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



Mr. Brian Baird, US Congressman (Democrat) and Chairman of the House Science & Technology Subcommittee on Energy, Science and Environment Meets DG, CSIR to Strengthen S&T Collaboration

delegation from the US Embassy, headed by Mr. Brian Baird, US Congressman (Democrat) and Chairman of the House Science & Technology subcommittee on Energy, Science and Environment met Prof. Samir. K. Brahmachari, DG, CSIR on 6 August 2010. Discussions were held on issues and challenges in the alternate energy sector for exploring possibilities of strengthening collaboration between the two counties including science diplomacy. Mr. Baird was accompanied by Mr. Christopher King, Staff Director, HSCI Subcommittee, the Science Cousellor and Ms. Heather Broman, S&T Officer, US Embassy, New Delhi.

Prof. Samir. K. Brahmachari, DG, CSIR, Dr. R.C. Budhani, Director, National Physical Laboratory (NPL), Shri A. Chakraborty, Head, International S&T Affairs Directorate (ISTAD) and scientists from ISTAD and PPD participated in the wide-ranging deliberations.

Shri A. Chakraborty, Head, ISTAD initiated the discussions by apprising the August gathering about the objectives of the visit of the high-powered US



Prof. Samir K. Brahmachari, DG, CSIR and Mr. Brian Baird, US Congressman

Delegation and provided an overview of CSIR's S&T prowess for leveraging its intrinsic strengths to forge a symbiotic partnership with the US.

Prof. Samir K. Brahmachari, DG, CSIR welcomed the delegation and made a detailed presentation on CSIR's pioneering initiatives in the emerging areas of scientific research for global good.

The deliberations, led by DG, CSIR focused the key on-going programmes of CSIR in the areas of affordable health and sustainable energy; including solar energy. The delegation noted with deep interest CSIR's initiatives in initiating a synergistic alliance with Prof. Whitesides, Harvard University, for promoting low-cost diagnostics in India. It was also urged that US could support such ventures which could form a milestone in Indo-US S&T cooperation.

Mr. Baird agreed that the Open Source Drug Discovery (OSDD) model involving 4000 researchers (with about 10% coming from USA) was indeed working excellently across the globe and could be successfully replicated for harnessing the prowess of young researchers to carry out cutting edge research in the area of solar energy.

The discussions also encompassed CSIR's pathbreaking endeavours in promoting higher education in the country for producing over 1000 Ph.D.s in the country per year in due course through the setting up of the Academy of Scientific & Innovative Research (AcSIR).

Both sides agreed to look into the vast array of opportunities that exist to strike a symbiotic partnership and remove bottlenecks — such as grant of US visa to Indian researchers — for fostering collaboration between the two countries.



Shri A. Chakraborty, Head, ISTAD, Dr. R. C. Budhani, Director, NPL and Dr. Y. P. Kumar, CSIR during the discussions

US delegation with TEAM CSIR

R&D HIGHLIGHTS



CSIR's Novel Contraceptive Drug – A Woman's True Saheli

Dr. P. Cheena Chawla

Having a baby is no joke, for it brings tremendous responsibility on the part of both parents right from the day of conception, through the next nine months and endlessly thereafter. While treading on the path of parenthood, one faces the music of bringing up a completely helpless newborn to an adult. Surely then, a couple must be mentally prepared to take up the challenge of parenting, and therefore, must avoid unplanned pregnancy.

The trauma of an unplanned pregnancy is sometimes so unbearable that the woman takes the extreme step of getting the baby aborted. Shockingly, according to an estimate of the World Health Organization, the annual abortion rate worldwide is 46 million, a majority of which occurs in developing countries. This reflects an unmet need of millions of couples for a family planning measure that does not take away the pleasure of the nuptial knot.

Coming to the rescue of hundreds of thousands of couples, CSIR developed the world's first non-steroidal, once-a-week oral contraceptive drug that gave women the freedom to decide when to get pregnant. Rightly named, *Saheli*, this drug is indeed a true friend as it helps to avoid pregnancy without any side effects.

A product of over two decades of research at the Central Drugs Research Institute (CDRI), Lucknow, *Saheli* comprises a novel non-steroidal biochemical namely, *'centchroman'*. This drug is not only unique due to its composition and mode of action but it is also very convenient to take. The recommended dose is taken twice a week for the first three months, followed by once a week schedule. This drug reached the general public in India in the year 1991 and was included in the National Family Welfare Programme in 1995.

Hormonal contraception was pioneered by Ludwig Haberlandt, an Austrian scientist who in 1921, showed that rabbits could be rendered infertile by transplanting in them ovaries from a pregnant animal that contained high levels of progesterone. By the 1930s, it was well known that high doses of sex hormones, namely estrogen and progesterone could inhibit the release of eggs. In 1957 the first oral contraceptive pill, containing both these steroid hormones, was marketed in the United States under the brand name Envoid. It was first approved for the treatment of menstrual disorders and later marketed as a contraceptive pill. As Envoid contained a high level of hormones, there were serious side effects of this drug.

Newer generation of combined contraceptive pills that came in vogue later contained reduced levels of the steroid hormones, estrogen and progesterone, in different proportions. For example, a low dose combination pill like *Mala-D* was found to be safer than the high dose combination pills. Another type of contraceptive pill, that is popular today, contains only progesterone. It prevents pregnancy by increasing the cervical mucus that slows down the



motility of the sperm, and also does not allow the uterine lining to develop properly.

Next in line were injectible contraceptives like *Depo-Provera* (Depot Medroxyprogesterone Acetate) that contain only progesterone. This high-dose progestin injection was introduced in 1969. Although a very effective contraceptive, the many side effects of *Depo-Provera* outweigh the benefits. Several other types of progestogen-only contraceptives were later developed like *Progestasert*, the first hormonal intrauterine device and *Norplant*, the first contraceptive implant.

High dose or prolonged use of hormonal contraceptives is known to have many side effects such as menstrual disturbances, cardiovascular diseases, and body weight changes among others. Nonetheless, millions of women around the world are today using hormone-based contraceptives. The focus of CSIR scientists was, therefore, on designing a novel contraceptive drug, which had the properties of fertility regulation minus the side effects of existing steroidal contraceptive pills.





The role of estrogen-progesterone balance in the development of fertilized ovum is well known. The understanding of the subtle biochemical events that play a role in priming of the uterus for implantation of the fertilized ovum have helped in zeroing down on molecules that interfere with the process of implantation without disturbing the normal levels of estrogen and progesterone. Concerted research efforts of CSIR scientists have shown that centchroman is bestowed with dual properties of being mildly estrogenic while being a potent anti-estrogenic agent.

With this unique blend of natural properties, *centchroman* is equipped to inhibit the fertilized ovum from implantation without disturbing the other effects of estrogen, which means that this drug does not disturb the normal hormonal balance. Thanks to CSIR scientists, *centchroman* is the only antiimplantation agent approved for clinical use in the world. Judicious use of this safe and effective anti-fertility drug is poised to check population growth.

Centchroman comprises ormeloxifene, which is a selective estrogen receptor modulator (SERM). These substances are characterized by their different actions in different body tissues. In other words, SERMs selectively inhibit or stimulate estrogen-like action in various tissues. At molecular level, estrogen acts by linking itself to receptor molecules that are present on tissues that respond to this hormone. As SERMs have a tissue selective activity, they behave like estrogen in some tissues and at the same time, block its action in other tissues.

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A wide range of steroidal contraceptives,

both as pills and injectibles, are in use

Estrogen is, in fact, the wonder hormone that is crucial for programming a woman's body for child birth. It prepares the womb for nourishing the fetus and promotes the glands in breast to produce milk. It also regulates the production of cholesterol by the liver, and thus safeguards the heart, protecting women from cardiovascular diseases. Estrogen even preserves bones by maintaining their required density. However, high levels of estrogen may promote breast cancer and also the cancer in the inner lining of uterus (endometrial cancer).

Exhaustive studies, in thousands of women, evaluating the use of centchroman as a contraceptive have shown that this drug is quite safe. Unlike steroidal contraceptives, centchroman does not cause nausea, vomiting or dizziness and has no adverse effects on the woman's lipid profile and platelet function. Moreover, the contraceptive effect of *centchroman* is reversible and a woman can experience normal pregnancy on stopping the drug. Besides its use as a contraceptive, this drug works as an effective treatment for dysfunctional uterine bleeding. To top it all, centchroman is bestowed with a unique property of being effective against breast cancer. Multi-centric trials have shown the efficacy of *centchroman* in treating breast cancer patients.

Centchroman has been licensed to two companies in India. It was first manufactured by Torrent Pharmaceuticals Ltd, Ahmedabad, and marketed as birth control under the trade name

Centron that was later discontinued. Torrent Pharmaceuticals now manufactures ormeloxifene under the trade name Sevista, as a treatment for dysfunctional uterine bleeding. HLL Lifecare Limited (HLL), formerly Hindustan Latex Limited, Trivandrum, is marketing this drug under the trade name, Saheli. In October 2008, HLL launched this once-a-week oral contraceptive pill, containing the drug centchroman, in Peru under the brand name 'Ivyfemme', which in Spanish means 'friendship flower'.

In yet another achievement, CDRI has developed a contraceptive cream named *Consap* from the saponins obtained from soap nuts (Reetha) of the plant, Sapindus mukorosii. Approved by the Drugs Controller General of India for its marketing and use, this local spermicidal cream is found to be quite safe on prolonged use, and can thus come handy to women to avoid pregnancy. Moreover, in one study CDRI scientists have also shown the activity of soap nuts against a protozoan parasite, Trichomonas vaginalis that causes a common sexually transmitted disease, Trichomoniasis. This endows Consap with both contraceptive and microbicidal properties. Consap has

been already licensed to the Hindustan Latex Limited for its largescale production and marketing.





Benefits of the CIPM MRA for NPL, New Delhi

Dr. A. K. Bandyopadhyay

(Head, Physico-Mechanical Standards, National Physical Laboratory, CSIR, New Delhi)

The Science of Accurate Measurement or Metrology is used enormously by the societies to develop technical regulations that address optimization of production, health, consumer protection, environment, security and quality of life. Sound development and effective implementation of these procedures and regulations enable sustainable development, build welfare and facilitate trade.

The International Bureau of Weights and Measures (BIPM), an inter-governmental organization under the authority of the General Conference on Weights and Measures (CGPM) and the supervision of the International Committee for Weights and Measures (CIPM) in October 1999, proposed an agreement which is termed as the Mutual Recognition Arrangement (CIPM MRA). The aim of this meeting was to renew the agreement to bring together the officials concerned with measurements in trade, representatives from inter-governmental organizations and international bodies whose missions benefit from the global uniformity and acceptance international of measurements, and representatives from industry.

The responsibilities of National Physical Laboratory (NPL), New Delhi as the National Measurement Institute (NMI) of India and also as one of the core signatories of CIPM MRA are not only to develop, maintain and

disseminate national measurement standards appropriate to National needs, but also to ensure internationally recognized traceability of measurements. The traceability of measurement system stems from the mandatory requirement of Quality Management Systems (QMS) under ISO/IEC guide 17025. The consensus output of this exercise is a procedure of recognition of the Measurement and Calibration Capabilities (CMC) of the NMI (here it is NPL) which is globally credible, recognized and accepted for measurement results. The motto is: "ONCE MEASURED/ TESTED, **EVERYWHERE** ACCEPTED".

Mass Standards

M/s Fresenius Kabi Oncology Ltd. (FKOL), Solan, India, is a pharmaceutical company that exports drugs and other pharmaceutical products to the USA and countries around the world. Recently, the U.S. Food and Drug Administration (USFDA) audited the company. Usually, FKOL calibrated its mass standard artifacts against the National Physical Laboratory of India (NPLI) standards, and NPLI provided them with the corresponding certificates as per the CIPM MRA.

While going through the documentation, the USFDA wanted to check the NPLI certificate No. 07040028/1.01/C-0163 corresponding to

the calibration of FKOL weights and asked FKOL to collect the information for traceability of the standards used by NPLI in this calibration process. A letter from FKOL including this request was sent to the NPLI administration in November last year.

NPLI acted immediately, providing all the calibration certificates for the artifacts used by NPLI to calibrate their standards. It also provided FKOL with the details of the Calibration and Measurement Capabilities (CMCs), declared by NPL in the field of Mass Standards, as they were published in the Key Comparison Database (KCDB), maintained at the BIPM, and thus internationally recognized under the provision of the CIPM MRA.

FKOL later informed NPLI that they had successfully qualified in their USFDA audit. Thus India is slowly becoming a hub for the global pharmaceutical industry and this success is being attributed to the benefit of the CIPM MRA – making it unnecessary to send instruments overseas for calibration.

Force Standards Simultaneous Measurement of Longitudinal and Bending Strains in Bolts used in Wind turbines

Specialized work for calibration of the bolts used in wind turbines was carried out by NPLI for M/s Suzlon Energy, The Netherlands, a company that has started





Set-up used for measurement of longitudinal and bending strains in bolts

operating in India as M/s Suzlon Energy (India). This calibration work was outsourced by the company to NPLI, which was a direct benefit gained by NPLI as a signatory of the CIPM MRA.

M/s Suzlon Energy (India) is engaged in setting up wind energy power plants in India. The $M36 \times 30$ cm bolts, which are used to fix the blades to the rotors, form a critical component for reliable and efficient operation of the wind turbines. Until recently, Suzlon Energy had been using bolts manufactured and calibrated at their factory in the Netherlands, but the company has started manufacturing the bolts in India.

In an effort to establish an in-house calibration and testing facility, the company outsourced a Consultancy Project to NPLI to explore the feasibility of calibrating the bolts at NPLI. The task involved simultaneous measurement of longitudinal and bending strains at three different angles under 450 kN force and 200 Nm bending moment on specially designed metallic bolts to reduce the maintenance cost of the wind turbines. The Project was carried out successfully, and Suzlon Energy was extremely satisfied with the measurement results.

Acoustics and Ultrasonic Standards

The construction of the Delhi Metro,

which is operated by the Delhi Metro Railway Corporation (DMRC), was a Project of National importance in India. The construction and engineering work complied with all the international standards for a project of its type and many internationally recognized companies participated in the venture.

NPLI, a signatory of the CIPM MRA, was entrusted with studying the noise and vibration generated by the Delhi Metro and its impact on the surrounding environment, in particular the barrier design for DMRC. The Project was completed successfully and on schedule and this has allowed NPLI to go on and undertake other noise and vibration impact studies, including the Bangalore Metro and also for other Historical Monuments in India.

(Reproduced from the BIPM key comparison database Newsletter: No 13, June, 2010 (*http://kcdb.bipm.org/NL/13/* NL_13_June10_content.html))



The noise and vibration impact studies of the Delhi Metro were undertaken by NPL, New Delhi



Seismic Vulnerability Assessment of Buildings in Almora by CBRI, Roorkee

For a comprehensive approach towards disaster mitigation, the estimation of seismic vulnerability of buildings is perhaps the most important component where earthquake engineers need to focus. Evaluation of the seismic safety of all buildings is required so that the weaker ones could be strengthened to resist future earthquakes. In a developing country this task is further difficult as both engineered and non-engineered buildings exist.

Buildings in the Himalayan regions of India are susceptible to large earthquake forces and so need to be evaluated. There is no well-defined standard procedure available to evaluate the seismic safety of such structures. However, different researchers throughout the world have tried to develop their evaluation philosophies. Some of these methods have already been implemented in cities of developed countries.

In this direction, scientists at the Central Building Research Institute (CBRI), Roorkee have made a significant effort to evolve a quick and suitable approach for vulnerability assessment of buildings in the hilly towns of northern India. This includes information on building inventory developed especially for the hilly regions of India. The building survey data of all the 11 municipal wards of Almora city were collected. Microtremor study for finding the predominant natural ground frequency was also studied for different locations of this town.

Broadly, the targets of the approach were:

- Preparation of exhaustive building inventories of Almora town.
- Study of the seismicity of the region and estimation of PGA values.
- Field survey and data collection for existing buildings in different wards.
- Preparation of sub-surface map of the Almora town.
- Study of predominant period at various locations using micro tremor.
- Estimation of seismic vulnerability of existing buildings.
- Preparation of seismic risk map and damage scenario map of Almora town.

Vulnerability Assessment

Vulnerability is the degree of loss to a given element at risk resulting from the occurrence of a specified earthquake. For loss assessment we firstly need a means of specifying the earthquake hazard. Secondly, classification of the buildings or other facilities need to be done into distinct types whose performance in earthquakes is likely to be similar both in nature and degree. Besides, method of defining loss has to be there so that the extent of loss to a particular building or population of buildings can be quantified. A means of estimating the distribution of losses to each building type for each discrete level of ground shaking or as a function of ground shaking is yet another requirement.

Vulnerability analysis may be carried out in three or more steps such

as (a) inventory creation of the building and related infrastructure; (b) relationship between the category of structure and its possible damage due to the seismic hazard; (c) loss computation. Many classifications for buildings have been tried all over the world. The issues, which are important for the seismic resistance of the building, should be identified with the aim that these could be incorporated into the inventory of the buildings. These are listed as under:

Structural Form: Shape of Plan, Shape in Elevation, Number of Stories, Stiffness, Percentage of Openings, Location of Openings, Foundations (Depth, Adequacy), Design Faults, Type of Roof.

Site Planning: Pounding Effect, Slope Effects, Mutual Stiffening Effects, Local Ground Failure.

Construction Quality: Quality of Building Material, Quality of Workmanship, Neglect of Design Specifications.

History: Age, Pre-existing Damage Weakening Structure, Repair and Maintenance of Structure, Modification to Structure.

Geology of Almora Region

The Almora city is located in the NW Himalayan belt bound by Himalayan territory towards its north which comprises of diverse rock formations varying from igneous through metamorphic to the sedimentary rock formations. These rocks are cut across by numerous thrusts and faults at



different scales. The major geological units comprising the Higher Himalaya, Lesser Himalaya and the Outer Himalaya are separated by major thrust faults. These thrust faults are regional in scale and traverse the entire Himalayan territory approximately parallel to the strike. All these major thrust

faults are reportedly active and are potential zones for future earthquakes.

Seismicity of the Region

On account of northward movement of the Indian plate, strains are accumulating in several parts of the Himalayas as well as in the Indian Peninsula. There are several areas in the Indian Peninsula along which strains are accumulating that get released in the form of earthquakes. The occurrence of earthquakes in Latur, Jabalpur and Bhuj are the glaring examples. Thus, during the International Decade of Natural Disaster and Reduction (IDNDR) and after, our country has experienced earthquakes of moderate to high intensities. The Uttarakhand region has experienced 20 moderate size earthquakes in the last 200 years and is still seismically active.

The Almora region has a seismic history, being affected by the Himalayan earthquakes. The seismicity in this region is due to movements along several faults, thrusts as well as lineaments. The Himalayan earthquakes have their epicenters very close to any of the terrain bounding thrusts i.e. Main Central Thrust (MCT), Main Boundary Thrust (MBT) or Himalayan Frontal Thrust (HFT).



Principle of Seismic Survey

Seismic Hazard Assessment of Almora

The PGA in and around Almora region are computed by assuming the seismic history of the region, a maximum expected earthquake of magnitude 7.5, with a 20 km depth. The attenuation relations which are developed for Himalayan region are used to compute the attenuation with distance. The PGA value may be of the order of 0.21 g within or around Almora region.

Effect of PGA due to Earthquake in Higher Himalayas Seismic Survey

Elastic waves generated on the ground surface travel downwards into the various layers and are refracted back to the surface from the junctions of the various layers. The waves are picked up at various points on the ground and arrival times are recorded. Subsequently, the velocity of propagation and depth of the layers are computed.

Seismic Profiling

Seismic refraction tests were carried out along two sections – one at the stadium and the other along a roadside. Twelve vertical geophones of 6 Hz frequency range were placed over a stretch of 100 m to detect the refracted signals from the sub-surface layers. Hammer blows were used as the source of energy. Multiple hammer strokes were used and data were stacked one above the other. Five shot locations were used two at both the ends and the one at the middle of the spread.

It was observed that the topsoil comprises highly

fragmented rocks mixed with soil. Below the top layer, the base rock was detected. Average depth of the top loose layer varied between 20–25 meters.

Ambient Vibration Studies

A Digital Triaxial Strong Motion Accelerograph (SMA) was used to collect ambient vibration data. The SMA was kept in trigger threshold mode for recording acceleration time histories of ground motion in digital form. The threshold was set very low to get even cultural noise generated inside the ground. SMAs have full-scale range of 2.0 g with sampling rate of 100 samples per second. It was observed that the natural frequencies of the structure undertaken in the study are between 0.85 to 1.5 Hz.

The data of the buildings was collected and compiled ward wise and masonry /RCC building wise. The following conclusions were made from this study: More than 50% buildings in Almora town were identified as 'Poor'. Only 5% buildings were qualified as 'Good'. About 10.5% of RCC buildings were qualified as 'Good', whereas 27.7% were rated to be 'Poor'. According to the study, 82% of masonry buildings were graded as 'Poor'.



CBRI, Roorkee uses CFD as a Tool to Study Fire Safety

In recent years, the major infrastructure in the country in the form of malls, underground car parks, Metro corridor etc., has remarkably developed. In a significant effort, CBRI, Roorkee has used Computational Fluid Dynamics (CFD) as a tool to study fire safety inside such infrastructure. A particular case of transport tunnels has been chosen in view of its importance in the development of Delhi Metro.

The study of various safety components showed that ventilation system was one of the very important safety measures inside tunnels used for controlling and extracting smoke in case of fire emergency. In long tunnels, where ventilation is provided by mechanical means, two types of ventilation layouts exist: longitudinal and transverse. The longitudinal ventilation is provided through jet fans located axially below the ceiling or through jet injection system where the fans are located in a fan room and air is supplied through ventilation shafts. In longitudinally ventilated tunnel fires, smoke and hot gases form a layer below the ceiling and flow in the direction





opposite to the ventilation stream. This phenomenon is called 'back layering'.

The ventilation velocity just sufficient to prevent back layering of smoke over the stalled vehicles is the minimum velocity needed for smoke control and is known as the critical velocity. The ability of the longitudinal ventilation system to prevent back layering is the current industry standard to measure the adequacy of the system for smoke control. The ventilation velocity depends on a number of parameters such as heat release rate (HRR), tunnel geometry, slope etc. This implies that ventilation system has to be designed for each individual tunnel.

The ventilation system can be designed and evaluated through experimental studies of each tunnel, but it is very impractical and expensive. An alternative method is to use mathematical modeling which when coupled with flow visualization techniques provides an excellent means to study the environment inside a tunnel. This helps in designing appropriate ventilation systems effectively without the need to conduct experiments.

Therefore, CFD model has been used to evaluate ventilation strategies in a transport tunnel in case of fire emergency. The aim was to study the smoke movement inside tunnels, and determine critical ventilation velocity for smoke control in longitudinally ventilated tunnels, which are similar to tunnel sections of Delhi Metro Rail corridor, India. The tunnel sections considered had jet injection type ventilation system.

The section of tunnel considered was 400 m long, 5.5 m wide and 6 m high. The analysis was carried out by assuming a variable fire source with a peak heat release rate (HRR) of 16 MW, located at the center of the tunnel. Ventilation ducts were located in the ceiling near the tunnel

portals and inclined at 10° to the plane of the ceiling through which fans discharged air. The influence of the fire HRR curve slope on the smoke flow dynamics in this realistic tunnel model fitted with inclined fans was investigated. In case of fire two scenarios were studied: (i) fans activated immediately and achieved their full speed after detection of fire. (ii) fans activated at delayed times to take into account the response time of the fans to achieve their maximum speed. The velocity of supply and exhaust fans necessary to remove smoke in 30 sec from the upstream direction was determined.

It was found that under natural ventilation conditions inside a tunnel, the smoke moved symmetrically along the crown in both directions, and cool air from bottom of tunnel portals moved towards the fire source. The smoke reached tunnel portals in about 3 min. It was also found that for this type of tunnel configuration, higher supply and exhaust velocities are required to produce the desired critical velocity than predicted by empirical formulae available in literature.

The velocities of fan required to produce different desired axial velocity inside the tunnel was determined. The exhaust fans do not influence the velocity in upstream area but are necessary for smoke removal in the downstream direction. It is also necessary that fans are activated to full speed within three minutes of starting of fire so that the ventilation system is effective for desired smoke removal.





CGCRI Signs Agreement with H. R. Johnson on Manufacture of Glass Beads/Nodules

The Central Glass & Ceramic Research Institute (CGCRI), Kolkata, has signed an Agreement with M/s H. R. Johnson (India), a Division of Prism Cement Limited for utilizing the know-how for manufacture of glass beads/nodules used for nuclear waste immobilization. The signing took place on 11 May 2010 on the National Technology Day at CGCRI, Kolkata.

CGCRI had been producing the material at its premises and supplying the same to the Department of Atomic Energy (DAE). Due to a quantum jump in the demand of the material in the coming years, the Institute recently took the initiative of transferring the technology to M/s H. R. Johnson (HRJ) who are engaged in the interalia manufacturing of vitrified polished tiles, wall tiles, frit including various other industrial products and had shown keen interest in taking up the technology

CGCRI.

developed by

The Agreement grants HRJ permission to utilize the know-how in India to make use and dispatch the product to DAE after usual inspection, chemical analysis and certification by CGCRI. The permission will remain



Prof. Indranil Manna, Director CGCRI shakes hand with Mr. G. S. Patnak, SBU Head, IPNR & IB, HRJ after the exchange of documents

effective for a period of five years from the date the agreement has been signed, termed effective date, on non-exclusive basis subject to the successful completion of the initial trials. After five years, the know-how may be licensed to HRJ on lump sum and royalty terms on non-exclusive basis.

Dr. Kasturirangan, Member, Planning Commission Visits NIO

Dr. Kasturirangan, Member, Planning Commission visited National Institute of Oceanography (NIO) on 28 May 2010. Dr. Satish Shetye, Director, NIO, briefed him on the research activities that are being carried out at NIO.

In his address to the scientific and technical staff, Dr. Kasturirangan indicated that this is the right time to take the research activities to a new height since the political will is supportive to S&T development and economic conditions of the country are favourable. He encouraged scientists to translate their ideas into actions, and build capabilities to do high-end research.

Dr. Kasturirangan told that the Planning Commission is ready to fund

research that links to the societal needs, interfaces with the industry, has strategic importance and/or developed linkages between various programmes of the Governmental Departments. He indicated that pure research that needs small funding should, no doubt, be continued but there is a need to evolve large projects

requiring large funding. Such projects can be evolved either by the laboratories within CSIR or in the form of megaprojects in collaboration with other research laboratories and/or universities.

Dr. Kasturirangan appreciated the work being carried out at NIO, and congratulated the scientists for the research activities that has placed the



Dr. Kasturirangan laying the foundation stone of the administrative building

Institute at high ranking and hoped for a broader outlook for the 12th Five Year Plan period with a couple of programmes in the form of megaprojects. During his visit, Dr. Kasturirangan visited some laboratories of the Institute and also laid the foundation stone of the administrative building whose construction would begin very soon.





Programme on *Planning for Life After Retirement* at HRDC, Ghaziabad

Most of us look forward to our retirement from full-time work, eagerly anticipating more free time and opportunities to enjoy and play. But the reality of retirement can be very different. Relationships with family and friends may change and unexpected challenges may lead us to wonder who we really are and what we can reasonably accomplish in the remaining years of our lives.

Retirement may cause different mental and emotional reactions at different times to different individuals. Through the identification and management of these emotions, retirees tend to enjoy this hard earned leisure more. How the individual relates to and interacts with society plays a big role in the outcome of emotions associated with retirement.

In order to help CSIR staff of all cadres in coping up with such a change, the HRDC had earlier launched a series of programmes on *Planning for Life After Retirement*. The 7th such programme was held on June 16 2010 in which 33 participants from various CSIR laboratories participated. The faculty for these programmes was drawn from Human Resource Management Association, New Delhi.

The objective of this programme is to prepare persons facing retirement to

appreciate realities and understand the associated psychological aspects in order to meet the challenges ahead. These programmes have been well received by the participants, with most of them suggesting organizing more of such programmes and inviting their spouses to co-participate, as retirement planning is an activity which will be more effective if spouse too is involved in it.

Honouring the suggestion, HRDC had invited for its 7th programme participants' spouses as well. The programme being an open one had 18 scientists, 3 technical, and 12 participants from admin/finance/ purchase cadres.



A group photograph of Programme on Planning for Life After Retirement at Human Resource Development Centre, Ghaziabad



Training Programme on *Quality Assurance and Quality Control in Laboratory Analysis* organized at NEERI, Nagpur

CPCB sponsored Training Programme on Quality Assurance (QA) and Quality Control (QC) in Laboratory Analysis was organized at the National Environmental Engineering Research Institute (NEERI), Nagpur in recent past for State and Central government agencies working in the area of water quality monitoring under Hydrology Project II. The objectives of the Training Programme were to explain about data collection, collation, compilation and interpretation for logical conclusions to develop QA/QC for water quality improvement/management.

The Training Programme involved

various lectures and laboratory demonstrations covering several aspects of quality assurance and quality control related to laboratory analysis for a variety of environmental matrices, viz. water, soil, air, etc. The CPCB and NEERI scientists imparted the training. Dr. T. Chakrabarti, Acting Director, NEERI in his Inaugural Address emphasized on the need of advanced instruments and techniques for correct estimation of environmental samples. He also delivered a lecture on Emerging Trends in Environmental Analysis. Dr. S. D. Makhijani, Director, CPCB, Delhi and Dr. D. D. Basu, Sr. Scientist, CPCB, Delhi delivered the lectures

on Laboratory Accreditation under EPA and ISO17025 and Error, Uncertainty and Quality Control in Analysis respectively. Dr. (Mrs.) Neeta Thacker, Scientist G and Head, Analytical Instruments Division, NEERI spoke on Approach to Analytical Quality Control in Water Quality Analysis. Dr. G. L. Bodhe, Scientist F, NEERI delivered a lecture on Uncertainty in Measurements.

The participants working as chemists, engineers, scientific officers, scientists and scientific assistants from Andhra Pradesh, Delhi, Gujarat, Karnataka, Maharashtra and Orissa underwent this training programme.

NEERI participates in 3rd Indo-German Conference on *Research for Sustainability*

The 3rd Indo-German Conference on *Research for Sustainability* was held at IIT Delhi, New Delhi on 3-4 February 2010. This Conference was jointly organized by the German Federal Ministry of Education and Research, Department for Science and Technology (DST), Govt. of India, National Environmental Engineering Research Institute (NEERI), Nagpur, IIT Delhi and the United Nations University, Germany.

The goal of the 3rd Indo-German Conference was to define strategic common areas between India and Germany in the fields of "water" and "waste management" research and development, and to build a network between the key factors. The networks are expected to generate research, development and innovation alliances for the better use of scientific and technological knowledge.

Dr. T. Ramasami, Secretary, Department of Science and Technology and Prof. Surendra Prasad, Director, IIT Delhi, welcomed the German Delegation headed by Dr. Wolf Junker, German Federal Ministry of Education and Research (BMBF). Dr. Ramasami stressed the future demand for sustainable technological solutions especially to close the ever increasing gap between water supply and water

demand in India.

Dr. T. Chakrabarti, Acting Director, NEERI drafted the vision of turning the huge amount of waste in India into new products or energy, and also gave an overview on *Research on Waste Management and Technologies in India*.

The principle of *Sustainability Science* was introduced by Dr. Wolf Junker, BMBF from the perspective of the German Government and by Prof. Kazuhiko Takeuchi, United Nations University from the perspective of Science. The main topics of the Conference were focused on R&D in the field of *Water* and *Waste Management*.



Prof. Dr. Karl-Ulrich Rudolph, University of Witten/Herdecke and Prof. A. K. Gosain, Indian Institute of Technology Delhi introduced R&D in the field of water research and technologies in India and Germany. In parallel sessions more specific R&D topics such as water efficiency, water reuse, appropriate solutions and general aspects, organic waste management, and treatment of residual waste and CDM measures were presented and discussed.

In this Conference, Dr. A. N. Vaidya, Solid & Hazardous Waste Management Division, NEERI chaired the session *Waste Management: General Aspects* and took part in the discussion and in providing recommendations of the Conference. He was also one of the coordinators for organization of this significant event. Mr. J. K. Bassin, Scientist & Head,



German Federal President Horst Köhler and Hon'ble Minister of State (IC) for Science & Technology and Earth Sciences Shri Prithviraj Chavan together with the participants of the Conference on Research for Sustainability

Delhi Zonal Laboratory, NEERI delivered a lecture on *Environmental Flow Assessment*, Mr. J. K. Bhattacharyya, Scientist, Solid & Hazardous Waste Management Division, NEERI spoke on *Occupational Health Hazards in Municipal Solid Waste Management* and Dr. S.P.M Prince William, Scientist, Solid & Hazardous Waste Management Division, NEERI highlighted various aspects related to *Bioethanol Preparation from MSW Organic Wastes: Advanced Pretreatment Processes for Lignocellulosic Wastes.*

National Conference on Computational Instrumentation organized by CSIO, Chandigarh

"There is a need to establish strong networking among the end users of technology and the R&D organizations along with Academic Institutes and the Industry so that optimal cost effective solutions can be delivered", His Excellency Shri Shivraj V. Patil, Governor of Punjab & Adminstrator, UT, Chandigarh said while inaugurating the National Conference on *Computational Instrumentation* held at CSIO, Chandigarh recently. This event was organized as a part of the Golden Jubilee Celebrations of CSIO.

He said that in developed countries

industries generally have an in-house R&D set-up. In India, however, it is not coming up as expected to sustain the R&D efforts and the cost involved. The national R&D institutions can, therefore, play a key role in bridging this gap. He appreciated the initiative taken by CSIO for organizing the event in the city and providing a unique forum to scientists, technologists and others to share their knowledge, perceptions and experience. His Excellency Shri Patil, who was present on the occasion of Silver Jubilee Year of the Institute way back in the year 1985, said that the change in the ambience of the Institute and its scientific growth over the years is clearly visible.

Earlier, Dr. Pawan Kapur, Director, CSIO welcomed the Chief Guest and acquainted the participants of various R&D activities being pursued by the Laboratory. While highlighting the achievements of CSIO he informed the August gathering that instruments are the key to the advancement of scientific, engineering, and medical research with the continuous development of newer and improved fusions of technologies.

Recent innovations in computational techniques coupled with the advances



in computer technology enable us to tackle large-scale practical problems for advanced instrumentation which could not be imagined before. Dr Kapur said that Computational Instrumentation (CI) is an interdisciplinary engineering specially motivated by an emerging revolutionary impact of computing on system engineering, analysis and design.

The use of embedded computational intelligence in instruments has facilitated scientists to tackle critical problems and new findings which, in turn, enabled the development of more powerful and novel instruments. The Conference aimed to provide a forum for interaction and exchange of ideas among scientists, engineers, researchers and users actively engaged in this area.

Around 100 participants from all over the country took part in this Conference. A total 60 papers were presented in six technical sessions namely: Embedded and Intelligent Instrumentation, Bio-Medical Signal Processing and Instrumentation, Computational Imaging and Analysis, Decision Support and Classification Techniques, Sensor, Wireless Networking for Agro and Health Sector, and Computational Techniques and Analysis.

Dr. H. K. Sardana, Convener of the Conference gave an overview and the aim of the Conference in the Inaugural Session. After the Inaugural Session, Professor Sneh Anand, IIT Delhi delivered the Keynote Address on the topic, *Technology Fusion in Computational Instrumentation for Clinical Practices*. She stressed on various techniques for assistive technologies, clinical diagnosis and treatment. She also focused on various prosthetic devices and special instrumentation for the blind. This session was chaired by Shri Yogesh Kumar, Technical & Business Consultant, NAL, Bangalore.

Prof. Sankar Kumar Pal, Director, ISI, Kolkatta delivered the Plenary Talk on *Machine Intelligence, Rough Fuzzy Granules and Mining: Concepts, Features and Applications.* He focused on various computational techniques for a huge variety of applications.

Other eminent persons, who delivered the invited talks or chaired the sessions included; Shri J. S. Bhatia, Executive Director, CDAC Mohali; Prof. S. S. Pattnaik, NITTTR, Chandigarh; Prof. Ashutosh Mishra, IIT Delhi; Prof. H. K. Verma, IIT, Roorkee; Prof. Tamalika Chaira De, IIT Delhi; Shri George Varkey, Executive Director, CDAC, Noida and Dr. G. P. S. Raghava, Scientist, IMTECH, Chandigarh.

Workshop on *Applications of Flow Cytometry in Nanomaterial Toxicology* at IITR, Lucknow

A five-day Workshop on 'Applications of Flow Cytometry in Nanomaterial Toxicology' was organized recently by the Indian Institute of Toxicology Research (IITR), Lucknow jointly with BD Biosciences, India. The objective of the Workshop was to provide hands-on experience on the most relevant toxicity assays for the safety/ toxicity evaluation of nanomaterials.

During the Inaugural Session Dr. K. C. Gupta, Director, IITR, highlighted the importance of the Workshop and welcomed all the participant and faculty. Dr. Alok Dhawan, Workshop Co-director, introduced the audience to the genesis of the Workshop. He apprised the audience that this was the first Workshop in the world on the use of flow cytometry in nanomaterial toxicology.

The Workshop was inaugurated by Prof. Manoj K. Mishra, Vice Chancellor, University of Lucknow, Lucknow. In his Inaugural Speech he emphasized the relevance of such workshops, especially with respect to creating trained manpower in the area of nanomaterial toxicology. Prof. Mishra also released the "Protocol Manual" at this occasion.

Prof. C. L. Khetapal, Director, CBMR, SGPGI, Lucknow addressed the gathering and pointed out the effort of IITR in holding such workshops for the scientific community. He emphasized that such workshops helped researchers to learn first-hand the different techniques in nanomaterial toxicology and their implementation to various research fields. Dr. Arvinder Singh, Head, Science & Technology, BD Biosciences, India, explored the importance of collaborative efforts of public-private partnership for the organization of Workshop. Dr. Alok K. Pandey, Workshop Co-Director, thanked all the dignitaries, participants, faculty and the organizing committee for supporting the Workshop.

The inauguration was followed by a lecture by Dr. Paresh Jain, BD Biosciences, India, on the *Basics of Flow Cytometry*. He presented an elaborate





Prof. Manoj K. Mishra, delivering the Inaugural Speech

introduction of flow cytometer, its setup and tracking. The lecture was chaired by Prof. Diana Anderson, University of Bradford, UK. Soon after the lecture, participants went to the laboratory where they got hands-on experience with the basics of flow cytometry as well as its set-up.

The second lecture was presented by Prof. Jayesh Bellare, IIT Mumbai, India, on the use of *Nanoparticles in Healthcare* with emphasis on ophthalmic drug delivery with nanoparticles. The lecture was chaired by Dr. K. C. Gupta, Director, IITR. Prof. Bellare showed the use of flow cytometer in monitoring the uptake of nanoparticles in cells. Participants then performed the experiments related to DNA cell cycle analysis by flow cytometry.

On the second day, lectures and experiments were focused on the preparation of nanoparticle suspension, characterization, uptake and cytotoxicity. Dr. Alok Dhawan, IITR, Lucknow, delivered a lecture on Nanoparticles: Characterization, Uptake & Cytotoxicity highlighting the importance of preparation of nanoparticles suspension in different media, optimal dose/concentration of treatment, their characterization, uptake and cytotoxicity. The lecture was chaired Dr. Rishi Shanker, Head, by Environmental Microbiology Division, and Area Coordinator, Environmental Toxicology Group, IITR, Lucknow.

Mr. Sangeet Biswas, Amil India



Demonstration of a laboratory experiment

Limited, gave a lecture on '*NP Characterization Using Dynamic Light Scattering*'. He informed the usefulness of the technique to ascertain the stability of nanoparticles in suspension and their impact on different studies. The lecture was chaired by Dr. Alok Dhawan, Area Coordinator, Nanomaterial Toxicology Group, IITR, Lucknow. The participants then did laboratory experiments on the preparation of nanoparticle suspensions, characterization using DLS, their uptake and cytotoxicity study using flow cytometry.

The third day was dedicated to the micronucleus assay. Dr Alok K. Pandey, IITR, Lucknow, presented a lecture on, *Micronucleus Assay Using Flow Cytometry*. He discussed about the formation of micronucleus and conventional methods for its detection. He also described the use of flow cytometry for high throughput screening of micronucleus formation due to genotoxic substances. The lecture was chaired by Dr. S. K. Rath, Head, Genetic Toxicology Laboratory, CDRI, Lucknow.

The participants subsequently did a laboratory exercise on MN assay using flow cytometry. Dr. Arvinder Singh, BD Biosciences, India, delivered a lecture on the details of *Immunophenotyping Using Flow Cytometry Multicolor*, which was followed by laboratory training on immunophenotyping. The lecture was chaired by Dr. Yogeshwer Shukla, Head, Proteomics Unit, IITR, Lucknow.

Day four started with a lab exercise related to apoptosis using FITC/PI dual staining protocol in cell line samples. Dr. B. S. Dwarikanath, INMAS, New Delhi delivered a lecture on, *Multi-Parameter Flow Cytometry for Studying Apoptosis*, which was chaired by Dr. Madhu Dikshit, Head, Cardiovascular Pharmacology Unit, CDRI, Lucknow. The laboratory experiments were carried out for apoptosis and MN detection where the participants came to know about the details of these assays.

On the concluding day a lecture on *Multiplex Assays for Secreted Cytokines and Intracellular Staining for Estimation of Cytokine Protein Synthesis* was delivered by Dr. Amit Misra, Pharmaceutics Division, CDRI, Lucknow. He emphasized the importance of flow cytometry in immunology. Laboratory experiments involving cytokinescytometric bead arrays (CBA) multiplex assays in human blood samples were also performed.

The Valedictory Session was chaired by Dr. K. C. Gupta, Director, IITR. Dr. Alok Dhawan, Dr. Mukul Das, Dr. Rishi Shankar and Dr. Alok K. Pandey were also present. Dr. K. C. Gupta thanked the organizing committee for conducting a successful Workshop in the area of nanomaterial toxicology. He discussed with participants about their views, experiences of the Workshop and asked suggestions for improvement. Certificates of participation were also distributed. Finally, Dr. Alok Dhawan thanked the Director, faculty members as well as the participants for their cooperation in making this Workshop a success. He also expressed his gratitude to BD Biosciences for their support and assured the participants for organizing more of such Workshops in future.



CSIR KRCs Chairpersons/Heads Meet at HRDC, Ghaziabad

A two-day meeting of the Chairpersons/Heads of CSIR Knowledge Resource Centres (KRCs) was held at Human Resource Development Centre, Ghaziabad on 15-16 April, 2010 to discuss and debate over the issues related to governance and functioning of CSIR KRCs, with specific emphasis on e-journal consortium's activities. A total of 50 members from CSIR KRCs attended the Meet.

While welcoming the participants, Dr. Naresh Kumar, Head, HRDC, Ghaziabad, gave a detailed background of the meeting, which was primarily aimed at improving the knowledge resource base and activities of KRCs for enhancing the research output of CSIR. Dr. Naresh Kumar outlined the development that has taken place after the KRC Manual was released. He also emphasized that in view of the ever increasing cost of access to information products, including journals and databases, and also in the light of dwindling readership, KRCs have to make their functions more in tune with changing needs of the users and have to modify their way of thinking and working in the face of changing technological development.

Dr Naresh Kumar emphasized that KRCs have to justify the huge expenditure that CSIR makes on their resources by making themselves more visible in terms of their contribution in the research output of CSIR scientists. He foresaw that the KRCs of tomorrow may not have magnificent physical structure and a large collection of books and journals in their physical form but will definitely be small functional places providing access to a vast resource in the new format. "KRCs of today must prepare to pave the way for tomorrow", Dr Kumar said. "The people in KRCs must become Informed Managers in the changed scenario instead

of being *Line Managers*," he further added.

Dr. Gangan Prathap, Director, NISCAIR, presented his Keynote Address on *KRC's: Crystal Gazing*. Presenting an

analysis of the data on the usage and download of information resources by various institutions of CSIR, Dr. Prathap emphasized the need for a re-look at the resources that CSIR KRCs have been subscribing to. He highlighted that each CSIR KRC must take upon itself to analyze output/citation/Energy Map of its institution so as to exactly decide about the proper utilization of budgetary resources and procure useful resources. suggested a need He for microconsortium kind of arrangement for less used resources such as civil engineering.

Dr. M. G. Kulkarni, NCL, Pune, a practicing Scientist and also the Chairman of NCL, KRC made a comprehensive presentation on *What the Future Holds for KRCs of Tomorrow*. Citing examples from published literature and using Science Citation as a guide, he created a very futuristic scenario of KRCs. He opined that present day librarian must know about the research domain and subdomains of his/her Institution apart from having the knowledge of Library Science. A librarian of tomorrow must be a very comfortable IT professional.

The session on *Revisiting the CSIR KRC Manual and Governance of CSIR KRC* proved to be a very lively, elaborately discussed and debated session. The panelists of the session were S. K. Mallik (CDRI), Mridula Chirmule (NCL), Poornima Narain (NAL) and N. C. Ghosh (IICB). The participants generally



The meeting in progress

appreciated the fact that the functioning of KRCs has become much more smooth and systematic due to the availability of an official document giving clear procedural details. However, many participants felt that few issues have to be clarified or modified in the Manual mainly because of changed situation. Many suggestions for proposed modifications in the Manual were put forward by the members.

It was also felt that manpower requirement in the future KRCs will not be the same as was prevailing earlier. Dr. Naresh Kumar suggested that a committee could be formed to decide about the requirement of number of personnel and their qualifications in view of the newly envisaged jobs in individual laboratories.

Dr. M. P. Tapaswi, Head, KRC of NIO, presented his analysis of the use of journals subscribed by various laboratories in CSIR. The analysis was based on (a) list of journals subscribed during 2007 and (b) The contributions of respective laboratories in the years 2007-2009 as reflected in *Web of Science* (WoS). The citations/references cited by the authors of the labs in their contributions were used as a parameter for assessing the 'usefulness' of a journal to a particular laboratory.

The aim of the study had two objectives: (a) To propose to discontinue the journals that are not and/or least used. This is to help bring back the publisher to



the negotiation table where CSIR will have a better bargaining power because of financial loss to the publisher and that offers the discontinued journals access to the Institutes (b) To check whether the consortium for 'Select Journals to Select Labs' as per Elsevier's formula for consortium offers would work in CSIR's favour. The calculations showed that most of the subscriptions could be maintained by an additional payment of about USD. 11000.00. The study further showed that the actions would benefit CSIR as follows:

- (i) Bring Elsevier back to negotiation table in CSIR's favour.
- (ii) Net saving of the costs on unused journals without loss of useful information access to researchers if the negotiation fails.
- (iii) Increased opportunities for collaboration of CSIR KRCs and projec tourselves as *One-CSIR*.

While speaking on *e-journal* Consortium — The Pricing Structure and the Strategies for the Future, Dr. R. R. Hirwani, Head, URDIP, Pune, observed that Science Direct was a very

useful product and needs to be procured by CSIR institutions. However, a rational pricing structure has to be negotiated with Elsevier. The members also exchanged the views on the Standard Agreement format of Elsevier and identified the clauses that are placing the laboratories in embarrassing an situation. Dr. Hirwani along with Dr. Tapaswi presented possible actions and strategies in order to reduce pressures of dictatorial terms from the commercial publishers in general.

Dr. Hirwani talked on the Infrastructure and Network Needs of CSIR System. He drew the attention of the participants towards a need for using open access sources and participating in open innovation platform as exemplified by *Open Source Drug Discovery* (OSDD) programme of CSIR.

The next session was aimed at sensitizing the participants on the CSIR's new initiative for Knowledge Management. Dr. K. Jayakumar, JSA CSIR made a detailed presentation of the initiative on *Enterprise on Knowledge Management*. He emphasized that the services and activities of KRCs should be linked with the new initiatives. Three products on Federated Search namely JCCC, GIST Find and EBSCO were demonstrated by their respective vendors.

The last technical session was chaired by Dr. Naresh Kumar. He gave a brief outline about the proposed budget allocation for the KRCs in the 12th Five Year Plan. He felt that during the 12th Five year Plan, CSIR KRCs should pitch for an allocation of Rs.400.00 crores to meet with the subscription and purchase cost of knowledge resources and also for the

development of infrastructural and resource base of KRCs. This could be done in a project mode. He informed the participants that a well crafted proposal for new infrastructural facilities and services. in tune with modern technological advancement should be made by the KRCs for consideration. A Committee was constituted having members from various age groups to have a discussion among all KRCs before making a concrete proposal. The discussions on issues like Institutional Repository, Scientometric/Bibliometric analysis, at laboratory level, were also held during the session.

Most of the participants took active part in the concluding session in which many suggestions/ideas were put forward for the activities/services of KRCs of future. Most of the participants were of the view that KRCs must thrive to become the most happening place of the institutions and the resources and services must be in tune with the information requirement of the user scientists of both the host institutions and the sister organizations.

Human Resource Development Centre (CSIR), Ghaziabad Meeting of Chairpersons/Heads of Knowledge Resource Centres on Knowlege Infrastruture Upgradation 15-16 April, 2010



Left to Right

Sitting Row:- D.B. Ramesh, Panduranga, H.Y. Mahakuteshwar, U.S. Ghosh, Dwijendra Singh, Yogeshwer Shukla, N.G. Goswami, Poornima Narayana, Gangan Prathap, Sukanya Bhasin, S.J.D Vara Prasad, Sunil Kr Sharma, Naresh Kumar, A. Harharan, Anuradha Shukla, S.Kaliyan, M.P. Chirmule, V.V. Lakshmi, S.N. Sinnarkar, Santosh Babu.
Standing Row:- Mukhtiar Singh, S. K. Srivastava, A.Mitra, N. C. Ghosh, Nishy P, Kavita Singh, S. K. Malik, D.K. Pandey, Anand K.Bachhawat, N.B. Bhoi, P. V. L. Reddy, M. P. Tapaswi, B. R. Mandal, K. K. Pathak, N. K. Wadhwa, A. P. Singh, Shaheen Syed, R. S. Bisen, B. M. Khanna, Deepak Wahal, P. K. Barooah, P. Divakar, Karanvir Singh, Renu Pandey, Ashok Kumar, Sanjay Sharma, Arvind Sharma, M. G. Kulkarni



Golden Jubilee Celebration at IIP

Indian Institute of Petroleum (IIP), Dehra Dun which provides R&D as well as technical support to downstream sector of petroleum industry has taken a lead in this important area. Over the last several years, IIP is pursuing research in biomass derived liquid fuels, gaseous fuels, additives and lubricants involving thermal, catalytic and biochemical routes.

IIP celebrated its Golden Jubilee on 14 April 2010. Various activities were organized such as Blood Donation Camp, SSBMT Zonal (Outdoor), Neuropathy Camp and Eye Check-up Camp. Several national and international symposiums/seminars were organized during the Golden Jubilee Year.

On completing 50 golden years of service to the Nation, a Function was organized at IIP on 14 April 2010. The Chief Guest of the Function was Hon'ble Union Minister of State (IC) for Science and Technology and Earth Sciences, Mr. Prithviraj Chavan. The Function was presided by the Secretary, Department of Scientific and Industrial Research & Director General of CSIR, Prof. Samir



Inaugurating the Function, and lighting of lamp (L-R) Mr. Prithviraj Chavan, Hon'ble Minister of State for Science & Technology and Earth Sciences, Dr. M O Garg, Director IIP; and Ms.Pratima Bagga



Mr. Prithviraj Chavan, the Hon'ble Minister of State for Science & Technology and Earth Sciences addressing the Golden Jubilee Function at IIP

K. Brahmachari. Many stakeholders and licensee attended the Function as delegates. The other dignitaries who attended the Function were many CMD's of Oil Companies including Mr. R. S. Sharma from ONGC, Previous Director Generals of CSIR, Dr. S. Varadrajan and Dr. G Tyagrajan, Ex-Directors of Indian Institute of Petroleum, Dehra Dun, Dr. T. S. R. Prasadarao and Mr. Sudhir Singal.

On the occasion, Baba Bhim Rao Ambedkar's birthday garlanding was

done on photographs of Baba Sahib by Hon'ble Minister, Dignitaries and Institute's SC/ST Welfare Association. Director, IIP briefed about Baba Sahib.

The Golden Jubilee Conference: on *IIP's Relevance in Past 50 years for the Petroleum Sector* presented by Institute's licensees and stakeholders, was chaired by Dr. D. P. Misra, Director, Tata Consulting Engineers Ltd. Mr. K. Murali, Director Refineries, HPCL Mr. K.V. Seshadri, Executive Director, Mumbai Refinery, BPCL; Mr. M K Joshi, Director Technical, Engineers India Limited; Mr. B. M. Bankapur, Director Refineries, IOCL; Mr. Adam P. Harvey, Senior lecturer, Chemical Engineering and Advance Materials, New Castle, University, Norway, spoke on this occasion on contributions of IIP towards science and the Industry.

On this occasion, Director, IIP presented a Road Map for the next 10 years i.e. 'Vision 2021'. Director General, CSIR appreciated IIP's efforts in research and commercialization of processes developed by it. He stressed upon the energy efficiency of technologies, to work for green chemistry and synthetic biology. He also said that our government's expectation



Prof. Samir K. Brahmachari, DG CSIR addressing the Golden Jubilee Function at IIP

from CSIR is to utilize resources for providing affordable food and sustainable energy to meet the basic needs of 800 million people below poverty line.





The Stakeholders with Mr. Prithviraj Chavan, the Hon'ble Minister of State for Sciences & Technology and Earth Science and Director General CSIR, Prof. Samir K. Brahmachari



Releasing the 50 years Memory Book (*IIP Turns a Golden Leal*) (*L-R*) Prof. S. K. Brahmachari, Mr. Prithviraj Chavan, the Hon'ble Minister of State for Sciences & Technology and Earth Sciences; and Dr. M. O. Garg

The Hon'ble Minister of Science and Technology, Mr Prithviraj Chavan, said that the country looks up to its premier scientific Institutes like IIP for finding solutions to some of the most vexing problems that confront our society and our development efforts. "Our scientific laboratories must align their priorities closely to the National needs such as water, food, sustainable energy, and affordable healthcare. I am happy to inform you that CSIR has started the programme called CSIR-800 to meet the basic requirements and upliftment of 800 million people living below the poverty line, through science and technology development," said the Hon'ble Minister.

He also informed that due to initiation by CSIR, the R&D components have been included in the National Mission on Enhanced Energy Efficiency (NMEEE) under the National Action Plan on Climate Change. Such R&D components could be in terms of thermal efficiency of boilers, employing novel techniques such as supercritical, IGCC etc. He said, "the Stone Age did not come to an end for want of stone." "Likewise, the Oil Age will disappear long before oil and gas resources are exhausted," he added. Energy efficiency and renewable energy are the two pillars of sustainable energy or two sides of the same coin.

The Hon'bleMinister also informed that Government of India has declared 2010-2020 as the *Decade of Innovations*. And we need new solutions in many areas to achieve our goals of inclusive and sustainable growth like in healthcare, energy, urban infrastructure, water management, transportation to name only a few. We need to develop

i n d i g e n o u s technologies for our needs.Chairman, ONGC, Mr. R. S. Sharma spoke briefly on IIP's contribution in petroleum research activities, particularly refining technologies. He spoke energy efficient processes and green technology.

To mark the 50 years of service, IIP and Hindustan Petroleum also signed a Memorandum for undertaking elaborative research in the energy sector. IIP has invented around 70 technologies with more than 210 national and international patents. And now the focus of the Institute has shifted towards more eco-friendly technologies with better management of available bio-waste and renewable source of energy.

A newly constructed wing named, *Modern Analytical Instruments* was inaugurated by the Hon'ble Minister on this occasion.



Mr. Prithviraj Chavan, the Hon'ble Minister of State for Science & Technology and Earth Sciences inaugurating the Modern Analytical Instrumentation Wing. Dr. M. O. Garg, Director IIP; and Prof. S. K Brahmachari, DG, CSIR are also present



Foundation Day Celebration at CMERI, Durgapur

Central Mechanical Engineering Research Institute (CMERI), Durgapur completed 52 years of dedicated service to the Nation on 26 February 2010. The occasion was celebrated in a befitting manner by the entire CMERI family and MERADO, Ludhiana amidst great enthusiasm. The 52nd Foundation Day celebration provided an opportunity of viewing the past accomplishments through the window of the present realities and gearing for planning more meaningful contributions in the future.

Three eminent personalities spared their valuable time to introspect along with the Institute on this day. Prof. Samir K. Brahmachari, who is leading a change movement within CSIR system as its Director General, graced the occasion as the Chief Guest. Dr. Gangan Prathap, Director, NISCAIR and a visionary scholar was present as the Guest of Honour. Prof. Suman Chakraborthy, an outstanding scholar hailing from IIT, Kharagpur was also present in the capacity of an erudite speaker.

The Foundation Day Programme started with the invocation song and the lighting of the ceremonial lamp following which Prof. Gautam Biswas, Director, CMERI extended a hearty welcome to the distinguished guests and to the audience.

Speaking on the occasion, Prof. Biswas outlined his vision of what an apex laboratory like the CMERI should ideally embrace in respect of fields or domains emerging out of the more classical branches of mechanical engineering. In doing this, he frequently referred to the necessity of benchmarking the activities of CMERI against those of an acclaimed international leader, the Mechanical Engineering Laboratory of Japan.

Prof. Biswas then took the audience on a guided tour of the activities of CMERI in such disparate disciplines as *Robotics* including the *Surface and Underwater Variants; Mechatronics; Design Engineering; Thermal Engineering; MEM/Micro Systems Technology; Advanced Materials & Nanotechnology; Chemistry & Biomimetics; Tribology; NDT & Metallurgy; Advanced Foundry Practices; Electrical, Electronics & Embeded Systems; Condition*



Prof. Gautam Biswas, Director CMERI delivering the Inaugural Address

Monitoring; Metrology, etc. He also outlined how two newly constituted groups, namely the Modeling & Simulation Group and the Drives & Control Systems Group would complement the current activities of the Institute.

Moving to how CMERI was addressing its social obligations, Prof. Biswas emphasized on the sterling role played by CMERI in the development of the *Soleckshaw*, the green mass transport alternative offered by CSIR as part of the CSIR 800 initiative and thereafter went to recall past contributions of the Institute in designing different tractors suited to different strata of the farming community, the latest in this line being the *Low HP Pushan Tractor*. He also cited the CMERI initiative for rejuvenation of rural economy in the North-Eastern part of the country now being facilitated in the public-private partnership mode by the Centre for Post Harvest Processing & Research, Aizawl and a similar centre at Itanagar.

In conclusion, Prof. Biswas stressed on the necessity of CMERI emerging as a knowledge hub, which, he felt, would attract sufficient talent and in future pave the way for major S&T contributions in different emerging subdisciplines of Mechanical Engineering as also for sustaining the laboratory by securing cutting-edge knowledge-led business.

Prof. Suman Chakraborthy, delivered his seminal lecture on, *Future* of Mechanical Engineering — Mechanical Engineering in 2050. He introduced the audience to a fascinating futuristic vision of Mechanical Engineering through the exposition of such nascent research areas as



Prof. Suman Chakraborthy, IIT Kharagpur delivering the Invited as well as National Science Day Talk

FOUNDATION DAY CELEBRATIONS



bacterially controlled mechanisms; selfassembling systems; rapid DNA hybridization through microfludics; nanofluidic batteries; micro convectors for chip cooling, etc. Prof. Chakraborthy's erudition left a deep impression on the audience, for whom it helped in opening up a totally new vista.

The next lecture, delivered by Dr. Gangan Prathap, dealt with an extremely interesting theme: *The Inventiveness of Nations*. In the course of the lecture, Dr. Prathap argued that instruction, knowledge and wisdom should rank far ahead of pecuniary rewards in assessing the impact of inventiveness and innovation, and further advocated the necessity of a paradigm shift in the established indices for measuring inventiveness of a country.

Prof. Samir K. Brahmachari, Director General, CSIR & Secretary, DSIR expounded the goal of the new CSIR, its relevance in the present scenario, and the course he envisions for CSIR attaining yet greater heights. Prof. Brahmachari spoke eloquently about the necessity of transcending the established limits of research and moving on to a



Dr. Gangan Pratap, Director NISCAIR delivering the Eminent Lecture

totally different space in the knowledge domain. He further advocated appreciation, championing and attainment of excellence in all the



Prof. Samir K. Brahmachari, Secretary DSIR and DG CSIR delivering the Foundation Day Lecture

spheres of CSIR. He stressed on the necessity of infusing CSIR with new

talent so that CSIR emerges as an entity ready to take on major research challenges in a globally competitive manner.

In a different vein, Prof. Brahmachari voiced his concerns about science & technology as a primary tool for improving the quality of life for the millions of toiling people. He felt that S&T even after six decades of independence, had little relevance when it comes to the common man and exhorted the scientific community to devise ways and means to pay back the society in equal terms. The CSIR 800 initiative, he added, was a step in this direction. Prof. Brahmachari lauded the efforts of CMERI for its pioneering role in this initiative.

The programme concluded with Dr. K. P. Roysarkar, Chairman, Foundation Day Celebration Committee, proposing the Vote of Thanks.

Prof. Brahmachari spent the latter part of the day visiting different laboratories of the Institute. His itinerary included the *Shallow Basin Test Facility, the Microsystems Laboratory*, and finally the Materials Technology Group Workshop where he inaugurated the *Laser Machining Facility*. A demonstration of *Soleckshaw* variants also took place during his visit to the Workshop.

The final leg of the visit saw Prof. Brahmachari in animated exchange with a group of newly inducted scientists, to whom he outlined the desired research directions.



Prof. Samir K. Brahmachari, Secretary DSIR and DG CSIR driving the *Soleckshaw*himself at MTG



Prof. Samir K. Brahmachari, Secretary DSIR and DG CSIR while visiting the AUV at Shallow Basin Site



Prof. Samir K. Brahmachari inaugurating the Laser Machining Facility at Manufacturing Technology Group



NBRI Scientist Honoured with TATA Innovation Fellowship

r. Chandra Shekhar Nautiyal, Senior Scientist of National Botanical Research Institute (NBRI), Lucknow has been awarded the prestigious *`Tata* Innovation Fellowship' by the Department of Biotechnology (DBT), Ministry of Science and Technology, Government of India. The fellowship has been instituted to recognize and reward scientists with outstanding track record in biological sciences and a deep commitment to find innovative solutions to major problems related to life sciences and biotechnology.

The TATA Innovation Fellowship carries an honorarium of Rs. 20,000/per month in addition to regular salary. A contingency of Rs 5 lakh per annum is provided towards conference participation and other expenses. This Award is conferred on Dr. Nautiyal for his eminence and contributions in the field of microbial biotechnology for enhancing the yield of plants that maximizes the economic, environmental and societal benefits to the people of

India.

Dr. Nautiyal joined NBRI as Scientist EI in February 1994, after spending about 10 years in Canada and USA



where he held several positions ranging from Post Doctoral Fellow to Production Manager in a Biotechnology Company. His research interests include the area of fundamental and applied aspects of plant-microbe interactions that relate to elucidation of relationships between microbial populations and environmental stresses, besides working out the intricacies of relationship between microbes and plants.

His efforts have also been focused on utilizing the knowledge-base thus developed for enhancing the yield of plants through transfer of commercially exploitable technologies for its further dissemination among farmers. This is for the development of sustainable management of soil fertility and crop production that so desperately need to be protected. The major spin-off of his contributions has been several patents, publications and utilization of these technologies by several biotechnology companies nationally and internationally.

Dr. Nautiyal has been bestowed with four National awards viz., Industrial Medal Award of the Biotech Research Society of India; The Biotech Product and Process Development and Commercialization Award, DBT; Vigyan Bharati Rashtriya Puraskar, and All India Biotech Association Award, for his outstanding research contributions.

He is a Fellow of *The National Academy of Sciences, India* and Fellow of *National Academy of Agricultural Sciences.* Dr. Nautiyal's future vision is to provide best-ofscientific solutions for our country's need-oriented research in the area of agricultural biotechnology, by adopting strategies for the improvement of plant stress tolerance and yield production.

Dr. Hemanta K. Majumder selected for *J.C. Bose National Fellowship* by DST, India

Dr. Hemanta K. Majumder, Scientist-G, Indian Institute of Chemical Biology (IICB) at Jadavpur, Kolkata has been selected for the Award of prestigious J. C. Bose Fellowship this year as clear recognition for his outstanding performance and contribution to science.

For the last two decades, Dr. Majumder and his group have been involved in research on the enzyme DNA topoisomerases of *Leishmania donovani*, the causative agent for visceral leishmaniasis or *kala-azar*. He has made outstand-ing contribution towards the under-standing of the biochemistry of the remarkable kinetoplast DNA (kDNA) network of the parasite and

the role of DNA topoisomerases in kDNA metabolism. His expertise on biochemistry, molecular biology and parasitology has been successfully utilized in DNA topoisomerases based



drug development against leishmaniasis. To understand basic DNA

enzymology, his group has cloned the genes for topoisomerase I and II of *L. donovani* and made detailed study on the structure and function of the individual domains of the enzymes. His laboratory has shown that unlike other eukaryotic type IB DNA topoisomerases, *Leishmania* enzyme is a bi-subunit enzyme with large subunit functioning as a molecular steer. The group has also developed a unique



construction of the enzyme termed as *Leish-Man* DNA topoisomerase, an ideal chimera for unraveling the role of small subunit of the enzyme.

Dr. Majumder and his group have developed topoisomerases targeted novel anti-leishmanial agents from various indigenous plants that have potential to become lead therapeutic compounds. His research on DNA topoisomerases and apoptosis in Leishmania has a tremendous potential for the development of targeted therapeutics against leishmaniasis. For his outstanding contribution in Leishmania research he was invited to edit a special issue of the journal Current Molecular Medicine, which was published in 2004 (Bentham Science Publishers, USA). He has also edited a special volume of the journal Advances in Experimental Medicine and Biology Volume 625 (Drug Targets in Kinetoplastid Parasites), 2007.

Dr. Majumder was elected as the Fellow of the National Academy of Sciences (FNASc) in 1995, Fellow of Indian National Science Academy (FNA) in 2004, Fellow of Indian Academy of Sciences (FASc) in 2006 and Fellow of the Academy of Science and Technology, West Bengal (FAScT), 1995. He has received many awards like (i) Dr. P.C. Sengupta Memorial Oration Medal by Calcutta School of Tropical Medicine for his contribution in Kala-azar research in 2004, (ii) Prof. Jnan Chandra Ghosh Memorial Award by Science Association of Bengal for excellent contribution in the field of Science and Technology research promotion and development in India and abroad in 2007, (iii) Prof. B.K. Bachhawat Memorial Lecture Award by National Academy of Sciences, India in 2007 (iv) DeshRatna Rajendra Prasad Memorial Oration Lecture Award by Rajendra Memorial Research

Institute, ICMR, Patna in 2008.

He is the President of National Academy of Sciences, India (Kolkata Chapter). He has also served as the Vice President of Society of Biological Chemists, India (2001-2004). His outstanding research contribution includes 70 papers and nine scientific reviews in reputed national and international journals. He is the Executive Editor of Special issues of two journals.

For his significant contribution in science the Hon'ble Chief Minister, Government of West Bengal has nominated him as the Working Chairman of State Council of Science and Technology, Govt. of West Bengal to look after the promotion of Science and Technology in the State for the benefit of the people. Dr. Majumder is serving this prestigious honorary position for the last six years.

A feather in the Cap of CLRI

The Department of Industrial Policy and Promotion, Ministry of Commerce and Industry, Government of India has recently appointed the Central Leather Research Institute (CSIR), as National Monitoring Unit (NMU) for monitoring and evaluation of the proposals under the sub-schemes, Human Resource Development (Placement linked as well as Skill Upgradation Training) and Support to Artisans of the Indian Leather Development Programme (ILDP). The duration of this appointment is for two years at the cost of Rs. 181.28 Lakh.

The NMU would assist the DIPP in implementation of projects under the scheme and shall, inter-alia, provide the following services:

- (i) Assessment and certification of the participants;
- (ii) Periodic monitoring of the training conducted by the Implementing Agency;
- (iii) Assist DIPP in monitoring the progress on sanctioned projects through a suitable MIS to be developed by NMU;
- (iv) Assessment of the impact of the Training conducted by the Implementing Agency every year and give recommendations for further improvements/applications/projects, if applicable;
- (v) Devise formats/guidelines for the assessment/monitoring of the effectiveness of Implementing Agency;
- (vi) Maintain database of all the trainees, their placement record and projects till the period of evaluation as per the guidelines;
- (vii Identify leading technical institutes (domestic and abroad) based on the survey of the Institutes (national and international) and prepare a panel of the institutions for Domestic/Foreign Training of Trainers involved in the projects under HRD;
- (viii) Examine the impact of the projects, number of artisans benefited under the project and their status in terms of physical and financial progress and general positive impact of the project in the cluster.



Dr. S. Sivaram, Director, NCL Awarded the *Goyal Prize* for 2007 in Applied Sciences

Dr. S. Sivaram, Director, National Chemical Laboratory (NCL), Pune, has been awarded the *Goyal Prize for 2007* in the subject of Applied Sciences. Dr. Sivaram has been recognized for his sustained contributions to polymer science and its industrial applications for over three decades. Dr. Sivaram joins other distinguished scientists of India, who have won this Prize earlier in the field of Applied Sciences, namely, Dr. R. A. Mashelkar, Dr. K. Kasturirangan, Professor J. B. Joshi, Dr. N. K. Ganguli and others.

The *Goyal Prize* carries a cash award, a gold medal and a citation. The Prize was awarded to Dr. Sivaram by Professor Goverdhan Mehta, in a ceremony held at Kurukshetra University on 19 April 2010.



Dr. Sivaram receiving the Goyal Prize from Prof. Goverdhan Mehta

Nominations invited for Prof. G. N. Ramachandran Gold Medal for Excellence in Biological Sciences & Technology - 2010

The Council of Scientific & Industrial Research (CSIR) invites nominations for the *Prof. G. N. Ramachandran Gold Medal for Excellence in Biological Sciences* & *Technology* for the year 2010. The Award is bestowed every year to an outstanding Indian scientist, who has made conspicuously important contributions, applied or fundamental, in the inter-disciplinary subject / field of Biological Sciences and Technology. The Award would be given for the work done primarily in India during ten years preceding the year of the Award. *Prof. G. N. Ramachandran Gold Medal* is presented during the Inaugural Function of Indian Science Congress. Nominations addressed to Head, Human Resource Development Group, CSIR Complex, Library Avenue, Pusa, New Delhi 110 012 should be sent as per prescribed pro-forma (Original + one copy) along with reprints of five most significant publications of the last 10-year's period by **15th October 2010.** The details of the Award and the prescribed pro-forma for nomination may be downloaded from our website http://csirhrdg.res.in.

Dr J. S. Yadav, Director, IICT gets Extension in Service

The service of Dr. J.S. Yadav, Director, Indian Institute of Chemical Technology (IICT), Hyderabad, is extended for a period of two years, beyond the age of his superannuation. The terms and conditions of his appointment as Director remain the same.



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