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CSIR-NAL @ Aero India 2017

Hon'ble Minister Calls on Industries to Take Forward CSIR-NAL Technologies

THE Hon'ble Minister of Science & Technology Dr. Harsh Vardhan called on industries, MSMEs in particular, to take forward the technologies rolling out of the CSIR-National Aerospace Laboratories (CSIR-NAL), Bengaluru. He was speaking at a brief press conference held as part of the Aero India 2017, where he also released a compendium on *CSIR-NAL Technologies for Industries.*

The eleventh edition of Aero India was held at the Air Force Station, Yelahanka, Bengaluru, from 14-18

Hon'ble Minister gets a feel of the cockpit

February 2017. The event provided a significant platform to bolster business opportunities in the international aviation sector. A rapidly growing economy, defence preparedness challenges and opening up of defence production to the private sector, have given a major fillip to the defence industry in India. It has also become a hub centre for defence business in the Asia.

Aero India has become the second biggest air show in Asia. A total of 549 companies took part in the event, of which 270 were Indian and 279 foreign. CSIR-NAL's *Hansa* was showcased at the event along with Mi-17 Helicopters, indigenously built HAL products comprising Light Utility Helicopter (LUH) flanked by Cheetal Helicopter, Advanced Light Helicopters (ALH) and the Light Combat Helicopter (LCH), formation comprising Dornier Do 228, Light Combat Aircraft Tejas, HTT-40 (Basic Trainer Aircraft) and Hawk. Hon'ble Raksha Mantri Shri Manohar Parrikar inaugurated the Aero India 2017 show in Bengaluru on 14 February 2017.

The NAL stall showcased its expertise and technical advancement in the area of aerospace.

CSIR-National Aerospace Laboratories set-up an excellent stall at the Aero India 2017. The NAL stall showcased its expertise and technical advancement in the area of aerospace. Some of the key technologies showcased in the Aero India by CSIR-NAL which are of interest to industries included the 55hp Wankel Rotary Engine, SUCHAN mini UAV, Carbon Fibre Composite Materials for high-end automobiles, NiTi Shape Memory Alloys, Chromate-free Anodized Coatings for aircraft aluminium alloy, GMR sensors for automobile applications, DHVANI for marksmanship training, Advanced display system for aircraft cockpit, DRISHTI for airport runway visibility measurement and aiding pilots for safe landing, etc. A major attraction this time was the CNM-5 mock-up with new glass cockpit and *Saras* simulator to give first-hand experience in simulating the touch and feel of an aircraft for the visitors.

A flying demonstration

Hon'ble Raksha Mantri Shri Manohar Parrikar and Hon'ble Minister for Civil Aviation, Shri Ashok Gajapathi Raju visited the CSIR-NAL stall on 14 February 2017. Shri Manohar Parrikar inaugurated the *Saras* Simulator and was very appreciative of all the exhibits displayed by CSIR-NAL.

On the third day of the event Dr. Harsh Vardhan, Hon'ble Minister of Science & Technology and Earth Sciences and Dr. Girish Sahni, DG, CSIR visited Aero India. The S&T Minister was given a demonstration of

Saras which is a multi-role light transport aircraft. The CSIR-NAL team informed the minister that the flight tests with ASTE team will be initiated in one and half months. The outcome of the flight tests will provide essential information towards arriving at configuration for the subsequent weight optimised build and pave the way forward towards arriving at an aircraft that will be suitable to meet the IAF requirement through Limited Series Production (LSP) phase.

Hon'ble Minister for S&T was very appreciative of the mockup display of 'CNM-5', the five-seat general aviation aircraft that has the distinction of being an outcome of the country's first public-private partnership in this area. Currently it is under development jointly with M/s Mahindra Aerospace Pvt. Ltd. It is being designed to be an affordable, easy-to-operate and easy-to-maintain light aircraft that can be customised to suit a variety of operational needs. This programme aims to boost manufacturing of small civil aircraft in the country.

A major event was the handing over of *Hansa*-3 to MESCO Aerospace Ltd. The handing-over ceremony was held after the flying display of *Hansa*-3. The S&T Minister appreciated AVM Lamba, the youngest to fly *Hansa*-3 at Aero India 2017. The aircraft was handed over to Ms Shipra Singh Rana, Managing Director, Mesco Aerospace Ltd. unveiling the *Hansa*-Next *Generation* heralding the new public-private partnership in taking forward the development of the two-seat aircraft. MESCO will be building up the production facility for production and marketing of *Hansa-NG*.

The Minister outlined the way forward for revival of *Saras* and CNM-5 aircraft programmes of CSIR-NAL. Recapitulating the CSIR-NAL contributions towards development of many critical technologies for the strategic sector and the mission-mode programmes of DRDO, ADA & ISRO, he outlined the major contribution of CSIR-NAL towards the design and development of digital flight control law and the critical advanced composite parts for LCA-Tejas and a major share of CSIR-NAL in design of LCA-

Hon'ble Minister for S&T was very appreciative of the mockup display of 'CNM-5', the five-seat general aviation aircraft that has the distinction of being an outcome of the country's first public–private partnership in this area.

Dr. Harsh Vardhan releasing a compendium on CSIR-NAL Technologies for Industries

Tejas. The Hon'ble Minister reiterated the continued collaboration between DRDO, ISRO & CSIR for furthering the Hon'ble Prime Minister's ambitious programme 'Make in India'.

Aero India 2017 was a successful event for CSIR-NAL also in terms of business enquiries. The laboratory received many serious business proposals. The major ones include Mennen Aviation Academy for *Hansa-NG*, GE Aviation for surface coatings, SAAB for IP core and display systems, Astronautics CA for ARINC avionics IP core development, MIDHANI for NiTi Shape Memory Alloy, CRPF for MAV/UAV, Pratt & Whitney, Canada for RTA engine, and Bharat Forge for NWS for Hansa NG and U/C for 19- and 70-seater aircraft.

CSIR-CIMAP Scientists come up with Herbal Cure for Acne

The Lucknow-based CSIR-Central Institute of Medicinal and Aromatic Plants (CSIR-CIMAP) has found a herbal cure for acne.

Twelve of the Institute's scientists worked on the solution for four years before successfully coming up with a herbal formulation that could fight acne.

The herbal formulation makes the most of the well-known healing properties of turmeric and neem. Turmeric and neem both have antiseptic and anti-bacterial properties which have been exploited in coming up with the herbal treatment for acne scars and inflammation.

CSIR-NCL to Donate Water Purifying Units to Remote Areas

The CSIR-National Chemical Laboratory (NCL) in Pune will be donating water purifying machines and oxygen enriching units to remote schools and government hospitals in Thane and Palghar districts in Maharashtra. This will enable the provision of clean drinking water and enhanced healthcare in these remote areas.

As part of the CSIR800 programme each of the 38 CSIR labs is mandated to set up Gramin Vigyan Kutir (CSIR tech village) and develop these isolated areas using technological interventions. This is part of CSIR's social outreach that is expected to have a major impact on the lives of people staying in the remote and less-developed areas of the country.

Hospitals in these areas report problems in availing the refill of oxygen cylinders. CSIR-NCL's oxygen-enriching machine is capable of supplying up to 35% concentrated oxygen enriched air, best suited for patients with severe lung disorders, asthma or COPD.

The lab is also providing 50-litre capacity water purifying machines to government hospitals and schools in these areas.

MoUs

CSIR-NCL and CSIR-IGIB Sign Licensing Agreement with Ahammune Biosciences for Vitiligo Drug Development

CSIR-NCL and Ahammune Biosciences teams during the signing of the agreement

CSIR-National Chemical Laboratory (CSIR-NCL), Pune, and CSIR-Institute of Genomics and Integrative Biology (CSIR-IGIB), New Delhi, together signed a Patent Licensing agreement with Ahammune Biosciences Pvt. Ltd., Pune for Vitiligo drug development on 2 March 2017. Ahammune is a resident incubatee company of Venture Center, NCL's technology business incubator.

Ahammune Biosciences is an innovation-led drug discovery start-up company with the vision to find a new drug for the debilitating skin disorder, Vitiligo. It is the most common depigmenting disease with over 80 million people affected by it. In Vitiligo, colour-producing cells are lost from areas of skin leaving behind white spots. The spread of depigmentation is unpredictable, ranging from days to years. Due to its effect on physical appearance, it is a cause of immense psychological torment, with patients feeling isolated and depressed.

This disease is of major concern in India, where it is considered as a social stigma due to its confusion with leprosy. The current treatment strategies provide only temporary relief and are mostly ineffective. Ahammune is striving to fulfil this unmet medical need in the vitiligo therapeutic area.

Ahammune Biosciences would like to conduct further work towards potential vitiligo drug development through this Licensing agreement. CSIR labs will receive milestone payments based on the progress.

The patent was the outcome of the collaborative research work in chemistry and biology between these two labs. Dr. D. Srinivasa Reddy (CSIR-NCL), Dr. Rajesh S. Gokhale (CSIR-IGIB, on deputation from NII) and T.N. Vivek (CSIR-IGIB) are the lead inventors of the patent.

Prof. Ashwini Kumar Nangia, Director, CSIR-NCL and Dr. (Miss.) Parul Ganju, Director, Ahammune Biosciences Pvt. Ltd. signed the agreement in the presence of the respective teams from both parties.

The spread of depigmentation is unpredictable, ranging from days to years. Due to its effect on physical appearance, it is a cause of immense psychological torment, with patients feeling isolated and depressed.

MIDHANI to Manufacture Shape Memory Alloy Products with CSIR-NAL Technology: A 'Make in India' Initiative

The technology is a result of a decade's R&D work carried out at the Materials Science Division of CSIR-NAL under the leadership of Dr. S.K. Bhaumik. Its commercialisation by MIDHANI will be a significant step towards the 'Make in India' initiative.

CSIR-National Aerospace Laboratories (NAL), Bengaluru, signed a Transfer of Technology (ToT) agreement with Mishra Dhatu Nigam (MIDHANI), a Defence Public Sector Undertaking (DPSU), based in Hyderabad for manufacturing of Nickel-Titanium (NiTi) Shape Memory Alloy (SMA) Products.

The agreement was signed on 4 March 2017 by Mr Jitendra Jadhav, Director of CSIR-NAL and Dr. Dinesh Kumar Likhi, Chairman & Managing Director, MIDHANI in presence of senior officers of both the organisations. This will enable MIDHANI to manufacture and market NiTi-SMA for engineering and biomedical applications using the CSIR-NAL technology.

The technology is a result of a decade's R&D work carried out at the Materials Science Division of CSIR-NAL under the leadership of Dr. S.K. Bhaumik. Its commercialisation by MIDHANI will be a significant step towards the 'Make in India' initiative.

Today, about 65% of the worldwide market share for NiTi-SMA comes from biomedical applications. Currently, NiTi-SMA products are not commercially available in India and imported from abroad at an exorbitant cost. The indigenous manufacturing of NiTi-SMA by MIDHANI would be a boon to the engineering and biomedical industries in the country. It would facilitate affordable health care to a wide section of the society.

The Special Materials Section of MIDHANI is geared up to manufacture varieties of NiTi-SMA products with the CSIR-NAL technology. It is expected that the engineering products will be available in a year's time and the material for biomedical applications will follow in another six months' time.

MoA between CSIR-SERC and NRDC

A Memorandum of Agreement (MoA) was signed between CSIR-Structural Engineering Research Centre (CSIR-SERC), Chennai, and National Research Development Corporation (NRDC), New Delhi, on 6 January 2017, for marketing the inventions/innovations, patents, formulations, know-how/ processes developed by CSIR-SERC.

The MoA was signed by Prof. Santosh Kapuria, Director, CSIR-SERC, and Dr. H. Purushotham, Chairman & Managing Director, NRDC. Dr. K. Balaji Rao, Chief Scientist & Advisor (M), Project Leaders and Scientists of CSIR-SERC, Shri D.C. Joshi, and Shri Amit Ranjan, and engineers of NRDC were present during the event.

Prof. Santosh Kapuria, Director, CSIR-SERC, and Dr. H. Purushotham, Chairman & Managing Director, NRDC exchanging the signed MoA

Science Awareness Programmes

CSIR-CBRI, Roorkee Reaches out to Young Minds

CSIR-Central Building Research Institute, Roorkee, organised a Workshop-cum-Training Programme for students on 23 February 2017, to generate scientific thinking in the younger generation.

In keeping with the advice of the Hon'ble Prime Minister of India and President of the Council of Scientific

Students from Kendriya Vidyala No. 1 & Kendriya Vidyala No. 2

and Industrial Research (CSIR), Shri Narendra Modi to all CSIR laboratories that they take up the responsibility to generate interest towards science in the minds of the youth and provide them with appropriate resources, CSIR-CBRI organised the workshop-cum-training programme for students under the CSIR Scheme, "Faculty Training, Motivation and Adoption of Schools & Colleges by CSIR Labs" on 23 February 2017.

On the occasion, Dr. Gopal Ranjan, Director General, Roorkee College of Engineering, Roorkee, motivated the students and presented an enlightening talk on **"Career Opportunities"**. He encouraged the students to aspire for the top slot and prepare by tying up loose ends and refining preparation strategies. He told the students about the golden rules to combat stress by properly organising the time, setting realistic goals, understanding one's work process, avoiding burnout, changing revision methods, taking care of oneself and not worrying. A fair evaluation of the self and the world around helps in making a wise and realistic career choice.

He said that education should be such that forms character, increases strength of mind, expands intellect, and enables one to stand on one's own feet. He explained that in the present day scenario one must face many challenges such as independent living, work commitment, grasping new ideas & concepts and a competitive life, for which one must decide the priorities. He told the students to remember the choice of career while keeping a watch on subjects of their choice and remember their weak points while choosing a stream.

He informed the students about numerous professional courses, open and distance learning system, and a vast sea of career opportunities in every lifestyle, including advertising to animation, banking to biotechnology, computer training, distance learning, engineering to event management, fashion designing to finance, hotel management, information technology to interior design, languages, law, mass communication to medicine, photography, sales, service and tourism, etc.

He said that one should not follow the herd in choosing a career but go by instinctive fondness for a subject. Entrepreneurship & self-employment are also a huge field of opportunity for which proper vocational education can develop the required attitude,

Students from Children's Senior Academy

Students from Anand Swaroop Arya Saraswati Vidya Mandir

Students from Shivalik Public School

knowledge, and skills.

Speaking on the occasion, Dr. R.K. Goel, Chief Scientist and Scientist-in-Charge, CSIR-CIMFR Regional Centre, CBRI Campus, Roorkee, enlightened the students on the requirement and importance of education, goals, orientation, and training programmes. He said that these orientation programmes expose and educate the young minds to different possibilities and applications of science. He advised the students to discover their talents, have presence of mind and work hard to achieve their dreams.

He presented an informative and interactive lecture on **"Tunneling in Rocks"**. He educated the young minds about the various types of tunnels such as water conductor tunnels for power projects, underground power stations, road tunnels, rail tunnels, underground shelters, and half tunnels.

Earlier, Dr. Atul Kumar Agarwal, Senior Principal Scientist, CSIR-CBRI, Roorkee, and Programme Coordinator welcomed the students of all schools and colleges at the inaugural function and motivated them. Emphasising on the need to awaken scientific temper through questions and interactions, he motivated the students to develop a scientific outlook and consciousness.

In his Presidential Address, Dr. N. Gopalakrishnan, Director, CSIR-CBRI, Roorkee, enlightened the students about the research and development work being carried out at CSIR-Central Building Research Institute, Roorkee, and other laboratories of CSIR. He motivated the students to participate in the programme actively and interactively. He encouraged the students to question, understand, learn, and adopt the mantra of "What, Why and How" in their lives.

Dr. Abha Mittal, Senior Principal Scientist, CSIR-CBRI, Roorkee, presented a formal introduction of Dr. Gopal Ranjan and Dr. R.K. Goel. A science film featuring CBRI scientific innovations and success stories was also screened.

The participants visited the labs of CBRI, Roorkee, including Rural Park, Organic Building Materials, Efficiency of Buildings, Plastics, Polymers and Composites, Fire Research, and Environment Science & Technology-Clay Products, etc. and learned about the newest developments and technologies of the institute. They also had an interactive session with the institute's scientists.

The programme was attended by more than 250 science students along with their faculty members from Kendriya Vidyalya No.1, Kendriya Vidyalya No.2, Shivalik Public School Laksar Road Roorkee, Children's Senior Academy, Mangalore, and Anand Swaroop Arya Saraswati Vidya Mandir, Roorkee.


Dr. Gopal Ranjan, Director General, College of Engineering, Roorkee


Dr. N. Gopalakrishnan, Director, CSIR-CBRI


Dr. Atul Kumar Agarwal Senior Principal Scientist


Dr. Abha Mittal Senior Principal Scientist


Dr. R.K. Goel, Chief Scientist and Scientist-in-Charge


Students interacting with the Institute's Scientists

CSIR-IICB Scientist Participated in Science Outreach Programmes

Dr. Dipyaman Ganguly, Senior Scientist, CSIR-IICB participated in several outreach programmes to popularise science among the common masses. He was invited to deliver a public lecture at the Science Awareness Camp for school students organized by Sripat Singh College, Jiaganj, Murshidabad, West Bengal, supported by the Department of Science & Technology, Govt. of West Bengal, on 6 September 2016.

Dr. Ganguly delivered a talk titled **'Adhunik jibbigyan o manusher sotyanweshon** (Modern Life Sciences and Human Quest for Truth)' for hundreds of students who were greatly inspired and got engaged in resourceful discussion following the talk.

On 17 January 2017, Dr. Ganguly delivered an invited talk at the Science Exhibition organised by Batanagar Sri Ramakrishna Ashram Vivekananda Vidyamandir (Higher Secondary) on the occasion of their 60th Foundation day. The lecture, **'Jibonbigyan o manusher sotyanweshon** (Life Sciences and Human Quest for Truth)' was attended by large number of students and teachers.

In the inaugural address, Director, CSIR-SERC highlighted that the importance of the workshop is to bring students closer to the world of research and also motivated them to take up research in science as a career.

Training and Motivation Workshop for Faculty and Students of Kendriya Vidyalayas by CSIR-SERC

A series of "Training and Motivation Workshops" for the faculty and students of Kendriya Vidyalaya schools in Chennai were conducted by the CSIR-Structural and Engineering Research Centre (CSIR-SERC), Chennai, in order to upgrade the knowledge-base of the faculty and students in new and emerging areas of science and to provide opportunities for interaction and exchange of ideas with the scientific community of CSIR laboratories.

The workshop series was inaugurated on 16 January 2017, by Prof. Santosh Kapuria, Director, CSIR-SERC. In the inaugural address, he highlighted that

activities of CSIR-SERC, threw light on major areas of research and also awakened the curiosity of the students who sought guidance to develop and take forward many of their original ideas. In the inaugural Workshop around 250 students of KVIIT and KV CLRI along with the faculty were motivated and inspired by the scientists and their presentations.

In the series held from 16-23 January 2017, six workshops have been successfully organised for 12 KVs in Chennai. More than one thousand students and about fifty faculty members benefited from these workshops.

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Dr. N.G. Bhagavan, Head, HRD, CSIR-SERC, Dr. M. Manickasamy, Principal, KV IIT and Smt A. Shashi, Principal, KV CLRI, were present during the inaugural function.

The presentations by the scientists of CSIR-SERC on recent R&D

Workshops/Training Programmes

CSIR-CIMFR Organises Coal Gasification Workshop at Vigyan Bhawan, New Delhi

A two-day workshop on "Challenges and Opportunities of Underground Coal Gasification (UCG-2017)" was organised by the CSIR-Central Institute of Mining and Fuel Research, Dhanbad. More than 80 delegates participated in this event hosted at the Vigyan Bhawan, New Delhi, during 13-14 February 2017.

The workshop was a part of the CSIR Network Project CoalGasUrja, and received additional financial support from ONGC, JCB India, ONGC Energy Centre, SAIL, SCCL and NLC India. In addition, many other governmental, industrial, research and academic organisations [DGH, NTPC, CCL, CMPDI, MECON, Ergo Exergy, Tata Steel, JSPL, SWP, MAPL, CSIR-IICT, IIM Ahmedbad and IIT(ISM) Dhanbad] supported this event.

The event was jointly inaugurated with another workshop on Emerging Mining Technologies and Low-Carbon Footprints (organised by CSIR-CIMFR and sponsored by MeitY, Government of India) by Prof. B.B. Dhar, Former

A two-day workshop on "Challenges and Opportunities of Underground Coal Gasification (UCG-2017)" was organised by the CSIR-Central Institute of Mining and Fuel Research, Dhanbad.

Joint Inaugural Session of UCG-2017 and EMT-2017

The lectures in this workshop were a blend of practical industrial experience, laboratory-level research (modelling and experimental) and policy-based research. Three lectures were delivered by industrial personnel having field-level experience in UCG.

Director of the Institute. Other distinguished experts present during the inauguration were Prof. Colin Hills (University of Greenwich), Dr. M.S. Blinderman (Director, Ergo Exergy Technologies) and Shri B.M. Baveja (Former Scientist-G, MeitY).

Dr. Pradeep K. Singh, Director, CSIR-CIMFR and Chair, UCG-2017 welcomed the audience to the workshop. All the dignitaries appreciated the efforts of CSIR-CIMFR in terms of the industrial outreach and the Institute's approach to perform research in the domains of clean energy, something that has become very relevant after the Paris Climate Agreement.

Dr. Ajay Kumar Singh, Scientist and Organising Secretary of the workshop introduced the content of the workshop and gave a thematic lecture on the prospects of Underground Coal Gasification technology in India.

The lectures in this workshop were a blend of practical industrial experience, laboratory-level research (modelling and experimental) and policy-based research. Three lectures were delivered by industrial personnel having field-level experience in UCG.

Of these, two lectures were delivered by Dr. Michael S. Blinderman, Director (Operations), Ergo Exergy Technologies Inc, Montreal, Canada. Dr. Blinderman – who has played a pivotal role in global development of commercial UCG – elucidated on how India could benefit from this technology in meeting its rising energy demands and also abating greenhouse gas emissions. He also addressed the application of the Exergy UCG™ Technology in international coal gasification projects.

Shri P K Jain, Dy. General Manager (P) at the Institute of Reservoir Studies, ONGC gave a lecture on the experience of UCG. Based on the feedback from the world-wide status of the technology, he gave important suggestions in the paper for expeditious and efficient implementation of UCG technology in the country.

In the policy stream, one lecture was delivered by Prof. Amit Garg (IIM Ahmedabad), who focussed upon the role of clean coal technologies in India's energy security. He suggested that a major thrust is required to create a favourable policy climate, technology R&D and transfer, and international financial support for large-scale penetration of clean coal technologies in India to ensure energy security with GHG mitigation.

Panel Session on UCG, being chaired by Padma Bhushan Dr. Kirit S. Parikh, Former Member, Planning Commission

A lecture was also delivered by Dr. Ajay K. Singh (CSIR-CIMFR), in which he used simulation results to show that gasification based projects in India could operate at equivalent costs with lower emissions, as compared to pulverized coal plants.

Shri Sunil K. Singh, Head (Alternate Energy), Directorate General of Hydrocarbons spoke on the policy and regulatory aspects for making UCG successful.

A panel discussion on the policy perspectives of UCG was also organized and was chaired by Padma Bhushan Dr. Kirit Parikh, Former Member, Planning Commission and one of the foremost energy experts in the country. Dr. Parikh reiterated the role of coal in future energy scenarios and suggested that clean coal technologies shall be instrumental in ensuring the future use of coal.

On the technical front, Prof. Anand B. Rao from IIT Bombay spoke about how CO_2 Capture and Storage (CCS) could be integrated with the UCG process to ensure overall lower carbon footprint. Another senior expert from IIT Bombay, Prof. Sanjay Mahajani, shared his experimental and simulation results obtained through the R&D project funded by ONGC.

Prof. T. Sundararajan from IIT Madras gave his perspectives on the various mathematical models used to simulate UCG processes. Dr. Debadutta Mohanty (Joint Organising Secretary, UCG-2017) spoke on the geological controls such as site selection and coal characterisation for successful implementation of UCG in various Indian sites.

Many officials from different companies suggested that routinely organizing such events could lead to better exchange of ideas between industry and academia. The workshop concluded with the valedictory address by Dr. Kirit S Parikh, Chairman, IRADe and Former Member, Planning Commission. He appreciated the initiative of the organisers and suggested that effective implementation of UCG would go a long way in ensuring sustainability in the Indian energy sector.

The organisers have finalised an agreement with the IOP Conference Series: Earth and Environmental Science to publish the peer-reviewed papers from this workshop. A book of abstracts was also published in electronic form for this workshop. A dedicated Android app for this event was also developed for this event by three undergraduate students from NIT Rourkela, which was appreciated by the organising committee.

Dr. Debadutta Mohanty spoke on the geological controls such as site selection and coal characterization for successful implementation of UCG in various Indian sites.

Conferences/Seminars

ICAGST 2017 Organised by CSIR-CGCRI

CSIR-Central Glass and Ceramic Research Institute, Kolkata, hosted the "*International Conference on Advances in Glass Science and Technology-2017*" (ICAGST-2017) during 23-25 January 2017. In addition, together with the International Commission on Glass, CSIR-CGCRI also hosted the "*ICG-CGCRI Tutorial*" on Glass – an event never previously held in India. Plus, the "*ICG Steering Committee Meeting (2017)*" was also held simultaneously, making the ICAGST 2017 a truly mega event of its kind.

The event was organised in association with All India Glass Manufacturers' Federation (AIGMF) and Glazing Society of India (GSI) making the endeavour relevant and useful for the Indian Glass industry.

Tutorial Inauguration

Glass production in India is not just on the upswing but it is also increasing tremendously to meet escalating demands. In India, the current production is about 4500 tons per day and for container glass it is 9000 tons per day.

Dr. Ranjan Sen, Chief Scientist and Head-Glass Division, Fibre Optics & Photonics Division as well as the Convenor, ICAGST-2017 warmly welcomed ICG-CGCRI Tutorial Faculty, all delegates and student participants. He stressed the fact that Kolkata, India, will have the proud privilege of hosting ICG Tutorials which are regularly held in France (summer) and China (winter). Of the 15 lectures planned, as many as ten are to be delivered by experts from abroad; the remaining five will be delivered by luminaries from India. The Tutorial aims to provide students with a comprehensive idea about the wonder material, 'Glass'. That this first-ever ICG Tutorial in India has sparked interest is evident – there are 31 registered participants with many from academia, research organisations and industry participating at various levels.

Glass production in India is not just on the upswing but it is also increasing tremendously to meet escalating demands. In India, the current production is about 4500 tons per day and for container glass it is 9000 tons per day. The country is the 5th largest producer of optical fibre with about 30 million fibre-km being produced in a year. Yet, these impressive production figures fall short in the face of demand. Thus the scope for growth in this sector is phenomenal.

Dr. Sen remarked that in the current scenario, therefore, the ICG-CGCRI Tutorial with its focus on close interaction between the initiates into the field and the veterans with their years of distilled experience could not have been better timed.

Prof. Alicia Duran, Vice-President, ICG and Research Professor CSIC, Instituto de Cerámica y Vidrio, Spain, gave a succinct presentation defining the history, scope and global role of the ICG. She pointed out that the ICG, a not-for-profit glass society and a global platform for worldwide cooperation, now has a footprint in 34 countries, worldwide. The ICG promotes cooperation between glass experts through its Technical Committees and by assisting in the organisation of sci-tech conferences, educational courses, workshops, road-mapping and by sponsoring awards in glass technology, etc.

Prof. Reinhard Conradt, Lehrstuhl für Glas und Keramische Verbundwerkstoffe

und Institut für Gesteinshüttenkunde, Germany spoke briefly on the scope of the Tutorial emphasising that it really is a "school" not a congress or conference for students. A school relies heavily on a teacher, he said and that, calls for extremely close interaction. Keeping that in mind ICG restricts a teacher to teaching only what he/she knows best, thus ensuring that students will be consciously engaged.

Prof. John Parker, Emeritus Professor of Glass Science and Engineering, University of Sheffield, UK, engaged the audience in an interactive session that promoted not just collaborative thinking but also thinking out of the box. He exhorted the participants to "think, to integrate it into understanding and to interact".

Dr. K. Annapurna, Principal Scientist, CSIR-CGCRI delivered the Vote of Thanks.

Inauguration of the ICAGST-2017

The Inaugural programme of the International Conference on Advances in Glass Science and Technology-2017 (ICAGST-2017) was a star-studded ceremony with Shri C.K. Somany, doyen of the Indian glass industry, attending as Guest of Honour. Prof. Dipankar Chakraborty, Former Director, Indian Association for the Cultivation of Science, was the Chief Guest. Dr. K. Muraleedharan, Director, CSIR-CGCRI, Dr. Manoj Choudhary, President, International. Commission on Glass, and Dr. Ranjan Sen, Head-Glass Division and Fiber Optics Division CSIR-CGCRI, as well as Convenor ICAGST-2017 were also present on the dais along with a host of invited dignitaries and delegates in the audience.

After the ceremonial lighting of the lamp and the presentation of bouquets, Director CSIR-CGCRI in his address said that even now the need to establish strong links with the fraternity from the glass industry exists as does the need to extend R&D support to industry. He exhorted the students to make the most of this wonderful opportunity and interact with the global experts. He said that there was a need to modernise ideas and explore new aspects of research.

Dr. Manoj Choudhary said that the ICG was pleased to have actively participated and collaborated, not just supported, the first-ever ICG Tutorial in India. Describing the ICG as a premier global organisation for the worldwide community of glass scientists, he presented a brief outline about the history of the ICG (set up in 1933).

Shri C.K. Somany, principal architect of modern India's Glass Container Industry presented a brief glimpse of his enormous experience and his forward-looking vision for the industry. He highlighted some very important and fading memories that deserve to be recalled. For example, the setting up of the Paisa Fund Glassworks by Ishwar Das Varshney by accepting just one paisa from members of the public. This almost forgotten episode from the days when India's glass industry was in a nascent stage is a shining example of social inclusivity and democracy in entrepreneurship — a lesson still relevant today.

He pointed out that although the demand for glass varies among the different types (Float, Container, Solar and Ophthalmic) customers demand constant and standardised quality at affordable cost. However, constraints faced by the glass industry include steep rise in prices of raw materials and fuel.

The almost forgotten episode from the days when India's glass industry was in a nascent stage is a shining example of social inclusivity and democracy in entrepreneurship — a lesson still relevant today.

Speaking informally later, he stressed again and again on the need to forge even stronger ties with CSIR-CGCRI and to use its services even more.

Prof. Dipankar Chakravorty's erudite address fascinated the audience. He enumerated the uses of glass from ancient to modern times and deliberated on the advanced materials. Elaborating on the aspects of optical fibres he mentioned that CSIR-CGCRI is one of the leading institutes in the field. He also touched upon nano silica matrix embedded with channels or nano composite glass and magneto dielectric properties of nano wires grown within nano composite glasses.

The ICAGST 2017 Keynote Lecture was delivered by Prof. Arun K. Varshneya, President, Saxon Glass Technologies, Inc., USA and Emeritus Professor of Glass Science & Engineering, Alfred University, USA. His topic was recent advances in the chemical strengthening of glass. The session was chaired by Prof. J. M. Parker, Emeritus Professor of Glass Science and Engineering, University of Sheffield, UK.

Following this, there were Nine Technical Sessions spread over three days. The highlight was a Theme Lecture by Dr. Vijay Kumar Saraswat, Hon'ble Member, NITI Aayog, Govt. of India who delivered an illuminating talk.

The Poster Session was a huge draw too. In all around sixty posters were presented. There were four categories under which the students were awarded: Multifunctional glass/glass ceramics and glasses for energy and environment; Glasses for photonic applications; Manufacturing, processing, structure and properties of glass, and Glasses for biomedical applications.

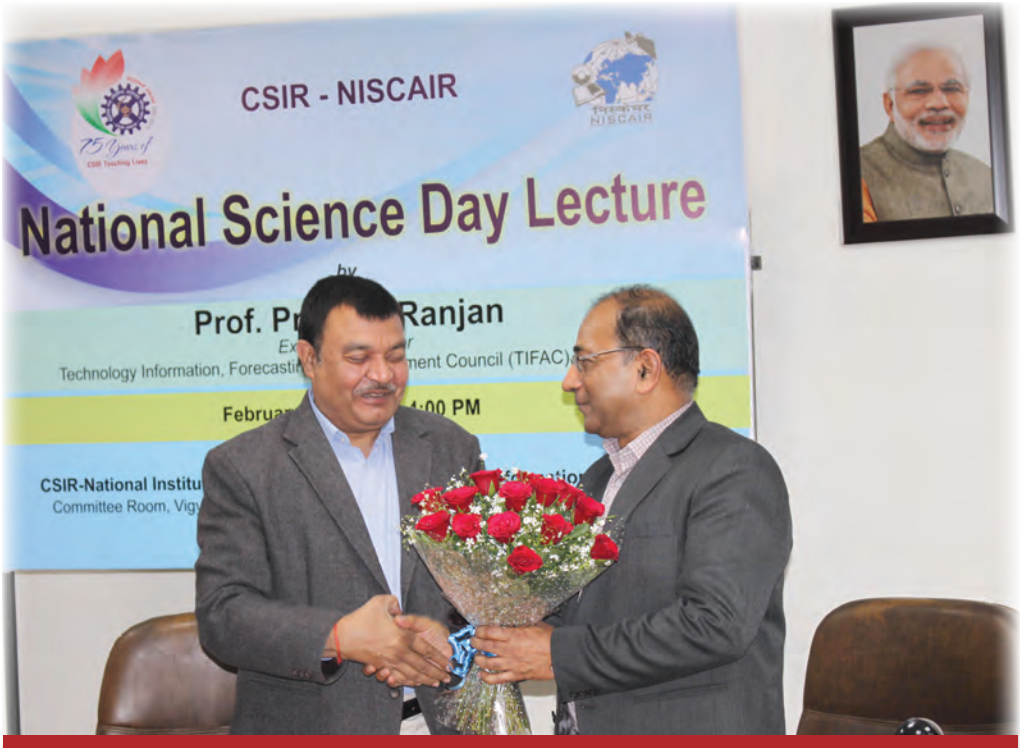
The ICAGST was a resounding success with 20 Invited Speakers from nine countries such as Brazil, China, Germany, Italy, Japan, Slovenia, Spain, UK and USA. There were twenty five delegates from Industry and all the heavyweights of the Glass Industry were represented. This included HNG, La Opala, Saint Gobain, Gujrat Guardian, Asahi Glass, Ant Ceramics, VB Ceramics, Anton Paar and Verder Scientific.

The curtains came down at the ICAGST-2017 with the conclusion of the Valedictory session where a couple of members each of the ICG, Glass Industry and the Organizers shared their experiences and hopes for the future. The experts were unanimous in their opinion that the Tutorials, if held more often and as a regular event, would do wonders in preparing the novices for the challenges they would face due to enormous advances in the field.

Contributed by **Dr. Sukanya Datta**

National Science Day Celebrations

CSIR-National Institute of Science Communication and Information Resources



Dr. Manoj Kumar Patairiya, Director, CSIR-NISCAIR welcoming Prof. Prabhat Ranjan

The theme for this year's National Science Day 2017 was "Science and Technology for Specially Abled Persons". On the occasion of the National Science Day, therefore, a lecture **"ICT Based Assistive Technology to Improve Quality of Life of Persons with Disability"** was organised at CSIR-National Institute of Science Communication And Information Resources (NISCAIR), Pusa Campus, New Delhi. The lecture was delivered by Prof. Prabhat Ranjan, Executive Director, Technology Information, Forecasting and Assessment Council (TIFAC), New Delhi.

Setting the tone of the lecture, Dr. Manoj Kumar Patairiya, Director, CSIR-NISCAIR welcomed everyone and said that the National Science Day has many underlining guiding principles to not only propagate science but also to inculcate scientific temperament amongst the fellow citizens of the country.

In his opening remarks, Prof. Ranjan highlighted the challenges faced by persons with disabilities in daily life and how science and technology can help them overcome those barriers. He narrated the story of a girl from Chennai who was suffering from cerebral palsy. She could not move her fingers. Inspired by the will to help her, Prof. Ranjan developed a hand gesture based universal remote control to help persons with restricted finger movements by using the accelerometer. For his innovation he was awarded the "HP Innovate Award 2009" and "NCPEDP-Mphasis Universal Design Award" in 2012.

Prof. Ranjan also explained the importance and utility of the devices developed by him like Mini Cepal which

Prof. Ranjan highlighted the challenges faced by persons with disabilities in daily life and how science and technology can help them overcome those barriers

helps to operate AC, TV, Light, etc. and a new device named RF CePal: Spilt System, for persons with disabilities who cannot turn back to operate these equipments. RF CePal consists of two pieces. One piece controls the gesture of the person using it and the other piece is placed somewhere in the room which monitors the equipment to be used. These two pieces are connected wirelessly.

Prof. Ranjan added that such technologies help people pursue their hobbies or to watch their favourite programmes on TV and bring a smile full of joy, confidence and self dependency on their faces.

Sharing his rich experiences, he said that he had come across hundreds of problems of various kinds and each person had unique needs. He cited another example of a girl who lost both her arms and one leg in an accident in her childhood but still mastered the Madhubani art of painting. He made a wheelchair with a joystick for the girl which she could operate with her only leg.

Prof. Ranjan said 'count the ability, not the disability!' We should only focus on the positive aspects of a person's ability rather than saying one is disabled. We must encourage what he/she can do instead of criticising what he/she cannot do.

Prof. Prabhat Ranjan also briefed about the Brain Computer Interface (BCI) technology, which can use a person's eye movement/blink, facial expression and conscious thoughts to operate devices like light, fan, TV, Computer, Speech output, Wheelchair, etc. Brain computer interface technology based on Electroencephalography (EEG) combined with wireless communication led to the development of neuro-headset which with the help of body gestures controls devices without touching them. This technology has changed the life of many disabled persons enabling them to use computers, surf Internet and play games. They can thus enjoy a sense of liberation, he said.

Prof. Ranjan informed that he had also tried to develop simple electronic machinery with a motive to make persons with disabilities economically employable so that they can become equally productive and respected in the society. He developed low cost AAC (Augmentative and Alternative Communication) device applications to use touch screen technology to help the disabled. He also told about the 3D brain mapping to help people who are in a vegetative state and who have no means to communicate after their brain gets damaged due to various reasons.

Talking about the importance of Indian culture, he said that mental health problems like learning disability, insomnia, anxiety, memory loss and depression, which are becoming common day-by-day, can be improved through ancient techniques like yoga, pranayam, kundalini, etc. Combining India's traditional knowledge with modern science is a winning combination, he said.

Dr. Sanjay Burde proposed the vote of thanks.

He said that mental health problems like learning disability, insomnia, anxiety, memory loss and depression, which are becoming common day-by-day, can be improved through ancient techniques like yoga, pranayam, kundalini, etc.

Contributed by **Sonam Choudhary**
Research Intern, CSIR-NISCAIR

CSIR-National Chemical Laboratory

CSIR-National Chemical Laboratory (CSIR-NCL), Pune, celebrated the National Science Day by conducting several programmes over a week such as Poster Presentation Programme by research students, various award lectures by scientists and meritorious students. More than 200 research posters were presented.

As a part of the celebration Prof. Pushpito Ghosh, Department of Chemical Engineering, Institute of Chemical Technology, Mumbai delivered the National Science Day lecture on the topic **"Simple Illustrations of the Interplay between Science and Innovation"** on 28 February 2017.

Prof. Pushpito Ghosh recapitulated some of the extraordinary works done by great scientists to understand the interplay between science and innovation. He said that researchers should have the desire to work for the prosperity of all. He explained how science has been flourishing and how the quest for understanding plays an important role in it. Often one would have inventions that did not rely at that time on great science. It may take a long time subsequently to understand it.

He recollected the extraordinary circumstances that led to the Raman Effect. C. V. Raman's inquisitive and probing mind became fascinated with the deep blue colour of the Mediterranean; he was unable to accept Lord Rayleigh's explanation that the colour of the sea was just a reflection of the colour of the sky. Raman showed conclusively that the colour of the sea was the result of the scattering of sunlight by water molecules.

Prof. Ghosh said that great inventions are those that yield asymmetrical returns, a small input giving amplified large outputs. He gave example of the Haber-Bosch process for the synthesis of ammonia which is considered as one of the greatest innovations since the wheel. A spontaneous combination of nitrogen and hydrogen on a substantial scale, and a combination of experimental success with thermodynamic considerations were needed for the success.

He talked about the research work of Ramsay and Young who in 1884 consistently observed a trace of undecomposed ammonia during the study of the decomposition of the gas at 800 °C. Prof. Ghosh explained how Le Chatelier despite the failure of the first attempt at the synthesis led him to abandon the matter and to publish his deliberations only in the obscurity of a French patent taken out under a foreign name and how Nernst succeeded in finding an approximate formula which permitted a prediction of the equilibria based on the values of the heat effect

A spontaneous combination of nitrogen and hydrogen on a substantial scale, and a combination of experimental success with thermodynamic considerations were needed for the success.

Prof. Pushpito Ghosh delivering the National Science Day Lecture

Prof. Ashwini Kumar Nangia, Director CSIR-NCL felicitating Prof. Ghosh

and the so-called chemical constants.

Prof. Ghosh further threw light on the street smart innovations done at CSIR-CSMCRI, Bhavnagar, focusing on sea water. He talked about the achievement of the industrial grade one solar salt in the field itself getting around 98 percentage purity. He talked about many more technologies that have large societal and industrial relevance considering in health, agriculture, pharmaceuticals, etc.

Prof. Ghosh concluded his talk conveying that great inventions are more often than not rooted in important scientific and technical leads. Success lies in being able to exploit the science gainfully, connect the dots, and patiently address the issues. Genuine need is a key driver of inventions and innovations, he said.

Earlier, Prof. Ashwini Kumar Nangia, Director, CSIR-NCL introduced the guest speaker to the audience. The programme concluded with distribution of the awards of the poster presentation programme and other academic awards at the hands of the guests.

CSIR-Structural Engineering Research Centre

National Science Day was celebrated by CSIR-Structural Engineering Research Centre and CSIR Madras Complex on 28 February 2017. Dr. Kallol Roy, Chairman and Managing Director, Bharatiya Nabhikiya Vidyut Nigam Limited (BHAVINI), Kalpakkam, was the chief guest.

In his welcome address, Prof. Santosh Kapuria, Director, CSIR-SERC and Co-ordinating Director, CMC, extended a hearty welcome to the Chief Guest. Dr. K. Balaji Rao, Chief Scientist & Advisor (M) introduced the Chief Guest to the august audience.

Dr. Kallol Roy, delivered the National Science Day Lecture on **"A Bayesian Estimation Approach for System/ Equipment Fault Diagnosis and Prognosis"**, looking into the possible applications of Bayesian Estimation in structural health monitoring of nuclear containment structures. Dr. S. Selvi Rajan, Chief Scientist, CSIR-SERC, proposed the vote of thanks.

Dr. Santosh Kapuria, Director, CSIR-SERC (above) delivering the welcome address and
Dr. Kallol Roy (below) delivering the National Science Day lecture

Dr. Girish Sahni, DG-CSIR Visits CSIR-CBRI

Dr. Girish Sahni, Director General, CSIR and Secretary, DSIR, Govt. of India, reviewed the R&D activities of CSIR-Central Building Research Institute, Roorkee during a recent visit on 10 January 2017 and encouraged the scientists, staff, and students to respond to the Hon'ble Prime Minister's call of "Make in India" by delivering their vast knowledge base in the domains of their operation.

Dr. Girish Sahni, DG CSIR addressing the gathering

Addressing the gathering, Dr. Sahni acknowledged that CSIR and CBRI have a very long and glorious history of producing strategically and socially important technologies and it is our responsibility to work hard to live up to the proud heritage. He said that CSIR has always played a key role in the nation's socio-economic development and asked CBRI to contribute its efforts to further strengthen it.

He advised CSIR sister labs to work together in cooperation in networking mode by sharing of ideas, co-ordinated planning and carrying forward the Government of India initiatives as outlined by the Hon'ble Prime Minister.

Apprising the scientists and staff of the Institute about the meeting with the Hon'ble Prime Minister of India, Shri Narendra Modi, Dr. Sahni informed that the Prime Minister congratulated CSIR on its work and asked to positively reinvent the organisation's image. Change is the law of nature and if we do not bring change then change will be forced on us. He said that the warning is on the wall to bring about the change that is required and expected from the Institute by the people and the leaders of the nation.

The Director General in his address asked the Institute to do a "Manthan", brainstorming session, and identify 20-25 big or small societal or intellectual problems, define them, create a team, if necessary, outsource resources and solve them. He urged the scientists and technologists to promote their research output in terms of innovative technologies in building construction, measures for achieving savings in depleting aggregates by using waste materials in construction and measures for enhancing building safety as per Indian standards.

Interacting with the scientists and staff of the Institute, Dr. Sahni asked them to examine ways to quickly transfer the technologies developed in the Institute to the common masses of the country. He advised the scientists and staff to work together as a team and

Dr. Sahni acknowledged that CSIR and CBRI have a very long and glorious history of producing strategically and socially important technologies and it is our responsibility to work hard to live up to the proud heritage.

said that when people work together they produce a unique positive energy. He said that creativity may be the seed of an individual entity but several people must work together as a team to interpret, prototype, model that creation and make it a reality. There should be a sense of focus, flexibility, and internal push to work and collaborate with industries to develop new technologies and deliver them to the poorest of the poor.

Dr. Sahni encouraged the scientists of the institute to develop technologies and contribute in the various schemes started by our Prime Minister including Digital India, Make in India, and Skill India. He encouraged young scientists to play a key role in India's march to become a technology power and senior scientists to mentor them. He said that the Institute is a mine of potential teachers and should recruit more students and researchers to have innovative discussions.

Mr Yadvendra Pandey, Chief Scientist, CSIR-CBRI addressing the gatherin

Addressing himself as the servant of the people, Dr. Sahni asked the CBRI family to share their problems, dreams, and their disappointments with him. He said that every person needs a boost to their self-esteem through encouragement. Every type of labour, be it research and development work, management or contract, etc. is necessary and should get encouragement and recognition. He called for pursuing those R&D activities on priority which would lead to the development of world class technologies with a focus on affordability and environment friendliness.

Earlier, Dr. N. Gopalakrishnan, Director, CSIR-CBRI, welcomed the Director General and advised scientists of the institute to strengthen the hands of the DG by doing exemplary research and development work and developing latest technologies for the average person so that he can proudly present our humble contributions to the Prime Minister and the nation. Later, Dr. Gopalakrishnan gave a brief presentation on the R&D activities, public interactions and novel products developed by the Institute. He presented a brief account of the Institute's

Dr. N. Gopalakrishnan, Director, CSIR-CBRI delivering the welcome address

facilities, laboratories, ongoing work, and CBRI's plan for the next few years to come.

Mr Yadvendra Pandey, Chief Scientist, CBRI presented a formal introduction of Dr. Sahni and welcomed him to the institute. He applauded Dr. Sahni for his passion and curiosity for innovations and knowledge on building sciences. On behalf of the institute, he promised the Director General to work for the poorest of the poor and work to bring CBRI on the national front as the highest authority in the building sector.

On the occasion, Dr. Sahni inaugurated the Fire Research Laboratory, an experimental facility for building fire research, where studies on the negative impact of the actual use of fire will be carried out. Also, the Display Centre exhibiting the capabilities of the Institute was inaugurated on the occasion. The display centre exhibits the Institute's research and development work through technical charts.

The technologies developed by the Institute including rice husk plastic wood, pine needle boards and panels, kota stone tiles, paver blocks from C&D waste, fire and water retardant canvas, transit shelter for disaster victims, lig house, Navodaya Vidhyala complex for earthquake prone areas, solar water distillation system for

Dr. Girish Sahni inaugurating the Fire Research Laboratory



Dr. Sahni going round the Display Centre

residential building, intelligent building system for model residential building, fire resistant door, pervious concrete, phospho-gypsum blocks, self-healing bio-concrete blocks and fly ash bricks etc. are displayed through models in the Display centre.

Dr. Sahni took keen interest in the Display Centre and applauded the efforts put in by the scientists and emphasised that all scientists should have a dream and transform lives of the common masses of India by developing innovative building technologies.

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