ISSN 0409-7467

CSIR News

NEWSLETTER OF THE COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH

Volume 66 No. 23 & 24 website: http://www.csir.res.in December 2016

In This Issue

India International Science Festival (IISF-2016)
Five-day Science Festival at CSIR-NPL

FOR five days thousands of people soaked in an atmosphere of science as the second India International Science Festival (IISF) got underway on 7 December 2016 at the CSIR-National Physical Laboratory (CSIR-NPL) in New Delhi. Huge numbers of enthusiastic students along with teachers, researchers & scientists, families and the scientifically inclined recorded their presence at the science festival.

The IISF 2016 was jointly organised by the Ministry of Science & Technology and Ministry of Earth Sciences in collaboration with Vijnana Bharti (VIBHA). The theme of the science festival this year was "Science for the Masses".

The programme was kicked off on 7 December with the inauguration of the Mega Science Technology & Industry Expo by Dr. Harsh Vardhan, Union Minister for Science & Technology and Ministry of Earth Sciences, and Shri Y.S. Chowdary, Minister of State. Speaking at the event, Dr. Harsh Vardhan said, "Any new and innovative idea will be appreciated and supported by our science department

Dr. Harsh Vardhan inaugurating the India International Science Festival 2016 (IISF-2016) Mega Expo

and the government." Let's learn science in a more creative way, he added.

Others present during the inaugural session included Dr. Girish Sahni, DG-CSIR; Prof. Ashutosh Sharma, Secretary, DST; Dr. VijayRaghavan, Secretary, DBT; Dr. Vijay Bhatkar, President, VIBHA, and Mr A. Jayakumar, General Secretary, VIBHA. While Dr. D.K. Aswal, Director, CSIR-NPL, welcomed the guests, Dr. Manoj Kumar Patairiya, Director, CSIR-NISCAIR, elaborated on the theme of the festival.

Inaugurating the Young Scientists' Conclave on 8 December, Union Home Minister Shri Rajnath Singh appealed to the youth to take Prime Minister Shri Narendra Modi's S&T programmes such as Digital India, Make in India, Skill India, Stand Up India–Start Up India to the common man.

Underlining the need to create scientific temper in the society, Shri Rajnath Singh said India is the world leader in Software Technology. Indians constitute the largest majority of software developers among immigrants in the Silicon Valley while the top executives of leading software companies including Microsoft and Google are headed by Persons of Indian Origin, he added. Shri Rajnath Singh said he would not like India to emerge as a Superpower, but

Union Minister for Science & Technology and Earth Sciences, Dr. Harsh Vardhan at the inauguration of the India International Science Festival 2016 (IISF-2016), Mega Expo organised at the CSIR-NPL, in New Delhi on 7 December 2016

rather aim to be the world's "guru" or teacher, as it will be enlightening rather than being intimidating.

Speaking on the occasion, the Union Minister for Science & Technology and Earth Sciences, Dr. Harsh Vardhan said India's R&D matches the best in the world. He said, we are now providing data on Earth Sciences and Weather forecasting to around 30 countries. With CSIR scholarships such as the INSPIRE, what we are witnessing today is brain gain instead of brain drain, he added.

Showcasing Technology

The five-day IISF 2016 not only aimed at developing scientific temper and attitude among young minds, it also showcased India's S&T prowess and technological developments through the Mega Science & Technology Expo.

The Expo projected Indian technological developments through more than 400 scientific models and exhibits by CSIR Laboratories and other organisations like DST, ISRO, DRDO, DBT, etc. The event emphasised interdependence of Science-Technology-Innovation and Society. The Mega

Science Expo also displayed innovations as part of government missions such as Swachh Bharat, Digital India, Unnat Bharat Abhiyan, etc. The IITs showcased various technologies developed under the Unnat Bharat Abhiyan whose mission is to enable higher educational organisations to work with the people of rural India in identifying development challenges and evolving appropriate solutions for accelerating sustainable growth.

The display of hydroelectric cell in the Start-up hall excited curiosity among the visitors as the hydroelectric cell generates electricity using nothing more than a few drops of water. Chief Scientist Dr. R.K. Kotnala and his research fellow Jyoti Shah of CSIR-NPL informed that this cell can generate up to about a quarter ampere current at a little less than one volt. This device is much economical than a solar panel, and may revolutionise the energy generation scenario. The device has already been patented and published in an international journal. Efforts are on to shape it in a convenient form like a dry cell and to improve its longevity and electrical contacts, said the scientists.

Celebrating Science

However, the highlight of the IISF was the "Science Village" – a conglomera-tion of around 3000 school students from all across the country. The students were selected by Members of Parliament from their respective adopted villages under the Pradhan Mantri Sansad Aadarsh Gram Yojana. These students from village schools were exposed to many scientific activities like interaction with scientists during special interactive sessions, planetarium, science films, laboratory visits and tours around Delhi.

Students also got the chance to perform various activities like Hands-on Science Experiments where they performed Physics and Chemistry experiments to learn basic concepts. The objective was "learning by doing" and group activities.

Union Home Minister, Shri Rajnath Singh at the inauguration of the India International Science Festival 2016 (IISF-2016), on 8 December 2016. Others included Union Minister for Science & Technology and Earth Sciences, Dr. Harsh Vardhan; DG-CSIR Dr. Girish Sahni; Secretary, Department of Science and Technology, Prof. Ashutosh Sharma, and Secretary, Department of Biotechnology, Dr. K. VijayRaghavan

A view of dignitaries at the IISF-2016 inauguration

On the second day of the IISF-2016, 550 students from the Manav Sthali Public School, New Delhi, dressed as Albert Einstein, in the presence of professors from Delhi University and Jawaharlal Nehru University as witnesses, to record their claim to the "Guinness Book of World Record" for the maximum number of students dressed as Albert Einstein. The earlier record was by 304 students of the Black Pine Circle School (USA), in March 2015.

DST INSPIRE

Yet another very popular programme during the IISF 2016 was the DST-INSPIRE (Innovation in Science Pursuit for Inspired Research) programme organised by the Department of Science & Technology. As the name implies, the programme aims to inspire and hook children early on to science and research, and expose them to the innovation cycle.

This year, around 600 students from across the country showcased their projects after qualifying district and state level rounds. Selected innovative projects of school children (VI–X classes) were showcased here. Sensitivity to societal concerns was well reflected in the projects by young scientists.

One such example was UMEED (Useful Mimicked Economical Ecofriendly Devices) – The sustainable society, an innovation by a class IX student, A. Vamsi Vishwanath of New Delhi. Reuse of plastic bottles to save the environment was reflected in the exhibit of 10th class student, Penta Rama from Vizianagaram in which she demonstrated how a plastic wire-making tool converts the plastic bottle into a wire which can then be used for various

Dr. Harsh Vardhan visiting the Mega Expo

purposes like packing, weaving baskets, cots, etc.

Many more innovations and creations were displayed during the programme including Mosquito repellent oils, Pipe cleaning robot, Anti-pollution vehicle, Algae – Pollution Control Key, Smart dustbins with remote alarm system, Smart bed for handicapped & babies, Effective utilisation of LPG, Articles from Banana stem, fibre, etc.

Industry-Academia Interaction

The Industry-Academia Interaction focused on Outstanding Technologies; Industry Oriented Curriculum Development; Entrepreneurial Ideas for Inductable Technologies in Small Industries; Metrology for Time & Frequency, Need for Environment Pollution and Monitoring Initiatives, and Agriculture & Industries.

The event was attended by eminent industrialists and academicians including young scientists, distinguished scientists, and teachers. Panels of experts from various fields discussed and proposed possible mechanisms and opportunities to develop competitive manufacturing capabilities and to improve their services through collaborating with each other.

Padma Shri Prof. K.L. Chopra, chief guest of the inaugural session, emphasised that in spite of having one of the largest systems of higher education in our country, we have very few technologies developed by our institutions. He hoped that with the interaction of academia and industry, we would be able to work better and together to achieve the common mission and with the advent of better quality products our industries could compete internationally, overcome trade constraints and achieve export targets. This will in turn translate into rapid industrial, economic and social growth. The government and policy makers should identify the gaps and plan accordingly in a more realistic manner for future planning, he said.

Young Scientists' Conclave

A key component of IISF 2016 was the Young Scientists' Conclave, during which parallel sessions were organised to discuss topics with great relevance to the society. This included various activities like plenary lectures, oral and poster presentations and workshops. Plenary sessions were conducted under six themes – Agriculture, Health, Water, Information Technology, Space and Defence & Energy – in which eminent scientists shared their research work through a series of highly informative talks.

Dr. Girish Sahni, Director General, CSIR, said that science is a thing to enjoy and it opens the door for great discoveries and innovations useful to mankind. Dr. Sanjay Kumar, Director, CSIR-IHBT talked about empowering communities through

value-added agriculture. He said that agriculture is central to India's economy and about 58% of the Indian rural population depends upon agriculture for their survival.

In the session on health, Dr. M.C. Misra, Director, All India Institute of Medical Sciences (AIIMS), said, "The frugal Gandhian innovations were aimed at serving the unserved." He added that IT could play a role in health care leading to faster reference, diagnosis and treatment. Dr. Soumya Swaminathan, Director General, Indian Council of Medical Research (ICMR) presented a lucid introduction to infections, their causes and evolution. She, however, cautioned that not all of the several trillion pathogens are bad.

The session on Water covered various aspects such as sources, cycling, and its value as one of our most valuable resources. Dr. Pradeep Majumdar of the Indian Institute of Science, Bengaluru, Dr. Santosh Rai of the Wadia Institute of Himalayan Geology, Dehradun, Dr. Virendra Tiwari, Director, CSIR-National Geophysical Research Institute, emphasised how new technologies like isotopes and satellite observations have led to better understanding of water resources, water cycle and budget.

During the plenary sessions on Information Technology, 'Cashless Transactions', use of PAYTM, etc. were discussed, while a road map for space crafts, communication, navigation and developments in the required materials was elaborated under the session on Space & Defence.

Dr. Girish Sahni addresses the gathering at the IISF-2016

Science Film Festival

One of the most popular and well-attended events at the India International Science Festival 2016 was the International Science Film Festival (ISFF) and Competition.

Globally acclaimed science films – both Indian and Foreign – featuring scientific innovations and success stories were screened during the festival in the 'Best of the competitive' and the 'Non-competitive' categories.

Inaugurating the International Science Film Festival (ISFF), Dr. Harsh Vardhan, Hon'ble Minister for S&T and Earth Sciences, said, "Science films are a tool for science education, scientific innovations and propagating success stories." Mr Ofir Akunis, Israeli Minister for S&T and Space said, "This event is an opportunity for Indians to get familiar with Israel's innovations."

During the inaugural session, two films from the Israel Space Agency and Ministry of S&T were screened followed by a film by DST-ARIES on its 3.6 Meter Devasthal Optical Telescope – *Reaching Stars & Beyond from Himalayas*.

A lively panel discussion on 'Science films as an effective tool for communicating science' was chaired by Dr. Manoj Kumar Patairiya, Director, CSIR-NISCAIR. This was joined by Inger Midtkandal, the S&T Counsellor from the Royal Norwegian Embassy, Andreas Roles-Olson, Science Officer from Embassy of USA, and Alexander Jmyrev, S&T Expert at the Russian Centre of Science & Culture.

Internationally acclaimed and award winning foreign films from countries like Israel, USA, UK, Sweden, France, Russia, Germany, Norway, etc., and Indian films on science, health and the environment were also screened during the festival. Separate interactive sessions/workshops on science films were organised by eminent science communicators and filmmakers such as Dr. Mike Pandey and Senior Science Film Academician, Prof. Iftekhar Ahmad.

Some Non-competitive Indian films were highlighted during the event like, *Timeless Traveller: Horseshoe Crab* and *The Vanishing Vultures* (Produced & Directed by Dr. Mike Pandey), and *Inside Out – TEJAS Light Combat Aircraft* (Directed by Ankit Ahuja).

The Final Day

In the Valedictory Function held on 11 December, Dr. Harsh Vardhan, Union Minister of Science and Technology and Earth Sciences said, "IISF has the potential to be the greatest science event and it will be a regular annual feature. Such a huge gathering even during the valedictory session is unprecedented and proves its popularity." He opined that many of the ideas presented by the students were innovative. Students inspire us, he added. He referred to the Prime Minister's faith in the potential of the youth of this country. Science is the way out of poverty, malnutrition and other issues prevailing in the nation, he added.

Three students, eleven films and over seventy young scientists were awarded. The national awards for DST-INSPIRE were bagged by Rakesh Krishna Kumar, Karnataka, for 'Seedographer'; Shiva Jyoti Chowdhary, Rajasthan for 'Effective Utilisation of LPG' and Sachindre Jadhav, Maharashtra for 'Kheti Mitra'. Fifty-seven other children received consolation prizes.

Two films from Kashmir in the International Science Film festival – *Saving the Saviour* directed by Jalaluddin Baba and *Don't Burn Leaves* directed by Abdul Rashid Bhatt were awarded.

The Young Scientist Conclave Award for Swachchh Bharat Abhiyan was claimed by Parvathi Manoj & team, followed by Mega Expo Award to the Defence Research Development Organisation (DRDO) in the Space and Defence category.

With the motto of "Science for the Masses", the India International Science Festival 2016 was indeed a call to the country's masses to celebrate science, develop scientific temper, cultivate a scientific attitude, and create & innovate to transform the nation.

OBITUARY

Prof. M.G.K. Menon – Renowned Scientist and Former CSIR Director-General Passes Away

A scientist of repute, visionary science administrator and former Director General of the Council of Scientific and Industrial Research (CSIR) Prof. M.G.K. Menon, passed away at the age of 88 years on 22 November 2016. He was ill for some time.

One among the pantheon of Indian scientists who propelled Indian science after the country's independence, Mambillikalathil Govind Kumar Menon, also known as M.G.K. Menon, displayed high levels of scientific merit and administrative talent.

As a scientist of note, he undertook experiments with cosmic rays to explore the properties of fundamental particles. He was also instrumental in setting up balloon flight experiments, as well as deep underground experiments with cosmic ray neutrinos in the mines at Kolar Gold Fields.

Acclaimed high energy particle physicist and an institution builder, Prof. M.G.K Menon was born on 28 August 1928 in Mangalore, Karnataka. He was famously known as MGK or Goku.

He was awarded a PhD at a relatively young age of 25 by the University of Bristol, UK in 1953. Prof. Menon is known for nurturing the Tata Institute of Fundamental Research (TIFR), Mumbai, which his mentor Homi J. Bhabha founded in 1945. After joining TIFR in 1955, Prof. Menon was handling the affairs of the Institute at the age of 33 years because of Bhabha's involvement with India's fledgling atomic energy programme and became the director of the Institute in 1966, at the age of 38, following Bhabha's untimely death.

In 1971, he was appointed Secretary in the Department of Electronics. In 1971, after the death of Dr. Vikram Sarabhai, he was given additional charge as Chairman of ISRO and the Physical Research Laboratory, Ahmedabad. Subsequently in 1974 he was appointed Scientific Adviser to the Defence Minister and concurrently looked after the DRDO.

In 1978, Prof. Menon was appointed Secretary, Department of Science and Technology and Director-General of the CSIR. He also served as member of the Planning Commission (1982-1989) and was a Minister of State (MoS) in the short-lived V.P. Singh Cabinet, and a Rajya Sabha member from 1990 to 1996.

Fondly called Goku Menon by his friends, the asteroid 7564 Gokumenon was named in his honour in late 2008. Prof. Menon was also awarded the Padma Bhushan in 1968 and the Padma Vibhushan in 1985.

Prof. Menon would be remembered as someone who established and nurtured scientific institutions, with the prominent examples being the TIFR and the transformation he brought about in the National Academy of Sciences. He will also be remembered for his efforts at promoting science and scientific temper and human resource development for science in the country.

CSIR-NAL's Wind Solar Hybrid (WiSH) System Inaugurated at Vivekananda Institute of Technology (VKIT)

On 17 September 2016 students of Vivekananda Institute of Technology (VKIT), Bengaluru, witnessed the inaugural event of the CSIR-NAL's WiSH system (900 W NALWIN + 500 W Solar PV Panels) on the roof-top of the Mechanical Engineering Department. The WiSH system, given its inter-disciplinary character, will add substantial value to the laboratory curriculum of various engineering departments at VKIT.

This was the second installation in the series of the WiSH systems, developed jointly by CSIR-NAL and M/s Aparna Renewables Energy Sources Pvt. Ltd., as part of CSIR-NAL's renewable energy drive for educational institutions. The first system has been installed at Jyothi Nivas College, Koramangala in May 2016 and has been operational since then.

CSMST, NAL- ARES Team

WiSH System at VKIT

The event was flagged off by Shri P. Ravikumar, IAS, Addl. Chief Secretary, Dept. of Energy, Govt. of Karnataka. He appreciated the initiative taken by CSIR-NAL to create interest in young budding engineers so that they can take up research in the area of renewable energy and emphasised the importance of harnessing renewable energy and its relevance to combat climate change.

Shri J.J. Jadhav, Director, CSIR-NAL, encouraged the students to try out new innovative ideas to make the system more efficient. Shri G.V.Balaram, Managing Director, KREDL, emphasised the importance of creating a pool of

technical HR at ITI level for O&M of renewable energy based systems apart from the ongoing efforts at higher level.

Prof. Dr. G.K. Narayana Reddy, Former Vice Chancellor, Karnataka University & President, Janatha Education Society (JES), urged students to strengthen the efforts to harness renewable energy. Dr. J.S. Mathur, Head, KTMD, Dr. G.N. Dayananda, Head, CSMST from NAL and Shri S.T. Narayana Gowda, Vice President, JES and Prof. Kumar, HoD, Mechanical Engineering Dept., VKIT, were present on the occasion.

Cartogram of Shanti Swarup Bhatnagar Awardees

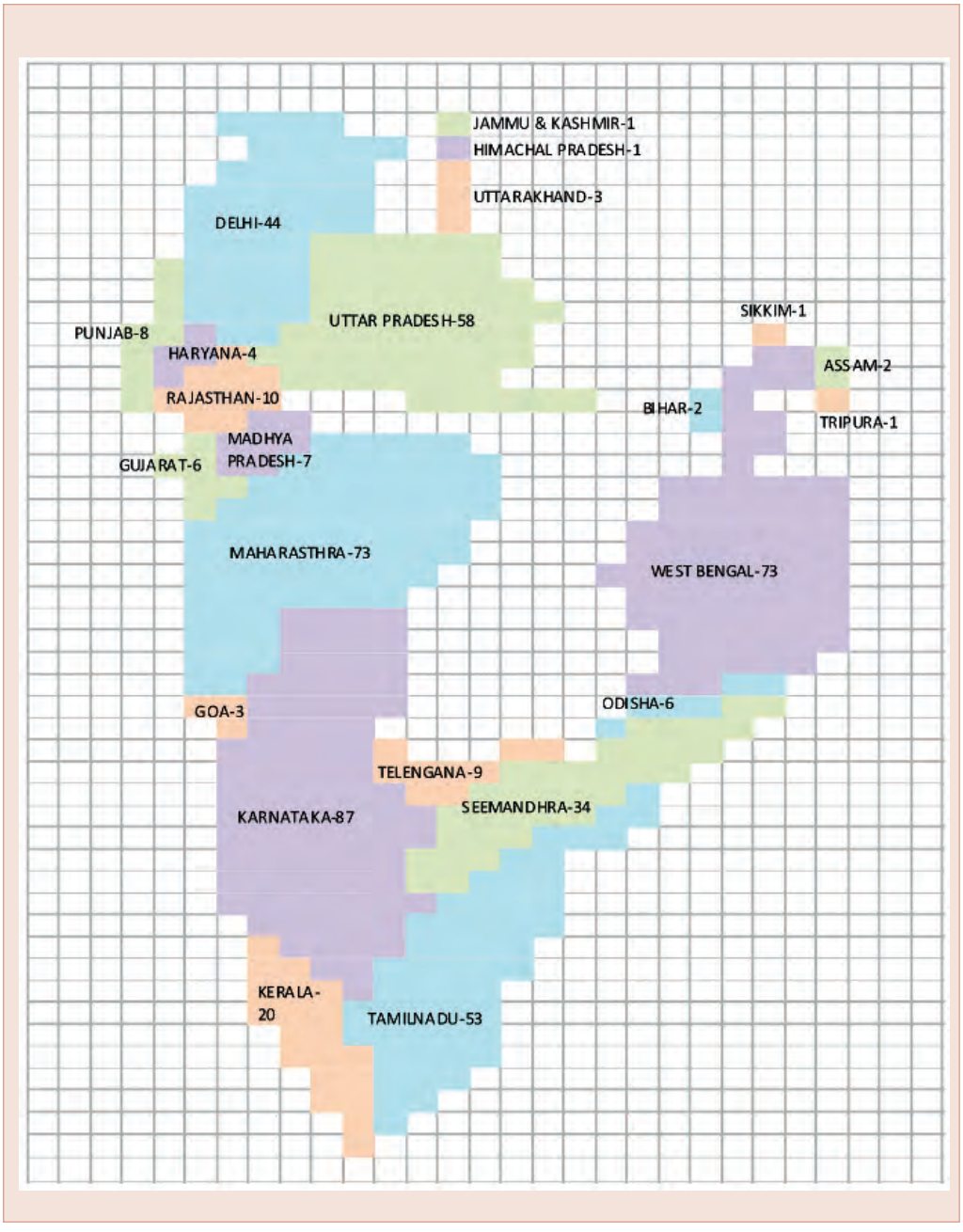
The Shanti Swarup Bhatnagar Prize for Science and Technology is arguably the highest multidisciplinary science award in India. It is conferred each year on Indian scientists below the age of 45 years.

The Table shows a summary of the awards made in each category and the share of the awards made category-wise in seven broad areas. Recently, CSIR, which instituted this award in 1958, compiled the biographical details and professional profiles of 525 awardees who had received this recognition from 1958 to 2016 and this is now available online: (https://en.wikipedia.org/wiki/List_of_Shanti_Swarup_Bhatnagar_Prize_recipients).

In this list CSIR has made an effort to assign each recipient to a state or union territory. There is some arbitrariness in that some are assigned to place of birth, others to place where the recognised work was done, etc. A few are even shown against foreign countries (e.g. USA, Belgium etc.). Of the 525 awardees, such data is available for 506 individuals, who have been shown against 23 states or union territories. As many as 13 states and union territories have drawn a blank according to the list.

Awards Against Each Category

Category	Recipients	% Share
Biological Sciences	93	18
Chemical Sciences	91	17
Earth, Atmosphere Ocean and Planetary Sciences	46	9
Engineering Sciences	75	14
Mathematical Sciences	67	13
Medical Sciences	59	11
Physical Sciences	94	18
TOTAL	**525**	**100**



Cartogram showing the state-wise dispersion pattern of SSB Awardees across India

Some of the "big" states, e.g. Chattisgarh and Jharkhand, are missing.

The figure shows a cartogram representing thematically how the state-wise dispersion pattern is across India. Underlying these patterns are the presence or absence of premier research-focussed institutions and universities in the states and union territories.

Contributed by Dr. Gangan Prathap who is associated with the A P J Abdul Kalam Technological University, Thiruvananthapuram. He was earlier Director of the National Institute for Science Communication and Information Resources (NISCAIR), New Delhi.

R&D Highlights

CSIR NAL's Contribution in the Highly Reflective Mirrors of INSAT Satellites of ISRO

The INSAT class of satellites makes use of sun shield mirrors for cooling the IR detector of Very High Resolution Radiometer (VHRR). These sun shield panels are made of 6061 T651 aluminum alloy. The basic material is chosen for its light weight, high strength and easy machinability.

These aluminum alloy surfaces are to be made as highly reflecting mirrors with stringent specifications such as specular reflectance >95% and diffuse reflectance < 0.05%. Aluminum cannot be polished to this specification as these alloys have very poor scratch resistance. The only solution to this problem is to engineer the surface with triplex layers. The surface modified layer should take up very high level of polishing (surface roughness < 5 nm).

At the CSIR National Aerospace Laboratories (CSIR-NAL), this technology has been successfully accomplished. All the stringent specifications laid by ISRO have been met as evident from the table below.

The first generation mirrors thus produced were successfully integrated in INSAT 2A, 2B, 2E, INSAT 3A and METSAT (Kalpana I). Second generation mirror has also been developed on single-point diamond turned aluminum panels with a roughness level of 2 nm. Complicated conical mirrors of LNA cooler assembly of EUTELSAT have also been successfully developed. This developmental work has resulted in huge foreign exchange savings and also self-reliance in strategic areas.

INSAT 3 DR is the fifth satellite of INSAT 3 series that has been launched by GSLV-F05. It is basically a meteorological spacecraft with two main payloads as Imager and Sounder along with the DRT/SAS & R communication payload. Passive radiant coolers are used to cool and maintain the temperature of IR detectors for meteorological payload operation from 95K (BOL) and 100K (EOL) for effective cooling.

The sun shields which were surface modified at Surface Engineering Division of CSIR NAL have been used in the recently launched INSAT 3DR (8 September 2016). ISRO has sent an appreciation letter elucidating the satisfactory on-orbit performance of INSAT 3DR coolers.

Properties	Specifications	Achieved
Total reflectivity	> 88%	89%
Specular Reflectance Component	> 98%	99%
Diffuse Reflectance Component	< 2%	1%
Angular spread of diffuse component	< 20°	5°
IR emittance	< 0.03	0.03
Surface roughness	2.0 nm	2.0 nm

CSIR-IICB Scientists Discover Disease-causing Event in Obesity-associated Diabetes

Obesity-associated type 2 diabetes is a major health problem in the world, more so with increasing urbanisation and changing lifestyle. Worldwide scientists are putting a lot of effort in understanding the mechanism of the disease and devising more effective therapeutic strategies. Recently, Dr. Dipyaman Ganguly's Laboratory from CSIR-Indian Institute of Chemical Biology (IICB), Kolkata, made an exciting revelation in this field of research.

When people become fat, the Visceral Adipose Tissue (VAT), fatty deposits inside the body that cling around the internal organs, get inflamed (migration of immune cells and their activation). This is a chronic low grade inflammation and is termed as metaflammation. Metaflammation has been found to contribute to eventual insulin resistance and high blood sugar in these people.

But, what triggers this migration and activation of immune cells and resulting inflammation in these fat depots, when people get obese, is not fully known till date and is thus a major challenge in the field.

The CSIR-IICB team, in collaboration with clinicians from ILS Hospitals, Kolkata, and Institute of Postgraduate Medical Education and Research, Kolkata, studied the VAT samples from obese people undergoing bariatric surgery and revealed the sought-after link.

They discovered that in obese individuals increased abundance of a specific chemical, named chemerin, contributes to the initiation of metaflammation, by recruiting a specific immune cell subset called plasmacytoid dendritic cells (or pDCs) into visceral adipose tissue. These cells get activated inside the VAT by activation through specific proteins called toll-like receptor 9 and lead to production of chemical immune mediators named type I interferons. Type I interferons in turn fuel the cascade of immune cell activation.

Production of type I interferons in VAT correlated with the level of insulin resistance and susceptibility to type 2 diabetes in obese individuals. The study was reported recently in *Diabetes* (http://diabetes.diabetesjournals.org/content/early/2016/08/23/db16-0331.long), the reputed journal published by American Diabetes Association (ADA).

This study also led to identification of multiple novel targets for development of new generation anti-diabetic therapies, which would potentially be able to remedy the root pathologies of the disease. The CSIR-IICB scientists are also developing new generation drugs based on these newly identified targets that can potentially be used for treating type 2 diabetes.

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MoUs

MoU Signed Between CSIR-NIO and Pancham Aquaculture Farms Ltd

CSIR-National Institute of Oceanography (NIO), Dona Paula, signed a Memorandum of Understanding with M/s Pancham Aquaculture Farms Limited (PANCHAM), Mumbai, on 23 November 2016 for developing technologies and products for bioremediation of aquaculture wastes/effluents, disease diagnosis, health management and skill development.

This MoU will enable PANCHAM to identify issues affecting sustainability in coastal aquaculture and CSIR-NIO with its vast experience in aquatic resource assessment and environmental management will provide scientific, technical and aquatic health solutions to the sustainable coastal aquaculture and disease management. PANCHAM is one of the largest aquaculture farming joint sector companies under the Government of Maharashtra, India. The present MoU would provide an opportunity for CSIR-NIO to work with stake-holders in this area.

Dr. Prasanna Kumar, Acting Director, CSIR-NIO, on behalf of the Institute and its parental body Council of Scientific & Industrial Research (CSIR), New Delhi and Dr. Ajit Sinha Patil, Chief Technical Officer, PANCHAM, Mumbai, on behalf of the company signed the agreement. CSIR-NIO and PANCHAM will collaborate in the areas of research projects, education and training programmes, Intellectual Property Rights generation, protection and sharing and Commercialisation of joint patents and inventions as per the terms of the agreement.

The signing of the MoU took place on the occasion of the CSIR Technofest 2016 showcasing CSIR-NIO's achievements in the field of marine sciences as a part of the CSIR Platinum Jubilee celebrations.

Seminar/Symposia

CSIR-IICB Organises Indo-Brazil Symposium

CSIR-Indian Institute of Chemical Biology (CSIR-IICB), Kolkata and Instituto de Biofisica Carlos Chagas' Filho, Universidade Federal do Rio de Janeiro, Brazil, had a collaborative joint research project entitled "To decipher biological processes of organisms causing diseases of clinical importance to both the countries" funded by the Department of Science and Technology, Government of India.

CSIR-IICB organised an Indo-Brazil Symposium on "Biochemistry of Kinetoplastid Parasites" during September 19-20, 2016. Dr. Chitra Dutta, Chief Scientist and Acting Director, CSIR-IICB, welcomed both the Brazilian and Indian Scientists.

The main purpose of the symposium was to have an in-depth discussion on different aspects of research being carried out in the two countries. Researches on

Leishmania were presented by Indian scientists and *Trypanosoma* researches were presented by the Brazilian scientists. Twenty five speakers delivered lecture on the two different parasites in the two-day symposium. A poster session was also arranged during the conference.

Prof. Wanderley de Souza, Brazil, in his Keynote address presented a review on structures and organelles that may constitute targets for new compounds against pathogenic trypanosomatids.

There were six scientific sessions. Other speakers included Dr. Emile Barrias of Inmetro from Brazil, Dr. Chandrima Shaha of NII, New Delhi, Dr. Amitabha Mukhopadhyay of NII, New Delhi, Dr. Chinmoy K. Mukhopadhyay of Jawaharlal Nehru University, New Delhi, Dr. Susanta Kar and Dr. Anuradha Dube of CSIR-CDRI, Lucknow and Dr. Syamal Roy of Panchanan Barma University. From CSIR-IICB the speakers were Dr. Chitra Mandal, Dr. Subrata Adak, Dr. S. N. Bhattacharyya, Dr. Nahid Ali, Dr. P. Jaisankar and Dr. H. K. Majumder.

During the tenure of the Indo-Brazil project (2012-2016) several visits between these two countries were made to achieve high science through the collaborative research. The symposium witnessed strong scientific interactions among the participants of both the countries.

Glimpses of the Programme

International Symposium on "Microbial Responses to Ocean Deoxygenation" Organised at CSIR-NIO

An International Symposium on "Microbial Responses to Ocean Deoxygenation" in association with UNESCO-Scientific Committee on Oceanic Research (SCOR) was inaugurated at the hands of Dr. Mirdula Sinha, H.E., Governor of Goa, in the presence of Dr. Bess Ward, Chair, SCOR Working Group 144, Princeton University, USA, Dr. SWA Naqvi, Former Director, CSIR-NIO, Dr. Prasanna Kumar, Director, CSIR-NIO and Dr. N. Ramaiah, Chief Scientist and Convenor of the Symposium, CSIR-NIO.

The symposium was organised by the CSIR-National Institute of Oceanography (NIO), Goa during 3-5 December 2016. The International Symposium was meant to advance knowledge on oxygen-deficient marine waters.

Ocean deoxygenation directly impacts marine ecosystem functions and services, through changes in food web structure and biodiversity. As oxygen levels decline, energy is increasingly diverted away from higher trophic levels into microbial community metabolism resulting in significant environmental changes to food web dynamics, impacts on fisheries, on fixed nitrogen losses, possible accumulation of hydrogen sulfide, and production of climate active trace gases.

The symposium also aimed at synthesising available information on coastal and open-ocean waters to provide a unified conceptual microbial and biogeochemical model, which will help direct future research.

"Goa has become a very popular place for national and international meetings and events," said Dr. Mirdula Sinha, H.E., Governor of Goa, as she welcomed the delegates of the international symposium to the beautiful state of Goa. She emphasised that, "As the overall volume and environmental impact of global oceanic activity increases, there is an

Dr. Mirdula Sinha, Governor of Goa addressing the audience

increasing need to deepen our study on the various aspects of oceans in order to address the emerging challenges, especially in regard to the issues of climate change and environmental pollution".

Further, she stated**,** "Scientists across the globe have a stupendous task of unraveling the hitherto unknown knowledge and facts about oceans. I hope that the scientific community will bring out fruitful results from their studies and research to enable the nation to fulfill its objectives, including exploitation of precious resources, preservation of marine eco-systems, mitigation of natural calamities and strengthening of the nation's food security."

Earlier, Dr. Prasanna Kumar, Director, CSIR-NIO welcomed the gathering and hoped the symposium would achieve its goals.

The Abstract Volume of the symposium was released at the hands of Dr. Mirdula Sinha, H.E., Governor of Goa. The inaugural programme ended with a distinguished lecture by Dr. SWA Naqvi, on "Is there a methane effect on nitrogen loss in anoxic waters?"

Dr. N. Ramaiah proposed the vote of thanks.

Release of the Abstract Volume

Events

World Science Day Celebrations at CSIR-NISCAIR

On the occasion of the UNESCO World Science Day for Peace and Development 2016, a day-long programme, "Single Bond to Triple Bond: Encouraging Scientist-Teacher-Student Interaction" was jointly organised by the CSIR-National Institute of Science Communication and Information Resources (CSIR-NISCAIR) and United Schools Organisation of India (USO) on 10 November 2016.

Noted scientists Dr. Narendra K. Sehgal, Dr. A.K. Pandey, Dr. V.K. Srivastava, Dr. B.K. Tripathi and Director CSIR-NISCAIR, Dr. Manoj Kumar Patairiya interacted with school science teachers who participated in the programme.

Speaking at the programme, Dr. Manoj Kumar Patairiya, Director, CSIR-NISCAIR, pointed out that the Teacher-Student bond is a rather strong, time-tested and important one that not only educates but fosters interest in science in school children. However, the Scientist-Teacher and Scientist-Student bonds are either weak or non-existent, he added. Dr. Patairiya stated that at a time when students are getting weaned away from science, strengthening the Scientist-Teacher and Scientist-Student bonds can encourage students to pursue science. Dr. Patairiya also added that teachers can play a vital role in the Scientist-Student engagement and that the day-long programme on the occasion of the World Science Day was a suitable platform for the scientists and teachers to brainstorm on encouraging the interactions between scientists, teachers and students.

Dr. A.K. Pandey, Chairman, MP Private Universities Regulatory Commission, opined that it is essential to educate the students about the many Indian contributions to science. He was of the view that teachers need to communicate about the pioneering contributions of great Indian scientists like Aryabhatta and others of ancient times. He said that highlighting the life and works of famous Indian scientists is generally neglected and awareness of their contributions can inspire and develop the confidence among the youth. Dr. Pandey stated that the process of attracting students to science should be initiated from the early stages of schooling.

Noted science communicator and Kalinga Prize Winner, Dr. Narender K. Sehgal who chaired the panel discussion said that science teachers should carry out simple experiments in the schools to enthuse the students. He said that the teachers can be the early role models for students. Dr. Sehgal was of the view that a conducive environment should be provided to the students that encourages them to ask questions and carry out experiments. Dr. Sehgal strongly supported the need for internalising the method of science among the youth.

Dr. Binod Kumar Tripathi, Joint Director, NCERT delved on the National Curriculum Framework (NCF) 2005. He said that it is the NCF that regulates the subject teaching in the classrooms and textbooks play a very important role in imparting education. Dr. Tripathi said that teachers have been traditionally playing the role of communicators resulting in passive classrooms. Dr. Tripathi stated that the teachers have to shift their role and become facilitators who can provide

a suitable environment to usher in active classrooms where students can explore, experience, and interact not only with teachers but with other students and even with scientists to develop mastery.

Interacting with the panelists, the school science teachers highlighted the challenges faced by them in teaching science. A basic problem that teachers of many schools faced is the inability of the school children to read and write properly, particularly in English which the teachers reported was a major challenge in the teaching of science. The teachers also stated that science labs in some schools did not have the basic instruments for carrying out experiments and if they have the instruments then the students did not have easy access to them resulting in lack of practical knowledge. Teachers were of the view that making the practical works compulsory at early stages help in retaining the student's curiosity as they move to higher classes.

The teachers conceded that there were some exceptional students who have immense interest in science and were more inquisitive but owing to the pressure of having to complete the syllabi and other compulsions, the teachers were not able to match the enthusiasm of such exceptional children and sought to know how scientists can help.

The panelists discussed and responded to the issues raised by the teachers. It was concurred that some of the issues were with regard to language abilities of the students and creating a conducive environment for teaching and learning of science in schools required putting in place suitable mechanisms in the school education system. It was also agreed that owing to financial constraints, schools found it difficult to purchase even basic instruments that were required for carrying out simple experiments. Even in the face of such limitations, the teachers should look for opportunities to pursue their demonstrable interest in science. The schools should also strive to seek support and engage with scientific institutions in the country.

Dr. N.K. Sehgal said that every child is curious and unfortunately, we unknowingly limit or lower their spirit of enquiry by our non-encouraging actions or words. He said that the science teachers have a vital role in developing scientific temper in school students and that is best done by answering all questions asked by children and encouraging them to ask more questions.

Dr. Patairiya said institutions such as CSIR have mechanisms in place that allow school students to engage with the scientists in the various R&D laboratories.

Based on the discussions it emerged that scientists can play a vital role in furthering science in schools. It was agreed that visits by students and teachers to laboratories and visits by scientists to schools should be pursued systematically.

In the post-lunch session, the teachers were given a guided visit to the CSIR-NISCAIR's Raw Materials, Herbarium and Museum Division, Data Centre and Digital Printing Facility.

The following are the set of recommendations made at the close of the programme:

- Periodic programmes of this nature that allow barrier-free interaction and communication between scientists and teachers should be organised from time to time as the benefits of such programmes have the potential to reach the last child in the classroom.
- Teachers should go beyond the role of a communicator and become a facilitator so that there is a shift from the present passive classroom to active classroom that focuses on allowing students to construct knowledge and attain mastery based on experiences.

- Mechanisms should be evolved for rural school children to engage with scientists.
- Science practicals should be introduced at an earlier level and the practical should be connected to occurrences, events and experiences of students in daily life.

Earlier in the day, Ms Nina Jain, Secretary General, United Schools Organization of India welcomed all the guests and participants.

Contributed by Purva Gupta, Research Intern, CSIR-NISCAIR

CSIR-IICB Participates in 20th National Exhibition in Kolkata

CSIR-IICB along with four more CSIR laboratories of Eastern Zone participated in the 20th National Exhibition organised by the Central Calcutta Science & Culture Organisation for Youth during 10 to 14 August at Dumdum, Kolkata. The theme of the exhibition was 'Vision of India for a new era'. More than one hundred Government organisations participated in this exhibition to showcase and share their work and endeavour with the common people of this country.

Glimpses of the Exhibition

As a part of the CSIR-pavilion, CSIR-IICB displayed popular and brief information about their products available in the market and important technologies having strong potential towards affordable healthcare.

During the five days children, students and the general public of different ages and categories visited the exhibition as well as the CSIR pavilion with great enthusiasm to acquire information.

The objective of participating in this exhibition was to attract students and the common

masses towards science and scientific research and also to draw the attention of industries and business houses towards successful tie-up with CSIR to take the technologies to the market and to create more job opportunities, and also to boost the Indian economy.

Among the CSIR-IICB exhibits/ displays were the success story of CSIR-IICB since its inception, the available products rolled out from CSIR-IICB like Asmon (herbal medicine for asthma) Prostalyn (herbal drug for prostate hyperplasia), Easy KA Test (Dipstick kit technology for detection of Kala-azar and PKDL). The institute also displayed the available technologies to combat mitochondrial diseases, Chronic Myeloid Leukaemia (CML), gastric ulcer and biomarker for valvular heart diseases.

On the concluding day, Shri Y.S. Chowdary, Hon'ble Union Minister of State for Science and Technology & Earth Sciences and Prof. Saugata Roy, Hon'ble Member of Parliament, Lok Sabha were present.

The minister in his speech mentioned that the theme of this exhibition was very broad based. He emphasised on public-private partnership with the provision of benefit sharing and to promote the deliverables for the benefit of mankind. He also stressed on promoting large R&D facilities, set up benchmark for R&D, funding mechanisms, modifying IPR policy, etc. The minister advised to go in for green manufacturing technologies and stressed on industries involving green and environment friendly resources. He also stressed on quality of education and advocated nourishing technology-business incubators.

Talking about IICB-TRUE, the facility recently set up by CSIR-IICB, he invited interested industries and entrepreneurs to take this opportunity of incubation and innovation centre established at Kolkata. Shri Chowdary said that three things – education, healthcare and agriculture – should be properly focussed and pursued to achieve high economic growth to make India the global superpower.

CSIR-IICB Organises Students' Research Festival

The annual students' research festival was organised at the CSIR-Indian Institute of Chemical Biology (CSIR-IICB), Jadavpur campus, Kolkata, on 16 September 2016. The programme was aimed at portraying the progress of scientific research performed in the research laboratories of the Institute.

There were nine presentations by research scholars from the biology and chemistry divisions, who emphasised the significance of translational approach to basic research. Significant ideas and observations were communicated by the speakers to the highly dynamic audience, who thoroughly contributed in the brainstorming discussion sessions. The lectures represented the interdisciplinary, yet unifying nature of research incorporating chemistry, biology and information technology, being carried out at the Institute.

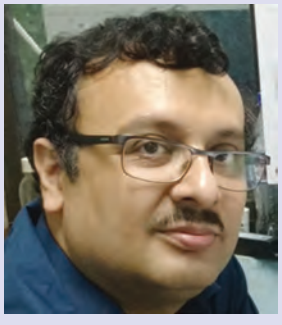
The talks were based on wide-ranging topics such as unearthing the underlying mechanisms of metabolic disorders like Type 2 Diabetes, parasitic infestations like Leishmaniasis and proteopathies like Amyotrophic Lateral Sclerosis. One of

the speakers highlighted the therapeutic properties of novel bioactive secondary metabolites isolated from plants found in the Indian subcontinent, while another talk enlightened the audience about how extracellular microRNAs (miRNA) which are present in biological fluids, hold great potential as disease biomarkers and in the formulation of novel therapeutics.

Students delivering presentations

Honours & Awards

CSIR-IICB Scientist Bags DBT National Bioscience Award for Career Development



Dr. Suvendra N. Bhattacharyya, Principal Scientist and Head of Molecular Genetics Division at CSIR-Indian Institute of Chemical Biology (CSIR-IICB), Kolkata, has won the prestigious *National Bioscience Award for Career Development* for the year 2015.

The award, given by the Department of Biotechnology, Govt. of India, recognises outstanding contributions of young scientists below 45 years of age in basic and applied research and provides grant for research for their career development. The selection of candidates for the award is made on the basis of recommendations of a Selection Committee. Dr. Bhattacharyya has won this award for his notable contribution in miRNA research.

CSIR-IICB Scientist Elected Fellow of the Royal Society of Chemistry (UK)

Dr. G. Suresh Kumar, Chief Scientist, CSIR-Indian Institute of Chemical Biology (CSIR-IICB), Kolkata, has been honoured with the Fellowship of Royal Society of Chemistry (FRSC), UK, in recognition of his outstanding research contributions in the field of chemical sciences.

Dr. Kumar has been selected for his more than three decades of research efforts in basic sciences, which resulted in the detailed understanding of the anticancer activity of many natural alkaloids through binding studies with nucleic acids and proteins. His research contributions in the areas of chemical biology and biophysical chemistry have been well recognised worldwide through more than 5000 citations for his 200 odd peer reviewed research articles in this field.

Appointments

Dr. S. Prasanna Kumar takes charge of CSIR-NIO as Dr. SWA Naqvi Superannuates

Dr. S. Prasanna Kumar, Chief Scientist at CSIR-NIO, has taken charge as Acting Director of CSIR-NIO, with effect from 1 September 2016 on superannuation of Dr. SWA Naqvi.

Dr. S. Prasanna Kumar, a Physical Oceanographer, is Chief Scientist and Head of Physical Oceanography Division at the National Institute of Oceanography, Goa, India. He has more than 30 years of experience in carrying out multi-disciplinary, multi-institutional studies of national and international importance.

He obtained his Bachelor of Science degree in Physics from University of Kerala in 1978 and Master of Science in Physical Oceanography from Cochin University of Science and Technology in 1980 by securing second rank. Subsequently he got a doctorate in coastal processes from Cochin University of Science and Technology in 1987. He joined the National Institute of Oceanography (NIO), Goa as Scientist in 1982.

At NIO, Dr. Prasanna Kumar studied coastal processes and dynamics associated with barrier beach system and subsequently took up studies related to underwater acoustic propagation to establish an acoustic tomography system for monitoring the ocean interior remotely. From 1992 till date his research interest has been in understanding the role of physical forcing in mediating biogeochemical changes in the Indian Ocean and its relevance to climate change. He is also a Professor at Academy of Scientific and Innovative Research (AcSIR), School of Oceanography, NIO, Goa.

Dr. Prasanna Kumar has received several awards and recognitions, including the STA (Science and Technology Agency) Fellowship of Japanese Government and INSA-Royal Society Fellowship for the year 1995. He has guided 4 Ph D students and has 70 publications in national and international journals of repute.

COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

HUMAN RESOURCE DEVELOPMENT GROUP

CSIR Complex, Library Avenue, Pusa, New Delhi 110 012

NOMINATIONS INVITED

CSIR Young Scientist Awards 2017

The Council of Scientific & Industrial Research (CSIR) invites nominations for the CSIR Young Scientist (YS) Awards for the year 2017. The awards are to be given for research contributions made primarily in India. The nominee should be a regular Scientist (as per CSRAP Rules) of CSIR system and should have joined the CSIR laboratory on or prior to 26 September 2016. The age of the nominee should not be **more than 35 years as on *26 September 2016***.

The YS Awards are given annually in the following disciplines: (1) Biological Sciences, (2) Chemical Sciences, (3) Earth, Atmosphere, Ocean and Planetary Sciences, (4) Engineering Sciences, and (5) Physical Sciences (including instrumentation). The YS Award comprises a citation, a cash award of Rs 50,000(Rupees fifty thousand only)*, and a plaque.

Nominations addressed to **Scientist Incharge, SSB YSA Unit, Human Resource Development (HRD) Group, CSIR Complex, Library Avenue, Pusa, New Delhi 110 012** should be sent as per the prescribed proforma (original + one copy) latest by **31 January 2017**. A CD/DVD/USB flash drive is also required containing digital photograph (in JPEG format), duly filled proforma and significant publications (*in PDF format*) of the nominee.

The details of the YS Award and the prescribed proforma for nomination may be obtained from above address or may also be downloaded from website: www.csirhrdg.res.in

**Likely to be revised*

Printed and Published by

Dr. Manoj Kumar Patairiya on behalf of CSIR-National Institute of Science Communication And Information Resources
Dr. K.S. Krishnan Marg, New Delhi -110 012 and printed at NISCAIR Press
Dr. K.S. Krishnan Marg, New Delhi -110 012
Editor : Hasan Jawaid Khan; **Assistant Editor :** Sonali Nagar; **Editorial Assistance :** Neelima Handoo
Design: Neeru Sharma & Sarla Dutta; **Production:** Pankaj Gupta
Phone: 25848702; Fax: 25847062; E-mail: csirnews@niscair.res.in; hjk@niscair.res.in
Website: http://www.niscair.res.in
Please direct all Subscription-related queries to:
Sales & Distribution Officer, NISCAIR; E-mail: sales@niscair.res.in; Phone: 25843359
Annual Subscription: Rs 500; Single Copy: Rs 50.00
RN 4512/57