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CSIR NEWS

Progress, Promise and Prospects

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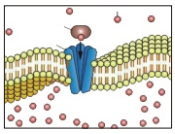


CEERI Centre, Chennai, Transfers its Technologies to Industry

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

Shri Prithviraj Chavan, Hon'ble Minister for Science & Technology and Earth Sciences Visits IICT and NIO

Indian Institute of Chemical Technology (IICT), Hyderabad

Shri Prithviraj Chavan, Hon'ble Minister for Science & Technology and Earth Sciences (Independent Charge), Government of India and Vice President, CSIR, visited the Indian Institute of Chemical Technology (IICT), Hyderabad, on 2 February 2010.

Shri Prithviraj Chavan, Hon'ble Union Minister of S&T and Earth Sciences, laying the foundation stones of centers of excellence at IICT

Addressing senior scientists of IICT and staff members, the Hon'ble Minister emphasized that some of the crucial areas that CSIR is all set to focus on are: climate change, affordable health care, non-fossil energy, water security and food, including development of appropriate technologies. He also pointed out that the growth rate of scientific output of the country, determined by the publications was 12% as compared to the global growth rate of 4% and it was 19% in case of China. He asked scientists to work very hard to compete with China in the field of developing new technologies and manufacturing of finished products.

The Hon'ble Minister was apprised of the major research activities of the Institute by a presentation made by Dr. J. S.Yadav, Director, IICT. The Minister laid the foundation stones of the following centres of excellence: Centre for Chemical Biology, Advanced Centre for Lipid Research and Centre for Pheromone Chemistry. He visited some of the important R&D labs and interacted with the research workers.

Later in the evening, an industry meet was organized, where the Minister addressed the captains of the industry, interacted with them and listened to their advice and problems patiently.

To provide a quick view of the major research activities of IICT for the last decade, a poster display was organized which highlighted the main research programmes and achievements. Samples of important products like drugs, agrochemicals and oils were also displayed for the benefit of the Chief Guest.

National Institute of Oceanography (NIO), Goa

Shri Prithviraj Chavan, Hon'ble Minister for Science & Technology and Earth Sciences (Independent Charge) visited the National Institute of Oceanography (NIO), Goa, on 15 February 2010. Shri Chavan was apprised of the work being carried out at the Institute, which includes services to Indian industry and research of strategic importance to the country. He also visited some of the laboratories of NIO to understand the activities and projects of national importance being pursued at NIO.

While addressing the staff of NIO, the Minister informed that the Government of India has recently provided considerable support towards infrastructure development for the country's research and educational institutions. He also expressed that generous support is now being made available for higher education in science by providing scholarships at different levels. Also, new institutes of excellence are being opened. He hoped that this investment will attract the young generation towards pure science studies, which act as a catalyst to accelerate scientific and industrial research in the country. He also appreciated the research work being carried out at NIO and indicated that NIO's role fits well in many of the missions of the country.

Shri Prithviraj Chavan, Hon'ble Union Minister of S&T and Earth Sciences inaugurating the Biology Extension wing (*left*) and being explained the NIO Project details (*right*)

The Hon'ble Minister then inaugurated an extension of the main building of the Institute that adds 3100 sq.m. of floor area having special facilities to support multi-disciplinary research, including sedimentary analyses, isotope studies and microbial ecology studies. The new facility will also have a 66 sq. m. cold room maintained at minus 20º C to store samples, and two 135 sq.m. of cold storage maintained at minus 4º C to preserve sediment cores besides 'clean rooms' of 70 sq. m. with controlled environment.

Talking to the press, the Hon'ble Minister stressed on the need for research in the EEZ of India and Antarctica, and expressed his satisfaction on the work being carried out by NIO and by the National Centre for Antarctic and Oceanic Research of the Ministry of Earth Sciences located at Vasco-da-Gama.

Director General, ICMR Visits CSIO

Dr. Vishwa Mohan Katoch, Secretary to the Government of India, Department of Health Research (Ministry of Health & Family Welfare) and Director General, Indian Council of Medical Research (ICMR), visited the Central Scientific Instruments Organization (CSIO), Chandigarh, on 8 January 2010. Dr Katoch was introduced to the scientists of CSIO and taken round the various laboratories namely, Medical Instrumentation, Photonics, Food Processing, Instrumentation Lab and Bio-Molecular Electronics and Nano Technology Labs. He showed keen interest in various diagnostic devices for the measurement of different physiological parameters and also in the work carried out by the laboratory on LINAC system. The latter is currently being used for patient treatment at two major cancer treatment hospitals in the country. He suggested that CSIO should work out a plan for the large scale production of this important equipment, which is needed for cancer treatment.

Dr. Katoch also took keen interest in prosthetic devices and low vision aids for orthopedically and visually impaired patients respectively. He was equally impressed with the high science research areas such as Bio-Photonics for the detection of pathogens for early detection of diseases. While appreciating the work done by CSIO, he expressed his desire to have collaborative R&D programmes between CSIR-CSIO and ICMR institutions in some cutting-edge areas of research.

Dr. Vishwa Mohan Katoch, Director General, ICMR, interacting with scientists of CSIO while visiting one of the labs of CSIO

Risorine — A Novel CSIR Drug Curtails TB Treatment

Dr. P. Cheena Chawla

Our battle against the disease-causing bugs is endless. Since antiquity scores of infectious diseases caused by bacteria, viruses and fungi have affected millions of people worldwide. Fighting these formidable foes has not been easy as these tiny life forms that cause life threatening diseases in human beings are clever enough to thwart all our attempts made to pin them down. Take for example, a wide range of antibiotics – the potent tools to kill many harmful bacteria – that are turning ineffective in the wake of development of resistance in microorganisms to these drugs. Moreover, due to the indiscriminate use of antibiotics there is an increasing microbial resistance to many new antibiotics as well.

To make matters worse, most antibiotics have their well known side effects on the human body. This is particularly a matter of great concern for diseases like tuberculosis for which patients have to take long-term treatment with drugs namely, rifampicin and isoniazid that have many adverse reactions on different organs of the body. In this light, the development of special molecules called 'bioenhancers' is a scientific breakthrough, as bioenhancers have no drug activity of their own but are uniquely endowed with properties for promoting the biological activity or simply the uptake of other drugs.

The bountiful Nature is replete with natural products, mainly contained in plant sources, which have played an important role in the development of drugs. Synergism – increase in the action of one biomolecule by another unrelated chemical – is the hallmark of herbal drugs. For example, 'berberine' is an anti-microbial alkaloid isolated from *Berberis fremontii* that has very weak anti-microbial activity in solution. However, in combination with a compound called 5-methoxy hydnocarpin (5-MHC), the anti-microbial activity of berberine is increased by 200-folds against the bacterium, *Staphylococcus aureus*.

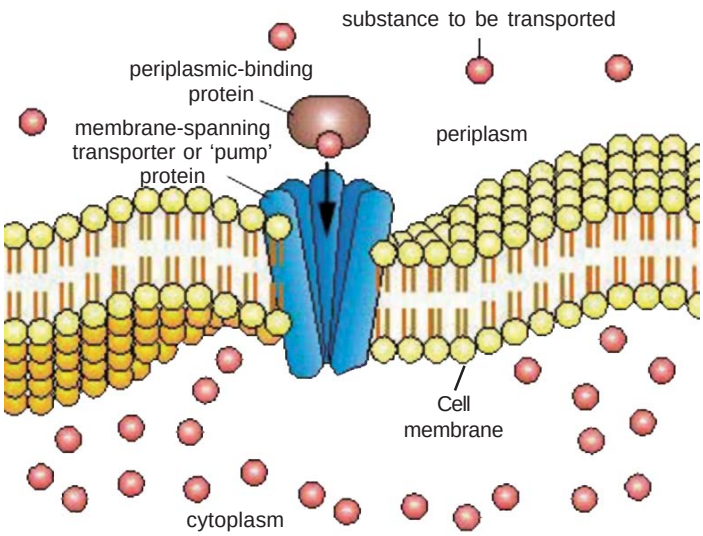
Black pepper is a precious herb, popular since ancient times for its culinary and medicinal values

Similarly, such bioenhancer activity of cow-urine distillate in a composition containing antibiotics and anti-cancer agents is also well known. Undoubtedly, bioavailability enhancement helps to lower dosage levels and shorten the treatment course.

In a significant development, Indian Institute of Integrative Medicine (IIIM), Jammu, in public private partnership with Cadila Pharmaceutical Ltd, Ahmedabad, has released a new drug formulation against tuberculosis called '*risorine*' that contains reduced dose (200 mg) of rifampicin + isoniazid (300 mg) + piperine (10 mg) found to be bioequivalent to standard rifampicin regimen. Launched in November 2009, this indigenously developed drug formulation could drastically cut short the duration of TB treatment. Risorine has been approved for marketing by Drug Controller General of India after successful completion of all the phased clinical trials.

The R&D work on developing this formulation was started in the erstwhile Regional Research Laboratory, Jammu now renamed as Indian Institute of Integrative Medicine by Dr. C. K. Atal, former Director, in early 1980s. On scrutinizing a large number of ancient Indian Ayurvedic formulations used in the treatment of a wide range of diseases, it was observed that in a majority of formulations '*Trikatu*' was used as one of the ingredients. *Trikatu* is a combination of three herbal products namely, *Piper nigrum* (black pepper), *Piper longum* (long pepper) and ginger.

Trikatu comprises ginger (1) black pepper l(2) and long pepper (3)

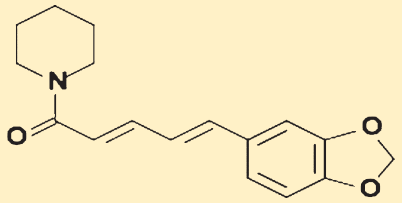


Cell transporter proteins pump specific substances in and out of cells

Concerted research efforts resulted in the isolation of an active alkaloidal molecule called 'piperine' from piper species, which was shown to increase the bioavailability of specific drugs. On combining piperine with many common drugs, a reduction of dose of that drug was observed for the same pharmacological effects, without any activity of piperine itself. This is due to enhanced uptake of the drug by body cells, and also because the drug remains available in blood for long durations.

Popularly known as bioenhancers', such compounds simply enhance the bioavailability and bio-efficacy of other drugs with which they are combined, without any pharmacological activity of their own at the same dose level. Scientists at IIIM, Jammu, tested the bioenhancing activity of piperine on various drugs, which ultimately resulted in designing the risorine formulation useful for the treatment of tuberculosis. The work, now patented, has been documented in various national and international journals particularly in India, Europe and USA.

Molecular structure of piperine



The bacterium, *Mycobacterium tuberculosis*, infects one in three people worldwide and kills about 3 million victims every year on a global scale. Nearly 9 million new TB cases add to the TB burden of our planet annually. TB is a major public health problem in our country as India accounts for one-fifth of the global TB incident cases. Besides this huge burden of TB patients, the cases with multi-drug resistant tuberculosis (MDR-TB) are on the rise as many patients discontinue with the TB drugs, primarily rifampicin and isoniazid, due to long treatment and unpleasant side effects of the drugs.

Rifampicin has been a first line anti-tubercular drug for a long time. It has been used for treating tuberculosis since 1960s and is known for causing many side effects. Also, the levels of rifampicin in blood decrease over a period of time due to the auto-induction of drug metabolizing enzymes by rifampicin.

In fact, cells of the human body contain on their surface membranes certain proteins called 'transporter' proteins that 'pump' specific substances out of cells, for being taken away by the blood.Undoubtedly, these proteins can protect cells from toxic overloads of many substances, but at the same time they can also spoil the efficacy of otherwise beneficial drugs, like rifampicin, by pumping them out of the cells before they can act. One of the most important such 'pump' proteins is *p-glycoprotein*, which is found in the membranes of cells in the intestines, brain, liver, pancreas, kidneys, and other tissues.

At the molecular level, piperine acts

by suppressing *p-glycoprotein* and *cytochrome P450* enzymes, which counteract the metabolism of rifampicin via these proteins, thus enhancing the oral bioavailability of rifampicin. Piperine also decreases the intestinal production of glucuronic acid, thus allowing more substances to enter the body in active form. This wonder compound thus allows many drugs to enter and remain within their target cells for longer durations.

Management of TB with risorine is poised to have remarkable benefits as the use of bioavailability enhancers, in general, not only increase the bioavailability for a drug, but also help reducing the cost of treatment and incidents of drug resistance while minimizing adverse drug reactions. In this new formulation, the rifampicin dose has been reduced from 450 mg to 200 mg along with isoniazid and piperine, with the same pharmacological activity as used earlier. Risorine could even replace the currently used rifampicin for 'Directly Observed Treatment Short-course' (DOTS) therapy, run by the Central government in association with different States.

According to the team of scientists at IIIM, risorine is very safe, effective and economical for the management of tuberculosis. In other words, with use of risorine TB patients would get cured in a shorter span of treatment. Interestingly, in a multi-centric clinical trial conducted across India in patients with radiologically confirmed diagnosis of pulmonary tuberculosis, more than 90% of the patients treated with risorine were cured of tuberculosis with lesser side effects. Cadila Pharmaceuticals is all geared to take this new formulation for tackling TB to foreign markets like China, Russia and African countries and expects to multiply its turnover from this segment by over ten times in the coming few years.

A marvel of the plant world and a sure gift to humankind, the black pepper has both culinary and medicinal values. Among its myriad medicinal properties, the one that makes its compound piperine a bioenhancer holds immense promise for making 'dose economy' drugs that particularly suit the health needs of people in the developing countries.

CEERI Centre, Chennai, Transfers its Technologies to Industry

The Central Electronics Engineering Research Institute (CEERI), Chennai Centre, has entered into agreement for commercialization of its technologies — X-ray Imaging Based Mango Sorting System and Plastic Waste Sorting System for Recycling of PET Materials — with M/s Proteck Circuits & Systems Pvt. Ltd., Chennai and M/s Dintis Technologies Pvt. Ltd., Bangalore, respectively at a Technology Transfer function held on 9 December 2009 at the Conference Hall, CSIR Madras Complex, Chennai.

Technologies Transferred

X-ray Imaging Based Mango Sorting System

Mango is one of the most important fruits in India. The internal quality of mango is a concern for consumers and export traders. The Indian mango variety viz. *alphonso* is the most important fruit for export. This variety, however, suffers from physiological disorder of spongy tissue growing in the pulp portion of the mango because of which, its export value and consumer satisfaction are affected. So far the causative factor of this occurrence has not been identified and there is no proven technology for its control as yet.

Certain varieties of mango viz., *neelam and totapuri* have seed weevil or stone-weevil infestation, which can affect the processed pulp. Due to this, the exporters and processors are unable to provide quality mangoes and pulp free from spoilage. As the presence of spoiled pulp inside the mango is not visible to human eye, it is not possible to detect affected mangoes. Till now, certain countries had banned the import of Indian mangoes because of this. In such a scenario, the immediate

Mango Sorting Machine

Displaying technology transfer documents (*from left*): Dr Chandra Shekhar, Director, CEERI; Mr Chander Parkash, Director, DST and Mr K. Balasubramanian, MD, M/s Proteck Circuits & Systems Pvt. Ltd., Chennai

priority is to detect spongy tissue and seed weevil infected mangoes by instrumental means and grading good quality mangoes for consumption and export.

In view of the above, CEERI's Chennai Centre, at CSIR Madras Complex had taken up a project with funding support from the Department of Science and Technology (DST), New Delhi. Under this programme, a totally non-destructive indigenous technology was developed by employing X-ray imaging technique to sort the mangoes based on internal disorders in real time. This system is poised to be a boon to mango growers, exporters, traders and processing industries. The X-ray scanned mangoes are safe for consumption and there is no health hazard. The developed system was also demonstrated to various user agencies, equipment manufacturers and potential entrepreneurs during a Technology Awareness Workshop held on 4 and 5 June 2009 at Chennai. This technology has now been transferred to M/s Proteck Circuits and Systems Pvt. Ltd., Chennai, for commercialization.

Plastic Waste Sorting System for Recycling of PET Materials

Plastics are ubiquitous and contaminating the environment. Disposal of plastics has become a technological and social subject that has created and attracted a lot of attention from researchers, business people, politicians, environmental activists and the general public. One way to reduce the environmental pollution, owing to plastic waste comprising disposables and durables, is to recycle them. That is, to recover the used plastics from municipal or industrial waste streams and convert them into new useful objects.

Recycling of plastic-wastes is steadily gaining importance because of the efforts on conservation of oil resources and the shortage of disposal sites. The plastic waste is separated into different material types by manual sorting, to obtain recyclable materials of high value. The purity of sorting fractions obtained in this way is not sufficient for direct recycling of pure polymers. Moreover, it is uneconomical and the working conditions are not only unpleasant but even hazardous to health. Considering the above difficulties, an automatic plastic sorting approach, involving automatic identification of materials followed by a mechanical sorting, appears as an attractive alternative to manual sorting.

NIR spectroscopy helps in identification of individual plastic types and offers a promising approach to waste sorting. Online inspection technology preferably makes use of NIR spectrometry, which is capable of operating rapidly. Spectroscopic methods are non-invasive and non-destructive measuring systems. These

Plastic Waste Sorting Machine

Dr Chandra Shekhar, Director, CEERI, Pilani (*right)* and Mr Dintis Thomas, MD, M/s Dintis Technologies Pvt. Ltd., Bangalore (*left*) exchanging the Technology Transfer Agreement documents. Dr Nagesh R. Iyer, Coordinating Director, CMC and Director, SERC is looking on

methods provide spectral data from which meaningful information can be rapidly extracted for analysis. The detection speed should however, match the specific situation created by the type and size of arriving parts. The identification is very accurate in terms of its ability to distinguish different plastics, and is reasonably precise.

On realizing the importance of the need, CEERI Centre, Chennai, has developed an NIR spectroscopy based plastic waste sorting system with funding from the Ministry of Environment and Forests. The system, consisting of a high-throughput NIR spectrograph and specially designed collection optics, is used to record the Near Infra Red spectra from disposed consumer plastic packaging wastes conveyed on an industrial conveyer belt. Spectra of different plastics are recorded between selective narrow ranges of the NIR spectrum.

The plastic waste typically includes six types of materials namely, poly-ethylene (PE), poly-ethylene-teraphthalate (PET), poly-propylene (PP), poly-vinyl-chloride (PVC), high density polyethylene (HDPE) and poly-styrene (PS). The experimental lab model classifies them and sorts PET alone. Through the existing set-up, PET materials can be sorted close to 100% with up to 200 kg per hour throughput. The maximum throughput is limited by the speed of the spectrograph used in the system. Higher throughputs up to 1 tonne/hr can be achieved by using high-speed spectrographs and faster sorting routine. This technology is now transferred to M/s Dintis Technologies Pvt. Ltd, Bangalore, for commercialization.

NIO's repository ranked at 245 in World's Open Access Repositories

Latest Ranking (January 2010 Edition) of World's Open Access Repositories is now available at *http://repositories.webometrics.info/index.html.* This has ranked the National Institute of Oceanography (NIO**),** Goa's repository (*http://drs.nio.org*) at 245. NIO improved its ranking from last year's position (267).

NIO's repository has been updated constantly by adding the new manuscripts making the research results available to the world's scientific community. There are only seven Indian repositories that are ranked in this list of 400 and NIO's repository stands 5th among them.

NIO's Technology for Production of DHA Transferred to M/s Avestha Gengraine Technology Pvt. Ltd., Bangalore

Docosahexaenoic acid (DHA), is an omega-3 fatty acid having beneficial nutrient properties including the development of brain functions in infants. It forms an essential component of infant food formulae, and is currently manufactured from marine sources like thraustochytrids.

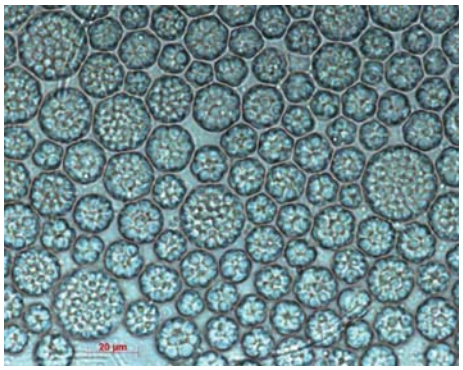
The National Institute of Oceanography (NIO), Goa, along with the other institutional partners namely, Indian Institute of Integrative Medicine (IIIM), Jammu, and Indian Institute of Chemical Technology (IICT), Hyderabad, under the New Millennium Indian Technology Leadership Initiative (NMITLI) scheme developed a knowledge-based know-how for the production of DHA through direct fermentation of marine thraustochytrid strain, SC-1.

CSIR had earlier signed an agreement on 2 July 2007, to transfer this technology of DHA production to Avestha Gengraine Technology Pvt. Ltd., Bangalore, an industrial partner, with the initial lump sum payment of Rs. 50 lakhs to the institutional partners after fulfilling the following criteria:

(1) A detailed Standard Operating Protocol (SOP) for culturing and maintenance of SC-1 culture, production details and downstream processing of DHA and chemical characterization of DHA was to be produced by all the three CSIR partners.

(2) A demonstration of production of DHA in 200 L fermenter and culturing of SC-1 to the concerned staff of Avestha Gengraine Technology Pvt. Ltd., Bangalore.

Once the company starts manufacturing DHA on a commercial scale, a further Rs. 100 lakhs will be paid to CSIR in three installments over a period of three years. This amount will also be distributed among the three partner Institutes. The Project titled, *"Recombinant Approach to Produce Alpha-Linolenic Acid and Docosahexaenoic Acid (DHA) in Sunflower and Yeast"* was initiated by Dr. S. Raghukumar and later on carried forward by Dr. Chandralata Raghukumar at NIO.



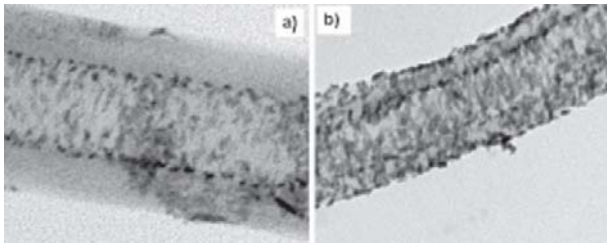
Thraustochytrid strain, SC-1.

A New Strategy for Developing Thin Fuel Cell Electrodes

Proton Exchange Membrane Fuel Cells (PEMFC) hold great promise for addressing the evergrowing energy demand because of their high efficiency, simplicity in operation and zero emission. Despite these advantages, fuel cells deployment faces stiff economical and technical barriers.

A principal drawback is the slow oxygen reduction reaction leading to inadequate efficiency of energy conversion in PEMFCs. To overcome this limitation and to achieve practical current densities, Pt is the best suited catalyst till date. However, to obtain better performance, a proper dispersion of Pt nanoparticles on a suitable support material is needed.

So far one-dimensional nanostructures of carbon such as nanotubes and nanofibers have triggered wide interest, mainly due to their exciting features such as anisotropy, unique structure and surface properties. However,



notwithstanding the much hyped advantages of these materials for fuel cell electrode applications, the inherently low surface area possessed by them restricts the amount of active component (Pt) that can be dispersed on these materials.

A catalyst with higher carbon to Pt ratio can lead to better dispersion, but this will result into a thick layer of catalyst with concomitantly higher mass transfer and electric resistances. From the point of view of designing membrane electrode assemblies (MEAs) — the active power producing center of a PEMFC — apart from controlling the size of Pt and its dispersion, a proper tuning of mass transfer rate is also important.

To overcome these two prevailing constraints on mass transfer and electric resistance there is a need to develop MEAs with thin electrodes. To accomplish this goal, a desired level of Pt loading should be achieved while restricting the carbon content to the minimum possible level.

Dr. Sreekumar and colleagues at the National Chemical Laboratory (NCL), Pune, have developed a novel approach to address these issues. The basic idea is to exploit the inner cavity of nanostructured carbon support materials for metal dispersion, which is more complex as compared to outer wall utilization.

A fascinating aspect of this achievement is that by implementing the metal dispersion on the inner and outer walls of the substrate, the available active species' surface area can be doubled by keeping the same carbon amount. Moreover, the hollow cavity may provide an intriguing confinement environment which can result in a modified behaviour of the materials confined inside.

The key step is the proper choice of a support material with tubular morphology and open tips where the inner cavity can be utilized as well. The first step towards practical utility is the filling of such cavities with suitable materials which need a better interplay between capillary action and wettability.

This goal is attained by a careful optimization of experimental procedure to achieve balanced surface tension and polarity characteristics of the reaction medium. Thus, by proper control of the experimental parameters, selective decoration of Pt nanoparticles on the inner as well as on the inner and outer walls of carbon nanofibers could be achieved.

Figure (a) and (b) show the HRTEM images of the Pt decorated carbon nanofiber samples consisting of decoration selectively on the inner wall and inner as well as the outer wall, respectively. While The HRTEM images show the selective decoration of Pt nanoparticles, the enhancement in the activity of the present catalyst as compared to the conventional CNT supported catalyst is clear from electrochemical studies. Cyclic voltammetry confirms almost double active area complimented by four times higher rate constant for oxygen reduction as revealed by rotating disk electrode (RDE) studies.

This catalyst has immense scope as an electrode material for PEMFCs because for a fixed catalyst loading, the available surface area will be doubled leading to better dispersion and a concomitantly low electrode thickness owing to the effective utilization of the carbon surface.

IMMT Granted US Patent for the Fly Ash Building Construction Materials

CSIR was Granted US Patent No: US20090250660 entitled, '*Composition for Building Materials and a Process for the Preparation Thereof*'. The Inventors of the patent are from the Institute of Minerals and Materials Technology-IMMT, (formerly, Regional Research Laboratory), Bhubaneswar. The Inventors are: Banshidhar Nayak, Barada Kanta Mishra, Snehasis Behera, Rajeev and Vimal Kumar.

ABSTRACT

The present invention provides a composition and a process for the preparation of chemical activated cold setting fly ash building construction materials. The chemical activator is

an alkaline aqueous solution of 11.2 to 13.6 in pH and 1.25 to 1.40gm/cc in density which contains admixtures of different concentrations of hydroxyl, sulfate, acetate and chloride bearing chemical salts of calcium, magnesium, sodium, potassium and aluminum in water medium.

The reaction of chemical activator solution and the mineral constituents of fly ash mix develop binding property. The binding matrix of chemical activated fly ash mix is mostly hydrous silica and silicate group of phases, which on setting under atmospheric condition attains strength suitable for building construction applications.

Utilization of fly ash of any source by weight ranges from 80 to 99% in the manufacture of building materials including heat and acid resistance and toxic waste disposal products.

Importance of Geographical Indications

Dr. Swaranjit Singh Cameotra

The Geographical Indications (GI) are the expressions or signs used to show that a product originates from a country, a region, a specific place or an environment. This is without any reputation or quality attached to it. The 1994 Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement) came into force in 1995, and had its effect in developed countries, including the United States. TRIPS sets forth standards to regulate international intellectual property protection and enforcement, and establishes international minimum standards for Geographical Indications.

Part II, Section 3 of TRIPS, in Articles 22-24, specifies the minimum standards of protection that WTO Members must provide for Geographical Indications. The importance of GI is illustrated in the following examples: *'Florida'* for oranges; *'Idaho'* for potatoes; and *'Washington State'* for apples. Some products like Darjeeling Tea, Champagne of France, Basmati Rice of DehraDun are other well known examples. Further, appellations of the origin are used to safeguard and protect the products of specific regions and environment, such as Kashmiri shawls, Cuban cigars, Scotch whisky and so on.

It is interesting to note that there is an IPR row over the famous Pashmina shawls in the international market. Pashmina shawls are traditionally made in Jammu and Kashmir. This geographical region is known for making high quality Pashmina shawls due to the environmental factors specific to the State. Recently, it was in the news that hundreds of the rare goats that produce the Pashmina wool died due to starvation in severe winter. In the winter months there is a shortage of fodder, which is a threat to more than one lakh goats that not only give unique wool but also large quantities of milk to the people.

To protect the claim over the shawl, the Geographical Indication Law (GIL) has to be passed by the Parliament or enacted by through the President. It is insufficient to protect GI goods by trademarks alone for claiming IP Rights. Under the WTO regulations, IP Rights over the GI products can be protected by the usage of the GIL. The problem of claim over GI products becomes more complicated in close bordering states. In case of conflict, the question of joint registration or separate registration arises. However, in most cases, priority is given to the first applicant claiming this mode of IPR protection. The definition of GI includes appellation of origin under the TRIPS Agreement.

Recently, Darjeeling tea has got the status of GI. The tea grown in this region has a typical flavour and aroma due to the unique soil and environmental conditions prevailing there. If the tea is taken out and planted elsewhere or some other brand of tea is planted in the Darjeeling region, the characteristic aroma of the Darjeeling tea does not show up. The altitude and humidity levels

also contribute to the fine blend of characteristics. The Kangra tea of Himachal Pradesh in India has also been given the GI status. The Kangra tea like the Darjeeling tea gives the unique and specific characters only when it is grown in the Kangra valley.

The famous Kullu shawl of Himachal Pradesh in India has been registered under the GI of Goods Act 1999 as GI No. 19 by the GI Registry, Chennai. This Act safeguards the interests of the genuine Kullu shawl weavers and producers. It is interesting to note that unauthorized shopkeepers or producers cannot even use sign boards/hoardings of selling Kullu shawls. If anyone is found selling fake shawls, a huge penalty is imposed on such a person or there is imprisonment of six months to three years or both under the GI Act 1999. It is interesting to note that the *Dasheri* mangoes have also been given the GI status of India.

Biological Diversity is becoming very important day by day. Efforts are being made to conserve and preserve biodiversity all over the world. We have to create awareness of the vital importance of conserving biodiversity for the current and future benefits/ applications. Mass awareness can be done by delivering lectures/interactions, through the media, internet and through journals, brochures and magazines. Registers and database creation of biodiversity is of great importance. The traditional knowledge of the local people must also be taken into account, respected and protected. The endangered species can be protected by restricting or stopping exploitation of the endangered sites and areas.

Plants, animals and microorganisms are indispensable for the environment ecosystem cycles. The microorganisms cannot be seen by our naked eye and are thus, lesser known by the people. These unseen beneficial microbes work in association with plants and animals. They also work for us very efficiently and independently by fixing atmospheric nitrogen for good plant growth, in the production of vitamins, enzymes, medicines, in the food industry, in cleaning pollutants of crude oil sludge, pesticides etc.

Special and consistent efforts have to be made to conserve and preserve the rich biodiversity on a long-term basis. In India the Biological Diversity Act is being implemented. A National Biodiversity Authority has been set up to monitor and regulate the biodiversity. Intellectual Property Right (IPR) is an important component in the area of biological diversity.

Unfortunately, when IPR issues are discussed, stress is not given to the Geographical Indications. GI is of utmost vital importance and must be strongly addressed in the issues of IPR. For example, the culture collections do have columns in their Data Sheets about the source of the culture and its isolation point. This information must be filled in and uploaded carefully whenever a culture is accepted or identified by the culture collection/depository. Inclusion of GI must be given vast publicity to create awareness amongst the people. The Government and the people are becoming more aware and cautious in the area of GI and its protection. There is a provision for the conservation and preservation of the GIs, besides the traditional knowledge and folklore of the local people.

A substantial progress is made by the Indian Government, National Biodiversity Authority (NBA) and all the States in the implementation of this Act. During the implementation of the said Act if any problems are encountered, the Government, NBA and the State Biological Diversity Boards have the power to make new rules, remove difficulties and regulate the implementation of the Act.

IPR helps in the protection of traditional knowledge, unwritten and unrecorded folklore of many developing countries. Thus, IPR and GI blend very well and fit in the Biological Diversity Act and all these tools together can be exploited to the benefit of the country and the cultures of origin. A country can apply for international protection system by registration of a particular GI as per the Lisbon Agreement. Further, TRIPS Agreement strongly conveys to all the members of WTO to protect GI.

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Time-Dependence of Salinity in Monsoonal Estuaries

The theories and classification schemes commonly used for understanding estuarine dynamics often refer to a steady state of the estuary in which the salinity field is time-independent. In this state, salinity-ingress into the estuary due to different processes (diffusion, gravity, current formation, impact of tidal asymmetries, etc.) is balanced by salinity-egress induced by runoff.

Studies made by scientists of the National Institute of Oceanography (NIO), Goa, have revealed that the salinity field of the estuaries that are located on the coasts of the Indian subcontinent and come under the influence of the Indian Summer Monsoon (ISM) is never in a steady state. They refer to such estuaries as 'monsoonal estuaries', an example of which is the Mandovi estuary located on the west coast of India.

Describing the annual cycle of the salinity field in this estuary, scientists have concluded that the essential unsteadiness of the salinity field arises from two features of the runoff into it.

First, most of the runoff occurs as a series of episodes of highs and lulls spread over about four months of the wet summer monsoon. Second, the total runoff is large, well over an order of magnitude larger than the estuarine volume. Two parameters have been defined to represent these two features, showing that they can be used to distinguish the monsoonal estuaries from others.

For further reading:
Vijith, V.; Sundar, D.; Shetye, S. R. Time-Dependence of Salinity in Monsoonal Estuaries. *Estuar. Coast. Shelf Sci.*: 85(4); 2009; 601-608.

CSIO signs MoU with RDSO

On the occasion of Golden Jubilee Foundation Day, the Central Scientific Instruments Organisation (CSIO), Chandigarh, signed a Memorandum of Understanding (MoU) with Research Design and Standard Organisation (RDSO), Lucknow, to take up some challenging areas of research in advanced instruments for railway safety.

The joint work aims to augment the railway infrastructure to ensure safety measures at par with international standards to avoid accidents. Factors responsible for rail accidents including track malfunctioning, negligence by operators, continuous wear and tear of various components used in engines and wagons, signaling problem and carelessness of people while crossing unmanned railway crossings, etc. will be dealt with.

By signing this MoU, CSIO and RDSO have joined hands to take up the challenging task of designing and development of advanced instrumentation systems for Indian Railways with state-of-the-art technologies based on automatic and reliable detection techniques. This will allow operators and infrastructure managers to monitor irregularities more effectively and direct maintenance staff to take timely corrective measures.

CSIO & RDSO, to start with, have identified the following areas of technical collaboration:

- Fiber Bragg Grating (FBG) based Sensors and Systems for Bridge Health Monitoring, Rail Weld and Fracture Detection, Unmanned Railway Crossing Annunciation, Structural Integrity Testing, Catenary Monitoring, etc.;
- Condition Monitoring and Early Warning for Landslide, Optical Pyrometers for Hot Box Devices, MEMS based Miniature OMS with Bluetooth and Palmtop Computation with Enhanced Memory;
- Enhanced Driver Vision System (Head Up Display System for Railways), Designing of Lens for LED type Signals;
- Instrumentation for Controlled Atmospheric Chamber for Fruits and Vegetables Movement; and
- Stress Measurement in Coaches, Fire Alarms, Micro Hardness Testing and Track Soil Measurement.

The MoU was signed by Dr. H. S. Pannu, Director General, RDSO, Lucknow, on behalf of RDSO and Dr. Pawan Kapur, Director, CSIO, on behalf of CSIO for a period of three years. Prof. Samir K. Brahmachari, Director General, CSIR, and Prof. Surendra Prasad, Director, IIT, Delhi and Chairman, Research Council of CSIO were among others present during the signing ceremony. Prof. Brahmachari, who also presided over the Golden Jubilee Foundation Day function of CSIO, termed this programme between CSIO and RDSO in line with CSIR's programme, '*CSIR for 800 million*'.

International Conference on
Nanobiomaterials for Environmental Applications (ICNEA 2009)

The National Environmental Engineering Research Institute (NEERI), Nagpur, organized the International Conference on, '*Nanobiomaterials for Environmental Applications (ICNEA 2009)*' during 7-8 December 2009 at NEERI.

The Conference was inaugurated by the Guest of Honour Prof. G. M. Chow, Professor and Chair, Department of Materials Science and Engineering, National University of Singapore; the Chief Guest, Padmashree Prof. K. L. Chopra, Honorary Professor, IIT Delhi and former Director, IIT Kharagpur; and the Special Invitee Dr. R.N. Singh, Chairman, Research Council, NEERI. The other dignitaries present on the occasion were Dr. Tapan Chakrabarti, Acting Director, NEERI and Dr. S. R. Wate, Scientist and Head, Environmental Impact and Risk Assessment (EIRA) Division and Organizing Secretary, ICNEA 2009.

While delivering the Keynote Address at the Inaugural Programme of the Conference, Prof. Chow stated that nanobiomaterials and their applications are widely recognized as an emerging area for material scientists, biotechnologists, chemists, engineers and medical professionals. Recent developments in the areas of materials science and biological sciences have enabled an impressive progress in the development of new nanobiomaterials.

Prof. Chow also said that the progress in nanobiomaterials research clearly requires an improved understanding in multiple disciplines. Besides, this specialized field of research requires the development of new design methodologies or utilization of novel processing/fabrication routes in order to obtain better material properties in terms of both physical as well as their biological performance. He said that the three-dimensional atom probe is one of the instruments that theoretically can provide chemical analyses in three dimensions with the highest spatial resolution.

Prof. Chow said that nanostructures have much greater strength, stability and surface area per unit mass than standard materials, and those less than 10nm size possess quantum effects whereby size may control, for example, conductivity, the specific wavelength of emitted light, transparency, or capacity to be a catalyst. Prof. Chow signified the importance of nanobiomaterials and stated that many research journals are coming up in the area of nanobiotechnology.

Speaking on this occasion, Padmashree Prof. K. L. Chopra said that nanomaterials are not very new as the technologies related to nanomaterials have been existing since 1950-60s. Scientists all over the world, especially chemists, have been creating them in medicines for over half a century. This was the beginning of the microelectronics era, though scientists did not actually call them by the name, *nano*. Prof. Chopra said that it is only now that the scientists can produce even metallurgical materials putting aside all theories of thermodynamics. However, large-scale application of these materials for production of mass-scale products is just impossible, he opined.

Prof. Chopra said that nano-materials are too expensive to be used on a mass scale, at least in developing countries. He also cleared a lot of myths about nanomaterials, such as one about these materials being new inventions. The second myth he busted was the one being projected by agencies like the UN Task Force on Nanomaterials, that these technologies will save humanity.

Prof. Chopra pointed out that these materials can not solve problems of big countries like India, where they are being projected as technologies that can be used to purify drinking water. This is something totally non-viable economically and socially, he added.

Prof. Chopra further said that it is only recently that the '*nano*' has been hyped worldwide. What has changed the scenario and made nanomaterials more useful today is the coming together of physicists, chemists and biologists for giving birth to new horizons in the area of nanomaterials. He expressed that nano-biotechnology and nano-agriculture have a promising future.

Dr. R. N. Singh, in his address said that the development of nanobiomaterials is the hottest technological topic of this century, and how to make synthetic nanobiomaterials has always remained a challenging task for our scientists. He stated that the union of distinct scientific disciplines is revealing the leading edge

of nanobiotechnology. Tracing the evolution of nanobiomaterials, Dr. Singh said that 15-20 years ago, the interdisciplinary activity of geneticists, biologists, immunologists and organic chemists created a more diverse toolbox now known as life science. Bioconjugates were created to help us move from outside the cell to the inside, he added.

Dr. Singh stated that physicists, chemists, polymer chemists and engineers in parallel laid the foundation for the small world of nano materials science, and in less than a decade, materials science and life science together are unraveling the mysteries of controlling, at the molecular level, the structure of matter.

Dr. Singh informed that particles, complexes, tubes, active surfaces and devices are being explored at the nano scale, which are leading to insightful understanding along with the creation of new scientific tools. He said that as per the current practices being followed for the development of nanobiomaterials, nanobiotechnology seems to be a combination of chemistry, biology and mechanical engineering, though chemists and physicists have been manipulating matter on the molecular level for centuries.

Dr. Singh also advocated that this multi-disciplinary approach will add new dimensions in the area of nanobiomaterials. He briefed about the role and importance of NEERI in carrying out the present and future R&D activities for the development of nanobiomaterials for human welfare. Focusing on the future research areas of nanoscience, Dr. Singh urged the scientists to apply nanoscience from both laboratory to field, and field to laboratory, particularly for effective environmental monitoring.

Earlier, in his Welcome Address, Dr. Tapan Chakrabarti said that nanobiomaterials is a multi-disciplinary scientific field with roots in life science, materials science and nanotechnology. Though the basic and application researches of nanobiomaterials have been the hot topic in the materials research for biomedicine and biotechnology, their environmental applications are also of prime importance.

Speaking on DNA and nanomolecules, Dr. Chakrabarti said that the idea of linking up nanoparticles through the use of modified DNA is not a new one, and researchers have recently made some headway in this direction. He stated that when a few nanoparticles are arranged in a particular structure, new properties can emerge. Nanoparticles in this case are analogous to atoms, which, when connected in a molecule, often exhibit properties not found in the individual atoms, and the properties of these new materials may be advantageous for many potential applications, he added.

Dr. Chakrabarti explained the importance of DNA in the development of nanobiomaterials and said that DNA can maneuver the strands in such a way that they engulf nanoparticles. He stated that biosensors are very important for environmental monitoring, particularly monitoring the levels of certain chemicals in air, soil and water. As biosensors, their biological base makes them ideal for toxicological measurements which are suited for health and safety applications, he added. He further said that nanobiotechnology is a promising solution which can aid in the development of clean and green technologies.

On this occasion, Prof. Chow, also delivered the Invited Lecture on, '*Upconversion Nano-Phosphors for Imaging and Sensing*'. In his lecture, he particularly pointed out that fluorescent bio-probes and sensors should be ideally nanoscale with narrow size distribution, while being resistant to photo-bleaching, biocompatible, non-toxic, highly luminescent and sensitive.

The Inaugural Programme was followed by six Technical Sessions where many national and international experts spoke on various important aspects. The distinguished speakers were: Prof. T. Pradeep, Department of Chemistry, IIT Madras, Chennai spoke on, '*Luminescent Quantum Clusters of Noble Metals Embedded in Proteins*'; Dr. Paresh Chandra Ray, Department of Chemistry, Jackson State University, USA on, '*Nanomaterial Based Sensing of Environmental Toxin*'; Dr. S. R. Wate on, '*Application of Materials for Environmetal Monitoring, Analysis and Sensing*'; Prof. Dhirendra Bahadur, Professor & Head, Department of Metallurgical Engineering and Materials Science, IIT Bombay, Mumbai on, '*Zinc and Iron Oxide Nanoparticulates for Environmental Remediation*'; Dr. S. Venkata Mohan, Scientist, Bioengineering and Environmental Centre, Indian Institute of Chemical Technology (IICT), Hyderabad, on, '*Exploiting the Role of Carbon Nano*

Powder and Tubes as Anodic Coating on Microbial Fuel Cell (MFC) Performance'; Dr. Hemant Purohit, Scientist & Head, Environmental Genomics Unit, NEERI, on '*Chemiresistive DNA Nanosensors*'; Prof. Hongtao Yu, Professor and Chair, Department of Chemistry and Biochemistry, Jackson State University, USA spoke on, '*Environmental Fate and Toxicity of Gold and Silver Nanomaterials*'; Dr. Bharat B. Kale, Nanocomposites Group, Centre for Materials for Electronics (C-MET), Pune on, '*Photodegradation of Phenol in Water by Zinc Indium Vanadate: A Novel Solar Light Photocatalyst*'; Dr. N. K. Labhsetwar, Scientist, Environmental Materials Unit, NEERI, on, '*Mixed Oxide Based Low-Cost Catalytic Material for Diesel Soot Oxidation*'; Prof. David Spivak, Professor of Chemistry, Louisiana State University, USA spoke on, '*Novel Approaches to Molecular Imprinting in Different Matrices*'; Dr. Michael J. Whitcombe, Cranfield University, U.K. on, '*Molecularly Imprinted Polymers – From Monoliths to Nanoparticles*'; Dr. R. J. Krupadam, Scientist, EIRA Division, NEERI on, '*Nanoporous Polymer Receptors for Sensing Environmental Pollutants*'; Dr. S. Sandhya, Scientist and Head, NEERI Zonal Laboratory, Chennai on, '*Optimization of Photocatalytic Degradation Conditions of Organic Dyes Using Silver Doped TiO_2*'; Prof. Y. Anjaneyulu, Department of Chemistry and Biochemistry, Jackson State University, USA spoke on, '*Computationally Designed Molecularly Imprinted Polymers as Novel Materials for Toxic Chemical Sensors*'; Dr. T. Prasada Rao, Chemical Sciences & Technology Division, NIIST, Thiruvananthapuram on, '*Molecularly Imprinted Polymer Materials for Removal of Selected Persistent Inorganic and Organic Pollutants*'; Dr. Anupama Kumar, Department of Chemistry, VNIT, Nagpur on, '*Synthesis of Molecularly Imprinted Polymers (MIPs) for Antioxidants*'; Dr. Ramaswamy, Director, Biotechnology Centre, Anna University, Coimbatore on '*Nanobiomaterials and Nano-medicine: Vision for the Future*'; Dr. Ajai K. Pillai, Department of Chemistry, Government VYTPG Autonomous College, Durg on, '*A Simple Method for Determination of Vanadium in Open Cast-Iron Ore Leachates Using Rhodamine*' and Ms. Rohini Kitture, Department of Electronic Science, Pune spoke on, '*Bulk and Nano-Forms of ZnO and TiO_2 for Textile Wastewater Degradation*'.

In the Valedictory Function, Dr. Tapan Chakrabarti, stated that this Conference has successfully covered various important areas pertaining to environmental materials, including the design and synthesis methods, characterization tools, molecular approaches and molecularly imprinted polymers. He said that the Conference has also highlighted various molecular tools for environmental applications. However, the issues related to molecular imprinting have remained in focus. This was followed by the panel discussion session, in which Dr. Chakrabarti presided as Chairman and Dr. Sukumar Devotta, former Director, NEERI as a moderator, and the other panelists were Prof. Hongtao Yu, Prof. David Spivak, Prof. G. M. Chow, Prof. Y. Anjaneyulu, Dr. P. C. Ray and Dr. M. J. Whitcombe.

Dr. Devotta briefed about the importance of nanobiomaterials, but at the same time, he pointed out that there should be a difference between nanobiomaterials and bionanomaterials. He said that nanobiomaterials are of significant application in the area of pharmaceuticals, but not in the area of environmental monitoring and mitigation. Probably one of the solutions to this issue is application of engineering. Prof. Chow said that for developing nanobiomaterials for environmental applications, there is a need to understand the inherent science in detail and provide cost-effective solutions.

Prof. Anjaneyulu pointed out that in view of the importance of nanomaterials, NEERI should develop necessary infrastructure for giving training to create skilled manpower in this field. Prof. Spivak commented that more toxicity related studies should be carried out in the area of nanobiotechnology.

Prof. Yu remarked that there should be more collaborative research in the area of nanobiomaterials. Prof. Whitcombe urged the scientists to identify the real problems and find out solutions for the society. The participants also interacted with the expert panel on various environmental issues. Dr. Wate, coordinated this session and in the end proposed a Vote of Thanks.

International Seminar on *Magmatic Ore Deposits (ISMO-2009)*

The Institute of Minerals and Materials Technology (IMMT), Bhubaneswar; Geological Society of India, Bangalore and National Geophysical Research Institute (NGRI), Hyderabad, jointly organized an international Symposium on, *Magmatic Ore Deposits* (ISMO-09) during 1-4 December 2009.

Platinum group elements (PGEs: Pd, Pt, Rh, Ru, Ir, Os) present in magmatic ore deposits are today assuming an increasingly important role for their use in automobile emission control, fuel cells, catalysis, electronic components and cancer treatment. In the past decade, there has been a surge in the exploration for PGEs all over the world, including the Indian subcontinent. This is reflected in the continuing growth of research and exploration efforts for magmatic N-Cu-(PGE) sulphide deposits hosted in mafic-ultramafic rocks in our country.

The incidence of platinum group of elements (PGEs) has been reported in Orissa and other States of India over last two decades. Despite tremendous progress, there remains much to be probed and known. This directly calls for the dissemination of plethora of geo-informatics for updating the present embodiment of Earth Science System. Thus, the present International Seminar was aimed at bringing together academicians, geologists, researchers, metallurgists and engineers from around the world to Bhubaneswar, with a view to understand the recent global advances on this front.

Symposium on *Applied Aerodynamics and Design of Aerospace Vehicles, (SAROD 2009)*

A Symposium on *Applied Aerodynamics and Design of Aerospace Vehicles*, popularly known as *SAROD* is a biennial event that started with a unique objective of bringing together designers and aerodynamicists across the country. The fourth *SAROD* was organized by the National Aerospace Laboratories (NAL), Bangalore, jointly with ADA, during 10-13 December 2009. It was sponsored by several governmental organizations that in addition to CSIR, included ADA, DRDO, HAL, ARDB, ISRO and AeSI.

The Inaugural Function was held on 10 December 2009 at Eagleton Golf Village premises. Dr. Sajeer Ahmed, Chairman, National Organizing Committee (NOC), welcomed the distinguished gathering and introduced the objectives of *SAROD 2009*. He also introduced the Chief Guest Dr. Radhakrishnan, Chairman, ISRO, and the Keynote Speaker Prof. R. Narasimha.

Dr. A. R. Upadhya, Director, NAL and Co-Chairman, National Advisory Committee, said that SAROD is a very unique symposium that assumes importance because of its focus on design. Mr. Biju Uthup, Co-chairman, NOC, spoke on the history and role of SAROD and its relevance to Indian aerospace programmes. On this occasion, the Symposium proceedings were released along with the Directory of Aerodynamicists and a 1:0.75 scaled model of an Indian boomerang.

Dr. Radhakrishnan, in his address, spoke on the space programme starting with early history of ISRO and covering up to present day programmes. Prof. Narasimha's Keynote lecture was on '*Boomerangs — In India and Elsewhere*'. He said he preferred to give a 'festive' talk on this subject. He spoke on the history and covered the aerodynamic aspects of boomerangs.

Previous SAROD events have set precedence by honouring three eminent aerodynamicists. On this occasion, Dr. Vasantha Sastry, former Director, SHAR, Dr. Aravamudhan, former Director, ADE and Dr. R. Balakrishnan, former Director, Vehicle Dynamics, DRDL were chosen to receive this honour.

The topics covered in the Symposium included CFD applications, navigation and guidance, algorithms and modelling, aeroelasticity, space applications, hypersonic airbreathing engines, hypersonic flows, control and trajectory optimization, MAV/UAV applications and design aspects, laminar flow technology, flight data analysis, design and optimization and investigative aerodynamics. In general, the Symposium addressed all the aspects of current research in aerodynamics and design of aerospace vehicles.

Prof. Shevare of IIT Bombay gave a plenary talk on, '*Assessment of CFD Work in India*'. Mr. P. Jayasimha of HAL, Bangalore, spoke on, '*Aircraft*

Design—Indian Perspective', and Prof. Edward Greitzer of MIT, USA, delivered the third Plenary Talk on, '*The Silent Aircraft and Beyond: an Industry-University Collaborative Enterprise*.'

The invited lectures covered a broad spectrum of activities and speakers came from academia, industry and R&D organizations proving again that design and product development are interdisciplinary and inter-organizational activities.

Invited talks included presentations by Dr. Chittur Venkatasubban of Hawker Beechcraft, USA on, '*CFD in Business Aviation: The Challenge and the Promise*', Mr. K. Sivan of VSSC on, '*Autonomous Trajectory Control Strategies for Un-powered Winged Entry Vehicles*', Dr. Francois Pepin of Bombardier, Canada on, '*Development of High-Lift Systems for the Bombardier CRJ-700,*' Dr. Gautam SenGupta of Boeing, USA on, '*Prediction of Transonic Flutter*', Dr. Francois Falempin of MBDA, France on, '*French R&T Effort for High Speed Airbreathing Propulsion*', Prof. Charbel Farahat on, '*Advances in Nonlinear Computational Aeroelasticity*', Prof. Richard Morgan of University of Queensland, Australia on, '*The Study of Radiating Hypervelocity Flows*', Prof. M. S. Bhat, IISc on, '*Development of UAV Research Platform for Randomized Path Planning and Control*', Prof. C. Venkatesan, IIT Kanpur on, '*Computational Aeroelastic Formulation for Helicopter Rotor Loads*' and Dr. A. Lurdharaj, ADE on, '*Design of Endurance UAVs*'.

On the second day, a panel discussion on two topics was chaired by Dr. Prahlada, CC R&D, DRDL. The panel consisted of Prof. Sitaram Bhat, IISc; Prof. Venkatesan, IIT Kanpur; Dr. Chittur Venkatasubban, Hawker Beechcraft; Dr. Gautam SenGupta, Boeing; and Dr. Aravamudhan, former Director, ADE. The first topic for panel discussion dealt with *Configuration Aerodynamics* while the second topic dealt with *Enhancing the Role of Engineering Students and Faculty in Aerospace Design Activities*. All the members clearly expressed urgent need to develop manpower in configuration aerodynamics and were of the opinion that the two topics went hand-in-hand. A need for establishing the centre of excellence for aeroelasticity was clearly felt.

SAROD 2009 achieved an important objective set by the Advisory Committee that is to involve engineering students in aeronautics discipline. One faculty member and one student each was invited from nearly 40 engineering colleges, teaching aeronautics in the southern region. The idea was to expose the students to the current research areas in aerodynamics and design of aerospace vehicles.

Technical sessions concluded with a brief closing function wherein Dr. Upadhya distributed certificates to the students and faculty who were specially invited to attend. SAROD 2009 also showcased an exhibition of technologies and services offered by the sponsors. There were a total of 19 stalls.

A scaled model of Indian boomerang was released during this event. Mr. Kamaleshaiah and his team made fine replicas, nearly 400 of them of an ancient Indian boomerang, which were on display at Government Museum, Egmore, Chennai. The original is made of ivory and is a non-returning type. Boomerangs are most ancient aerodynamic devices used primarily for hunting.

Several private organizations came forward to give financial assistance for the Symposium. These included IBM, Mahindra Aerospace, Josts Engineering, CAE, L&T (Defense, Nuclear and Aerospace Cluster), SUN Microsystems, HP, SGI, Altair Engineering, GridPro, Captronix, Metacomp, ESI, Tesscorn Systems, Laser Spectra Services and Dantec. The Symposium banquet was hosted by HAL and the cultural evening, viz., *Bharatanjali*, was sponsored by L&T.

International Workshop on *Molecular Epidemiology, Environmental Health and Arsenic Exposure Assessment*

The Fourteenth All India Congress of Cytology and Genetics (AICCG) held every alternate year in different parts of India was hosted by Indian Institute of Chemical Biology (IICB), Kolkata, during 1-4 December 2009.

Seated on dais during the inaugural session *(from left)* are: Dr. A. K. Giri, Prof. S. Jha, Prof. D. J. Chattopadhyay, Prof. Allan Smith, Prof. A. K. Sharma and Dr. S. Roy

IICB has a Fogarty Training Programme in collaboration with the University of California, Berkeley, USA, funded by NIH, USA which focuses on the development of skills and capacity building for research to deal with critical environmental health issues. Under this training programme, IICB organizes a Workshop on the topic related to human health related research every alternate year.

This year, the training Workshop was organized along with the Fourteenth AICCG meeting. The main topic for the Workshop was: '*Molecular Epidemiology, Environmental Health and Arsenic Exposure Assessment*'. The AICCG Meeting and Workshop were intended to review the advances made in the field of cytology and genetics and to review the advancement of research in the field of environmental health with special reference to arsenic exposure assessment.

The Workshop had 45 invited speakers from different parts of the globe including stalwarts like Prof. Nina Holland, Prof. Allan Smith (University of California, Berkeley, USA), Prof. J. Christopher States (University of Louisville, USA) and Dr. David Kalman (University of Washington, USA) to name a few. Thirty two participants from India and abroad took part in the Fogarty International Workshop.

The Inaugural Function was held in Meghnad Saha Auditorium in Central Glass and Ceramic Research Institute and was chaired by Dr. Siddhartha Roy, Director, IICB. The other dignitaries present were Prof. Arun Kumar Sharma, President, AICCG; Prof. Allan Smith, Director of Fogarty Programme at the University of California, Berkeley, USA and Prof. Dhrubojyoti Chattopadhyay, Pro-Vice Chancellor, Calcutta University. Dr. Ashok K. Giri, the Organizing-Secretary, 14th AICCG and Fogarty Workshop, and Prof Sumita Jha of the Department of Genetics, Calcutta University were also present among others.

The Fourteenth AICCG had nine invited Plenary Sessions, three Invited Lecture Sessions and two Poster Sessions, in addition to the Inaugural and Concluding Sessions. Eminent scientists addressed key issues in the fields of Cytology and Genetics starting from classical topics like karyotype analysis in plants and animals, to state-of-the-art techniques including genomics and proteomics, their applications in identifying high risk individuals, molecular mechanism of pathogenesis and probable remedial measures. Talks covering wide areas in every sphere of Cytology and Genetics delivered by speakers from different backgrounds were the main attraction of 14th AICCG.

Sixty one participants presented their posters in two poster sessions on genetic toxicology. Both the sessions were highly appreciated by the judges, invited speakers and participants. Among the participants Mr. Ravi Doddapaneni, Ms. Sukanya Majumdar, Ms. Myo Ma Ma Than, Ms. Debarati Ghosh and Mr. Udayan Bhattacharya were awarded the cash prizes alongwith certificates for their poster presentations

Mr. Ravi Doddapaneni receiving the Best Poster Award from Prof. Allan Smith

by Prof. Allan Smith, Dr. A. K. Giri, Prof. S. Raisuddin and Prof. Anita Mukherjee respectively, during the Concluding Session.

From the discussions ensuing during the Concluding Session, the following major recommendations emerged:

Group photograph of the faculty and participants of 14th AICCG

- Utilization of new cutting edge technologies like genomics and proteomics should be adopted more commonly in India to understand and overcome the rampant health problems of both plants and animals;
- More emphasis needs to be given to research related to environmental health with special reference to water and air pollution in this subcontinent;
- Since arsenic contamination is a major health hazard in India, regular monitoring of the groundwater quality in different parts of the country is highly recommended; and
- Molecular genetic studies in arsenic-induced skin lesions etc. need to be introduced for better understanding of the mechanism of arsenic carcinogenesis which may be different from carcinogenesis induced by other agents.

Indo-Russian Workshop on
Complex Networks: Dynamics and Synchronization

The Indian Institute of Chemical Biology, (IICB), Kolkata, organized an Indo-Russian Workshop on, '*Complex Networks: Dynamics and Synchronization*'. It was attended by nine Russian delegates who presented their work, and two scientists from Germany, one from Spain and one from United States. There were a total of 55 participants including young researchers from different parts of India. Eighteen talks were presented in the Seminar.

As a continuation of the Workshop, an International Symposium on, *Complex Dynamical Systems and Applications* was also arranged at Digha Science Centre, West Bengal, during 3-6 December 2009 where few more scientists from abroad and also from India joined and discussed their current research activities.

The topics covered included physical systems, neuron models, and cardio-

Russian delegate Prof. Vladimir Belykh is delivering his speech

The participants in the Workshop at IICB

vascular system. The talks focused on collective behaviours of small units (unit cells or oscillators) in such systems. Problems related to biological systems were discussed in the Symposium. The physicists discussed the theoretical models and as well as some experiments conducted by them. They however, felt that close interaction with biologists and faculties from medicine can translate their experience into real biological systems leading to exchange of knowledge. A number of physicists participating in the Symposium felt the necessity to concentrate on synthetic genetic networks in future and planned to explore the possibilities of bringing together physics, biology and medicine in the present period to prepare joint programmes of action on Dynamical Processes in Biological Systems.

International Workshop on *Biomolecular Electronics and Organic Nanotechnology for Environment Preservation*

The Department of Science & Technology Centre on Biomolecular Electronics, National Physical Laboratory (NPL), New Delhi, jointly with Department of Biological Functions and Engineering, Graduate School of Life Science Systems Engineering, Kitakyushu, Kyushu Institute of Technology, Japan, organized an International Workshop on, B*iomolecular Electronics and Organic Nanotechnology for Environment Preservation* from 17 to 20 December 2009 at NPL.

Prof. S. K. Joshi, former Director General, CSIR, the Chief Guest on the occasion, while inaugurating the Workshop expressed that the Workshop will bring together scientists from Japan and India who are actively contributing to true interdisciplinary field of Biomolecular Electronics and this will accelerate the pace of growth of biomolecular devices.

A dais view of the Workshop

A group photograph of the participants of the Workshop

Prof. R. C. Budhani, Director, NPL, in his speech enlightened that the fusion of nanotechnology and bio-molecular electronics is also likely to lead to the development of futuristic products and technologies, which will eventually contribute to the national economies. Prof. K. Kaneto delivered the Keynote Address, which was highly informative.

The Workshop was attended by about 250 delegates including experts from Japan, US, Sweden, Korea and India. The leading scientists and specialists from almost all the fields of Bimolecular Electronics and Organic Nanotechnology participated in the Workshop. A total of 145 papers, classified as 11 Plenary Lectures, 28 Invited Lectures, and 12 Oral and 90 Posters were presented. Besides, a Panel Discussion also took place during the last day of the Workshop. In parallel with the poster presentation, an exhibition was arranged in which commercial equipment available today in relation to biomolecular electronics was exhibited by five exhibitors.

The Workshop was highly successful and it paved the way for healthy discussions, interactions and awareness on Nanotechnology and its applications from the environment point of view. The lectures were very informative and they motivated younger minds to accept challenges in the frontier multi-disciplinary field of research and development in biomolecular electronics.

Dr. V. P. S. Awana receives MRSI Medal

Dr. V.P.S. Awana, NPL, receiving the MRSI Medal for the year 2010

Dr. V. P. S.Awana Scientist E1, National Physical Laboratory (NPL), New Delhi, received MRSI Medal for the year 2010. He delivered the Medal lecture in 21st MRSI annual meeting held from 9-11 February 2010 at Sardar Patel University in Gujarat.

The MRSI medal is conferred upon Dr. Awana for his outstanding contribution to the field of superconductivity and superconducting materials. Dr. Awana has published over 200 research articles in SCI journals in his research career of over two decades.

Dr. Awana has also been honoured earlier for his research work. Some noteworthy Awards among them include the INSA Young Scientist Medal, DAE Golden Jubilee Young Achievers Award and Rajib Goyal Medal. He has availed various prestigious international fellowships including JSPS, ICYS and MANA from Japan, CNPq and FAPESp from Brazil, ISEM-ARC from Australia. He has also been Max Planck Fellow at Germany.

Dr. Gopal Bhatia Awarded B. D. Bangur Award 2009

Dr. Gopal Bhatia, Scientist G and Head, Carbon Technology Unit, Division of Engineering Materials, National Physical Laboratory **(**NPL**),** New Delhi, has been awarded B. D. Bangur Award 2009, instituted by M/S Graphite India Ltd, and Indian Carbon Society. The Award was presented to him, jointly with Dr. P. K. Jain, Scientist, ARCI, Hyderabad, at the First Asian Carbon Conference, held at Habitat Center, New Delhi, during 25-27 November 2009 in recognition of the outstanding contributions made by him to the field of Carbon Science and Technology and for the growth of Carbon Technology in India. The Award consists of a cash amount of Rs. 50,000/- a medal and a scroll.

Dr Sekhar Majumdar Honoured

Dr. Sekhar Majumdar, former Head, Computational & Theoretical Fluid Dynamics Division (CTFD), National Aerospace Laboratories (NAL), Bangalore, has been elected Fellow of the Indian National Academy of Engineering, New Delhi, from 1 January 2010.

Prof. Gautam Biswas becomes a Fellow of the Indian Academy of Sciences, Bangalore

Prof. Gautam Biswas, Director, Central Mechanical Engineering Research Institute (CMERI), Durgapur, has become a Fellow of the Indian Academy of Sciences, Bangalore. His areas of research are: Computational Fluid Dynamics and Heat Transfer. He has developed methodologies for handling free surface flows, bubble formation in film boiling and turbulent transport.

Before joining CMERI, Prof. Biswas was holding the post of GD and V. M. Mehta Endowed Chair Professor of Mechanical Engineering at the Indian Institute of Technology (IIT), Kanpur. He has earlier been the Dean of Academic Affairs at IIT, Kanpur. He was a Humboldt Fellow in Germany and JSPS invited Fellow in Japan. He is Fellow of the American Society of Mechanical Engineers (ASME), the Indian National Academy of Engineering and the National Academy of Sciences (India). He is also a Fellow of the Institution of Engineers (India).

Prestigious '*Padma Shri*' Award Conferred on Dr. V. Prasad Dimri

The prestigious '*Padma Shri*' Award, one of the highest of the three Civilian Awards of India, which is given in recognition of distinguished service in a chosen field, has been conferred on Dr. Vijay Prasad Dimri, the then Director, National Geophysical Research Institute (NGRI), Hyderabad, in recognition of his work in Science and Engineering.

The *Padma* Awards are announced on the occasion of Republic Day, every year. For the 2010, the President of India has approved 130 *Padma* Awards (6 *Padma Vibhushan*, 43 *Padma Bhushan* and 81 *Padma Shri*). The Awards are presented by the President of India at a function held at Rashtrapati Bhavan sometime in March/April every year.

Prof. Samir K. Brahmachari, Chosen for Nayudamma Award

Prof. Samir K. Brahmachari, Director General, CSIR, has been chosen to receive the prestigious 'Nayudamma Award' for 2010, jointly instituted by Nellore based Nayudamma Centre for Development Alternatives and R. M. K. Engineering College, Kavaraipettai, Tamil Nadu.

Prof. Brahmachari, a Ph.D. in Molecular Biophysics from Indian Institute of Science, Bangalore, was earlier a Professor of Molecular Biophysics and Genetic Engineering at the Indian Institute of Science, Bangalore, before joining as Director, IGIB. He has pioneered functional genomics initiative in India and has successfully led the Indian Genome Variation Consortium Project.

Prof. Brahmachari is presently coordinating a national network project on 'In Silico Biology' for drug target development. He and his coworkers have demonstrated association of two genes to schizophrenia and bipolar disorder. They have identified several SNPs and other markers associated with various neurological disorders. Prof. Brahmachari is the first to discover how human miRNA can target HIV genes and control virus replication, thus opening up a new vista of anti-viral therapeutics.

Prof. Brahmachari has received several awards and distinctions for spearheading various

facets of research in biotechnology. These include: INSA Young Scientists Award in 1979; Kani Medal (National Cancer Research Centre, Japan), 1981; Shanti Swarup Bhatnagar Award (CSIR) 1990; FICCI Award, 1999; Millennium Medal (Indian Science Congress) 2000; Ranbaxy Award 2001; Prof. B. R. Ambedkar Centenary Award for Excellence in Biomedical Research (ICMR) 2005; J. C. Bose Medal (INSA) 2007; and H. K. Firodia Award For Excellence In Science and Technology (2007).

Prof. Brahmachari is an elected member of the Human Genome Organization, 1991 and is also an elected member of the HUGO Council, 2004. He has been elected to the fellowship of all the three National Academies. He has also been a member of various Task Forces and Committees, Government of India; Member, Expert Group on Human Rights and Biotechnology, United Nations; Council Member, FAOBMB, since 1997; and Member, Indo-European Commission S&T Steering Committee. He has been even included in the Advisory Committee of the X-Prize in Genomics which consists of leading scientists of the world.

Prof. Brahmachari has also been involved in the issues related to genomics research and human rights. As an Advisor to Human Rights High Commission, he has also addressed issues of unethical exploitation of genetic resources of the Third World. He has championed the concept of rights of patients in benefit sharing in the development of genomic medicines. He has also contributed significantly in promoting industry-academia interactions through novel program of knowledge partnership.

Prof. Brahmachari has over 140 publications in leading international journals and has 10 patents and 14 software copyrights to his credit.

फार्म 4/FORM IV

(नियम 8 देखिए/See Rule 8)

1	प्रकाशन का स्थान/Place of Publication	New Delhi
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मैं ---------- एतद् द्वारा घोषित करता हूं कि मेरी अधिकतम जानकारी एवं विश्वास के अनुसार ऊपर दिए गए विवरण सत्य हैं.

I, Deeksha Bist, hereby declare that the particulars given above are true to the best of my knowledge and belief.

Sd/- Deeksha Bist

Dated 15 March 2010

प्रकाशक के हस्ताक्षर/Signature of Publisher

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