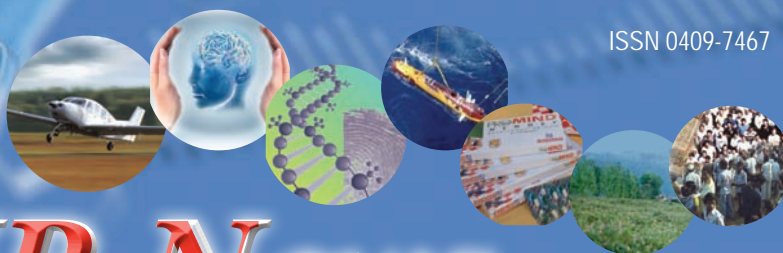




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In The News

India is Surging Ahead in R&D on Alternative Fuels, says Dr. Harsh Vardhan



The Union Minister for Science & Technology and Earth Sciences, Dr. Harsh Vardhan addressing the gathering at the Indian Institute of Petroleum, in Dehradun. The Director, CSIR-Indian Institute of Petroleum (CSIR-IIP), Dehradun, and DG-CSIR, Dr. M.O. Garg is also seen

DR. HARSH VARDHAN, Union Minister for Science and Technology, on a recent visit to CSIR-Indian Institute of Petroleum (IIP), Dehradun announced that the Indian Railways would soon set up plants to manufacture diesel for mechanical traction with technology patented by scientists at the CSIR-Indian Institute of Petroleum (CSIR-IIP) and Gas Authority of India Limited (GAIL). The Minister was at CSIR-IIP in Dehradun on 17 April 2015.

In a unique scientific innovation, CSIR-IIP and GAIL have come up with a technology that can convert 1 tonne of broken buckets, mugs, toothpaste tubes, bottle caps and other Polyolefin products into 850 litres of the cleanest grade of diesel. The development makes possible manufacture of diesel conforming to Euro-5 specifications in sulphur content.

The Minister elaborated: "We are the first to have this capability and henceforth

plastic waste will be viewed more as a resource than a nuisance.”

On his visit to the CSIR-IIP campus, Dr. Harsh Vardhan also inaugurated the

Advanced Tribology Research Centre. He was accompanied by Dr M.O. Garg, Director-General of CSIR who is also the Director of the prestigious establishment. Dr Sudeep Kumar, Head, PPD of CSIR and other scientists were also present.

Dr. Harsh Vardhan in another significant announcement said that another feather in CSIR-IIP’s cap is the successful project to produce low-carbon jet fuel from the inedible, drought-resistant Jatropha plant. He said, “We have gone several steps ahead in developing alternative sources of jet fuel. Jatropha apart, CSIR-IIP has the knowledge to make jet fuel out of any non-edible oil – even the waste cooking oil from our kitchens is soon to become prized material in the market.”

The Minister further said, “We must make a social movement out of alternative fuel use. Our cultural heritage has been one of the most environment friendly. Our villagers have used cowdung cakes as a fuel source for thousands of years. In recent decades we had been following the mad path of over-consumption. Now, thanks to our scientists we can revert to our original mindset of preservation.”

While moving fast with alternative fuels, CSIR-IIP has continued with its founding mission of developing cleaner forms of fossil fuels. This has led to the development of a world class sweetening catalyst which helps to remove excessive foul smelling mercaptans from LPG. “After capturing the Indian market, recently 600 kg of this new material hit the international market,” Dr. Harsh Vardhan announced.



Dr. Harsh Vardhan unveiling the plaque to inaugurate the Advanced Tribology Research Centre, at the CSIR-Indian Institute of Petroleum, in Dehradun



Dr Harsh Vardhan visiting the CSIR-Indian Institute of Petroleum (IIP) Campus in Dehradun



Dr. Harsh Vardhan (middle), Dr. M.O. Garg, Director-General, CSIR (left), Dr. Sudeep Kumar (right), Head, PPD-CSIR at CSIR-IIP

CSIR-National Institute of Oceanography's Regional Centre in Mumbai Inaugurated by Maharashtra CM



The Mumbai Complex of CSIR-National Institute of Oceanography (CSIR-NIO) was inaugurated by Chief Minister of Maharashtra, Mr. Devendra Fadnavis at the Regional Centre on Lokhandvala Road, on 26 March 2015.

Speaking at the function, the Chief Minister pointed out the need to bridge the gap between research and application, and also change the focus from exploitation to exploration of marine resources. Mr Fadnavis underlined the link between ecology and economy and for preservation of the environment. He also assured to provide the necessary support from his government for development of the Centre.

Initiating the function, Director of CSIR-NIO Dr. S.W.A. Naqvi mentioned that the Regional Centre of CSIR-NIO was mainly catering to the understanding of biodiversity as well as monitoring of marine environment along the states of Maharashtra and Gujarat, which is also highly industrialized. In order to extend research to other sectors particularly biotechnology, he requested the government of Maharashtra to help in resolving issues for developing infrastructure to encourage young researchers to join the Mumbai Centre.

Speaking at the function, Dr. Bharati Lavekar, MLA of Versova, highlighted the achievements of CSIR-NIO in conservation of coastal ecosystems and requested the Chief Minister to provide required support for development of the Centre.

The function was also attended by Mr. Amit Satam, MLA Andheri West.

Addressing a press conference after the function, Dr. Wate, Director, CSIR-National Environmental Engineering Research Institute, (NEERI), Nagpur highlighted the overloading of marine environment with pollutants that need to be monitored; Prof. Lakda, Director, Centre for Fisheries



The Mumbai Complex of CSIR-National Institute of Oceanography (CSIR-NIO) was inaugurated by Chief Minister of Maharashtra, Mr. Devendra Fadnavis at the Regional Centre on Lokhandvala Road, on 26 March 2015

Education urged for developing an integrated plan for Maharashtra coast as well as training of fishermen with new techniques; Dr. Pushpito Ghosh, ex-Director, Central Salt and Marine Chemicals Research Institute (CSMCR), Bhavnagar suggested identification of tangible output of research related to marine research such as improving the capability in desalination for potable water; Dr. Jayant Sahasrabudhe, Secretary, Vigyan Bharati emphasized on the need to connect research with society and Dr. Rajiv Nigam, Deputy Director, CSIR-NIO highlighted the achievements of CSIR-NIO towards exploration of marine resources as well as in unearthing heritage sites in marine environment.

In his vote of thanks, the Scientist-in-Charge of Mumbai Centre, Dr. S.N. Gajbhiye mentioned that CSIR-NIO has been providing support to industry along the coast since 1975 and would like to extend it by improving these facilities in future for mitigation of pollution on the coast.

Mr Fadnavis underlined the link between ecology and economy and for preservation of the environment. He also assured to provide the necessary support from his government for development of the Centre.

CSIR-CFTRI Workshop aims to Transform People with Special Needs into Entrepreneurs

In a unique initiative targeted at transforming people with special needs into successful entrepreneurs, the CSIR-Central Food Technological Research Institute (CFTRI), Mysore a premier food research laboratory of the Council of Scientific and Industrial Research (CSIR), organised a workshop on “Enabling the Specially-abled with CSIR-CFTRI technologies” on 29 April 2015.



People with special needs watching a demonstration on how food technologies function as part of the CSIR-CFTRI workshop

Members of two NGOs, the Mathru Mandali Shishu Vikas Kendra, Asiana and the Mysore District Parents' Association for the Empowerment of the Developmentally Disabled (MDPAEDD), which are working for empowering persons with special needs, saw the technologies developed by the institute at the workshop held on the institute campus.

User-friendly and easy-to-implement technologies were demonstrated before persons with disabilities so that new opportunities open for them and they become successful entrepreneurs. These included technologies for preparation of papad, paushtik atta, sambhar powder and malted weaning food. These technologies can be adapted easily by the NGOs for supporting their livelihood towards a healthy society, according to the CFTRI.

CSIR-CFTRI Director, Prof. Ram Rajashekar, said that the workshop was aimed at developing the skillset of those with special needs for creating sustainable enterprises in future. He hoped that more companies and organisations would come forward and replicate this initiative and contribute towards the betterment of special people.

Technology to Make Buildings Blast-proof by CSIR-SERC

Scientists at the CSIR-Structural Engineering Research Centre, Chennai have developed a construction technology that promises to make buildings blast-proof. Called Laced Steel-Concrete Composite Technology (LSCC), the new technology incorporates prefabricated design, steel rods in a lace-like pattern filled with concrete providing enhanced strength and durability.

The institute has applied for patents in India and the US. The new technology has been subjected to rigorous field trials, exposing it to high-intensity explosions.

Apart from being cost-effective, the technology meets all security parameters. The technology is ideal for storage of explosives and chemicals in defence installations as well as buildings and installations considered vulnerable or of high importance.

Scientists at the Institute are also working on slurry-infiltrated fibre concrete — a combination of cement slurry and steel fibre, which has been found to be effective for offshore structures and bridge piers, because it can withstand collisions by ships or other heavy vessels.

Phenalenyl-based iron complex displays good catalytic activity for hydrogen peroxide fuel cell



In a collaborative work, scientists of the CSIR-National Chemical Laboratory, Pune and the Indian Institute of Science Education and Research, Kolkata have prepared a phenalenyl-based iron (III) complex, which is found to be displaying good catalytic activity as cathode electrocatalyst for hydrogen peroxide fuel cell. This could pave the way to cost-effective hydrogen peroxide fuel cells.

The work was published in the 1 May 2015 issue of the *Journal of the American Chemical Society*.

This is a collaborative work between Dr. Swadhin Mandal of IISER-Kolkata and Dr. Sreekumar's group in NCL. Dr. Swadhin's group prepared a phenalenyl-based iron (III) complex, which is found to be displaying good catalytic activity as cathode electrocatalyst for hydrogen peroxide fuel cell. The testing of the material was done in Dr. Sreekumar's group as they have the dedicated facilities and expertise for performing the standard tests.

H_2O_2 fuel cell is an attractive system mainly because it can be operated by using relatively cheap electrocatalysts. The conventional polymer electrolyte membrane fuel cells use costly platinum (Pt) as the catalysts for both anode and cathode. Also, the cathode Pt loading will be very high as the oxygen reduction reaction at the cathode is very sluggish. In the case of the H_2O_2 fuel cells, the

anode and cathode reactions are as follows:

Anode: H_2O_2 converts into $O_2 + 2H^+ + 2e^-$; $E_0 = -0.68$ V

Cathode: $H_2O_2 + 2H^+ + 2e^-$ converts into $2H_2O$; $E_0 = 1.77$ V

This means that the H_2O_2 fuel cell operates with controlled oxidation of H_2O_2 at the anode giving O_2 and $2H^+$ ions (at 0.68 V vs NHE) and reduction of H_2O_2 at the cathode producing $2H_2O$ (at 1.77 V vs NHE). This gives a maximum output cell potential of 1.09 V.

The study published in JACS, deals with a closed-shell phenalenyl-based iron(III) complex, displaying excellent electrocatalytic property as cathode material for one compartment membraneless H_2O_2 fuel cell.

Being Pt-free, the cost of the system will be less. H_2O_2 fuel cell has not yet become a mature system as normal PEMFC. Since, H_2O_2 storage and transportation are very easy compared to H_2 , which is being used as a fuel in PEMFC, the former system retains some advantages in this respect. The main attraction is its cost effectiveness as the Pt-based systems are very expensive where nearly 40-60% of the cost in a membrane electrode assembly is coming from the Pt alone.

Reference:

Switching Closed-Shell to Open-Shell Phenalenyl: Toward Designing Electroactive Materials, by Anand Pariyar, Gonela Vijaykumar, Mrinal Bhunia, Suman Kr. Dey, Santosh K. Singh, Sreekumar Kurungot, and Swadhin K. Mandal, *Journal of the American Chemical Society*, 1 May 2015

Sreekumar Kurungot and team at CSIR-NCL

Being Pt-free, the cost of the system will be less. H_2O_2 fuel cell has not yet become a mature system as normal PEMFC. Since, H_2O_2 storage and transportation are very easy compared to H_2 , which is being used as a fuel in PEMFC, the former system retains some advantages in this respect. The main attraction is its cost effectiveness as the Pt-based systems are very expensive where nearly 40-60% of the cost in a membrane electrode assembly is coming from the Pt alone.

MoUs**CSIR-CGCRI signs Two MoUs on National Technology Day**

11 May is celebrated as National Technology Day in India. It is a day dedicated to acknowledging the great strides taken by the nation in the field of advanced technology and a day set apart for celebration of the same along with contemplation about the way forward.

It was extremely fitting that CSIR-Central Glass and Ceramic Research Institute, Kolkata, chose to mark the day by signing a couple of MoUs.

The first MoU was for removal of arsenic (including the process for media preparation) and iron from groundwater signed with PorelDass Water & Effluent Control Private Limited, with its office in the Howrah Industrial Cum Commercial Complex, West Bengal. It involves the utilization of Process Knowhow for Ceramic membrane-based water treatment plant based upto a capacity 20,000 LPD in India on non exclusive basis. It is initially for a period of three years, but subject to renewal on prevailing market, past history, performance and future prospect.

The product includes Arsenic/Iron Removal Plant of varying capacity upto 20000 litre per day with stainless steel (SS 316L) modules, ceramic membrane (1 Metre long 34 ± 0.5 mm \varnothing), stainless steel (SS 316) pumping station unit with stainless steel (SS 316) impeller, piped with stainless steel

valves and pressure gauges, top and bottom headers and bypass line, all housed in a self standing structural mounting frame with or without raw water and filter storage tanks.

It also includes Arsenic/Iron Removal Plant of varying capacity upto 20000 litre per day with FRP lined PVC modules, food grade epoxy coating inside, ceramic membrane (1 Metre long 34 ± 0.5 mm \varnothing), pumping station unit piped with polypropylene valves and pressure gauges, top and bottom headers and bypass line, all housed in a self standing structural mounting frame with or without raw water and filter storage tanks. In addition, there is Arsenic/Iron Removal Plant of varying capacity upto 20000 litre per day with colour coated MS modules, food grade epoxy coating inside, ceramic membrane (1 Metre long 34 ± 0.5 mm \varnothing), pumping station unit piped with polypropylene valves and pressure gauges, top and bottom headers and bypass line, all housed in a self standing structural mounting frame with or without raw water and filter storage tanks. Plus, there is Colloidal Adsorbent Media for removal of Arsenic from ground water.

CSIR-CGCRI has for long been involved in the development and deployment of ceramic microfiltration membranes. The institute is well-known for its affordable ceramic elements fabricated in both



Officials of PorelDass Water & Effluent Control Pvt. Ltd, Howrah, with Scientists of CSIR-CGCRI. Shri Kamal Dasgupta, Acting Director, CSIR-CGCRI, Kolkata is third from right



Officials of General Surgical Company, Chennai, with Scientists of CSIR-CGCRI. Shri Kamal Dasgupta, Acting Director, CSIR-CGCRI, Kolkata is fourth from right.

monochannel and multi-channel (7 and 19 channels of about 4 mm nominal diameter) configuration using slip casting and extrusion techniques.

Shri Kamal Dasgupta, Acting Director CSIR-CGCRI signed the MoU on behalf of the Institute. His counterpart from PorelDass Water & Effluent Control Private Limited was Shri Soumendu Porel.

The second MoU was signed with General Surgical Company, Chennai. It involves transfer of knowhow for the technology behind the manufacture of bioactive ceramic scaffolds/granules and integrated orbital implants. The know-how is for production of Hydroxyapatite (and bi-phasic calcium phosphate) based scaffolds, granules and integrated orbital implants. The know-how is suitable for production of 10,000 pieces/annum for integrated orbital implants and as per requirements, for the other items. It will cover all the processing steps from powder preparation to finished products.

The loss of an eye is not just traumatic for the individual but it also disfigures the person's facial features. This in turn leads to diffidence in facing social situations. Artificial eyes are usually used to address the situation in such cases. The artificial eye developed by CSIR-CGCRI in the form of a light porous orbital implant that looks and moves naturally is a significant improvement from the cosmetic point of view. An alumina peg fixed

with the implant has facilitated the synchronized movement of the eye implant with respect to the other eye ball.

This had not been previously possible so that earlier artificial eyes looked static and unnatural. Since the eye implant designed by CSIR-CGCRI moves and looks natural, it is expected that this will have increased acceptability among the users. It is thus commendable that General Surgical Company, Chennai has come forward to manufacture such orbital implants.

According to the MoU, CSIR-CGCRI will also train two employees of General Surgical Company, Chennai. The license may be renewed, after three years, after review committee recommendations at CSIR-CGCRI. Interestingly, it has been enjoined that GESCO shall affix in a conspicuous manner upon every product and/or mode of packaging containing the product, a label or plate bearing the inscription "CSIR-CGCRI KNOWHOW" in letters of size not less than half of the nominal size of the largest size of letters giving either the name of GESCO or its brand name or trade mark for the product. It is expected that this will enhance the visibility of the CSIR Brand name in the public eye.

Shri Kamal Dasgupta, Acting Director CSIR-CGCRI signed the MoU on behalf of the Institute. His counterpart from General Surgical Company, Chennai, was Mr. Samuel W. George.



CSIR-CGCRI has for long been involved in the development and deployment of ceramic microfiltration membranes. The institute is well-known for its affordable ceramic elements fabricated in both monochannel and multi-channel.

The artificial eye developed by CSIR-CGCRI in the form of a light porous orbital implant that looks and moves naturally is a significant improvement from the cosmetic point of view. An alumina peg fixed with the implant has facilitated the synchronized movement of the eye implant with respect to the other eye ball.

Workshops**Workshop on Magnetolectrics at CSIR-CECRI**

CSIR-Central Electrochemical Research Institute, Karaikudi, a CSIR laboratory with its prime focus on electrochemical science and technology, has recently added “*Physical Property Measurement System (PPMS)*” to augment experimental facilities and to initiate activities in the area of magnetism and magnetolectrics.

To attract researchers to the field of magnetism and to update them with the opportunities available, a one-day Workshop on Magnetolectrics was conducted on 10 April 2015. Eminent scientists from the field – Dr. P.A. Joy, CSIR-National Chemical Laboratories, Pune, Prof. A. Sundaresan, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, Prof. P.S. Anil

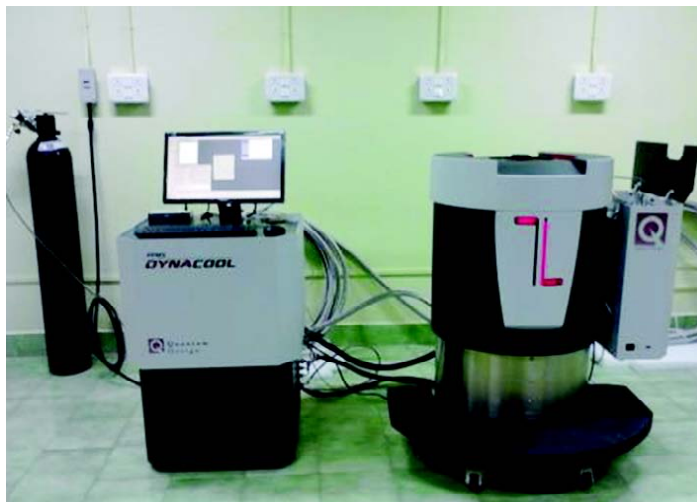
Kumar, Indian Institute of Science, Bangalore, Prof. P.N. Santhosh, Indian Institute of Technology-Madras, Chennai, Dr. Manoj Rama Varma, CSIR-National Institute for Interdisciplinary Sciences and Technology, Thiruvananthapuram and Dr. Navneet Pandey, Quantum Design India Pvt. Ltd., Mumbai – delivered lectures. Around 60 participants, including research scholars and scientists, attended and gained vital insights.

Dr. D. Jeyakumar, Sr. Principal Scientist, CECRI and Convenor of the event welcomed the gathering. Dr. Vijayamohan K. Pillai, Director, CSIR-CECRI, in his introductory remarks, stressed the importance of magnetism in various technologies.

The speakers, through their illuminating lectures, covered the topic from fundamentals of magnetism to advanced topics including magnetolectrics, multiferroics and spintronics. They also highlighted the importance of data interpretation and talked about ways to avoid artifacts during data collection. Intrinsic details of the instrumentation and accessories of PPMS were explained well by the scientist from Quantum Design India. The workshop also included short presentations by Dr. K. Ramesha and Dr. N. Lakshminarasimhan, scientists and Mr. K. Selva Chandrasekar, research scholar of CSIR-CECRI.



PPMS Workshop at CECRI



Physical Property Measurement System (PPMS) 9T magnet, Dynacool, Quantum Design, USA.

CSIR-CFTRI organises one-day workshop for SMEs in Nasik under CSIR MSME Initiatives



CSIR-CFTRI conducted a one-day workshop on “Value Addition to Agri-resources for SMEs in Food Sector” in collaboration with Udyogwardhini Shikshan Sanstha, a Nasik-organisation involved in training young professionals for setting up new business.

The programme was held at Nasik on 27 February 2015 and was coordinated under the banner of CSIR MSME Initiative supported by Department of MSME, Govt. of India, New Delhi. The focus of the meet was on upgradation in terms of product/technology/skill base and productivity enhancement in the MSME sector. Lectures were arranged on various topics on processing of agri-horti resources relevant to the region by scientists of CFTRI.

A total of 212 prospective entrepreneurs participated in the event. The participants expressed their interest to have similar workshops in the topics related to shelf-life extension of pomegranate, custard apple,



A view from the Inaugural Session of the SME Meet at Nasik (Maharashtra)

sapota, guava; technologies for value addition to red onion, guava, mosambi, fig, grapes and vegetables grown in that part of the region.

Prof. Ram Rajasekharan, Director, CSIR-CFTRI in his message stated that, “It has been our desire that CSIR-CFTRI’s knowledgebase should provide the base for establishing many sustainable business enterprises in the country.”

One-day workshop on “Communication and Presentation Skills” – My Experiences

Good communication skills are an indispensable requirement for effectively and accurately conveying one’s ideas and feelings. It undoubtedly goes a long way in strengthening bonds and achieving goals, right from your professional life to social gatherings and everything in between. But, of course, it works for those who work at it.

So I decided to attend the one-day workshop on “*Communication and Presentation Skills*” organized by Dr. Mrudula, Priyadarshini and team at CSIR-NAL on 9th April 2015. They were going to share with us the skills they had learnt in their training at Goa on the same subject.

The workshop was inaugurated by the Director who stressed on the relevance of

such skills, both in speaking as well as in writing. He emphasized the importance of presentation and communication skills and the need for implementation of such skills in our day to day work, as most of us are involved in technical presentations, project proposals sometimes at the ministry level where communication skills, both written and verbal, play a major role in success.

The session started in an interesting manner as Priya announced, “We are fortunate to have a renowned person amongst us today, *Indira Gandhi*.” Suddenly a lady entered the room, wearing a crisp saree and sunglasses, went up to the dais and boldly said, “Every drop of my blood will contribute to the growth of this nation and to make it strong

Good communication skills are an indispensable requirement for effectively and accurately conveying one’s ideas and feelings. It undoubtedly goes a long way in strengthening bonds and achieving goals, right from your professional life to social gatherings and everything in between. But, of course, it works for those who work at it.

and dynamic...” The next moment she removed her goggles, put a bindi on her forehead and said the same dialogue rather timidly and with a smile. Actually, this was Gomathy Madam from KTMD helping out the trainers to portray the importance of voice modulation and body language in a speech.

Priya and Mrudula then went on to tell us more about the role of PEGS - *Posture, Eye-Contact, Gesture and Sound (Voice Modulation)* in public speaking. Our Prime Minister, Mr. Narendra Modi and the US President, Mr. Barack Obama were cited as the orators who vividly follow PEGS in their speeches.

The way in which Priya and Mrudula conveyed the dos’ and don’ts for effective communication was quite fascinating and interesting too. Each of us was given an opportunity to implement PEGS by talking on “the happiest moment of our life”. With the intention of helping us to become better speakers, the trainers after each of our speeches, tried to comment on the strong as

well as weak aspects of our style of speaking which was, according to me, a good way of giving personalized attention to each of us. This feedback will definitely help in moulding ourselves into more eloquent speakers as we discovered that apart from voice, a lot of things are said using non-verbal signals, gestures, facial expression, body language and even our appearance.

To explore our presentation skills, we were then divided into five groups and each group was given a write-up on a particular topic. Ours was “How to develop a strong personality”. Each group was given a laptop and asked to prepare a PowerPoint presentation on the given matter in half an hour and later present the same in five minutes. After lunch we had all the group presentations following which Mrudula told us more about making effective presentations. She emphasized the importance of ppt layout styles, controlled animation, practice, planning and time management in delivering the intended matter. Our group was glad to be judged the winner.



We were then enlightened on another interesting and important aspect of effective communication, and that is “Listening”. Although it felt irrelevant in the beginning as, like many others, I used to take “listening” as granted, but I understood later through the formula *NNEAR* (*N-Nodding, N-Name, E-Eye contact, E-Expression, A-Ask questions, R-Repetition*) that it is indeed an important skill in imbibing the information being communicated. To evaluate ourselves as listeners, a couple of group activities were then conducted. It was quite amusing to note the extent to which we can succeed if we listen properly.

The next exercise was related to how decision making can benefit from effective communication. This was to assess our teammates as well as ourselves on certain aspects like how well we can express and assert our point of view to convince others in the group, at the same time respect the opinion of others too while arriving at conclusions. Although at that time we did it

just as an exercise, later I could understand its relevance in our day to day life.

The whole workshop was quite informative, yet enjoyable as some fun-games were also conducted to keep up the enthusiasm. The small gifts given for winning a team or individual exercise and the chocolates distributed for actively responding to the speakers’ interaction also added to the fun element.

It’s never too late to work on your communication and presentation skills and thereby improve your quality of life. Undoubtedly, the tips imparted to improve our communication and presentation skills can, in the long run, prove extremely beneficial in both our professional as well as personal lives. I feel all the participants, including me, got motivated to implement the tips to become articulate speakers and attentive listeners, thanks to Mrudula and Priyadarshini.

Anjana Krishnan from CSIR-NAL



This was to assess our teammates as well as ourselves on certain aspects like how well we can express and assert our point of view to convince others in the group, at the same time respect the opinion of others too while arriving at conclusions.

Symposia

CSIR-IICB Organizes National Symposium on “Recent Advances in Biotechnology”

A one day National Seminar on “Recent Advances in Biotechnology” was jointly organized by CSIR-Indian Institute of Chemical Biology (CSIR-IICB) & Jadavpur University Kolkata Chapter of BRSI, The Biotech Research Society (India) on 17th April 2015 at CSIR-IICB, Kolkata.

The seminar was attended by about 260 delegates, invitees, faculties, researchers, students and volunteers from different parts of India and from colleges, universities and institutes in and around Kolkata. The program was convened and coordinated by the president of the BRSI unit, Prof. Lalitagauri Ray, Jadavpur University and secretary, Dr. Suman Khowala, CSIR-IICB.

At the onset of the programme, Dr. Chitra Mandal, Acting Director, CSIR-IICB,



delivered the welcome address. Later, a brief introduction of BRSI activities was given by Prof. Lalitagauri Ray and the keynote address was delivered by the Guest of Honor, Prof. Dhrubojyoti Chattopadhyaya, Pro-VC, The University of Calcutta.

The Plenary Lecture on “Development of HYMET[®] process for the maximization of gaseous energy recovery from organic wastes” by Prof. Debabrata Das, IIT, Kharagpur was appreciated by all.

The invited speakers included Dr. Durg Vijay Singh, Institute of Life Sciences, Bhuvaneshwar, Dr. Abhilash, CSIR-NML, Jamshedpur and Dr. Samudra P. Banik, Maulana Azad College, Kolkata in the morning session. In afternoon session presentations were delivered by Dr. Sharmila Chattopadhyay, CSIR-IICB, Dr Dipankar Haldar, JU, Dr. Anirban Roychoudhury, CSIR-IMTECH, Chandigarh and Dr. Ambika C. Banerjee, East India Pharmaceuticals

Works Pvt. Ltd, Kolkata. The lectures covered subjects ranging from microbial technology, enzyme biotechnology, plant and environmental biotechnology, bioprocess development of metals, minerals and sugars to genetic analyses of bacteria as well as nanobiotechnology and biopharmaceuticals.

A total 63 posters were presented, of which 7 posters were awarded on merit of their content and presentation by an independent team of judges. The seminar established a scientific and research environment and created interaction between students, researchers and scientists & faculties about recent developments in biotechnology.

Science Awareness Programmes

Summer School Programme-2015 at CSIR-CFTRI

A unique Summer School Programme was held at CSIR-Central Food Technology Research Institute (CFTRI), Mysore for students from government high schools of Mysore District, Karnataka from 20th April to 1st May 2015 with the medium of instruction being Kannada.

The programme aimed to instill scientific inquisitiveness in children. The programme

was initiated at CFTRI to enthuse rural children to pursue careers in science. Twenty students from five government schools participated in the programme.

The two-week programme exposed the students to experimentation, laboratory practices and state-of-the-art instruments. The students had an opportunity to get hands-on experience with machinery & equipment. Motivational lectures and demonstrations by the scientists of the institute invoked a strong positive response from the students. In their own words “it made them spend their vacation time very productively”.

The students visited the Food Engineering Centre, Pilot Plant, Analytical Quality Control Lab, Central Instrumentation Facility, Glass Blowing Section, Mechanical Workshop, Animal House, Library and International School of Milling Technology. The students had a memorable experience in science as they spent a few hours every day at the R&D departments in the institute.

The programme included provision of food and transport for the children. The students were encouraged to ask questions



Summer School participants learning to work in the lab along with Scientist

that came to their mind and closely interact with scientists as much as possible. They were also encouraged to give lectures on the topics of their choice to develop self-confidence.

The Summer School programme was inaugurated by Prof. Ram Rajasekharan, Director, CSIR-CFTRI. He urged the students to be fearless, curious and cheerful. He motivated them to pursue scientific careers by telling them how research and development is an endless and satisfying process. He cited the example of his own school days and advised them not to let go the child inside them.

Prof. Rajasekharan asked the children to be always in communication with their parents. He specially thanked the parents and teachers for sending them to CFTRI to learn science. He wished all the students a very happy learning experience at CFTRI during the course of the programme.

On the concluding day, a certificate presentation ceremony was held in the Assembly Hall, in which department heads, scientists, research scholars from CFTRI and Head Masters of participating government schools were present. Dr. K. Srinivasan presided over the ceremony and presented certificates and mementos to all the students who participated in the programme.

As the students expressed their views on the programme, it was amazing to see how much they had learnt in these two weeks

and very comforting to hear they had thoroughly enjoyed the unique opportunity. The concept of the programme and successful completion of the programme was very much appreciated by everybody present.

Speaking on the occasion, Dr. K. Srinivasan told the students how lucky they were to be a part of the programme in which they could interact freely with the scientists and understand science. He said that these children will be our ambassadors to promote science as a career at their schools.

Speaking on the occasion, the Head Masters of the schools thanked CFTRI for selecting their school children and providing them an opportunity of learning science with the Scientists. This would be an unforgettable experience in their lives, they said. They also thanked the Director and requested him to organize for more such programmes for government school children.



Prof. Ram Rajasekharan, Director, CSIR-CFTRI urged the students to be fearless, curious and cheerful. He motivated them to pursue scientific careers by telling them how research and development is an endless and satisfying process.



Prof. Ram Rajasekharan, Director (centre) is seen with the participants of Summer School Programme held from 20 April to 1 May 2015 at CSIR-CFTRI

CSIR- Advanced Materials and Processes Research Institute, Bhopal



Dignitaries on the dais

CSIR-AMPRI, Bhopal celebrated the National Technology Day on 11 May 2015 to commemorate the momentous accomplishments of Science and Technology. The day is celebrated every year to commemorate the series of nuclear tests at Pokharan. Subsequently the firing of Trishul missile by DRDO and launching of HANSA civilian aircraft by CSIR–NAL have marked the Technology Day.

On this occasion the technology of Silicon Carbide reinforced composites developed by AMPRI, Bhopal was transferred to M/s Exclusive Magnesium, Hyderabad. Shri Sunil Raj, the Managing Director, M/s Exclusive Magnesium, Hyderabad was present on the occasion.



A view of the National Technology Day Celebration at AMPRI

Dr. L.M. Kukreja, Senior Professor, Homi Bhabha National Institute, ‘Outstanding Scientist’ and Head, Laser Materials Processing Division, Raja Ramanna Centre for Advanced Technology, Indore was the Chief Guest. Prof. (Dr.) P.K. Verma, DG, MP Council of Science and Technology, Bhopal presided over the function.

At the outset, Dr. S. Das, Director, CSIR –AMPRI, Bhopal welcomed the guests and highlighted the activities of AMPRI, Bhopal.

Sh. P. D. Ekbote, Chief Scientist, CSIR –AMPRI underlined the importance of celebration of the National Technology Day.

Dr. L.M. Kukreja delivered the Technology Day lecture on “Emerging Technologies of Laser Materials Processing” on the occasion. He presented the fascinating scenario of usage of Laser techniques.

On this occasion video messages from Founder Directors Prof. P. K. Rohatgi and Prof. T. C. Rao were played.

Prof. P. K. Verma, DG, MPCST, Bhopal in his presidential address expressed confidence and desired that MPCST and AMPRI collaborate in scientific research in the service of the nation. He said that the Technology Day is not just a celebration but a way to remember our past achievements also.

The function concluded with a vote of thanks from Dr. Navin Chand, Chief Scientist, CSIR–AMPRI.

CSIR-Central Electrochemical Research Institute CECRI, Karaikudi

The National Technology Day, commemorating the Pokhran nuclear test of May 11, 1998, was celebrated at the CSIR-Central Electrochemical Research Institute (CECRI) on 14 May 2015.

Delivering the Technology Day lecture on *Space missions for societal applications*, Dr. K.S. Dasgupta, Director, Indian Institute of Space Science and Technology, Thiruvananthapuram recalled the farsightedness of the philanthropist Dr. R.M. Alagappa Chettiar in establishing CECRI as a national laboratory under CSIR. He also recalled Dr. Vikram Sarabhai's contributions to Indian space technology. India, he said, had come a long way from its first successful launch of a satellite on 18 December 1958. Today, we are among a handful of nations that use satellite communication for education and social development. In fact, India's satellite communication system network reaches more than 200,000 people as well as 2,400 villages across six states.

Among ISRO's notable contributions are Satellite Instructional Television Experiment (SITE, 1975–76), its first societal space project, video telecasting, training over 40,000 teachers through SITE, 45 space vehicle launches, 74 spacecraft missions, Kheda communication project, Gramsat networks and Jhabua development communication project.

Dr. Dasgupta said that the application potentials of satellite communication were tremendous, especially for rural development. Leapfrogging developments have been made in tele-education, science



Director, CSIR-CECRI addressing the gathering

literacy, telemedicine, satellite navigation, remote sensing, geo-positioning, television broadcasting, space-based disaster management, and tele-ophthalmology mobile van systems of village resource centres. He urged the youth to pursue a career in the basic sciences in general and space science in particular.

In his welcome address, Dr. M. Jeyachandran, Chief Scientist, CSIR-CECRI highlighted the many technologies and processes that CSIR-CECRI had presented to the nation.

Dr. Vijayamohan K. Pillai, Director, CSIR-CECRI in his introductory remarks, picked CSIR-CECRI technologies relating to ammonium perchlorate, gold plating and composite corrosion protection, as key ones among the many that revolutionized the Indian technological landscape. The program concluded with a vote of thanks by Mr. R.V. Alagesan, Head, Technology Transfer and Business Development, CSIR-CECRI.

CSIR-Central Scientific Instruments Organisation, Chandigarh

CSIR-Central Scientific Instruments Organisation, Chandigarh celebrated the National Technology Day on 12 May 2015 by holding an Open Day and organizing the National Technology Day Lecture. All the laboratories of CSIO were kept open

for the general public in the forenoon. Many visitors including students from various schools, colleges, universities and the general public went around the laboratories of the institute. They interacted with the scientists and were

He also recalled Dr. Vikram Sarabhai's contributions to Indian space technology. India, he said, had come a long way from its first successful launch of a satellite on 18 December, 1958. Today, we are among a handful of nations that use satellite communication for education and social development. In fact, India's satellite communication system network reaches more than 200,000 people as well as 2,400 villages across six states.



given exposure to the technologies available and being pursued at CSIO.

Later in the afternoon, Mr Surinder Singh, Director, Semi-Conductor Laboratory (SCL), SAS Nagar, Punjab delivered the National Technology Day Lecture on the topic "Overview of Space Systems and Technologies". He described the Space

and future trends and finally took the audience on a virtual tour of SCL. He quoted that, "The beauty of life does not depend on how happy you are, but on how happy others can be because of you."

Earlier, Dr. Amod Kumar, Acting Director, CSIO welcomed the chief guest and said that the National Technology Day is celebrated in India on May 11 every year to mark India's technological advancement and expertise. On this day, India achieved a huge technological progression. The first, indigenous aircraft Hansa-3, was test flown from Bangalore. India performed the successful test firing of the Trishul missile on the same day and also executed three successful nuclear tests, carried out at Pokhran, in Rajasthan.

He emphasized that scientific research should be for the benefit of society. He stated that technology is neither good nor bad; it is the application of technology that makes it so. He said that at times there is a debate whether we should develop processes or products but the more important thing is to develop that which is useful to the society.

A scientific publication of CSIO in Hindi language *Soch* was released during the function. Prizes were also given away to the winners of a football match organized by the CSIO Staff Club. The function concluded with a formal vote of thanks by Dr. C. Ghanshyam, Chief Scientist, CSIR-CSIO, Chandigarh.



Sitting from Left to Right: Dr. Amod Kumar, Acting Director, CSIR-CSIO, Shri Surinder Singh, Chief Guest and Director, Semi-Conductor Laboratory, SAS Nagar, Punjab and Dr. C. Ghanshyam, Chief Scientist, CSIO

Systems in a very concise and easy to understand way and discussed the Indian scenario. Mr Singh gave an overview of Launchers and Earth Orbiting Satellites for Remote Sensing, Communication and Navigation. He also informed the audience about Deep Space Missions, Mars Mission

CSIR-North East Institute of Science & Technology, Jorhat

CSIR-North East Institute of Science & Technology (NEIST), Jorhat celebrated the National Technology Day 2015 on 11 May 2015.

Shri P. Padmanabhan, Managing Director, Numaligarh Refinery Ltd., Numaligarh graced the occasion as Chief Guest while Dr. N.N. Dutta, Chancellor, Assam downtown University was present as Guest of Honour. The programme was

presided over by Dr. D. Ramaiah, Director, CSIR-NEIST wherein invitees, important personalities from Academia, Industry and Press & Media besides CSIR-NEIST fraternity attended in large number.

Delivering the Technology Day lecture before a packed auditorium, Shri Padmanabhan emphasized the power of technology in revolutionizing the world and improving the quality of lives. He mentioned

that, technology is something that makes us do things differently for the benefit of the people/society. He urged the people to introspect and understand its proper use while citing instances of its misappropriation by human kind.

Being from the oil industry sector, he mentioned some of the challenges faced by the oil sector and said that it is not a technologically evolved industry unlike other industries such as Electronics, IT, etc. Hazards are also an area of high concern in the oil sector. In his message, he urged the scientists, technologists and all researchers to be more humanitarian, inquisitive and good human beings. Following the lecture, Shri Padmanabhan addressed various queries and questions from the audience ranging from technical to environmental issues concerning oil industries.

Addressing the gathering, Dr N.N. Dutta spoke about the technological advancements made in medical science which have made so many sophisticated diagnostics, surgeries, etc. possible today. Advanced MRI, CT scan, endoscope to technology applications in stereotactic surgery are some notable developments over the years, he said. Dr Dutta also laid emphasis on the importance of developing technologies for the benefit of the people.

Earlier, Dr. D. Ramaiah, Director, CSIR-NEIST in his opening remarks spoke in brief about the significance of the day and mentioned the importance of S&T for inclusive growth.



Shri P. Padmanabhan, Managing Director, NRL, Numaligarh delivering the Technology Day Lecture as Chief Guest. Other dignitaries on the dais seen are (from left), Dr. R.C. Boruah, Outstanding Scientist, CSIR-NEIST; Dr. D. Ramaiah, Director, CSIR-NEIST and Dr. N.N. Dutta, Chancellor, Assam down town University & Guest of Honour.

Dr. R.C. Boruah, Outstanding Scientist, CSIR-NEIST delivered the welcome address and briefly spoke about the Institute and its contribution in the field of S&T. The function concluded with vote of thanks proposed by Dr. H.P. Deka Baruah, Head-Biotechnology Division & Coordinator of the function.

CSIR-National Metallurgical Laboratory, Jamshedpur

Jamshedpur-based CSIR-National Metallurgical Laboratory (NML) celebrated the National Technology Day on 12 May 2015 in the NML auditorium.

Dr. S. Srikanth, Director CSIR-National Metallurgical Laboratory, in his welcome address said that for a country ranked 76th among 238 countries in Innovation Index, 168th in literacy rate, 60th in technological index, 138th in terms of per capita income, 136th in Human Development Index, the call for “Make in India” as given by the Prime Minister might appear an

aspirational dream. But, going by our recent accomplishments, this call by the PM definitely seems achievable. The country needed to assume leadership roles in R&D, technology development and innovation rather than only depending on cheaper labor costs, better infrastructure, liberalization of policies and procedures, unshackling bureaucracy, promoting entrepreneurship, eliminating corruption and so on. This would make the development model much more sustainable, he said.

Mr C. Tandi, executive director & head,

IEOT, Oil & Natural Gas Corporation Limited, Mumbai was the chief guest at the function. While delivering the Technology Day lecture he said, “Science & Technology solve the innumerable critical issues and problems encountered by the people and society at large. It can give comfort to a common man and enhance the work efficiency and also our longevity.”



Giving a brief account of the technologies developed by CSIR-NML, Dr. A. Mitra, NML Head Business Development,

said, “The growing importance of industrial and technological research is evidenced from the fact that more than 60% of NML’s earnings in 2014-15 was from industrial projects”. He added that during 2014-15 NML developed thirteen technologies, six technologies were transferred, twenty eighty patents were filed, 250 technical services were provided, generated industrial cash flow amounting to Rs. 20.00 cores and international cash flow of Rs. 2.00 cores.

There are 66 active technologies at NML in the area of Mineral Beneficiation & Mineral processing; Process metallurgy; value additions to leans and waste; Biomaterials; Devices and sensors for NDT evaluation; water & effluent treatment; and surface treatment.

Later, the laboratory’s *Annual Report 2014-15* and *NML Technology Hand Book (2015)* were released by the Chief Guest, Mr. C. Tandi.

Students and the Chief Guest were also taken around the laboratory where they interacted with the scientists. Later, Dr. S. Srikanth, Director, CSIR-NML along with the Chief Guest inaugurated the newly renovated and modernised NML Canteen.

Lectures

4th Prof. P. Ramachandra Rao Memorial Lecture at CSIR-NML

The 4th Prof. P. Ramachandra Rao Memorial Lecture, in honour of the former Director of CSIR-National Metallurgical Laboratory was recently organized at the CSIR-NML Auditorium, Jamshedpur. Other organizations that actively collaborated were the NPGMM Trust Dept. of Metallurgical Engineering, Indian Institute of Technology (BHU), Varanasi and the National Academy of Sciences, India, Jharkhand Chapter.

Engineering students from Aditya Institute of Technology, Adityapur; AcSIR students; CSIR-NML Research Fellows; Scientists; Engineers from Tata Steel and invited dignitaries attended the Lecture. Prof. S.N. Ojha, Dept. of Metallurgical

Engineering, IIT, BHU, Varanasi chaired the function. Dr. R.K. Mandal, Head Metallurgical Department of IIT, BHU introduced the speaker.

Dr. S. Srikanth, Director, CSIR-NML, Jamshedpur while welcoming the audience, introduced (Late) Prof. P. Ramachandra Rao, former Director, CSIR-NML, and talked about his contributions in the field of Metallurgy and Materials Science.

Dr. G. Malakondaiah, Formerly Director, Defence Metallurgical Laboratory, DRDO, Hyderabad & Chief Controller, R&D (HR&M), DRDO, New Delhi delivered a talk on “Sustained Steel Research: A Case Study of DMR-1700 Steel”. He said

that several thousand grades of steel are available in tonnage production like Plain carbon steels; Alloy steels (Low alloy steels & Highly alloyed steels); Stainless steels (Ferritic, Austenitic and Martensitic); Dual phase steels; IF steels and many more. There is a steel for practically any application like Automotive steel; Structural steel (Construction, Machinery and Large structures); Pipeline steel; Steel for aerospace

and Naval steel, etc.

According to Dr. G. Malakondaiah, there was a need for basic studies in deformation behaviour of iron and its alloys and fracture behavior. DMR-1700 steel in the softened condition can be easily formed/rough machined before finally subjecting it to hardening and tempering treatment in order to develop an optimum combination of strength and fracture toughness, he said.



Women's Day Celebrations

International Women's Day Celebrations at CSIR-NAL

CSIR-National Aerospace Laboratories and CSIR-4PI organized the International Women's Day Celebrations on 6 March 2015 at the S.R. Valluri Auditorium. This year the theme for International Women's Day was "Make it Happen".

The guests of honour this year were Dr. V. Shubha, Chief Scientist & Head, Airport Instrumentation Group, CSIR-NAL and Ms. Subhashini Vasanth, well-known dancer & founder trustee, Vasantha Ratna Foundation for ART.

Dr. Poornima Narayan, Chairperson, International Women's Day Organizing Committee, NAL welcomed the gathering. She introduced the speakers to the audience by highlighting their multi-faceted achievements, both professionally and at a personal level as women.

The lecture on "Drishti: A Visibility Measuring System – An Indigenous Development" was delivered by Dr. Shubha. She talked about how Drishti works and expressed proudly that this compact, robust and completely indigenous instrument of international standards was developed by her team in a very short span of time, despite many hurdles. She further informed that this instrument has been installed in prime airports in India and is working exceptionally well. The audience was impressed with the accolades the team had received till now for their efforts.

Ms. Shailaja Menon gave an overview of the new-look website developed to

commemorate the occasion. The website was then launched by the Director, NAL. The new-look is a joint venture with ICAST providing the graphics and KTMD the contents.

The next speaker of the day, Ms. Shubhashini Vasanth, kept the audience engrossed with her speech on "The Flight Within". In a very dignified manner she shared with the gathering her moments of enlightenment and her journey towards discovering herself. She said that a Whatsapp video on the MOM (Mangalyaan) is what made her delve deeper into herself and ponder over her existence after her *anchor*, her husband, Col. Vasanth was no more. Emphasising that showing love and sensitivity towards the family of martyrs is the need of the hour, she went on to talk about her NGO which strives to provide better lives to such bereaved families in providing "educational needs of the martyrs' children".

The talks were followed by the announcement of the awardees for the "Aerowomen" of this year by Dr. Anjana Jain. The guests of honour presented Ms. Jyotsna Clemi Joshi (daughter of Mr. Benedict Darwin Joshi, CSMST) and Ms. Spurthi (daughter of Mr. Dattatreya, ADK) with a certificate and cash award for excelling in academics.

In his presidential address, the Director, NAL applauded Dr. Shubha's endeavours in the field of airport instrumentation and

congratulated her for all her accomplishments. He appreciated Ms. Subhashini Vasanth for being bold and successfully channelling her efforts towards providing support to martyrs' families for a humanitarian cause "education for martyrs' children". The Director then went on to thank the speakers for sharing their experiences and for delivering such motivating lectures.

This year Mr. Raghavendra and team put up a very impressive dance-drama named "It's Possible". The act had elements of diverse nature incorporating a background movie,

dance items and live dialogues with an apt message that if we want, then together we can change the prevalent mindset and make gender parity a reality. Mr. Raghavendra and Mr. Nishanth were awarded mementoes as a token of appreciation for their effort in organising the cultural event and for the graphic design of the Women's Day website respectively.

The programme concluded with the vote of thanks by Ms. Anjana Krishnan during which mementoes were presented to the speakers. The event was impressively compered by Ms. Radha Ramami.

Honours & Awards

Dr. Sourav Pal honoured by IIT Kharagpur and Nicolaus Copernicus University, Poland



Dr. Sourav Pal, Director CSIR-National Chemical Laboratory, Pune has been invited to be a Distinguished Visiting Professor at the Indian Institute of Technology (IIT), Kharagpur for a period of five years. He is expected to interact with the faculty, students and scholars and give talks. He will be jointly hosted by the Department of Chemistry and Centre for Theoretical Studies of IIT, Kharagpur.

Dr. Pal has also been invited to be a Visiting Professor at Nicolaus Copernicus University in Toruń, Poland for a period of one month. In this period he will conduct research and collaborative work with members of the academic staff in the faculty of Physics, Astronomy and Informatics. The visit will be organized within the project "Enhancing Educational Potential of Nicolaus Copernicus University in the Disciplines of Mathematical and Natural Sciences".

Dr. Pal has been a distinguished theoretical chemist, working at CSIR-NCL since the last 30 years and has contributed to diverse areas of theoretical chemistry including the challenging aspects of methodological and conceptual developments. He has contributed

significantly to the many-body theory of molecular electronic structure and properties using coupled-cluster methods. He has done significant work in the area of chemical reactivity and density functional theory response. In recent years, he has contributed to the catalytic and hydrogen storage materials using computational material science. He has been the Director of CSIR-NCL since December 2010.

Dr. Pal has been recognized by several awards and honors for his contribution to science and technology including the prestigious Shanti Swarup Bhatnagar Award in Chemical Sciences. He is the Fellow of all the three National Science Academies of India. He is also a Fellow of the Royal Society of Chemistry and J.C. Bose National Fellow of Department of Science and Technology.

Dr. Pal serves on the editorial boards of several international and national journals in chemistry and has guided over 25 Ph.D. theses. He has published over 225 papers in International peer-reviewed journals. He has also authored a book titled *Mathematics in Chemistry* and contributed chapters in several books. He has been invited to deliver plenary/keynote/highlighted lectures in several institutions and international conferences of repute over the years.

CSIR News is profiling all the CSIR laboratories throwing light on the significant areas they work in and their achievements.

CSIR-Central Drug Research Institute, Lucknow

The CSIR-Central Drug Research Institute, Lucknow was established at a time when the Indian pharma industry was almost non-existent. Its mission was to strengthen and advance the field of biomedical research in India. Pursuing its founding mission, the Institute played a crucial role in nation building on at least four major fronts: (i) policy initiatives for the development of the Indian pharmaceutical industry, (ii) development of new drugs and process technologies for commercial production, (iii) consultancy to pharmaceutical industry, and (iv) development of trained human resource for drug research.

The Institute was formally inaugurated on 17th February 1951, with five R&D divisions and a skeletal staff of scientists and technicians. Today, it has evolved as a premier centre of drug R&D and has the distinction of having all the infrastructural facilities for development of new drugs from concept to commercialization stage including SAR, QSAR, combinatorial synthesis, high throughput screening, bioinformatics, proteomics, genomics, regulatory toxicology, pharmacology, pharmacokinetics, pharmaceuticals and expertise in conducting clinical trials, etc.

Thrust Areas

- 1. Malaria & Other Parasitic Diseases:** The project area covers the biomedical research aspects of Malaria, Filariasis, Leishmaniasis and other parasitic diseases. The global problem of these parasitic diseases is due to the constant emergence of parasite resistance to limited armamentarium of drugs, which demand sustained research. Objectives of this area are development of new drugs/drug combinations as therapeutic interventions for malaria, leishmaniasis and filariasis; establish novel target based drug assay protocols for identification of new leads; and knowledge generation on parasite biology and host parasite interactions.
- 2. Reproductive Health Research, Diabetes & Energy Metabolism:** This is one of the important areas of research pursued at CSIR-CDRI and has been structured mainly considering the national needs in reproductive health. Major objectives include development of novel agents for fertility regulation, management of post-menopausal osteoporosis, type II *Diabetes mellitus*, hyperlipidemic condition and other endocrine disorders through modern drug design, scientific validation of traditional remedies; and understanding pharmacological basis of actions of promising agents & existing therapeutics and undertake basic research to generate new knowledge on reproductive endocrinology relevant to fertility regulation, osteoporosis and diabetes.
- 3. Tuberculosis & Microbial Infections:** The project area aims for the simplification and shortening of treatment for drug-sensitive tuberculosis and search for new treatments for MDR-TB; and development of new drugs for bacterial, fungal and viral (HIV and JEV) infections and tuberculosis.
- 4. CVS, CNS & Related Disorders:** Includes development of new target-based drugs to alleviate CVS, CNS and related disorders (hypertension, dyslipidemia, atherosclerosis, thrombosis, myocardial infarction, anxiety, psychosis, dementia, stroke, stress, gastric ulcers and inflammation); and to carry out excellent basic research to delineate the



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molecular mechanisms of these pathologies so as to identify suitable targets for drug discovery, as well as to analyze the possible mechanism(s) of action of the candidate drugs.

5. **Cancer and related areas:** The project area aims for understanding the biology of cancer under the Indian context and development of possible therapeutics for the same. The institute has done research work on Oral, Cervical, Breast, Blood and Prostate cancers. The project area also aims to develop new drug targets, elucidation of mechanism of action of identified drugs and identification and validation of cancer biomarkers in the Indian context.
6. **Safety & Clinical Development:** Objectives include pre-clinical, clinical development and commercialization of new generation affordable drugs for diseases of national importance and international relevance; and creation of Centre of Excellence in the field of Clinical trials, Regulatory toxicology, Safety pharmacology, Pharmaceutics and Pharmacokinetics & metabolism and catering to the needs of pharmaceutical industries.

Achievements

The Institute has pioneered new drug discovery in India, well reflected by the fact that out of 18 new drugs discovered/developed in India, 12 drugs have been discovered/developed by CSIR-CDRI. Six new drugs developed by the institute viz. Centchroman, Centbucridine, Gugulipid, BESEB, Arteether and Elubaquin have been commercialized and have reached the market and are successful.

Its first plant-based modern medicine Gugulip was derived from the resin of the

plant *Commiphora mukul*. The medicine was marketed by CIPLA with good success.

Centchroman (Ormeloxifene) as contraceptive: It is a novel non-steroidal agent unrelated to any conventionally used contraceptive. It is the only anti-implantation agent approved for clinical use in the world. It offers a unique combination of weak estrogenic and potent anti-estrogenic properties. Due to this subtle mix of estrogenic and anti-estrogenic action it inhibits the fertilized ovum from nidation and thus prevents pregnancy, but at the same time it does not appear to disturb the other estrogen effects. It has shown potential as anti-breast cancer agent by acting as antiestrogen. Preclinical experiments have shown its use in osteoporosis treatment. It is being marketed by HLL Lifecare Ltd (formerly Hindustan Latex Ltd) as Saheli, Novex & Novex-DX.

Arteether as Antimalarial: It is a semi-synthetic derivative of artemisinin, the active constituent of the plant *Artemisia annua* developed as blood schizontocidal antimalarial while working in collaboration with CSIR-CIMAP. It is being prescribed to the patients as second line of treatment for chloroquine-resistant *P. falciparum* malaria including cerebral malaria. It has been licensed to Themis Medicare Ltd., Mumbai which is marketing it under the trade name E-Mal as an injectable formulation. The drug is being marketed in more than 30 African & Asian countries.

Bacosides Enriched Standardized Extract of Bacopa as Memory Enhancer:

CSIR-CDRI has developed a single plant-based natural memory enhancer called Bacosides Enriched Standardized Extract of Bacopa (BESEB) from *Bacopa monniera*. Clinical trials on BESEB have been conducted in India by CSIR-CDRI and in



Swinburne University of Technology's Brain Sciences Institute & University of Wollongong, Australia by Lumen Marketing Co., Chennai. The product is useful for the prevention & early treatment of dementia particularly ADHD children (Attention Deficit Hyperactivity Disorder); Elderly persons with AAMI (Age Associated Memory Impairment); and for those with emotional stress from relationship or stress, tension, anxiety from work/study. It is being exported to Australia, New Zealand, France, Germany, Indonesia, Malaysia, Singapore and Philippines.

The Institute has also played a very important role in developing process technologies for known drugs and drug intermediates. Out of over 80 process technologies developed and licensed, more than 50 have been successfully commercialized.

The institute has been the main source for developing Ph.D. level trained scientists for drug research in the country. The Institute has provided research facilities to over 1200 students leading to the award of Ph.D./M.D. degree from different universities/medical colleges. Facilities for Ph.D. and post-doctoral level research have produced trained scientists who secured important positions in the national and international pharma companies/agencies.

Besides, the Institute has played a key role in providing training to sponsored candidates from academia and industry in different aspects of drug research involving biological screening, quality control and standardization, handling of laboratory animals, analytical techniques, usage of sophisticated instruments etc.

The institute has made significant contributions to the creation of knowledgebase in drug research which is evident from over 8500 research publications in reputed international and national journals and 440 patents obtained in India (350) and abroad (90).

Basic research comprises an integral part of the Institute's R&D programme. The CSIR-CDRI's contributions to basic research are in structure and function of drug targets,

endocrine function, microbial immunology and genetics, biochemistry of malaria, filaria and leishmania parasites, biology of neural and cardiovascular function, gene/protein engineering and design and generation of novel biostructures.

CSIR-CDRI has also been successful in establishing good business relationships with the pharma industry, both Indian and foreign. Support of industry is also evident from marketing of CSIR-CDRI's products, commercialization of technologies, contract research and "collaborative-cum-licensing" agreements signed with pharma industry for further development of candidate drugs.

In the post-genomic era when the country dreams to progress from "Generic Drugs to Genomic Medicines", CSIR-CDRI envisages to get prepared for self-sufficiency towards regulatory studies needed for genomic medicines.



For further details contact:

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Appointments

Dr S. Das Assumes Charge as Director, CSIR-AMPRI, Bhopal

Dr S. Das has taken charge of the post of Director, CSIR-AMPRI, Bhopal on 31 March 2015.

A doctorate in Metallurgical Engineering from IIT Kanpur, Dr. Das has accomplished in basic as well as applied research in Materials Science and Technology, Metal Matrix Composites, Light Alloys, Metal Foam, and Tribomaterials with applications ranging from automotive components, mining equipment components, farm machinery implements and defense. His work embodies a vast pool of knowledge and experience as R&D scientist in Materials Science & Technology.

The academic achievements are manifested in his original research contributions through over 150 papers published in refereed international journals (with high impact factors). These contributions are well reckoned as shown through numerous citations to his papers. His original work on solidification processing of MMCs, structure property correlations, and understanding of dispersion of particulates in metallic melts has made it possible to make tailor-made composites. He has carried out work on tribological studies, mechanical properties, and thermo-mechanical processing of MMCs. He has guided a number of PhD (16) and postgraduate research scholars (25). His frequent best paper awards, in metallography contests in reputed conferences, and invitations from US



university as guest faculty bear testimony to his pursuit of academic excellence.

His endeavors in applied and industrial R&D are best exemplified in his design of a custom-built stir caster (capacity of 100 kg melt per batch) for particulate dispersed MMCs. Development of prototype automobile

components such as brake-drums, brake discs, pistons, cylinder liners, with MMCs and performance evaluation has been a major work. Similarly, components for mining and mineral & coal processing equipment have been demonstrated in field applications. A refrax apex insert for hydrocyclones was successfully demonstrated at HZL mines.

His recent work consists of development of aluminium foams for different applications where low density and high specific energy absorption is required in automobile, aerospace and thermal management sectors. Recently Al foam filled crash box was designed, tested and made for automobile application.

Dr. Das has had a very rewarding interaction with industries such as Tata Motors, Mahindra & Mahindra, Naval Science & Technology Laboratory, Hindustan Zinc Ltd, coal industries, etc. that have given him credentials for knowledge networking and management. He has been a recipient of the “Metallurgist of the Year - 2003 Award” (NMD) instituted by the Ministry of Steel, Govt. of India.

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