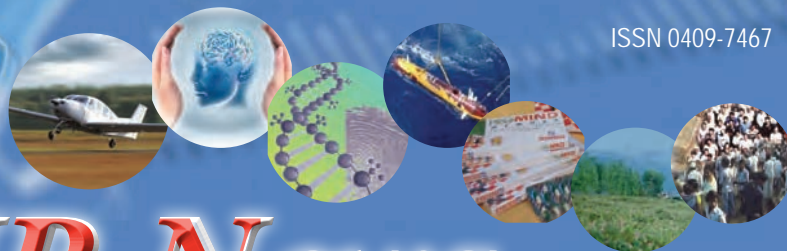




ISSN 0409-7467



CSIR News

NEWSLETTER OF THE COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH

Volume 64 No. 3 & 4

website: <http://www.csir.res.in>

February 2014

In This Issue

25 In The News

- CSIR Acquires New Research Ship
- CSIR-NAL's Proud Contribution to the GSLV-D5 Programme
- CSIR-NCL Felicitates Prof C.N.R. Rao on being Conferred Bharat Ratna

30 R&D Highlights

- CEERI Developing Indigenous 3 MW Magnetron
- CSIR-CEERI Develops Capacitive Micromachined Ultrasonic Transducer
- CSIR-NGRI Mapping Groundwater with State-of-art Technique

34 MoUs

36 Conferences

38 Seminars/Symposia

39 Workshops

40 Training/Science Awareness Programmes

42 Celebrations/Events

46 Honours & Awards

48 Appointments

In The News

CSIR Acquires New Research Ship

The newly acquired Research Vessel, *Sindhu Sadhana*, was handed over to the Council of Scientific and Industrial Research (CSIR) in the presence of Dr. Shailesh Nayak, Secretary, Ministry of Earth Sciences (MoES), Govt. of India, at a function held at the Western India Shipyard Limited, Marmugao on 28 December 2013.

The new ship will be operated by CSIR-National Institute of Oceanography

(CSIR-NIO) for carrying out multi-disciplinary research in the Arabian Sea, Bay of Bengal as well as the Indian Ocean. The indigenously built vessel has been constructed at ABG Shipyard at Surat in Gujarat.

Speaking on the occasion, the then DG-CSIR, Prof. Brahmachari, urged the scientists to ensure that the ship is utilized not only for basic scientific research but also cater to applied research such as exploring for new minerals and hydrocarbon resources



Research Vessel, *Sindhu Sadhana*

as well as assisting the fishing community leading to economic growth of the country. He further suggested carrying out oceanographic expeditions onboard which would help in understanding the processes in the seas around India and provide inputs for forecasting the variations in marine environment that affect large populations living along the coast.

Dr. Nayak said that the Indian oceanographic community takes pride in the fact that the first indigenously built multi-disciplinary vessel is joining the fleet of research vessels of the country to explore marine resources and environment.

While expressing his gratitude towards CSIR and MoES for their financial and technical support in acquiring the ship,



Dr. S.W.A. Naqvi, Director, CSIR-National Institute of Oceanography (CSIR-NIO) assured that RV *Sindhu Sadhana* will serve as a platform to launch oceanographic research programmes of global importance and translate this knowledge to the benefit of the nation.

The 80 m long and 17.6 m wide ship can accommodate 57 personnel including 29 scientists and 28 crew members. She is designed for a cruising speed of 13.5 knots and an endurance of 45 days. The ship is equipped with a number of laboratories for online data collection and data processing including sophisticated instruments to study the biological, geological, chemical and physical aspects from oceans. The vessel is equipped with dynamic positioning system that allows holding the vessel at a point for sampling including 24-meter long sediment cores. It also facilitates precise deployment of instrumented moorings, towing of Remotely Operated Vehicles and Autonomous Underwater Vehicles.

CSIR-NIO is planning to carry out oceanographic expeditions onboard RV *Sindhu Sadhana*, which will help in gathering seafloor information resulting from high resolution mapping and sampling, which will help in identifying suitable areas for offshore development and mineral prospecting including petroleum hydrocarbons. Studies on sedimentary processes and their role in burial of organic matter and sequestering of atmospheric carbon dioxide in marine sediments, which play a significant role in global carbon budget, will also be conducted.



CSIR-NAL's Proud Contribution to the GSLV-D5 Programme



ISRO recently launched the GSLV-D5 successfully riding on an indigenous cryogenic engine. The Indigenous Cryogenic Upper Stage was successfully flight-tested onboard GSLV-D5 launch vehicle on 5 January 2014 from the Satish Dhawan Space Centre SHAR, Sriharikota. GSLV-D5 successfully launched a communication satellite — GSAT-14 — precisely to its intended Geosynchronous Transfer Orbit making it a proud moment for India.

CSIR-National Aerospace Laboratories (NAL), Bengaluru is proud to have been associated with the programme. A gist of the contribution made from CSIR-NAL is outlined here.

In the year 2010, after the GSLV failure, VSSC came up with an urgent requirement of unsteady pressure measurements in ITS region with simulated wire tunnels for post-flight failure analysis. One of the force models was modified for the above studies and results were supplied in a month's time, which gave valuable inputs to the project.

Later in the year 2011, it was decided to complete aerodynamic re-characterization of the GSLV D5 vehicle with fully simulated wind tunnel model. The major challenge was to design, manufacture and test models for force measurements, steady and unsteady pressure measurements in a very short time frame. It was decided to design the models at CSIR-NAL and manufacture them at VSSC.

The design project team worked in two shifts and completed the design of three models and model components were manufactured at VSSC within a record time. Final assembly of the force model, instrumentation of about 160 pressure ports on steady and about 45 unsteady pressure ports on models were carried out at CSIR-NAL.

To complete aerodynamic characterization of the vehicle about 1000 runs were carried out on the complete force model, truncated unsteady and steady pressure in CSIR-NAL 0.6m and 1.2m wind tunnels. For detailed unsteady pressure

measurements, the existing 24-channel high-speed data acquisition and processing system was upgraded to 48-channel system and about 80 runs were conducted. For steady-pressure measurements on GSLV model about 150 pressure ports were instrumented. All these activities were carried out within a record time.

The Acoustic Test Facility (ATF) at CSIR-NAL has been involved in the dynamic environment qualification of stages, subsystems and components for the GSLV programme since 1995. Thirty major acoustic test programmes on the GSLV were completed at ATF, spreading over the years 1995 to 2013 with a total of 515 b l o w d o w n s . Considering the fact that ATF conducts acoustic tests on full-



Strap-on Nosecone of GSLV



Cryo Stage Wire Tunnel located near the 25Hz horn at a height of 11.5 metres for tests

scale launch vehicle hardware with some of the hardware being actual systems used for flight, this has been a mammoth task.

The GSLV Heat Shield – both metallic as well as CFRP – the Core base shroud, the 1/2 & 2/3 interstages, the strapon nosecone, the L40 engine bay and the strap-on nosecone avionic decks are the major stages/subsystems qualified at ATF. Subsystems/

hardware of the indigenous cryogenic stage were qualified for liftoff/trans-atmospheric acoustic environment at ATF in the last year and a half.

Very high acoustic levels of the order of 164 dB were required to excite localized areas on the specimen. These tests had a direct impact on the integration and assembly processes of the stage. The wire tunnel, umbilical connector units, the cryo stage vent valves, the LH2 vent and relief line and the protection plates in the ITT region underwent tests.

A major test on the cryogenic stage consisting of the liquid oxygen tank, the lower shroud covering the truss region, truncated main cryogenic engine, the steering engine, the wire tunnel in the tank and shroud portion, the Inter Stage 2/3L and the separation plane connectors was conducted to determine the integrity of the shroud and to verify separation connector mating status under acoustic loading. ATF has designed and fabricated unique test fixtures for all the GSLV test programmes.

The ATF team has also significantly contributed to the several Environmental Test Level Committees and other test and evaluation committees at ISRO.



GSLV Cryogenic Upper Stage-Lower Shroud (middle), insulated liquid oxygen tank (top) & IS2/3L

CSIR-NCL Felicitates Prof C.N.R. Rao on being Conferred Bharat Ratna

CSIR-National Chemical Laboratory (CSIR-NCL) jointly with Pune-based R&D institutes and University of Pune organized a function to felicitate Prof. C.N.R. Rao on being conferred the Bharat Ratna.

Dr. R.A. Mashelkar presided over the felicitation programme that was organized at the Indian Institute of Science Education and Research (IISER), Pune on 13 December 2013. Dr. Mashelkar said that IISER Pune is the most appropriate place to organize this event, because Prof. Rao had put in massive efforts and energy to initiate the IISERs. Dr. Mashelkar described him as a great science leader and institutional builder.

A short video on Prof. C.N.R. Rao was screened on the occasion.

Dr. Sourav Pal, Director, CSIR-NCL said that CSIR-NCL is the institute other than Indian Institute of Science (IISc), Bangalore to have the longest association with Prof. Rao. He said that the entire country is proud of Prof. Rao's achievements. Prof. Rao has set a high benchmark for himself and others and he still keeps on challenging himself. His contributions in Material Chemistry led to the development of the subject in India and the world. Dr. Pal said that he has been associated with Prof. Rao for more than four decades. He also remembered the days spent



Dr. Sourav Pal felicitating Prof. C.N.R. Rao. Also seen are (from left): Dr. Shekhar Mande, Director, NCCS, Prof. B N Goswami, Director, IITM, Prof. W.N. Gade, Vice Chancellor, University of Pune, Prof. K.N. Ganesh, Director, IISER, Dr. R.A. Mashelkar, National Research Professor, and Mrs. Rao

at IIT Kanpur where Prof. Rao was his teacher. Prof. Rao was the builder of the Department of Chemistry at IIT Kanpur as well as the Solid State Structural Chemistry Unit at IISc and founded The Jawaharlal Nehru Centre for Advanced Scientific Research, a multidisciplinary research institute in Bangalore. Dr. Pal stated that CSIR-NCL had benefited a lot from his wisdom as chairman of Research Council and in many other capacities.

Dr. Shekhar Mande, Director, National Centre for Cell Science (NCCS), said that his institute had benefited a lot directly and indirectly from Prof. Rao's guidance.

Prof. B.N. Goswami, Director, Indian Institute of Tropical Meteorology (IITM), said that the nation needs Prof. Rao to inspire young students and people.

Prof. George Thomas, who has additional charge as Director of IISER Trivandrum said that Prof. Rao has made Indian science vibrant by establishing IISERs and the enormous support he has given to Indian youths and science. He said that Prof. Rao has the ability to spot talent from a large number of people available around.

Prof. L.S. Shashidhara, IISER Pune, said that Prof. Rao is a visionary. The IISER is

now experiencing the taste of his advice on framing major and minor courses at IISER.

Prof. W.N. Gade, Vice Chancellor, University of Pune, said that it is a great moment for the Indian scientific community that Prof. Rao has been declared as the recipient of the most prestigious Bharat Ratna award.

Dr. S. Sivaram, former director of CSIR-NCL, remembered that he met Prof. Rao in January 1965. Prof. Rao has made lasting impression on young students, he said. He had genuine affection for students and he himself took care of them as a caring father. His attitude towards the students is always very kind. He said that one should learn mentorship from Prof. Rao. Dr. Sivaram narrated the incidents from his personal experience with Prof Rao highlighting this fact.

Dr. T. Ramasami, Secretary, Department of Science and Technology, New Delhi said that the impact made by Prof. Rao on Indian science is enormous. He is a priceless gift of nature to Indian science and his award is truly a celebration of Indian science, he said.

Sharing his feelings, Prof. C.N.R. Rao said that he felt very shy to accept the award. He said that he came from a very well educated middle class family. He had wonderful parents. They provided him the freedom, he was the only child. He also remembered Prof. H.C. Brown from whom he took inspiration of publishing. Finally, he gave a message to young scientists that whatever they do should be worth publishing.



Prof. Rao has made lasting impression on young students, he said. He had genuine affection for students and he himself took care of them as a caring father. His attitude towards the students is always very kind. He said that one should learn mentorship from Prof. Rao.

CEERI Developing Indigenous 3 MW Magnetron

Linac-based X-ray machines are extensively used for industrial, medical and security applications. Radio Therapy Machines for the treatment of cancer and Cargo Screening Machines for inspecting heavy cargos are required in hospitals, airports and shipyards. Mobile cargo screening machines mounted on trucks are used for surprise checks at highways near borders for possible smuggling of explosives and narcotics.

BARC, Mumbai in association with ECIL, Hyderabad has plans to develop such cargo screening machines to be employed near borders. These LINAC based X-ray machines use high power microwave sources such as Klystrons and Magnetrons for the acceleration of electron beams to energies up to few MeV, which produce X-rays of required wavelength and intensity. Magnetrons being inherently efficient, compact and small in size provide economical solutions for such cargo screening machines.

Under a Deity-sponsored project, CSIR-Central Electronics Engineering Research Institute (CEERI) is the third partner responsible

for the 3 MW 2.856 GHz pulse Magnetrons. The major feature of this magnetron is the ceramic version co-axial cathode support, which will axially support the cathode, concentrically, inside the cylindrical anode and will act as high voltage feed-through. A large number of mobile cargo screening machines (more than 250) are required to be installed in the country. Indigenous development of the machine including magnetrons will result in substantial saving of foreign exchange.

Design, assembly and processing of 3 MW Magnetron prototype has been



Fig. 2. Prototype on Processing Station



Fig. 1. 3 MW magnetron prototype

completed (Fig. 1). The prototype on the processing station is shown in Fig. 2. The emission characteristics of the diode are given in Fig. 3.

The agreement between theoretical and experimental I-V curves is excellent. The emission characteristics of the magnetron diode are indirectly the test of quality of the cathode activation. It is done by applying DC anode voltage between anode body and the cathode and measuring the anode current. Dip test has also been performed and results indicate satisfactory activation of the cathode. The operating heater voltage and current are 11 V and 10 A respectively, while the typical design values are 14 V and 8 A, respectively.

Specifications	
Peak Power (Min.)	3.0 MW
Average output power	3.0 kW
Frequency	2856 MHz
Tuning range (Min.)	10 MHz
Cathode	Indirectly heated oxide coated
Heater Voltage (Typical)	14.0 V
Heater current	8 A
Peak anode voltage (Max.)	50 kV
Peak anode current (Max.)	120 A
Magnetic flux density	1650 Gauss
Mean input power (Max.)	6 kW
Pulse duration (Max.)	5.0 μ s
Pulse repetition rate (Max.)	300 Hz
Efficiency	45% min
Focusing	Electromagnet

The prototype is ready for conditioning and aging with high-pulsed anode voltages using high voltage pulsar.

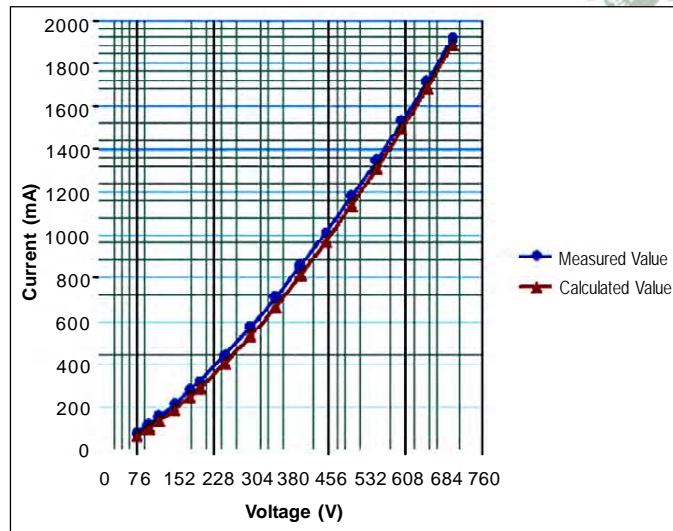


Fig. 3. I-V Characteristics of 3 MW Magnetron prototype

CSIR-CEERI Develops Capacitive Micromachined Ultrasonic Transducer (cMUT)

In line with the country's strategic needs, CSIR-CEERI has developed a capacitive micromachined ultrasonic transducer (cMUT) for non-destructive testing applications. The cMUT device has been developed under a sponsored project from DAE (Department of Atomic Energy), New Delhi. The cMUT devices were delivered to DAE for evaluation.

A schematic diagram illustrating basic components of the cMUT is shown in Fig. 1. It is basically a parallel plate capacitive structure with bottom electrode fixed on the substrate and top electrode on the suspended membrane, which can vibrate at ultrasonic frequencies. DC bias is applied for polarisation and to ensure deflection in the desired mode of operation, which is out-of-

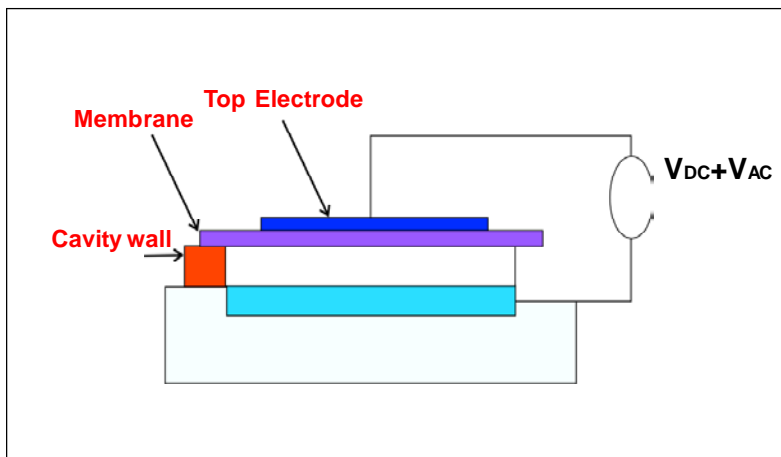


Fig. 1. Schematic diagram of cMUT

plane. A small amplitude AC signal is superimposed on the applied DC bias for excitation in the desired mode at ultrasonic frequency.

The cMUT device was fabricated using anodic bonding technique. Fabricated devices

Specifications	
Parameter	Description
Base material	Silicon/Pyrex
Membrane material	Silicon and SiO ₂
Shape of membrane	Circular/Hexagonal
Size of the membrane	100 μm
Thickness of membrane	1.5 μm
Air cavity height	1.5 μm
frequency	~2 MHz
Pull-in voltage	100 V

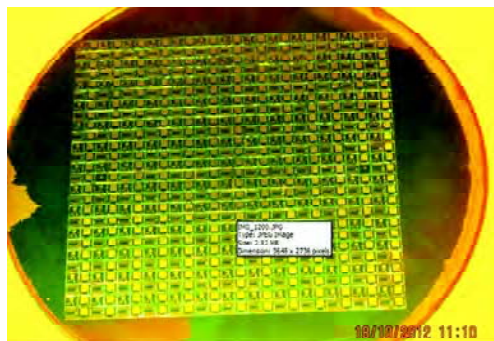


Fig. 2. 4"-wafer with fabricated devices

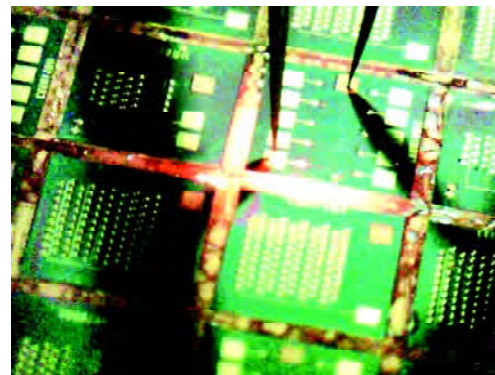


Fig. 3. Device under test

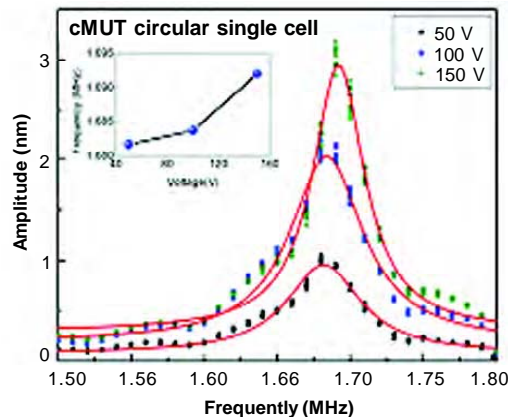


Fig. 4. Frequency response of fabricated device

on 4" wafer are shown in Fig. 2. Device under test is shown in Fig. 3. Frequency response

of a single circular cell is shown in Fig. 4 and resonance frequency is found to be ~1.7 MHz.

CSIR-NGRI Mapping Groundwater with State-of-art Technique

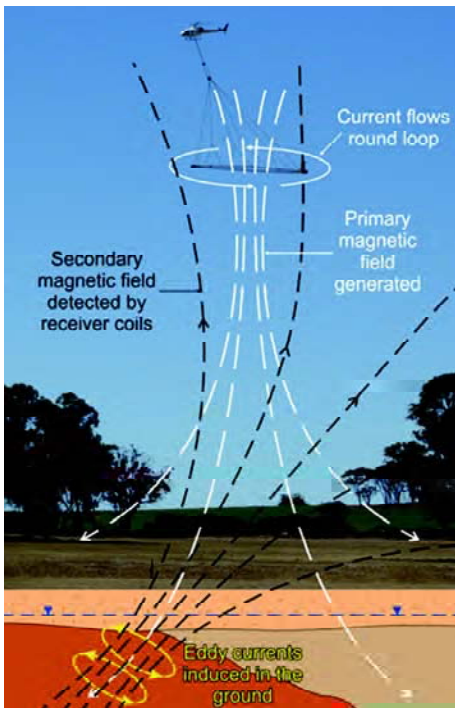
A vast country like India, with a complex geological set up, has to meet its major water demands from groundwater. The Ministry of Water Resources (Govt. of India) has proposed mapping the aquifers of the entire country using appropriate and effective methodology for fast and realistic mapping of aquifers in collaboration with Aarhus University, Denmark for SkyTEM heli-borne surveys in six study areas located in Rajasthan, Maharashtra, Karnataka, Bihar and Tamilnadu.

To accomplish the task with a strong scientific rationale, CSIR-NGRI is studying these areas with a state-of-the-art technique

called heli-borne transient electromagnetic measurements (TEM). The interpretation of the heli-borne data will be constrained by ground geophysical follow-up and validated by borehole results. The ground geophysical follow-up will comprise resistivity, induced polarization and electromagnetic sounding/profiling, resistivity-induced polarization imaging and multi-parametric geophysical logging of boreholes. The integrated approach and joint inversion of data would bring out precise aquifer maps and terrain-wise appropriate field methodologies and interpretational approaches, which will be upscaled.

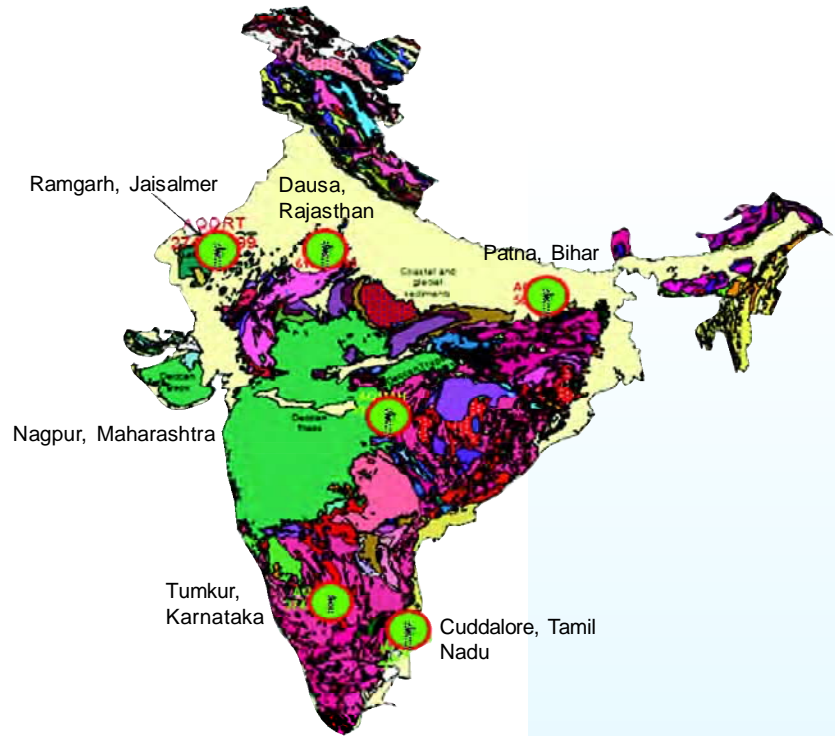


CSIR-NGRI and Aarhus University, Denmark signing the agreement. Dignitaries (sitting L to R) Shri P.V. Singh, Secretary MoWR, Prof. M.K. Sen, Director, CSIR-NGRI, Prof. Esben Auken, Director, HGG, Freddy Svane, AU Ambassador, Danish Embassy; standing from L to R: Dr. Subash Chandra and Dr. Shakeel Ahmed



State of art heli-borne-TEM survey: SkyTEM system, schematic representation of induction phenomenon i.e. excitation of ground with primary EM field, generation of eddy currents in ground and receiving secondary EM field at SkyTEM receiver

The SkyTEM is a specially designed heli-borne hook on transient electromagnetic system for groundwater mapping and has been successfully experimented globally. It is a dual moment system facilitating measurements for shallow and deeper subsurface information separately. SkyTEM 101 having a magnetic moment of 5000 and 30,000 Am² will be used for delineation of the shallow fractures while SkyTEM300/500 system with transmitter having larger magnetic



Heli-borne system carrying EM Loop and other instruments

moment of 5000 and 100,000-200,000 Am² will be used for the sedimentary area.

AQUIM provides information on near surface aquifers and also near surface clays and pollutants of the aquifers. The other

advantage of SkyTEM is that the system is absolutely real time calibrated during data acquisition and the response is not post-levelled or corrected. The movement (pitch and roll and altitude, GPS positioning) of the system is monitored on the career frame and incorporated during processing to achieve very reliable and accurate hydrogeological models.

Expected outputs from the study are: 3D aquifer model of pilot area on 1:50,000 scale, Terrain wise aquifer maps.

The survey being carried out for the first time in India, was inaugurated by Shri Harish Rawat, the then Minister of Water Resources, and now Chief Minister of Uttarakhand, in the presence of Shri Ashok Gehlot, the then Chief Minister of Rajasthan and various other dignitaries at Dausa, on 27 September 2013.



Ministers and other dignitaries flagging off the Heli-borne survey

MoUs

CSIR-IICB signs MoU with Narayana Health



CSIR-Indian Institute of Chemical Biology (CSIR-IICB), Kolkata has entered into a MoU with Bangalore based Narayana Health to work together to establish joint collaborative research in niche areas of translational research by utilizing the facilities and expertise in both the institutes. A team of eight specialists from Narayana Health visited CSIR-IICB to sign this MoU.

Dr. I. Rupert, Chief Medical Services, Rabindranath Tagore International Institute of Cardiac Sciences, Kolkata and Mr. Kaushik Bhattacharya, Administrative Officer, CSIR- IICB, Kolkata signed the umbrella MoU in the presence of Prof. Siddhartha Roy, Director and other senior scientists of CSIR-IICB on 23 October 2013 at a function held at CSIR-IICB, Kolkata.

The broad objectives of the MoU are to enable identified scientists of these two institutions to work together and establish joint collaborative research programmes in niche areas of biomedical sciences. For this purpose it has been decided to constitute a steering committee consisting of members from both institutions that will identify areas where effective collaboration can be initiated.



CSIR-CRRI signs MoU with Bengal Engineering and Science University (BESUS)



The purpose of this MoU is to create a framework for collaboration between CSIR-Central Road Research Institute (CRRI), New Delhi and CED-BESU with the objective that both CSIR-CRRI and CED-BESU shall encourage interaction between Scientists, Research Fellows, Faculty members and students of both the organizations through the following arrangements:

- Exchange of personnel through deputation as per the rules of the respective institute, for limited periods as mutually agreed upon.
- Organization of joint conferences and seminars.
- Practical training of CED-BESU students at CSIR-CRRI.
- Joint guidance of student project/thesis at CED-BESU by CSIR-CRRI on mutually agreeable terms.
- Undertaking joint sponsored research and consultancy assignments offered by governments/public sector organizations through mutually agreed terms and conditions.
- Undertaking capacity build-up training programmes for various clients in the area of specialization of the two institutes based upon mutually agreed terms and conditions.



CSIR-NEIST signs MoUs

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

- Mr Samman Lowang Rajkumar of Arunachal Pradesh on 18 September 2013 for extending consultancy on “Detailed Project Report for the proposed composite forest farming at Malisa Tea Garden area, Tirap, Arunachal Pradesh in two phases.
- M/s Sarada Clinics Pvt.Ltd., Kolkata on 7 October 2013 for transfer of knowhow on Herbal Anti-Asthmatic Formulation.
- M/s Triveni Enterprise, Jorhat on 22 October 2013 for transferring marketing rights of its herbal product, Anti-Arthritis.
- Directorate of Biotechnology, Dept. of Science, Technology & Environment, Govt. of Tripura on 24 October 2013 for collaboration.

Conferences**International Conference on Membranes and Applications Organised by CSIR-CGCRI**

CSIR-Central Glass and Ceramic Research Institute (CSIR-CGCRI), Kolkata organized an International Conference on Membranes and Applications 2013 (ICMA-2013) during 22-23 November 2013 at Kolkata. The International conference was co-branded by the European Business and Technology Centre. The theme of this conference was: Futuristic Membrane-based Technologies towards Clean Energy and Green Environment.

The Conference was attended by ten experts from Belgium, Germany, Italy, Sweden, USA and Tunisia along with about eighty Indian delegates from CSIR laboratories, corporate R&D sectors, academia and defence laboratories in addition to other dignitaries, guests and a host of young researchers.

Shri Kamal Dasgupta, Acting Director, CSIR-CGCRI delivered the Welcome Address. He outlined the history of research into membranes, an activity taken up in a small way in the late eighties, and gave a brief but comprehensive picture of the institute's achievements in the field. He said that with increasing pollution levels, there has been a commensurate increase in the need for filters to remove pollution – one reason why CSIR-CGCRI's Ceramic Membrane Division is increasingly coming into the scientific limelight. He expressed the hope that ICMA-2013 would not only connect all delegates intellectually to facilitate the exchange of ideas but also attract more young researchers to the field.

Dr. S.N. Roy, Co-chairman, ICMA 2013 and Head, Ceramic Membrane Division, warmly welcomed all delegates to CSIR-CGCRI: a centre for excellence. He was hopeful that the conference would fulfill its aim of sharing knowledge and expertise amongst experts on development of ceramic membranes, drinking water, waste water treatment, carbon dioxide capture, hydrogen production and separation. He was optimistic that CSIR-CGCRI would uphold the tradition of encouraging multi-disciplinary science in mission-mode of CSIR by holding ICMA at regular intervals.

He said that globally, every sector is looking for clean and green technologies. Membrane technology is a shining example of the very few truly clean and green technologies available. He informed the audience that under societal missions, CSIR-CGCRI had installed sixty water filtration



Shri Rachhpal Singh, IPS (Retd.), Minister-in-Charge Planning Department, Govt. of West Bengal, Chief guest of the inaugural function delivering his address. Seated: Dr. S.N. Roy, Dr. Pushpito Kumar Ghosh, Shri Kamal Dasgupta and Shri Swachhha Majumdar

In addition to the Keynote and Plenary Addresses there were ten technical sessions that included Invited lectures and Poster presentations.

Shri Rachhpal Singh, IPS (Retd.) and Minister in Charge, Dept. of Planning, Govt. of West Bengal was the Chief Guest and Dr. Pushpito K. Ghosh, Director, CSIR-Central Salt & Marine Chemicals Research Institute, Bhavnagar was the Guest of Honour.

plants equipped with ceramic-membrane based filtration system for purification in West Bengal and North-eastern states of India. These ceramic-membrane based filters were suitable for treating waters with high iron and arsenic content and also for saline ground and river waters to produce potable aqua.

Dr. Pushpito K. Ghosh, in his address, praised CSIR-CGCRI for its significant contributions to the nation. He said that CSIR-CGCRI has, over the years, demonstrated its ability to work on applied sciences and that is why a conference such as the ICMA is so important.

Delving down to the very basis of life, Dr. Ghosh said that membranes are as old as time and that there is, and would have been, no life possible in the absence of membranes. He described membranes as “nature’s brilliant gift” and referred to the discovery of osmosis in 1758 by Jean-Antoine Nollet in France. Nollet had used natural membrane (animal bladder) to demonstrate the process by which a solvent passed selectively through a semi-permeable membrane. He also touched upon the phenomenon of reverse osmosis by which saline water could be made potable.

Interestingly, there is an Indian touch to this story. It was in the late fifties that Srinivasa Sourirajan, Samuel Yuster and Sidney Loeb successfully made a functional synthetic Reverse Osmosis membrane from cellulose acetate polymer; which could retain the salt and allow fresh water to pass. This revolutionized the field of reverse osmosis. Then came thin film composite membranes, that changed the game thanks to their robustness. He said that in times of calamity, such as in the aftermath of the cyclone Phailin, proven membrane technology to provide safe drinking water in affected areas was possible because of mobile van equipped with this technology.

In his address, Dr. Ghosh spoke about many new and a few potential applications of membranes and membrane technology. He said that there were many types of membrane technologies at the moment but that the future had tremendous scope for even more. He admitted that membrane applications had competing technologies and

that issues exist. However his advice was for CSIR-CGCRI to aspire towards the limit. He suggested that future areas of research in the field could focus on green technologies in emerging areas and new applications of membranes. He said that attention should be paid to the property of self-cleaning in membranes as fouling was a problem. Membranes of the future should also have the ability to withstand attack by corrosive solvents; and should be inert, robust, user-friendly, and cost-effective. He asked researchers to direct their attention to issues created by the need for disposing of waste membrane cartridges. Finally, he called for the introduction of a formal course in Membrane Technology and invited CSIR-CGCRI to do so for the benefit of the future generations.

Shri Rachhpal Singh, Minister in Charge, Dept. of Planning, Govt. of West Bengal made a succinct speech. He appreciated the efforts of CSIR-CGCRI and said that the institute was working silently for humanity and doing good work for society at large and also in the international arena. He reiterated with pride that CSIR-CGCRI was a Centre of Excellence in the area of glass and ceramics and that it had equal prowess in basic and applied research relevant to the country’s socio-economic needs. He particularly praised the use of membrane technologies in the context of purification of water in West Bengal of its arsenic and iron load. CSIR-CGCRI’s endeavour to provide safe drinking water to the citizens was well-appreciated by the Chief Guest.

Mr. Swachchha Majumdar, Convener, ICMA 2013 delivered the Vote of Thanks.

The Keynote Address entitled Ceramic membranes for separation on molecular level was delivered by Hannes Richter, Fraunhofer-Institute for Ceramic Technologies and Systems, Germany. Fraunhofer is Europe’s largest application-oriented research organization and Dr Richter who works in the field of Environmental and Process Engineering gave a brief outline of the multifarious areas in which the institute is active. He said that nano-porous membranes are characterized by pores that have diameters in the range of nanometers and sub-



Interestingly, there is an Indian touch to this story. It was in the late fifties that Srinivasa Sourirajan, Samuel Yuster and Sidney Loeb successfully made a functional synthetic Reverse Osmosis membrane from cellulose acetate polymer; which could retain the salt and allow fresh water to pass. This revolutionized the field of reverse osmosis. Then came thin film composite membranes, that changed the game thanks to their robustness.

nanometers. These are used to separate liquid or gaseous mixtures. It is possible to customise nanoporous membranes according to customer specifications for applications in gas separation, pervaporation, vapour permeation and liquid filtration.

The Department of Nanoporous Membranes works on three different types of membranes: Amorphous, Zeolites and Carbon. He made particular mention of ceramic nano-filtration membrane (450 Da) which is suitable for treating textile effluents. The waste water discharged by the textile industry contains synthetic dyes that are not broken down easily, nor filtered out by conventional biological membranes. However, using ceramic nano-filtration is an easy way to do so. An added advantage is that these membranes have a long life and the first filter change is required after almost a decade! This reduces waste water treatment costs significantly.

The Plenary Lecture was delivered by Giuseppe Barbieri, Institute of Membrane Technology, Italy. He spoke on Membrane Reactors in hydrogen production and gave

an overview of membrane types suitable for separating gases. He said that the new opportunities offered by membrane reactors in pure hydrogen production have improved hydrogen production cycles. This is important because hydrogen has enormous use in chemical and petrochemical industry.

In addition, there were 14 invited lectures delivered by scientists from prestigious educational and scientific organisations such as Vito, Belgium; Laboratory of Materials Science and Environment, Tunisia; Bhabha Atomic Research Institute, Mumbai; Ceramic Technological Institute; Bharat Heavy Electricals Ltd, Bangalore; Entech Metals Pvt. Ltd, Kolkata; Aqua-QAB of Sweden; Amravati University; Jadavpur University and National Institute of Technology, Durgapur.

From the CSIR family, scientists from the Indian Institute of Chemical Technology, Hyderabad, National Institute for Interdisciplinary Science and Technology, Thiruvananthapuram and the host CSIR-CGCRI presented invited lectures. 39 contributory papers and 17 posters were also presented.

Seminars/Symposia

Symposium on Multi-Scale Modelling at CSIR-NCL

CSIR-National Chemical Laboratory (CSIR-NCL), Pune organized a symposium on Multi-Scale Modelling on 10 December 2013 to celebrate the award of chemistry Nobel Prize to Martin Karplus, Michael Levitt and Arieh Warshel for the year 2013 for the "Development of multi-scale models for complex chemical systems".

This was a moment to remember the contributions of the awardees and to encourage the students. Eminent scientists working in this area spoke on the occasion. There was also a poster presentation by both faculty and students.

Dr. Suman Chakrabarty, scientist, CSIR-NCL, in a brief overview, highlighted the significance and utility of multi-scale

modelling as a general approach in computational study of complex (bio)chemical systems. He narrated the history of the key contributions and pioneering ideas of this year's Nobel laureates that paved the way for computational modeling as an emerging field as we know today.

Dr. Sourav Pal, Director, CSIR-NCL, spoke on several Nobel Prize winners in chemistry starting from van't Hoff up to the recent Nobel winners. He talked about Quantum Mechanics and Molecular Mechanics methods. He said that both methods could be used independently. The first one provides accuracy and the second affords simplicity. He explained the

combined approach of QM and MM within the same system to have the necessary accuracy as well as simplicity. He described additive and subtractive means of QM/MM calculation and the care necessary in dividing QM and MM parts.

Dr. Debashree Ghosh, scientist, CSIR-NCL, in the talk on QM/MM methods, explained where it started and where are we now. She talked about the basic idea of QM/MM and what sort of problems can be addressed with the method. Dr. Ghosh also described the basic quantum and classical methods as well as multi-scaling with semi-empirical methods. She talked about the inventions of Warshel and Levitt and their contribution in multi-scale model development. She finally talked about the current areas of research within QM/MM methods.

Dr. Sudip Roy, scientist, CSIR-NCL, talked about the journey and successes of the Nobel awardees of this year. He also touched upon the birth of CHARMM software for molecular dynamics at the Harvard University. Other than molecular dynamics and multi-scale simulation, Prof.

Karplus also contributed to the calculation of vicinal proton coupling in NMR. Dr. Roy's talk was outlined from Prof. Karplus's brief autobiography "*Spinach on the Ceiling: A Theoretical Chemist's Return to Biology*" published in *Annu. Rev. Biophys. Biomol. Struct.* 2006.

Dr. Madhusudan, Computational Structural Biologist at IISER Pune, explained the principles of protein structure prediction right from *ab initio* protein folding and the steps in protein structure modeling and model evaluation.



Dr. Sourav Pal, Director,
CSIR-NCL addressing the audience

Workshops

Workshop on Technologies for North East Region and Implementation Framework Held

Under the CSIR 800 initiative, a two-day workshop on Technologies for North East Region and Implementation Framework (TIF) was organized by CSIR-CRRI in association with CSIR-NEIST at Chintan Bhawan, Gangtok, Sikkim during 6-7 September 2013. The workshop was held to deliberate on the technologies that are suitable for the North-East region and to discuss the framework for adoption of such technologies by state departments so that new and better technologies can be easily implemented at the grassroots level.

The Workshop was inaugurated by Shri Ran Bahadur Subba, Minister, Roads and Bridges and Cooperation Departments, Govt. of Sikkim. Shri M.C. Boro, Commissioner-cum-Special Secretary, PWD, Govt. of



Dignitaries on the dais (from right),
Shri M.C. Boro, Commissioner-cum-Special
Secretary, PWD, Govt. of Assam;
Dr. R.C. Boruah, Acting Director,
CSIR-NEIST and Shri Ran Bahadur Subba,
Minister, Roads and Bridges and Cooperation
Departments, Govt. of Sikkim

Assam and Shri G.S. Sharma, PCE-cum-Secretary, R&BD, Govt. of Sikkim were also present. Dr. R.C. Boruah, Acting Director, CSIR-NEIST gave the welcome address where he stressed upon the importance of such workshops for commercialization of technologies and socio-economic development thereby.

The Inaugural Programme was followed by the Technical Session in which Shri Sanjay

Deori, Scientist, CSIR-NEIST, Shri M. Nagabhushan, Dr. Kishore Kumar, Shri Kanwar Singh and Shri A. Saurikha, Scientists, CSIR-CRRI, presented their deliberation as Resource Persons. The Workshop ended with a Panel Discussion on Technology Implementation Framework. About 100 participants from various states of the North East participated in the workshop.

Training/Science Awareness Programmes

Science Awareness Programmes organised for School Students by CSIR-NEIST, Branch Laboratory Naharlagun



Dr. B.G. Unni, Dr. Joram Begi, Dr. R.C. Boruah, Prof. T. Mibang, and Shri Taloh Potum at the training programme

CSIR-North East Institute of Science & Technology (NEIST), Branch Naharlagun organised a one day Science Motivation Programme on “Biotechnology & Biodiversity” on 11 September 2013 and a Scientific Awareness Programme on 20 September 2013 for school students.

The Science Motivation Programme on “Biotechnology & Biodiversity” was attended by more than 100 students of higher classes (Class X, XI and XII) from Kendriya Vidyalaya No. 1, Royal International School and Good Shepherd Public School.

In the inaugural session addressed by Dr. R.C. Boruah, Director (Acting), CSIR-NEIST Jorhat, talked about the objectives of the institute and the progress made so far in utilizing the rich regional resources of the region. He also appreciated the activities undertaken by the branch laboratory and appreciated the In-charge for organizing such motivational programmes for the students of Arunachal Pradesh.

Speaking as the Chief Guest, Rajiv Gandhi University Vice Chancellor, Prof. T. Mibang urged the students to develop a scientific temperament and work hard for a better future. While encouraging the students, the Director of Higher & Technical Education, Govt. of Arunachal Pradesh, Dr. Joram Begi, advised them to adopt innovative thinking and develop inquisitiveness. He said, “Science is for development of yourself and betterment of humankind.”

The programme was also attended by Shri Taloh Potum, ADM, Capital Complex, Itanagar who motivated the students to take up a career in science for the development of the society.

In the technical session, Prof. A.K. Das, RGU explained to the students about various aspects of Ethnobotany of the plant kingdom of Arunachal Pradesh and the NE Region.

Dr. B.G. Unni, Area Coordinator of Biological Science, NEIST Jorhat, speaking on Prospects in Biotechnology & Molecular

Biology, explained to the students about recent advances in the areas of Molecular Biology and Biotechnology and on the emerging exciting career opportunities in Biotechnology and other related areas.

Dr. Rajib Gogoi, Scientist, Botanical Survey of India, Itanagar, talked to the students about Species Identification of Plant Life.

There was an interaction among the students and resource persons immediately after the presentation and a number of queries of students were answered by the experts.

Later, the students and teachers visited the laboratory and medicinal plants garden where they were provided with basic information about the different medicinal plants, cultivation of mushroom and production of vermi-compost, etc. for the socio-economic development of the rural people.

In another one-day scientific awareness programme organised on 20 September 2013, a group of meritorious school students of class IX from 20 schools of Sonitpur district in Assam attended the programme along with their teachers.

Chandan Tamuly, Scientist-in-charge, CSIR-NEIST Branch Naharlagun interacted with the students and made them aware of Natural Product Chemistry, Plant Science & Ecology and other sections of the institute. He also told them about chemical investigation of medicinal and aromatic plants and its utilisation by pharmaceutical industries, development of agro-technology and evaluation of nutritional value of selected wild edible plants of Arunachal Pradesh.

Dr. B.C. Baruah, Sr. Technical Officer, conducted the training and provided technical guidance to the students on “cultivation of mushroom” and “production of vermicompost”. He explained to them the importance of edible mushrooms,



Chandan Tamuly, Scientist-In-Charge interacting with the students in scientific awareness programme



Dr. B.C. Barush, Sr. T.O. provided guidance in medicinal, aromatic and economic plants garden to the students



A view of the participants

vermicompost and its utilisation for waste management.

The students visited the medicinal, aromatic and economic plant garden of the institute. CSIR-NEIST Branch Itanagar,

Naharlagun Arunachal Pradesh has been organising such motivational programmes to create scientific awareness among the school students of Arunachal Pradesh and Assam.

Celebrations/Events

CSIR-IICT celebrates 70th Year with Curtain-raiser Event



Dr. (Ms) M. Lakshmi Kantam, Director, CSIR-IICT handing over a memento to Shri S. Jaipal Reddy, Minister for Science & Technology and Earth Sciences and Vice President CSIR, during the Curtain Raiser function held on 4 August 2013 at CSIR-IICT, Hyderabad

The CSIR-Indian Institute of Chemical Technology (IICT), Hyderabad, launched its Septuagennial year (entering its seventh decade) celebrations “CSIR-IICT@70”, on its anniversary, 4 August 2013. Shri. S. Jaipal Reddy, Minister for Science & Technology and Earth Sciences, and Vice President, CSIR, graced the curtain raiser ceremony as Chief Guest.

Welcoming the gathering, CSIR-IICT Director Dr. Mannepalli Lakshmi Kantam, gave a brief account of IICT and expressed a keen interest in working with fellow IICTians to add a new dimension to the Institute. She acknowledged the contributions of Director General, CSIR and former Directors of IICT and looked

forward to their continuing support.

Dr. Ahmed Kamal, Outstanding Scientist, IICT, recalled the significant contributions of IICT in its 70 years. He highlighted the achievements and expressed gratitude to all those who were a part of it. Dr. R.B.N. Prasad, Chief Scientist and Chairman “IICT @70”, briefed the gathering on the yearlong events and programmes planned for the celebrations.

The curtain raiser ceremony commenced with the unveiling by the Chief Guest, of the logo designed for the occasion. In his address, the Minister expressed that “scientific temperament should not be confined to research laboratories but should be spread far and wide and taken to all corners of the world; science should be useful to all sections of society”. Referring to the thoughts of social reformer Raja Rammohan Roy on science, he emphasised the relevance of not only spreading scientific temper but also promoting philosophical outlook based on science. He further added that, “We need science with a human face. India needs technologies which can be useful to people, especially the poor.”

Appreciating the contributions being made by IICT in the field of science and technology, he added that the Institute had contributed significantly both to academic endeavor and to Industry over the last --70 years. The Minister informed that the new Science, Technology and Innovation Policy, 2013 would focus on a strong and viable science, research and innovation system, towards a high technology-driven path for India. He assured that the Government would provide adequate resources for technology-based science and



Shri S. Jaipal Reddy with Dr. (Ms) M. Lakshmi Kantam and all the former and present directors of CSIR laboratories located at Hyderabad, during the function



research projects.

The Minister inaugurated the Meteorological Tower of Climate Change on Vector Control Programme and the Cancer Therapeutic Research Laboratory. He also laid the foundation stone of the Centre for Fluorochemicals on the occasion. He released a compendium on CSIR-IICT Competencies and Research Facilities and also presented the CSIR-IICT Foundation Day Awards for 2012-13.



A view of the audience

Green Republic Day at NIO

Continuing with its endeavor towards creation of greener environments, CSIR-National Institute of Oceanography (NIO), Goa celebrated the Republic Day with a tree plantation drive by the Director, Dr. S.W.A. Naqvi and the staff of its Dispensary at NIO Colony, Dona Paula. Considering its medicinal value, the seedlings selected for plantation this year were that of Neem.

NIO has initiated the tradition of tree plantation at the hands of their staff members who are retiring every month as well as on national holidays such as the Independence Day in order to promote greenery at its office campus and residential colony. Several staff members and a German Scientist Dr. Victor Smetacheck joined the drive.

Earlier in the morning, Dr. Naqvi hoisted the flag and enthused the gathering to strive towards accomplishing the mission of NIO which aims at improving our understanding of the seas around us for the benefit of society. On this occasion, prizes were distributed to the winners of various indoor and outdoor tournaments for the staff members and their families.



CSIR-NBRI celebrates Annual Day

CSIR-National Botanical Research Institute (NBRI) celebrated its Annual Day on 25 October 2013. Renowned Plant Ecologist of International repute Prof. J.S. Singh, NASI Sr. Scientist & Professor Emeritus, BHU, Varanasi, was the Chief Guest and Prof. S.B. Nimse, Vice Chancellor, University of Lucknow, presided over the function.

Dr. C.S. Nautiyal, Director, NBRI welcomed the dignitaries and guests and presented the Annual Report of the Institute summarizing various activities undertaken and major achievements made by the Institute in the past one year. Highlighting the work carried out during the year 2012-13, he said that the Institute published 174 research papers in leading national and international journals. Out of these,

88 were in SCI journals with an impact factor of 2.313 per scientist and total IF of 180.466. The Institute, in order to popularize gardening techniques, created a new facility displaying different styles of vertical gardening in the Botanic Garden. He also added that a new *Gladiolus* cultivar 'Acharya Jagdish Chandra Bose' was developed and released by Prof. S.K. Sopory, Chairman, RC, CSIR-NBRI on 19 January 2013.

Dr. Nautical also mentioned that the Institute was graced by the visit of Bharatratna, Dr. A.P.J. Abdul Kalam on the occasion of the Diamond Jubilee inaugural function, on 25 October 2012, who interacted with students and replied to the queries of the young students about nature, environment, science and life. A series of special science lectures by renowned scientists, academicians and policy-makers from India and abroad was also organized as a part of Diamond Jubilee celebrations. The Institute was also conferred with CSIR Award for S&T Innovations for Rural Development (CAIRD)-2011 which was presented by Dr. Manmohan Singh, Prime Minister and President, CSIR, on the occasion of 70th CSIR Foundation Day celebration on 26 September 2012 at Vigyan Bhawan, New Delhi.

On this occasion, Annual Report 2012-2013 was released by Prof. J.S. Singh. A CSIR-NBRI folder and Rajbhasha Patrika "Vigyani" were also released by him.

In his Annual Day lecture entitled, Emerging Features of Tropical Dry Deciduous Forest, Prof. J.S. Singh said that



Prof. J.S. Singh



Dr. C.S. Nautiyal (left) Prof. J.S. Singh and Prof. S.B. Nimse (right) at the function

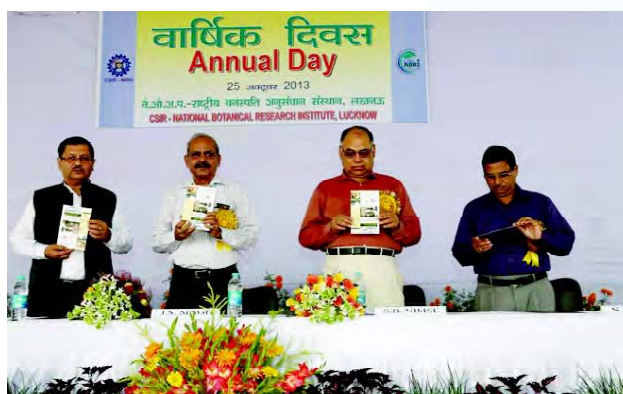
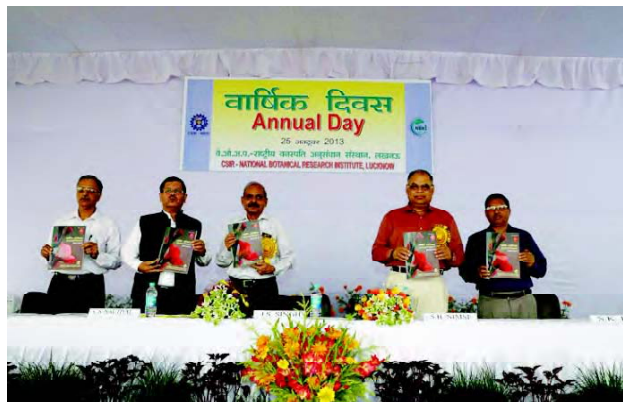


dry tropical forests which cover 42% of the tropical ecosystems and 53% of the total forest cover in India are a mosaic of communities, dynamic in space and time, which offer an interesting perspective to study the ecosystem functioning. He further said that short-lived components, especially microbial biomass which acts as a source and a sink of plant-available nutrients, play a dominating role in ecosystem function. He added that intensive exploitation has fragmented and converted significant portions of the dry tropical forest into savannah and cropland ecosystems with reduced amounts of microbial C, N and P, and reduced the proportion of macro-aggregates in the soil. Deforestation and fragmentation of land habitat has not only resulted in reduction of plant diversity but also led to domination of exotic invasive species, he concluded.

Prof. S.B. Nimse, in his address, said that lack of interdisciplinary studies has resulted in poor quality PhDs, which should be stopped. He also advocated that research and innovation should go hand in hand and it is only possible if research institutes and universities join hands together for academic exchanges and interdisciplinary research activity.

On this occasion, Prof. Nimse felicitated scientists/research scholars who published high impact research papers in different decision units of NBRI with citations and mementoes. Dr. Sanjay Dwivedi was felicitated for the Best Research Paper with an impact factor of 6.248. The other scientists/research scholars were: Dr. Bajrang Singh, Dr. Sushma Verma, Dr. S.N. Singh, Ms. Smita Kumar, Dr. Sandhya Mishra and Dr. Abhishek Niranjana. Dr. Satish Kumar was felicitated for publishing an article of high societal impact.

Prof. Nimse also distributed prizes to winners of the inter-laboratory sports tournament held on the occasion of Diamond Jubilee celebrations.



Releasing various publications



Prize winners with the dignitaries

Honours & Awards

Dr. Sourav Pal and Dr. C.V. Ramana Recognized



Dr. Sourav Pal, Director, CSIR-National Chemical Laboratory (CSIR-NCL), Pune has been selected to receive the SASTRA-CNR Rao Award for the year 2014 by SASTRA University, Thanjavur. Another scientist from CSIR-NCL, Dr. C.V. Ramana has been elected as a Fellow of Indian Academy of Sciences, Bangalore.

The SASTRA has instituted the "SASTRA CNR Rao Award" for excellence in chemistry and material science. Dr. Sourav Pal, a distinguished theoretical chemist, contributed to the areas such as challenging aspects of methodological and conceptual developments, many-body theory of molecular electronic structure and properties using coupled-cluster methods. He has been working at CSIR-NCL for last thirty years and took over as director of the laboratory in December 2010.



Dr. C.V. Ramana is associated with CSIR-NCL as a senior scientist in the Division of Organic Chemistry. He is a distinguished organic chemist with expertise in diverse areas. His major contributions to chemical synthesis include the development of new synthetic tools and new synthetic strategies aimed towards complex natural products synthesis and on expanding the synthesis

Dr. Pal is recipient of several awards and honours for his contribution to science and technology including the prestigious Shanti Swarup Bhatnagar award in chemical sciences, fellow of all science academies in India, a fellow of the Royal Society of Chemistry, Chemical Research Society of India Silver Medal and many others. He has also delivered many memorial lecture awards.

Dr. Pal has guided about twenty five Ph.D. students. He has published over 200 research papers in international peer reviewed journals. He serves on the editorial boards of several international and national journals in chemistry. He has also authored the book *Mathematics in Chemistry*. The Award carries cash amount and a citation. The award will be presented to him on 28 February 2014 in Thanjavur.

landscape across various fields by employing metal – catalyzed transformations.

Dr. Ramana has more than ninety publications, besides ten patents in India and abroad. Dr. Ramana has received several awards and honours including CSIR Young Scientist Award, the Professor D.K. Banerjee Memorial Award Lecture, CRSI Bronze Medal in Chemical Science, etc.

CSIR-CDRI Scientist Elected as Fellow of the Indian National Science Academy



Dr. Anuradha Dube, Chief Scientist, CSIR-CDRI, Lucknow has made notable research contributions in the areas of vaccine development, model development and drug discovery against visceral leishmaniasis (VL). She has identified *L. donovani* parasite proteins with Th1-stimulatory property as potential vaccine targets, has generated transgenic reporter based fluorescent parasite

for drug screening/basic biology. The only available nonhuman primate model for preclinical evaluation of potential drug/vaccine against VL is credited to her work. Dr. Dube was elected as a Fellow of the Indian National Science Academy at the Annual General Meeting on 4 October 2013. The Fellowship will become effective from 1 January 2014.

CSIR-CDRI Scientist Elected as Fellow of the National Academy of Sciences India

Dr. Puvvada Kalpana Murthy, Chief Scientist, CSIR-CDRI, Lucknow, has been elected as the Fellow of the National Academy of Sciences India, Allahabad.

Dr. Murthy has made noteworthy contributions to our understanding of the host-parasite interactions in lymphatic filariasis using a novel approach. She found that the differential susceptibility to *Brugia malayi* infection and development of clinical manifestations are determined by size, site

and timing of parasite exposure and that the underlying diverse host's immune responses are due to cytokine modulating molecules of the parasite life-stages, especially the adult worms. Parasite molecules stimulating anti-inflammatory cytokines helped the parasite to survive even in non-permissive host, whereas pro-inflammatory parasite molecules offered protection to the host from filarial infection and even leishmanial infection.



VASVIK Award for CSIR-IICT Director

Smt. Chandaben Mohanbhai Patel Industrial Research Award for Women Scientists for the year 2011 has been conferred on Dr. M. Lakshmi Kantam, Director, CSIR-Indian Institute of Chemical Technology, Hyderabad due to her extensive efforts in basic research which resulted in the development of novel homogeneous and heterogeneous catalysts and their applications towards the development of innovative green processes for fine and bulk chemicals. In particular, utilization of nanomaterials, hydrotalcites and hydroxyapatites as catalyst supports and catalysts for asymmetric catalysis and C-C/C-N coupling reactions. The award carries a cash award of Rs. 1.0 Lakh and a citation.

The award was presented by Shri Niraj Bajaj, CMD, Bajaj Group of Industries at a function recently held at Mumbai.



Dr. M. Lakshmi Kantam, Director CSIR-IICT receiving the VASVIK award from Mr Niraj R Bajaj (right) CMD of Mukund Ltd., of Bajaj Group in November at Mumbai

CSIR-NAL Scientist Selected for VASVIK Award

The VASVIK Award for the year 2011 in the category of Mechanical & Structural Sciences & Technology has been awarded to Dr. G.N. Dayananda, Chief Scientist and Head of the Centre for Societal Missions & Special Technologies at CSIR-National Aerospace Laboratories, Bengaluru. VASVIK Industrial Research Awards are given to an individual or group of individuals who have made outstanding contribution to the advancement of science and technology or provided leadership leading directly to national prosperity in India.

Dr. Dayananda has successfully led the CSIR-NAL team effort in the Development of Indigenous State-of-the-Art Aerospace Grade Autoclave Technology. A successful Public Private Partnership (PPP) model along with the private industries, M/s UCE-Mumbai and M/s Datasol-Bengaluru to manufacture and market these autoclaves has been put in place. The PPP model is expected to pave the way for more such initiatives exploiting the technological strengths of our public sector and marketing & production capabilities of the private sector.



CSIR-NIIST Scientist selected as Fellow of International Society for Energy

Prof. Ashok Pandey, Chief Scientist & Head, Centre for Biofuels and Biotechnology Division, CSIR-National Institute for Interdisciplinary Science and Technology, Trivandrum has been selected as a Fellow

by the International Society for Energy, Environment and Sustainability for his excellent scientific contributions in the area of biofuels development.

Appointments

Dr. Sunil Kumar Puri takes over as Acting Director, CSIR-CDRI, Lucknow



Dr. Sunil Kumar Puri took over the charge as Acting Director of the CSIR-Central Drug Research Institute (CDRI), Lucknow on 31 December 2013.

Dr. Puri has made significant contribution to the discovery and development of novel class of safe and effective antimalarials for blood schizontocidal, anti-relapse, gametocytocidal and prophylactic use. Besides, he has also significantly contributed towards establishment of new *in vitro/in vivo* models for experimental malaria studies, exploration of drug combinations for management of drug resistant malaria parasites; and development of novel immunoprophylactic agents. His studies on development of therapeutic intervention for relapses in malaria have led to the successful commercialization of a novel 8-aminoquinoline antimalarial drug Elubaquine which has higher safety margin than primaquine.

Dr. Puri has played instrumental role in the discovery and development of candidate antimalarial drug Compound 97-78, which is currently undergoing Phase I clinical trials. Another antimalarial compound 99-411

discovered and developed by his group has completed the preclinical studies and IND is under preparation for submission to DCGI. Both the antimalarials have been licensed to IPCA Laboratory, Mumbai for further development and commercialization. Dr. Puri has also been associated with DNDi's drug discovery consortium for discovery and optimization of new therapeutic interventions for Leishmaniasis where the group has selected a candidate for clinical development.

Dr. Puri is the recipient of Fellowship of National Academy of Sciences (FNASc) and Dr. BN Singh Memorial Oration award of the Indian Society for Parasitology. His research team has received prestigious CSIR Technology award for Innovation-2009 for development of synthetic endoperoxide antimalarials as substitute to artemisinin derivatives.

He has published more than 170 research papers in reputed journals and seven book chapters. He has mentored 12 students towards their PhD degree and trained over 65 post graduate students. Besides he has filed 35 patents in India and 88 patents abroad. More than 19 Indian patents and 26 foreign patents have been granted.

Printed and Published by

Deeksha Bist on behalf of CSIR-National Institute of Science Communication And Information Resources
Dr K.S. Krishnan Marg, New Delhi -110 012 and printed at NISCAIR Press
Dr K.S. Krishnan Marg, New Delhi -110 012

Editor: Hasan Jawaid Khan; **Editorial Assistance:** Neelima Handoo

Design: Neeru Sharma & Sarla Dutta; **Production:** Supriya Gupta

Phone: 25848702; Fax: 25847062; E-mail: csirnews@niscair.res.in; hjk@niscair.res.in

Website: <http://www.niscair.res.in>

Please direct all Subscription-related queries to:

Sales & Distribution Officer, NISCAIR; E-mail: sales@niscair.res.in; Phone: 25843359

Annual Subscription: Rs 500; Single Copy: Rs 50.00

RN 4512/57