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## In The News

### DG-CSIR Visits CSIR-CBRI Says “CSIR has transformed nation’s socio-economic scene”



**DR SHEKHAR C. MANDE**, Director General, CSIR and Secretary, DSIR, reviewed the R&D activities of CSIR-Central Building Research Institute (CBRI), Roorkee, on a visit to the Institute on 24 December 2018. He encouraged the scientists, staff and students to generate global-level technologies and transfer them to the society.

Addressing the gathering, Dr Shekhar C. Mande acknowledged the glorious history and the contributions of CSIR. An unsung hero of nation’s development, CSIR has transformed the nation’s



Dr Shekhar C. Mande said that every CSIR lab has a niche and a strong base of excellent scientists who are contributing their excellence for the society

Elaborating the vision and mission of CSIR, Dr Mande explained that the organisation works on everything in terms of science and technology. Every CSIR lab has a niche and a strong base of excellent scientists who are contributing their excellence for the society, in the domain of their knowledge base. CSIR is one of the world's largest publicly-funded R&D organisations contributing to every area of science.

socio-economic scene since independence, he said. When India was denied the technologies at the global front, CSIR took on the challenge and generated world-class technologies indigenously, earning world respect and transforming India into the self-reliant tech nation it is today. Continuing into the IP era and understanding the power of knowledge, CSIR built and protected the nation's intellectual wealth, making it the largest IP holder in the country. Now in the age of globalisation, CSIR has taken on the challenge to generate knowledge and technologies at the global level.

Elaborating the vision and mission of CSIR, Dr Mande explained that the organisation works on everything in terms of science and technology. Every CSIR lab has a niche and a strong base of excellent scientists who are contributing their excellence for the society, in the domain of their knowledge base. CSIR is one of the world's largest publicly-funded R&D organisations contributing to every area of science. It connects academia, researchers, scientists and industry, building an ideal platform for fundamental, societal and translational research.

Dr Mande encouraged the scientific staff of CSIR-CBRI to do advanced exploratory research work along with the young researchers. The research should be examined to identify societal impact, compared with existing technologies and analysed for technological readiness. The Institute must then collaborate with the industries to translate such feasible and scalable technologies to fulfil the nation's unmet needs. He also discussed several missions undertaken by CSIR to translate the research from lab to land in terms of marketable, value-added technologies.



Dr N. Gopalakrishnan, Director, CSIR-CBRI, welcoming the Director-General

Dr Shekhar C. Mande encouraged CSIR-CBRI to work in the direction of Green Technologies. He appreciated the Institute's work in the direction of affordable housing, disaster mitigation, waste to wealth generation and urged to take it forward with a focus on value-added products from regional waste, green development and green technologies. The issues of climate change, environment protection and preservation have been acknowledged at the global level. CSIR as a whole needs to build affordable green technologies to reduce the carbon footprint of the nation, he said.

Focusing on the need to bring science to the society, Dr Mande explained that for larger societal impact, people need to be aware of the exemplary technologies being developed for the benefit of the masses. This can be achieved through effective science communication. Dr Mande emphasised on the need for building a talented pool of science journalists and communicators who would bridge the gap between the scientific and non-scientific communities, through modern awareness tools such as print and e-publications, science films, awareness and outreach programmes, etc.



Dr Shekhar C. Mande interacting with scientists of the Institute and releasing publications brought out by the Institute

Dr Mande also insisted on working closely with academic institutes, state universities, etc. to upgrade the skills of their young researchers from an early age by sharing of appropriate resources, expertise and technical support. He highlighted the success of various CSIR schemes such as Jigyasa Student-Scientist Connect Programme and Skill Development Programme, to achieve both the goals.

Earlier, Dr N. Gopalakrishnan, Director, CSIR-CBRI, gave a presentation on the R&D activities, public interactions and novel products developed by the Institute. He presented a brief account of the Institute's facilities, laboratories, ongoing work and CBRI's plan for the years to come.

Later, Director General, Dr Shekhar C. Mande, also met with the Institute's scientists and discussed their views on the future roadmap.

On the occasion, Dr Mande released the latest edition of the quarterly bilingual CBRI Newsletter Bhawnika. A book *Superiority Features of Indian Heritage Structures* and its website was also launched by Dr Shekhar C. Mande.

Dr Mande also inaugurated the "CSIR-CBRI Construction Technology Demonstration Park for Mass Housing". The technologies developed by the Institute under rural housing, affordable mass housing, C&D waste management,



Dr Mande inaugurating the "CSIR-CBRI Construction Technology Demonstration Park for Mass Housing"



DG-CSIR going around the display of projects and models

dry construction, utilisation of bamboo in construction, etc. were demonstrated through models and technical charts. Live demonstrations of CBRI developed

machineries and technologies such as boring machine, robotic technology for periodic inspection of civil structures, mini crane advanced versions, etc. were appreciated by the Director-General. Dr Mande also showed keen interest in the models developed under PMAGY, conservation of heritage structures and mass housing projects.



Dr Mande also laid the foundation stone for the new facility on “Construction of Pseudo-Dynamic Test Facility for Buildings” and inaugurated the newly developed “Intelligent Building” and “Cement Concrete & Composites Lab”.

DG-CSIR also visited the various



Dr Mande laying the foundation stone for a new facility on “Construction of Pseudo-Dynamic Test Facility for Buildings” and inaugurating the newly developed “Intelligent Building” and “Cement Concrete & Composites Lab”



laboratories of CSIR-CBRI, Roorkee including the Fire Research Lab, Landslide Experimental Lab, etc. and also inspected the recently laid high strength fly ash based Geopolymer Concrete Road developed by CSIR-CBRI in collaboration with NTPC-NETRA. He also planted trees in the Institute campus and encouraged green living.



DG-CSIR visiting the laboratories at CSIR-CBRI and planting trees in the campus

The main objectives of the programme were to assess and document medicinal plant diversity, conserve the medicinal plant wealth through gene banking, determine the quality parameters as per the regulatory guidelines and parameters and information required on medicinal plants for the database.

## CSIR-CIMAP to Host World's Largest Gene Bank of Medicinal Plants

CSIR-CIMAP (Central Institute of Medicinal and Aromatic Plants), Lucknow, is soon coming up with the biggest genetic bank of medicinal and aromatic plants in the world having a collection of genetic information that is unique for all living species. The genetic information of Iranian saffron, Indian mint, Indonesian mace and Sri Lankan black pepper along with more than 300 other spices and medicinal plants will be profiled and saved at CSIR-CIMAP.

The institute organised a training programme on “Diversity, documentation, gene banking and database for medicinal plants” in close cooperation with Ministry of External Affairs, India and the IORA RCSTT (Indian Ocean Rim Association Regional Centre for Science and Technology Transfer) in Lucknow, during 25 November to 1 December 2018 as the first activity of the IORA-RCSTT coordination centre on medicinal plants at CSIR-CIMAP.

The IORA is an association of 21 countries and 7 dialogue partners which have identified six areas of cooperation including medicinal plants. The main aim of the coordination centre on medicinal plants at CSIR-CIMAP was to address the gaps for improving trade and business of medicinal plants and products among IORA member countries and dialogue

partners, the first step is to develop a knowledge repository by creating a robust database on Medicinal plants, Experts, Products, Institutions and Regulatory Regimes. This requires collation and compilation of existing domain knowledge on medicinal plants in each member state and its continuous updating. The programme was organised by the IORA RCSTT Coordination Centre on Medicinal Plant at CSIR-CIMAP to sensitise and train the representatives of the Member States.

The main objectives of the programme were to assess and document medicinal plant diversity, conserve the medicinal plant wealth through gene banking, determine the quality parameters as per the regulatory guidelines and parameters and information required on medicinal plants for the database. The basic aim of the training course is to have a detailed gene data bank of the medicinal plants which could be shared among the member countries.

The concept of gene data bank will not only help in conservation but will also serve as a source of information in the future. The member countries have also agreed to share their knowledge of medicinal and aromatic plants found in their respective countries, turning the endeavour into a unique conservation effort.

# Researchers from IIT Roorkee and CSIR-NCL Develop Dyes to Increase Efficiency of Solar Cells



IIT Roorkee and CSIR-NCL researchers jointly develop porphyrin dyes with light-to-current conversion efficiencies of 7% for third generation solar cells.

*Image Credit: www.indiatoday.in*

Researchers at CSIR-NCL, Pune and IIT Roorkee have developed organic dyes that can increase the efficiency of Dye Sensitised Solar Cells (DSSC). M. Shankar, Associate Professor, Department of Chemistry, IIT Roorkee, with his team has worked to improve the photovoltaic conversion efficiencies of an organic dye called “porphyrin” for DSSC applications. The research has been published in the journal *ACS Applied Energy Materials*.

Porphyrin is the building block of chlorophyll and also a complex organic molecule that allows plants to harvest light energy for photosynthesis. The first study on the use of porphyrins for power conversion efficiencies was

conducted in 1993 and resulted in very low percentage – only 2.6% -- not enough for practical applications. After several modifications on porphyrins, the research team utilised Zinc containing porphyrins which have been found promising.

Solar cell technologies are categorised into three generations: the first and second generations comprise photovoltaic cells and utilise inorganic semiconducting materials such as single crystal silicon (Gen I) and thin film silicon and CdSe type semiconductors (Gen II); the third generation is still in the research stage which includes DSSC, and which needs a combination of cheap organic dyes and nanoparticles

Researchers at CSIR-NCL, Pune and IIT Roorkee have developed organic dyes that can increase the efficiency of Dye Sensitised Solar Cells (DSSC).

of titanium dioxide, to convert light into electricity.

The researchers have established a process to produce functional porphyrins without the use of platinum and

palladium catalysts and have developed simple, efficient, cost-effective sensitizers which involve fewer synthetic steps resulting in five porphyrin Zn(II) complexes with power conversion efficiency 5.3% to 7.1%.

### MoUs/Agreements

## CSIR-NPL and M/s Global PT Provider (P) Ltd Sign Agreement of Production of Bharatiya Nirdeshak Dravya



CSIR-National Physical Laboratory (CSIR-NPL) and M/s Global PT Provider (P) Ltd signed an agreement for the production of Bharatiya Nirdeshak Dravya (BND) on 27 November 2018. CSIR-NPL is the National Metrology Institute of the country, and a member of the International Bureau of Weights and Measures (BIMP), serving most of the Indian industries, academia and strategic sectors

by administering them apex level calibration facilities.

CSIR-NPL contributes metrological traceability to the reference material producers, which can be further exported in different countries under the brand name of Bharatiya Nirdeshak Dravya (BND). Global PT is the NABL authorised PT provider and also producer of reference materials which includes hardness blocks.

## Curbing Fake and False Science News Vital: Indian Science Communication Congress



Fake and false science news making way into the mainstream and social media is a cause of serious concern. The spread of such undesirable information and the ways and means to address the growing menace were discussed and debated strongly at the 18th Indian Science Communication Congress (ISCC-2018) organised by CSIR-National Institute of Science Communication and Information Resources (NISCAIR) on 21-22 December 2018. The theme of the science communication congress was “200 Years of Science Journalism in India”.

In the inaugural session, tracing the history of science journalism and science communication in the country, Dr Manoj Kumar Patariya, Director, CSIR-NISCAIR said that science journalism in the country has come a long way since



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the first monthly magazine Digidarshan came into being in 1818. The magazine published science articles in English,

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Dr Arvind Mishra, Secretary, Indian Science Fiction Writers' Association, said that there should be more science communication in Indian languages.

Dr R.K. Bhandari said we should not lose any opportunity to learn from disasters and should work on using the learning to limit or prevent future disasters.

Prof Sai Baba pointed out that there is more need for science communicators today than ever in the past.

Hindi and Bengali.

Delivering the keynote address, Dr Arvind Mishra, Secretary, Indian Science Fiction Writers' Association, said that there should be more science communication in Indian languages. He also touched upon the need for 'barefoot' science communication that should focus on science communication at the grassroot and rural levels.

Dr R.K. Bhandari, the guest of honour and Chairman, Forum on Disaster Mitigation, Indian National Academy of Engineering spoke about documenting disasters and communicating the same. He said that we should not lose any opportunity to learn from disasters and should work on using the learning to limit or prevent future disasters.

Prof V.L. Dharurkar, Vice Chancellor, Tripura Central University was the chief guest of the inaugural function and Dr Narendra K. Sehgal, UNESCO-Kalinga Prize Winner for Science Popularisation chaired the inaugural function.

Following the inaugural function, there was a panel discussion on "Vigyan Patrakarita: Kal, Aaj aur Kal". Prof M. Sai Baba, Principal Scientist, Energy and Environment Program & Science Communication, National Institute of Advanced Studies (NIAS), Bengaluru, chaired the panel discussion. In his opening remarks, Prof Sai Baba pointed out that there is more need for science communicators today than ever in the past. A number of panellists spoke about various aspects of the past, present and the future of science communication.

Prof V.L. Dharurkar, addressing the audience



Dr Arvind Mishra stressed on the need for 'barefoot' science communication to focus on science communication at the grassroot and rural levels



Dr R.K. Bhandari said that we should not lose any opportunity to learn from disasters





Release of “Malpa Landslide Disaster” book. From left: Dr Manoj Kumar Patairiya, Director, CSIR-NISCAIR; Dr Narendra K. Sehgal, UNESCO-Kalinga Prize Winner for Science Popularisation; Prof V.L. Dharurkar, Vice Chancellor, Tripura Central University; Dr R.K. Bhandari, Chairman, Forum on Disaster Mitigation, Indian National Academy of Engineering, and Dr Arvind Mishra, Secretary, Indian Science Fiction Writers’ Association



Dr B.K. Tyagi, Scientist & Registrar, Vigyan Prasar mentioned that the risks associated with technologies should be communicated. Dr I. Arul Aram, Professor of Media Studies, Anna University, Chennai, spoke about introducing a course on science and technology communication at Anna University. Shri Abhay S. Rajput, Indian Institute of Tropical Meteorology, Pune expressed concern about pseudoscience stories appearing in the mass media. Ms Lipsa Panda, Researcher at CSIR-IGIB stressed on communicating science through animations and infographics.

Prof A.P. Singh, Vice-Chairman, ISCOS, Lucknow opined that a policy document is required on how to communicate science to the masses. Shri R.S. Ahirwar, Senior Principal Scientist, CSIR-AMPRI, Bhopal stated that there is a need to have more programmes like JIGYASA where scientists and school students can interact with each other.

Shri Hasan Jawaid Khan, Chief Scientist, CSIR-NISCAIR during his closing comments said that for expanding coverage of S&T news in the media, there was need for a closer working relationship between scientists and journalists so that details of scientific projects could be conveyed to

the public accurately and in a language they could easily understand.

Following the panel discussion, there were three scientific sessions where a number of papers were presented. The topics of the three sessions were, “From Science Journalism to Science Communication – Taking Science to the People”, “Communicating Science for Sustainable Development” and “Communicating Science through Digital and Print Media”. The sessions were chaired by eminent science communicators such as Prof K.G. Suresh, Director-General, Indian Institute of Mass Communication; Dr Jagdish Chander, Scientist G, Department of Science and Technology; Dr Shambhu Nath Singh, Director, School of Journalism and New Media Studies, IGNOU; Dr Deepika Bhaskar, Delhi University; Dr Nisha Mendiratta, Head, NCSTC, Department of Science and Technology, and Dr Prabhakar Ingle, Head, Publication and Science Communication, CSIR-NCL.

The final roundtable and summing up session was on the topic “Has Science Journalism Come of Age in India – A Critical Analysis”. The Guest of Honour, Shri Jayant Sahasrabuddhe, Organising Secretary, Vijnana Bharati

There were three scientific sessions where a number of papers were presented. The topics of the three sessions were, “From Science Journalism to Science Communication – Taking Science to the People”, “Communicating Science for Sustainable Development” and “Communicating Science through Digital and Print Media”.



During Panel Discussion on “Vigyan Patrakarita: Kal, Aaj aur Kal” (From L to R): Mr Hasan Jawaid Khan, Chief Scientist, CSIR-NISCAIR; Shri R.S. Ahirwar, Senior Principal Scientist, CSIR-AMPRI; Dr S.K.S. Rathore, Senior Principal Scientist, CSIR-AMPRI; Prof A.P. Singh, Vice-Chairman, ISCOS, Lucknow; Dr B.K. Tyagi, Scientist, Vigyan Prasar; Prof M. Sai Baba, Principal Scientist, Energy and Environment Program & Science Communication, National Institute of Advanced Studies (NIAS), Bengaluru; Dr I. Arul Aram, Anna University, Chennai; Prof Afrina Rizvi, Professor, Mass Communication, Aligarh Muslim University; Shri Abhay S. Rajput, Indian Institute of Tropical Meteorology, Pune, and Ms Lipsa Panda, CSIR-IGIB

There is a need to impart critical appraisal skills to researchers to help them identify and filter fake news. The Congress expresses concern about fake and false science news making their way into the media and emphasizes that ensuring the authenticity of information should be paramount for science journalists and science communicators.

said that science communicators have to play a key role in communicating Indian science to the masses. Dr Nakul Parashar, Director, Vigyan Prasar also graced the concluding session as a Guest of Honour. Also speaking at the concluding session, Prof Krishan Lal, Co-Chair, IAP for Science, said time has come to raise our science magazines and science journals to the international level.

Prof (Dr) Manoj Kumar Patairiya, Director, CSIR-NISCAIR summed-up the recommendations of the Indian Science Communication Congress 2018 as follows:

1. There is a need to impart critical appraisal skills to researchers to help them identify and filter fake news. The Congress expresses concern about fake and false science news making their way into the media and emphasizes that ensuring the authenticity of information should be paramount for science journalists and science communicators.
2. Artificial Intelligence can play an important role in science communication in the future.
3. There is more innovation required in science communication. Demonstration of scientific concepts can help in easily communicating science, especially among students.
4. It was shown that some regional newspapers like *The Morning Express* cover more science news than national newspapers.
5. Evidence-based research, as well as evidence based communication, is necessary for furthering science communication in India.
6. Science communication should bring about behavioural change among the masses by making them scientifically aware.
7. Science communication has been able to contribute to mitigation efforts in crop burning, pesticide and fertilizer overuse.
8. Radio will continue to play a vital role in science communication along with the print, social and audio-visual media.
9. There should be concerted efforts amongst all stakeholders to enhance coordinated communication

between scientists and journalists. There should also be more interactions between scientists and students.

10. There is a need for a policy document on how science should be communicated to the masses.
11. Science communication should effectively be used to popularize technologies and help the scientists in taking their technologies from the laboratories to the market.
12. There is a need for more courses and programmes in science and technology communication so that a large pool of science journalists and science communicators can be created. This should be a national responsibility.
13. Surveys in public understanding of science are necessary to gauge the

status of scientific literacy in the country.

14. There is a need to organise community-driven science fairs in the country to promote science communication and scientific temper.
15. Grafting folk, traditional, tribal and electronic media remains a challenge today and there is a need to converge these for effective science communication.

About 150 science communicators, researchers, scientists, science enthusiasts and students participated in the event. The Indian Science Writers' Association (ISWA), Society for Information Science (SIS) and Indian Science Communication Society (ISCOS) were the academic partners of the Indian Science Communication Congress 2018.



Contributed by G. Mahesh,  
Senior Principal Scientist, CSIR-NISCAIR

## PGT Workshop at CSIR-CBRI

CSIR-Central Building Research Institute, Roorkee, organised a workshop for the postgraduate teachers of Kendriya Vidyalaya Sangathan on 26 December 2018, under the Jigyasa Programme. The scientists of the institute presented lectures in their area of expertise and informed about the latest technologies developed by CSIR & CBRI. Dr N. Gopalakrishnan, Director CSIR-CBRI, welcomed the teachers and encouraged them to adopt a scientific approach towards life and to inculcate a scientific temper in their students.

Dr L.P. Singh, Principal Scientist presented a lecture on “Nanotechnology” and informed about the applications of nanotechnology in buildings, use of nanotechnology to modulate concrete and optimise loading capability in buildings. Dr Singh informed that research is being carried out to develop affordable, advanced and sustainable technologies to ensure the economic and social development of the country.

While presenting a lecture on “Inclusion of Storytelling and Humour to Reduce Monotony for the Development of Scientific Temper”, Dr Atul Kumar Agarwal, Senior Principal Scientist and Jigyasa Programme Coordinator explained to the teachers that compared to other subjects science is considered monotonous by the students. Therefore, teachers should try to create vibrancy in the classroom by sharing scientific jokes and humorous incidents inspired by the lives of eminent scientists. Dr Agarwal shared some interesting facts related to the lives of Newton,



Albert Einstein, Thomas Alva Edison, Madame Marie Curie, etc.

The participants also visited the laboratories of the institute and learnt about the innovative work carried out in the area of advanced building materials such as rice husk, plastic wood, pine needle board, phosphate bonded bricks, bio-concrete block, building block from C&D waste, kota stone tiles, geopolymer concrete blocks, etc. and interacted with the scientists of the Institute.

In the Rural Technology Park, the participants saw demonstration models of various rural technologies developed by the institute including fire retardant non-erodible mud plaster thatch roof, low-cost latrines, waste water disposal system, prefab brick panel and jack arc panel system, etc. The participants also observed the Technology Gallery of the institute.

About 40 physics postgraduate teachers of Kendriya Vidyalaya Sangathan from Dehradun, Jammu, Lucknow and Jaipur regions along with Principal Shri Vipin Tyagi participated in the programme.



Lecture

## Prof A.K. Shukla delivers the Prof J.W. McBain Memorial Lecture at CSIR-NCL



Prof A.K. Shukla, Honorary Professor, Indian Institute of Science, Bangalore while delivering the talk



Mr Prabhakaran Ganapathy, Chief Scientist, CSIR-NCL felicitating Prof Shukla

Prof Shukla pointed that the energy demand has increased in India by 50% during the period of 2010-2015 due to economic growth and increase in population. Major sources to meet the energy demand have been oil, natural gases and coal. The renewable energy sources including solar, wind and biomass contribute relatively less.

CSIR-National Chemical Laboratory (CSIR-NCL), Pune, organised the fourteenth Prof J.W. McBain Memorial Lecture on 30 November 2018. The lecture was delivered by Prof A.K. Shukla, Honorary Professor, Indian Institute of Science, Bengaluru, on the topic “Batteries for a Sustainable World”.

Prof Shukla focused his talk on one of the major challenges ahead – “Energy”. Energy is enabling and pervasive, the more you generate the more it is in demand. He reminded that, “The modern energy services are crucial to human well being and to the countries for economic development.” Yet globally over 1.3 billion people are without access to electricity and 2.6 billion people are without clean cooking

facilities. More than 95% of these people are from either Sub-Saharan Africa or developing Asia and 84% of these are from the rural areas.

Prof Shukla pointed that the energy demand has increased in India by 50% during the period of 2010-2015 due to economic growth and increase in population. Major sources to meet the energy demand have been oil, natural gases and coal. The renewable energy sources including solar, wind and biomass contribute relatively less. If we look at the Indian scenario, the amount of electricity generation has enhanced, still we are facing the energy poverty and it is a big challenge for all of us. Energy management has become the necessity of the time; hence energy storage has become the central point.

Electrical energy is most user-friendly, convenient and cleaner. He talked about diverse ways of energy storage and its applications.

Electrochemical energy storage involves batteries, ultra-capacitors, redox flow batteries. These are different batteries as they are modular, quicker, flexible and cost-effective. He said, there is a missing link of storage of solar energy which has to be addressed. The storage of energy and its retrieval on demand will be crucial in the future.

Prof Shukla threw light on the history of the battery and its various types. He talked about the key issues associated with different batteries and the need for R&D efforts to mitigate these issues. Prof Shukla also asserted that today everyone has a battery

around themselves as smartphones are ubiquitous; they owe most of the success to the Lithium-Ion batteries that are so attractive because of the light weight, sustainability and feasibility. Later, he presented a challenge to the younger students and future scientists to create a super battery that will allow electric cars to travel with a single charge distances comparable to what a conventional car can do with a full tank of fuel and to allow massive batteries bank together and somehow independent to make the fossil fuels obsolete.

Earlier, Dr P.A. Joy, Chief Scientist, CSIR-NCL, gave the welcome remarks and introduced the speaker Prof A.K. Shukla. He also explained the background of the Prof J.W. McBain Memorial Lecture.



## Dr K.P.S. Murthy Delivers the CSIR-NCL Foundation Day Lecture



Dr K.P.S. Murthy, Director, HEMRL, Pune delivering the CSIR-NCL Foundation Day Lecture



Dr Sunil Joshi, Chair, Chemical Engineering and Process Development, CSIR-NCL felicitating Dr Murthy

Dr K.P.S. Murthy said, “Defence research is not a profession; it is a service as you are no longer competing with your colleagues, you are competing with another nation.”

Dr Murthy also talked about the financial implications of the various phases of research. The cost of the research is not much for investment but when the technology gets matured for demonstration the cross functional teams have to get involved in its evaluation, which is costly and time consuming.

CSIR-National Chemical Laboratory (CSIR-NCL), Pune celebrated its 69th Foundation Day on January 5, 2019. As part of the celebration Dr K.P.S. Murthy, Director, High Energy Materials Research Laboratory (HEMRL), Pune delivered the CSIR-NCL Foundation Day Lecture on January 9, 2019.

Dr K.P.S. Murthy gave a lecture on the topic “Research and Development – Opportunities and Challenges in High Energy Materials”. He talked about the importance of defence research explaining how it differs from other R&D. He said, “Defence research is not a profession; it is a service as you are no longer competing with your colleagues, you are competing with another nation.” Defence research is a team work where the quality, repeatability, consistency and the performance is more important; cost matters less.

Dr Murthy said that defence research focuses on expanding the scientific knowledge and investigating new technologies to provide better war fighting equipments. He said, “We need to anticipate technological needs for an uncertain future and establish relevant and feasible technologies to utilize in war fighting programs.”

He explained the process of the development of any war system and how the entire project is designed. There are four basic parameters for the prioritized science and technology projects as adversarial threats, capability needs, customer requirements and available resources.

Dr Murthy also talked about the financial implications of the various

phases of research. The cost of the research is not much for investment but when the technology gets matured for demonstration the cross functional teams have to get involved in its evaluation, which is costly and time consuming. He highlighted the role of Defence Research and Development Organization and its collaborative goal to support the defence R&D programmes especially in the areas of basic and applied research, to utilize the analytical and experimental knowledge in development of prototypes, to share processing and testing facilities at DRDO and its institutes and to build strong knowledge base in selected areas ultimately reducing the overall development cost and time.

Dr. Murthy also informed about the core competencies of HEMRL, Pune which includes the synthesis, characterization and evaluation of high energy materials and its in-house manufacture at Pilot Plant scale. He talked about the important contributions of the HEMRL which include advanced energetic propellants, composite propellants and solid propellant technologies for propulsion systems of indigenous rockets and missiles.

Earlier, Dr Sunil Joshi, Chair, Chemical Engineering and Process Development, CSIR-NCL gave the welcome remarks and introduced the speaker to the audience.

Later, NCL Research Foundation Awards were also distributed to the CSIR-NCL staff at the hands of Dr Murthy.

## Honours & Awards

# CSIR-NISCAIR Receives the Green Petal Award-2018



CSIR-NISCAIR (National Institute of Science Communication and Information Resources), New Delhi, received the Green Petal Award 2018 for research excellence on 2 December 2018 by the Green Maple Foundation (GMF).

As part of its science dissemination mandate to a wide range of targeted

audiences, CSIR-NISCAIR publishes 18 research journals, three popular science magazines, scholarly and popular science books, monographs, etc. The Institute is also involved in skill development in areas such as science communication, library automation, database development, etc.



**Appointment****Dr K.S.M.S. Raghavarao Takes over as Director, CSIR-CFTRI**

Dr Raghavarao has over 25 years of experience with the right combination of applied and basic research. Out of 30 of his significant achievements, 25 were converted into processes/ technologies, out of which 15 were transferred to industry. Phycocyanin from Spirulina is the second highest technology premium at CFTRI. Whole coconut milk powder was transferred to four industries.

Dr K.S.M.S. Raghavarao, a Chemical Engineer specialising in Food Engineering and Biotechnology, has taken over charge as Director, CSIR-CFTRI (Central Food Technological Research Institute), Mysuru.

He obtained B.Tech from Andhra University (1981) and PhD from ICT, Mumbai (formerly UDCT) in 1987. After his post-doctoral at NIST-Colorado and a brief stay at NIT, Warangal, he joined CFTRI in 1990.

Dr Raghavarao has over 25 years of experience with the right combination of applied and basic research. Out of 30 of his significant achievements, 25 were converted into processes/ technologies, out of which 15 were transferred to industry. Phycocyanin from Spirulina is the second highest technology premium at CFTRI. Whole coconut milk powder was transferred to four industries. Virgin Coconut Oil (VCO) technology has been transferred to about 60 industries.

Dr Raghavarao has guided 20 students/fellow scientists for PhD in Food Engineering/Biotechnology and is currently guiding five more. He has been the recipient of prestigious NASI-Reliance and VASVIK awards for applied research. He has received National Fellowships of Academies such as FNAE & FASc, Bangalore besides several others (FNAAS,



FAFST, FAPASc, FIE). He has received National Award for technology transfer by Ministry of Agriculture for Virgin Coconut Oil technology.

He has over 160 publications (with 'h' index of 45) and citations over 6500, about 28 International patents and 55 Indian patents. He initiated several new research areas at CFTRI such as Aqueous Two-Phase Extraction, Reverse Micellar Extraction, Adsorption, Bioreactor design for Hairy root and plant cell cultures, viscous fermentation (microbial polysaccharides), and solid state fermentation besides food processing equipment especially for Indian traditional foods. He collaborated with several technology departments across CFTRI and outside institutions as PI/Co-PI in 50 grant-in-aid projects and 25 industrially sponsored projects.

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