: Knowledge Economy, Some Concerns and Suggestions"

Appointments

Prof. Ashwini Nangia appointed as Director of CSIR-NCL, Pune



Prof. Ashwini Kumar Nangia took over as the eleventh Director of the CSIR-National Chemical Laboratory (CSIR-NCL), Pune on 29th February 2016. He was earlier with the School of Chemistry, University of Hyderabad.

Prof. Nangia obtained M.Sc. in Chemistry from IIT Kanpur in 1983. He worked under Frederick E. Ziegler at Yale University for his Ph.D. on the total synthesis of sesquiterpene natural products via a stereoselective claisen rearrangement route. After his Ph.D. he worked in NOCIL Agrochemicals R&D Centre, Navi Mumbai, and then joined School of Chemistry, University of Hyderabad as Lecturer in 1989 where he rose to the position of Professor of Chemistry in 2001.

Prof. Nangia established a research group on the synthesis of iridoid lactones, enzyme inhibitors and steroid analogues. He continued the research in the field of synthesis till 1995-96. He then moved his focus to supramolecular chemistry, importantly on the crystal engineering, in the second half of the 1990s. He established research programmes on host-guest inclusion compounds, hydrogen bonding, polymorphism, and co-crystals. He demonstrated the significance of recurring halogen trimer synthon in the self-assembly of hexagonal host frameworks and postulated O-H...O hydrogen bond shortening in neutral arrays of polycarboxylic acids. He also contributed to the new field of

co-crystals and polymorphs and its applications to the pharmaceutical industry.

Prof. Nangia was Young Associate of the Indian Academy of Sciences, Bangalore and awarded the Raja Ramanna Fellowship by DST. He is also a JC Bose National Fellow. He was elected as fellow of Indian Academy of Sciences, Bangalore, Indian National Science Academy, New Delhi, National Academy of Sciences (India), Allahabad, and AP/TS Akademi of Sciences, Hyderabad. He is also elected as Fellow of the Royal Society of Chemistry, London.

Prof. Nangia serves on the editorial boards of several international and national journals in chemistry including *CrystEngComm* and *Crystal Growth & Design*. He is on the Advisory Board of *Chemistry-An Asian Journal* and *Journal of Pharmaceutical Sciences*. He has also served as the associate editor of ACS journal *Crystal Growth & Design*. He is member of the INSA National Committee on Crystallography. He has guided over 25 Ph.D. theses at the University of Hyderabad and has published over 200 research papers in international peer reviewed journals including several reviews and patents.



Dr. B. Chandrasekaran takes over as Director of CSIR-Central Leather Research Institute (CSIR-CLRI)

Dr. B. Chandrasekaran has been appointed as Director, CSIR-Central Leather Research Institute (CSIR-CLRI), Chennai. He was earlier Chief Scientist at the Institute and has been associated with Leather Sector Skill Council (LSSC) as Chairman of the HRD Cluster of CSIR-CLRI in development of curriculum and vertical growth integrating the skills with levels of education.

Dr. Chandrasekaran is a Leather Technologist and specializes in Cleaner Production Technologies, Leather Education, Leather Product Design & Development, CAD Techniques for Leather Product Design, Organizational Development, Consultancy in R&D and Organizational Excellence. His expertise lies in Inter-Institutional Cooperation and Global R&D Consultancy.

Dr. Chandrasekaran is the recipient

of Kannammal Memorial Award for holding first rank in the M.Tech, Sulabh International Award and the AIMO Award. Dr. Chandrasekaran is the Vice-President of Indian Leather Technologists' Association, and Life-Member, A.C. Tech Leather and Footwear Alumni Association (ALFA), ISO Leather, American Leather Chemists Association and International Union of Leather Technologists and Chemists Society.

He is the Project Coordinator for CSIRs prestigious International Consultancy assignment in Ethiopia which focuses on capacity building of Leather Industry Development Institute (LIDI), Ethiopia and is instrumental in negotiating for similar services in the metal and engineering sector in Ethiopia. He is also credited with preparation of a Three-year Action Plan for the execution



of the Twinning Program at LIDI, Ethiopia.

Dr. Chandrasekaran has coordinated several projects on HRD needs of the Indian leather product sector as a part of HRD mission and Support to Artisans of DIPP GOI through NMU. He also

developed curricula and educational tools and materials for under graduate, diploma and certificate courses in leather and leather product sector for a network of training institutions including Anna University Chennai & AAIT, Addis Ababa.

Prof. Santosh Kapuria is New Director of CSIR-SERC



Prof. Santosh Kapuria, *FNA, FNASc, FNAE*, Professor, Department of Applied Mechanics, Indian Institute of Technology (IIT), Delhi, has taken over charge as Director, CSIR-Structural Engineering Research Centre (CSIR-SERC) and Coordinating Director, CSIR Madras Complex (CMC) on 30 December 2015.

Having served in various capacities as Engineer/Sr. Engineer/Deputy Manager, Engineers India Limited (1991-2002) and Associate Professor/Professor, IIT Delhi (since 2002), Prof. Santosh Kapuria has more than 25 years of experience in the field of structural engineering.

His areas of scientific interest include: Smart Composite and Sandwich Structures, FGM Structures; Damage Detection and Structural Health Monitoring; Active/Semi-Active Control of Structures, Finite Element Analysis; Computational Structural Mechanics; Offshore Pipelines and Structures, Mounded Storage Vessels, Pressure Vessels and Buried Piping; Biomechanics, etc.

Prof. Santosh Kapuria, is a Fellow of the Indian National Science Academy (INSA); National Academy of Sciences, India (NASI) and Indian National Academy of Engineering (FNAE). He is

Editorial Board Member, *Journal of Thermal Stresses*, Taylor & Francis (since 2014) and Guest Editor, *ACTA MECHANICA*, for a Special Issue on “Mechanics of Functional Materials and Structures” (2012-14). He holds the Rajat Gupta Chair Professorship at IIT Delhi since May 2011. He was General Chair for ACMFMS-2012, held in New Delhi, and Co-Chair (with Prof. C.F. Gao) for ACMFMS-2010 held in Nanjing, China.

Prof. Santosh Kapuria has won several awards and credits, prominent among them are: “*University Medal*” for scoring first rank in all the eight semesters, during B.C.E. (Civil Engineering) in Jadavpur University, Kolkata; “*N.S. Govinda Rao Medal*” for the Best M.E. Student in Structural Engineering, Indian Institute of Science (IISc), Bengaluru; “*Excellent Doctorate Thesis*” in Applied Mechanics, IIT-Delhi; “*Fulbright Senior Research Fellow*”, Stanford University, USA; “*Humboldt Senior Research Fellow*”, Technische Universität Darmstadt, Germany; “*Swapan Chandra Memorial Medal (JU)*” for highest marks in Design of Structures; “*Highest Rating*” in Annual Appraisal Report, Engineers India Ltd., in each of the eleven years of service; *State Merit and National Scholarships* (From class V to Graduation), etc.

Prof. Santanu Chaudhury is New Director of CSIR-CEERI



Prof. Santanu Chaudhury has assumed charge as Director of CSIR-Central Electronics Engineering Research Institute, Pilani from 9 March 2016.

Prof. Chaudhury is B.Tech (1984), Electronics and Electrical Communication from IIT Kharagpur and has a Ph.D. degree in the area of Computer Science and Engineering from IIT Kharagpur (1989). His areas of research interest include Image Processing, Embedded Systems and Machine Learning.

Prof. Santanu Chaudhury was earlier Professor in the Dept. of Electrical Engineering since 2000 and Dean, Undergraduate Studies, IIT Delhi (2009-2012). He has contributed new techniques for video compression based on parametric compression which has been patented by industry.

He was handling sponsored project and consultancy at IIT Delhi worth Rs. 16 cr. He developed an image categorisation and orientation detection scheme which has been patented and used in a product by industry (Samsung). He also developed on-the-fly code compression and transfer scheme for LG Smartphones in a collaborative project with LG. He also developed an Embedded Platform for Smart Camera in a project funded by MCIT for which NAL and industry partners have initiated technology transfer process.

Prof. Chaudhury is the Consortium Leader for MCIT funded project on Development of Robust Document Image Analysis and Recognition System (Phase-2) for Printed Indian Scripts-involving 15 institutes across the country. In Phse-1 of the project, he led a

consortium of eleven institutes to develop OCRs for Indian scripts such as Devnagari, Bangla, Gurumukhi, Malayalam, Tamil, Kannada and Telugu scripts available on the web (TDIL Website) for general usage.

He is the co-ordinator of technology projects (involving 11 institutes) under Indian Digital Heritage programme of DST where digital techniques are being developed for digital restoration and preservation of the heritage of Hampi. He has even developed a new technology for entering Devnagari characters in Smartphones through a combination of gesture and touch inputs for Qualcomm. This work has been submitted for patenting.

Prof. Chaudhury has worked for development of a new technology for reference-free video quality assessment for Interra Systems Limited. The technology has been submitted for patenting. He also developed a scheme for Cloud-based image super-resolution scheme, submitted for patenting with Samsung.

He is the author/co-author of 259 research publications in leading national and international journals and refereed conference proceedings, co-authored one book "*Multimedia Ontology: Representation and Applications*", and filed 12 patents. He has supervised 15 Ph.D. theses and over 120 post graduate (M.Tech.) thesis.

Prof. Chaudhury is Fellow of the Indian National Academy of Engineers (FNAE), Indian National Academy of Sciences, Allahabad (FNASc), and International Association of Pattern Recognition (FIAPR).





Dr. Tapas Nandy is Acting Director, CSIR-NEERI, Nagpur

Dr. Tapas Nandy has taken over as Acting Director of the CSIR-National Environmental Engineering Research Institute (CSIR-NEERI), Nagpur in January 2016. Dr. Nandy holds a Ph.D. degree in Environmental Engineering with 34 years of experience in research and development in wastewater treatment and management with recourse to disposal, recycle and reuse. He also has extensive field experience in wastewater management in various industrial sectors.

The major projects that Dr. Nandy led include designing of common effluent treatment plants (CETPs) at Pali and Balotra in Rajasthan and wastewater management in distilleries and tanneries in Tamil Nadu. He also contributed in operationalizing CETPs for industrial

sectors in Delhi. Dr. Nandy has been involved in rejuvenation of lakes and rivers in the country. He has also conducted studies in various industrial sectors as directed by the Hon'ble NGT, High Courts and Supreme Court for assessing the impact of industrial activities on environment and recommending necessary control measures to be adopted for environmental protection.

Dr. Nandy has guided 20 M.Tech. and 6 Ph.D. students in the field of Science and Engineering. He has published over 70 research papers in international journals, authored 2 books and prepared more than 100 technical reports. He has obtained 4 patents to his credit. Dr. Nandy is a member in various national committees.

Honours & Awards

CSIR-IICB Scientist Selected as Member of Advisory Board of RSC Journal



Dr. G. Suresh Kumar, Senior Principal Scientist, CSIR-Indian Institute of Chemical Biology, Kolkata has been inducted as a member of the international editorial advisory board of *Molecular Biosystems*, the flagship journal of the Royal Society of Chemistry (RSC) for chemical biology, -omics sciences and systems biology.

The RSC, founded in 1980, is one of the most popular societies and has more than 45,000 members. It was created for advancing the chemical sciences with its headquarters at London and publishes journals and books in all areas of

chemical sciences and on subjects at the interface of chemistry and biology.

Dr. Kumar has carried out research work on the structural and thermodynamic aspects of small molecules binding to DNA, RNA and proteins and has more than 175 publications in reputed international journals and a few hundred conference publications to his credit. As one of the founders of the Chemical Biology Society, India and DNA Society of India, he has contributed remarkably to the growth of Chemical Biology and DNA research in India.

Dr. E. Bhoje Gowd from CSIR-NIIST receives MRSI Medal

Dr. E. Bhoje Gowd, Senior Scientist, CSIR-National Institute for Interdisciplinary Science and Technology has been conferred with the Materials Research Society of India (MRSI) award in recognition of his outstanding research contributions to Polymer Science and Technology. He received the award in the 27th MRSI National Symposium held at CSIR-North East Institute of Science and Technology, Jorhat, Assam during 18-21 February 2016.

Dr. Gowd has been associated with the Materials Science and Technology Division for the last five years. His group is focused on the development of

multifunctional nanofillers for semicrystalline polymers, understanding the structure formation in bulk and thin films of block copolymers, and control of structure and morphology of semicrystalline polymers, and therefore the physical and mechanical properties, by understanding the crystallization behavior of polymers under different environments and conditions.

Dr. Gowd is also a recipient of the Alexander von Humboldt Fellowship (Germany), Ramanujan Fellowship from Department of Science and Technology, India and Indo-US Science and Technology Forum (IUSSTF) award.



CSIR-NCL Scientist receives Innovation Challenge Award from Stanford University

Dr. M. Karthikeyan, a scientist from CSIR-National Chemical Laboratory (CSIR-NCL), Pune has been selected for the Open Innovation Challenge, Thomson Reuters and CodeX Award 2015 in the area of Big Data Analytics. The award comprised a citation and a cash prize of 10000 USD and was sponsored jointly by the Stanford Computer Science Department and Stanford Law School.

The challenge involved analysis of a large amount of data to discover trends and patterns with predictive abilities. The evaluation of the proposed solution was carried out by the group of judges and experts that featured three levels of screening. About 450 solvers participated in the event worldwide and the best three were selected for the award.

The solution developed by Dr.

Karthikeyan involved open-source based predictive modeling methods that provide analytics to data scientists and legal practitioners.

Dr. Karthikeyan has been working in the area of Chemoinformatics and has authored several publications and patents related to Drug Discovery and information technology. He has also authored a textbook on *Practical Chemoinformatics* published by Springer. He is currently serving on the editorial board of *J. Combinatorial Chemistry* and *J. Molecular Informatics*.

Dr. Karthikeyan has earlier received the BOYSCAST Award in 2003 by the Department of Science and Technology and Overseas Associate Award in 2007 by the Department of Biotechnology to pursue advanced research in University of North Carolina, Chapel Hill, USA.



Dr. Pratima awarded Raman Research Fellowship



Dr. Pratima M. Kessarkar, Scientist in the Geological Oceanography Division of the CSIR-National Oceanography Institute, Goa has been awarded the Raman Research Fellowship for the year 2015-16.

This fellowship is granted to CSIR researchers for carrying out research in

the emerging/high priority areas. Under the fellowship, Dr. Pratima will work with Dr. Martin Frank, at the GEOMAR Helmholtz Centre for Ocean Research, Wischhofstrasse, Germany on “Changes in deep water masses in the Arabian Sea during the Late Quaternary” for a period of four months.

फॉर्म 4/FORMIV (नियम 8 देखिए/See Rule 8)

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	पता /Address	As above in (3)
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Dated 15 March 2016

Sd/- Deeksha Bist
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