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Team CSIR

Dr T. Ramasami takes additional charge as Secretary, DSIR and Director General, CSIR

Dr Thirumalachari Ramasami, Secretary, Department of Science and Technology, has taken additional charge of the post of Secretary, Department of Scientific & Industrial Research and Director General, CSIR, with effect from 7 March 2007.



Dr Ramasami holds a Master's degree in Leather Technology from the University of Madras and Ph.D. in Chemistry from the University of Leeds, UK. He received Gold Medal and Prizes at both Bachelor's and Master's levels from the University of Madras and Coleman Research Prize 1976 for Best Doctoral Thesis from U.K. Thereafter, he carried out research work on energy in Ames Laboratory, Iowa, USA and on electron transport phenomena in Wayne State University, USA. He joined the Central Leather Research Institute (CLRI), Chennai, as a Scientist in 1984 and served as its Director for more than 10 years before taking over as Secretary, DST, in May 2006.

CLRI earned a global leadership status during Dr Ramasami's tenure as its Director as evidenced by 30% global share of publications, >7% share of global patents, positions in fashion forecasting and the level of public-private partnership in leather research. It also won two major landmark awards: CSIR Special Technology Award 1998, for saving nearly 400 tanneries from closure through technology intervention and support, and the Third World Network of Scientific Organisation's Technology Award for outstanding S&T innovations for Micro Enterprise Sector in Leather, in 1998. For his outstanding contributions, he received Shanti Swarup Bhatnagar Prize in Chemistry in 1993 and was conferred the coveted National Civilian Award Padma Shri in 2001.



NAL MoUs with L&T e-Engineering Solutions and Shoba Aviation and Engineering Services

The National Aerospace Laboratories (NAL) and Larsen and Toubro Limited, e-Engineering Solutions (L&T e-ES), Bangalore, signed a memorandum of understanding (MoU) on 19 February 2007 for co-operation in engineering design services and training.

Another MoU signed recently by NAL is with Shoba Aviation and Engineering Services Pvt. Ltd, for manufacture, maintenance, product support and marketing of SARAS, the 14 seater multipurpose aircraft.



Exchange of MoUs' documents

New Products from CEERI

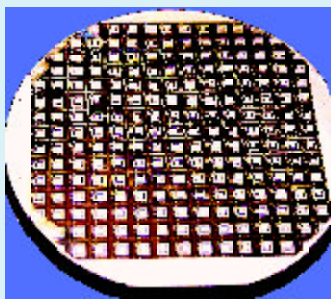
The R&D activities at the Central Electronics Engineering Research Institute (CEERI), Pilani, have led to development of the following new products:

MEMS Acoustic Sensor

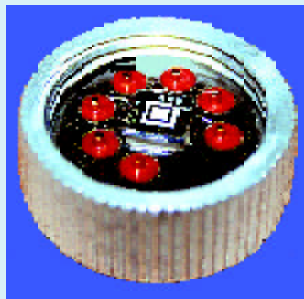
A MEMS (microelectromechanical system) acoustic sensor, based on zinc oxide piezoelectric material has been developed under the sponsorship of VSSC, Thiruvananthapuram, for their acoustic pressure measurement at different stages of satellite launching. The device can be used in two modes, either in acoustic wave generation or acoustic wave sensing.

The MEMS acoustic sensor has been fabricated using a 25-micron thick silicon diaphragm formed by wet bulk micromachining technique. Over the diaphragm, zinc oxide layer was sandwiched between a pair of aluminium electrodes and separated by a

thin dielectric layer of 0.1 micron PECVD silicon dioxide. The silicon diaphragm with cavity was anodically bonded with a pyrex glass. Two versions of the acoustic sensor were developed. In the first version, the pressure developed inside the silicon cavity was released through the hole in glass. In the second version, a built-in acoustic tunnel was incorporated in the cavity. The tunnel facilitates the release of acoustic pressure in the cavity and hence avoids drilling of hole in the glass. Several packaged and unpackaged devices have been delivered to the sponsoring agency for evaluation.



Fully Processed Acoustic Sensors on a 4" Silicon Wafer



Packaged Acoustic Sensor Chip

Specifications

Chip size	: 5.0 x 5.0 mm ²
Frequency	: 31.5 Hz to 8 kHz
Sensitivity	: 50 mV rms/Pa
Sound pressure level	: 160 dB
Rim capacitance	: 160 pF
Central capacitance	: 120 pF
Package	: User defined



MEMS Ultrasonic Transducer

A MEMS-based ultrasonic transducer array for the non-destructive testing applications has been developed under a project sponsored by IGCAR, Kalpakkam, and the first batch of 21 packaged and 100 unpackaged devices recently delivered to the sponsor.

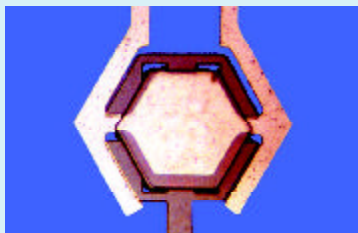
The MEMS ultrasonic transducer operates as a variable capacitor using a fixed rigid back-plate and a thin flexible conducting membrane, which works as a top-plate of the capacitor. The membrane is free to deflect under the influence of incoming ultrasonic waves. Application of AC super-imposed on DC bias across the membrane causes the membrane to vibrate around its mean position and produce ultrasonic waves. A pair of ultrasonic generating and sensing transducers comprises complete non-destructive testing set up. The device utilizes one-micron polysilicon membrane as an ultrasonic generator as well as sensing layer, which stands over one micron thick thermal silicon dioxide support. This support has been fabricated in the form of either a continuous

wall or six posts of 20 x 20 micron square-shaped cross-sectional area with a height of one micron. The shape of single cell membrane is hexagonal with the edge length of 50 microns. The cross-section of the device is given in the figure.

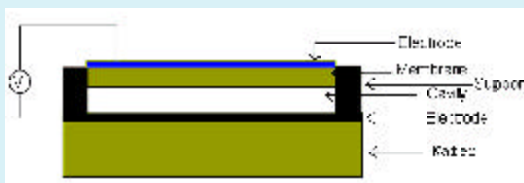
The device has been designed in four kinds of arrays: (i) 10 x 10, (ii) 5 x 5, (iii) 5 x 1 and (iv) single cell in both the modes of support is shown in the figures.

Specifications

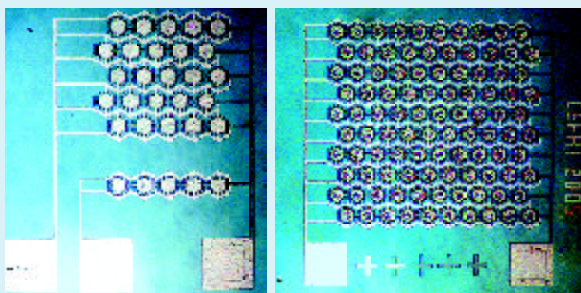
Transducer chip size	: 2.25 x 2.25 mm
Transducer chip thickness	: 0.5 mm
Shape of membrane	: Hexagonal
Edge length of membrane	: 50 micron
Thickness of the membrane	: 1.0 micron
Cavity height	: 1.0 micron
Maximum stress of membrane	: 200 MPa
Natural frequency	: 2.3 MHz
Driving voltage	: 40 V DC + 10 V AC
Max displacement of membrane	: 0.167 micron
Capacitive resolution for sensing	: 0.23 atto F/Pa



Single Cell



Cross Section of Transducer



1 X 5 and 5 X 5 Cells

10 X 10 Cells

Large Area InGaAs/InP PIN Photodetectors

Large area InGaAs/InP photodetectors developed at CEERI are for power monitoring applications, such as monitor photodiode inside a laser module and in optical power meters for testing the fibre optic networks. Being a large area device, it can gather more light and produce more optical current as against small area photodetectors. The 1 mm diameter detectors are extensively used in optical power meters to measure powers from -70 dBm to +28 dBm. Currently, these detectors are being imported from other countries and there is considerable potential for producing these devices within our country at an affordable cost to replace their imported counterparts in critical light measuring applications. The responsivity and dark current of the device has been optimized by appropriately providing a silicon oxinitride antireflection (AR) coating layer over the active area.



Salient features

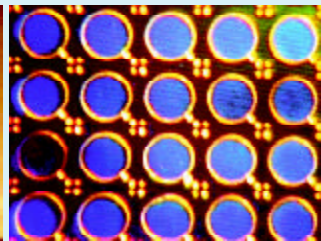
- **Dark current of around 45 nA at bias voltage of -5V**
- **Average responsivity ~ 0.83 at 1310 nm and 0.99 at 1550 nm**
- **Linearity at high power ~ 5 mW (at saturation)**
- **Response of the PD is linear down to 100 nW**
- **Noise equivalent power (NEP) ~ 70 nW**

Specifications

Chip area	: 1.3 x 1.3 mm ²
Active area	: 1 mm diameter
Breakdown voltage	: > 20 V
Dark current (-5V)	: < 50 nA
Operating voltage	: - 5 V
P contact	: Gold plated pad (~3 micron)
N contact	: Chip bottom (alloyed gold)



Individual Photodetector



Photodetector Array

The performance test report of the detector developed at CEERI vis-à-vis imported one, conducted by M/s Optiwave Photonics, Hyderabad, is given below:

	CEERI Photodetector	Imported Photodetector
Bonding	Good	Good
Responsivity (1310/1550 nm)	0.8/0.65	0.9.5/0.8
Dark current	45 nA	<10nA
High power	5 mW	5 mW
NEP @ 1550 (CW)	100 nW	10 nW

High-Voltage Supply System for Testing and Characterisation of Multi-Grid Traveling Wave Tube

A high-voltage power supply system for testing and characterisation of multi-grid traveling

wave tube has been developed that consists of nine high-voltage power supplies inter-connected as shown in figure. The cathode supply VCATH is negative variable, referenced to earth. Four collector supplies VC1 to VC4 are variable supplies floating on the cathode supply. Similarly, heater supply VH, beam forming electrode supply VBFE and anode supply VA2 also float on cathode. Anode supply VA1 is referenced to earth.

All supplies use high-frequency conversion with built-in protection against over-load and short circuit at the output. A proprietary isolated voltage sensing circuit is used for floating supplies. Modular construction facilitates flexibility in interconnection and troubleshooting.

Specifications

Cathode Supply

Voltage	: Variable -10 kV
Current	: 100 mA (max)
Load Reg	: 1%
Line Reg	: 1%
Ripple	: 80 V p-p

Collector Supply-1, 2, 3, 4

Voltage	: 0 to 8 kV wrt cathode
Current	: 100 mA (max)
Load Reg	: 2%
Line Reg	: 2%
Ripple	: 80 V p-p

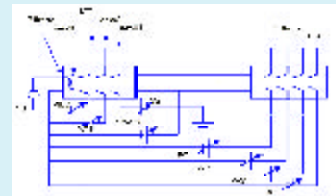
Beam Focusing Electrode

Pulse Voltage	: 0 to 2 kV
Current	: 10 mA
Duty cycle	: 1 to 100%

Anode & Filament

Anode 1	: 0 to 1 kV, 10 mA
Anode 2	: 0 to 10 kV, 10 mA
Filament	: 0 to 10 V, 2 A

Schematic Diagram of Multi-grid TWT Characterisation Power Supply System



Prototype of Power Supply System



NAL's Light Weight Helicopter granted US Patents

The National Aerospace Laboratories (NAL), Bangalore's Light Weight Helicopter has been granted a US patent #7168656 on 30 January 2007. Dr B. R. Pai,

former Director, NAL, is the inventor of this light weight helicopter. Earlier, this helicopter was granted a Great Britain patent #GB2384224, on 19 January 2005

and an Australian patent #AU 2001248731 was granted on 15 June 2006. With this additional patent, NAL now has a total of 13 foreign patents to its credit.

Flow Instabilities in Presence of Fluid-Structure Interactions

Shanti Swarup Bhatnagar Prize Winner

Dr Sanjay Mittal's Work

Prof. Sanjay Mittal of the Indian Institute of Technology, Kanpur has been awarded along with Dr A. K. Lele, National Chemical Laboratory, Pune, the Shanti Swarup Bhatnagar Prize in Engineering Sciences for the year 2006 for the research contributions to the understanding of flow instabilities in the presence of fluid-structure interactions, specially



Prime Minister of India Dr Manmohan Singh awarding the Shanti Swarup Bhatnagar Prize to Dr Sanjay Mittal. Also seen are Shri Kapil Sibal, Minister for Science and Technology and Dr R.A. Mashelkar, the then DG of CSIR

when structure is flexible and interactions are highly dynamic and unsteady [CSIR News, 56 (2006) 297].

Prof. Sanjay Mittal has worked on problems, both that address fundamental issues in fluid mechanics as well as applications to practical problems including those that arise in national projects. One area that Prof. Mittal and his students have been working on is the investigation of fundamental aspects of the instabilities in flows involving vortex-induced vibrations. Such

flows are encountered in several engineering situations such as wind induced vibrations of tall buildings, towers, marine structures and electrical transmission lines. They have discovered and explained several new phenomena associated with such flows. For certain flow parameters very large amplitude oscillations of the structure can occur. These oscillations in turn change the flow substantially. Most of the present designs of structures subjected to wind loading are carried out based on forces

encountered by the structure when they are stationary (not vibrating). Dr Mittal's work clearly shows that this can in some cases lead to unsafe design.

In another piece of work Dr Mittal has shown the significance of wind/water-tunnel wall effects during the experimental testing of models for flow induced vibrations. If the walls are close to the model, the flow

and vibration characteristics can change qualitatively. This has major implication in conducting experimental investigations of such flows. He has also found that the critical flow speed at which the flow becomes unstable also depends on the properties of the structure. Flow past a flexible structure can become unstable at much lower speeds compared to a rigid structure. Dr Mittal has very close interaction with DRDO laboratories. In an engineering application that involves fluid-structure interactions, he has



proposed design changes to the existing ram-air parachutes that increase their aerodynamic efficiency, substantially. The drop-test results from these changes are very encouraging. Dr Mittal and his group also work on other problems of interest in Aerospace Engineering such as turbulent flow past wings and airfoils, ram-air parachutes, flows in high speed wind-tunnels, diffusers and air-intakes of high speed aircraft and missiles and aerodynamic shape optimization using Adjoint based methods. They utilize High Performance Computing platforms such as a parallel cluster to carry out their large-scale calculations.

Prof. Mittal has been instrumental in setting up several facilities at IIT, Kanpur. One of these is the Aero-modeling Laboratory that was set up primarily to teach a compulsory course to undergraduate students to give them the much needed exposure to hardware and integration. This has met with resounding success. Not only has this been able to excite the students in Aerospace Engineering, it has also led to a general increase in the interest in Aero-modeling related activities in the Campus.

Prof. Sanjay Mittal received his Bachelor's degree in Aeronautical Engineering from IIT, Kanpur in 1988. He was adjudged the best student in his class. He also received the best project award. After finishing his Masters (1990) and Ph. D. (1992) in Aerospace Engineering from University of Minnesota, USA and

working there for a year and a half he returned to IIT, Kanpur in 1994 as an Assistant Professor. Prof. Mittal has set up a very vibrant research group at IIT, Kanpur, in the area of Computational Fluid Dynamics (CFD) and High Performance Computing (HPC). Their work is not only significant from the point of view of fundamental fluid dynamics, but has also been applied to several engineering problems including those that have arisen from national projects. Prof. Mittal has handled various research and consultancy projects from organizations such as DST, AR&DB, CDAC, ADRDE, DSC. He has also been quite active in organizing several conferences such as the First Indo-US Frontiers of Engineering (FOE) symposium and National Frontiers of Engineering (NatFOE) symposium. He has been instrumental in setting up various facilities such as the Aero-modeling, Virtual Reality, and CFD Laboratories at IIT Kanpur. As a recognition of his research activities, he has received several honours/awards including the Swaranajayanti Fellowship from DST (2003), A.K. Bose award from INSA (2002), INAE Young Engineer Award (2000) and INSA Young Scientist Medal (1999). Dr Mittal is a member of the advisory board of the *International Journal of Numerical Methods in Fluids* published by John Wiley & Sons and a Fellow of the Indian National Academy of Engineering (INAE). He is recognized as a good teacher and has developed new courses at IIT, Kanpur.

International Conference on Chemoinformatics

Chemistry, the science of materials and their transformations, exhibits a broad diversity of information, which now encompasses enormous knowledge regarding chemical structure, properties and reactions. Concerted efforts are needed to master the flood of information and accumulated knowledge in chemistry today. However, chemoinformatics as subject has not penetrated in India. In order to raise the awareness among academia and industry an international conference was organized at the National Chemical Laboratory (NCL), Pune, during 22-24 January 2007.

This conference brought together about 120 delegates from USA, Germany, UK, and Hungary, besides India. Among the distinguished speakers were Prof. Gasteiger (Germany) and Prof. Alex Tropsha (USA) who have pioneered this field for the last thirty years. Convener of the conference Dr Karthikeyan from NCL, in his brief remarks, covered the theme of the conference. Dr Krishnan, Head, Information Division of NCL highlighted the evolution of chemoinformatics from early days where chemical structure information was handled using punched cards. He also highlighted the growth of various databases specific to chemistry and their application in pharmaceutical sectors.

Prof. Gasteiger gave a keynote address on 'Chemoinformatics: Making chemistry more efficient'.



Prof. Gasteiger (Germany) delivering the keynote address on "Chemoinformatics: Making chemistry more efficient"



Dr Krishnan, NCL, delivering his inaugural address during the International Conference on Chemoinformatics



Dr Karthikeyan, NCL, delivering his welcome address

He spoke about the growth of chemoinformatics as scientific discipline over the last thirty years. He also discussed structure activity relationships, computer-assisted synthesis and design, lead discovery and lead optimization, as well as spectra interpretation and structure elucidation with examples. He concluded by highlighting applications of chemoinformatics in areas of drug design, analytical,

inorganic, medicinal, organic and physical chemistry, etc. Prof. Gasteiger's speech provided bird's eye-view of the subject and opportunities in this emerging area to the beginners, and made the experts realize the need for contributing significantly to some of the potential topics and their applications in drug discovery and allied sciences.

Dr Indira Ghosh, Director, Bioinformatics Center, Pune University, spoke on 'Novel approach to identify the active islands in virtual screening'. She described some case studies on farnesyl transferase and plasmepsin II. Dr Andreas Bender from Novartis Institute for Biomedical Research, Boston, USA, discussed 'In silico drug design: From virtual screening and the prediction of adverse drug reactions to the shape of chemical space'. Dr Bhuma Vedantam from Jubilant Biosys Ltd, Bangalore, gave a talk on 'Molecular Knowledge bases for chemical informatics'. Dr C. Devkumar from Indian Agricultural Research Institute, New Delhi's talk was on 'Chemoinformatics opportunities in Agricultural Research'. Dr Karthikeyan spoke on design and development of high performance computing tools for chemoinformatics. He also highlighted various applications like harvesting chemical data from Internet, computing molecular properties, and analysis of computed data from molecular structures using distributed computing environment.

In another theme on predictive studies in chemoinformatics, Prof Alex Tropsha of University of North

Carolina, USA, delivered a keynote address on 'Chemoinformatics as predictive science'. He covered several modelling approaches with successful case studies. Dr Kalyanasundaram Subramanian from Strandlife Sciences, Bangalore, spoke on 'In-silico ADMET: Emerging trends'. He elaborated on failure in drug discovery owing to poor pharmacokinetics and toxicological problems and how the in-silico methods can be effectively used to predict failed candidates well before synthesis to save cost, efforts and time. Prof. Prasad V. Bharatam from NIPER, Chandigarh, delivered a talk on 'Pharmacoinformatics in designing agents for ROR gamma activity'. He discussed the links between various informatics such as neuro, immuno, genome, biosystems, proteome, metabolome, ADME, toxicity, bioinformatics and chemoinformatics. The topic of Dr Kunal Roy, Jadavpur University, Kolkata's talk was on 'K-means cluster based selection of test sets for the development of predictive QSAR models'. The criteria for selection of training and test sets based on representative points of test set to that of training set in multidimensional descriptor space was explained with some case studies. Dr Nitin Sapre from DA University, Indore, spoke on 'Computational modelling of substitution effect on anti-HIV-1 nucleoside reverse transcriptase inhibitors'. He highlighted the application of Kier-Hall electrotopological state (E-state) indices, which are functional group based to study the effect of substitution in QSAR modeling.



Dr Sanjay Bajaj from SGGS College of Pharmacy, Chandigarh, delivered a talk on 'Modelling biological activity and physico-chemical properties of aziridinyl dinitrobenzamidines using topological indices'. The QSAR equation developed with high predictability values on growth inhibitory activity in four NTR transfected cell lines was presented. He also presented the relationship between reported lipophilicity as well as solubility with topological indices. Dr Sashidhar Rao from Schrodinger, USA, spoke on 3D pharmacophores and database searches in drug discovery with computational tool called PHASE from Schrodinger. Dr Sudhir A. Kulkarni from Vlife Sciences Technologies Pvt. Ltd, Pune, presented a talk on 'Group based QSAR: mitigating interpretation challenges in QSAR'. In this talk, he highlighted several traditional approaches in QSAR and advantages of group based QSAR method for interpretation of generated models and direction about site for improvement with some case studies. Florian Nigsch from Cambridge, UK, in his presentation on 'Melting point prediction tool employing k-nearest neighbour algorithms and genetic parameter

optimization', highlighted application of kNN modelling technique using publicly available dataset of molecules with melting points for prediction studies. Dr Jyothi Subramanian from Nicholas Piramal Research Center, Mumbai, gave a talk on 3D QSAR studies on cyclin dependent kinase 4 (CDK-4) inhibitors using COMFA and COMSIA. Dr Sankar from Pondicherry Engineering College presented chemical ontologies for reaction representation.

On the third and concluding day of the conference the focus was on application of bioinformatics and chemoinformatics in drug discovery research. Prof. Jonathan Essex from University of Southampton, UK, delivered a talk on 'Computer simulations for ligand binding affinity predictions'. The presentation was illustrated with simulation and sampling with live animation. Dr Pei Li from Accelrys' presentation was on 'A platform for application integration and iterative analysis: An introduction to pipeline pilot'. He also demonstrated with some examples of the integration of informatics data and algorithms to create automated and easily modifiable data processing workflows. Dr Szabolcs Csepregi from ChemAxon Ltd, Hungary,

described 'Advanced structural search with Chemaxon tools'. The advantages and unique features of Jchem for rational drug design, compound registration systems and laboratory information management systems were explained with examples. He informed that Chemaxon tools are freely available for academic community. Dr Sreedhara R Voleti from Ranbaxy Laboratory Limited, Gurgaon, presented 'Elucidative studies of RBx-7796 as lipoxygenase inhibitor by molecular modelling' with some details on mode of bind of RBx-7796 to the active sites of humans 5-LO and 15-LO based on molecular dynamics studies.

About 50 posters were displayed. The posters of Dr Sunil Panigrahi from University of Hyderabad and Ms Pooja Sharma from Indian Institute of Chemical Biology, Kolkata, received best poster award from ICCI-2007, which comprised a certificate and cash prize of Rs 5000 each.

During the conference, Dr Karthikeyan proposed the establishment of Indian Chemical Informatics Society (ICIS), which was well received by the delegates and they agreed to the formation of ICIS. He highlighted the aims and objectives of the society to promote the general advancement of S&T of chemoinformatics in the country. This includes providing a forum for exchange of information amongst the persons attached to the society. It will be an educational, scientific, non-political and non-profit making organization catering to the needs of its members from various disciplines for science, engineering and technology.



A view of the audience



National Seminar on Technology Upgradation in Vegetable Oil Industry

The Indian Institute of Chemical Technology (IICT), Hyderabad, organized the Sixth National Seminar on Upgradation in Vegetable Oil Industry, in association with the Solvent Extractors' Association of India on 20 January 2007 at IICT. A large number of members from the vegetable oil industry, traders involved in vegetable oil extraction, researchers and scientists involved in research on oils and fats and IICT staff members attended.

Welcoming the participants, Dr J.S. Yadav, Director, IICT, announced that a Centre of Excellence for Lipid Science and Technology to cater to the needs of the vegetable oil industry would be established at IICT during the 11th Five Year Plan period. The Centre would receive funds from Council of Scientific & Industrial Research (CSIR) to the tune of Rs 40 crore over a period of 5 years to create infrastructure such as buildings, equipment and manpower. With the full support of CSIR, the research will focus on steps to bring down oil prices, increase oil industry profitability and creation of value-added products.

On this occasion, IICT and Punjab-based AP Organics Limited signed a Memorandum of Understanding for developing value-added products from the rice bran oil industry. AP Organics Ltd, situated in Dhuri, Punjab, is one of the country's leading rice bran oil processing units. By using novel technologies developed by IICT, the company would produce useful micronutrients,



Representatives of IICT and A. P. Organics (P) Limited after signing the MoU for developing value-added products from the rice bran oil industry

which are lost in the routine extraction of the rice bran oil. As per the MoU, the company would provide funds to the tune of 10 lakh per year to IICT to do the major exploratory work. As of today, India is one of the major producers of rice bran oil with a potential of 12 lakh tonnes and production of 7.5 lakh tonnes per year. With the efforts of research institutions like IICT and vegetable oil producers in India, production of rice bran oil can go up to 10 lakh tonnes in the next 3 years. Also, with the novel enzymatic process developed by IICT, quality of the oil can be further improved by retaining important micronutrients in the oil.

Dr B. Sesikeran, Director, National Institute of Nutrition (NIN), Hyderabad, inaugurated the seminar and advised the vegetable oil industry to strive for manufacturing "healthy oil", to contain risk factors for coronary heart disease.

Major topics covered in the seminar were: Value-added products

from vegetable oils using enzymatic processes by Dr J. S. Rao, Novozymes South Asia Pvt. Ltd, Bangalore; Innovative approaches for the preparation of bio-diesel and value-addition to by-products generated during bio-diesel production by Dr R.B.N. Prasad, IICT; Expeller Technology — New generation expellers by Dr V. S. Vadke, Extech Engineering Services, Thane; and Innovative packaging — Success to marketing by Shri B.K. Karna, Indian Institute of Packaging, Hyderabad.

A panel discussion encompassing areas like Trans fats in Vanaspati; Interpretation of Rule 37-D of PFA and labeling requirements; Unsap matter limit in rice bran oil; Safe limit of argemone in rapeseed oil; BIS standard and scope for revision; and Standard for repeated frying of oils, were the highlight of the seminar, where reputed members from the oil industry and researchers such as Shri O.P. Goenka, Director, Foods, Fats & Fertilisers Ltd, AP; Shri Anil Modi, MD, Anil Modi Oil Industries Ltd, Pilibhit, UP; Shri P.K. Sardar, Chief Director, VOP Directorate, New Delhi; Dr Ahmed Ibrahim, SRO, NIN, Hyderabad and Shri Anand Menon, Chief Gen. Manager, KSE Ltd, Irinjalakuda participated. In all, about 100 participants from the Solvent Extractors' Association of India and allied fields participated in the seminar.



International Workshop on Combinatorial Chemistry and Technologies, Molecular Design and Their Application to Exploit Biodiversity

The National Chemical Laboratory (NCL), Pune, organized an International Workshop on Combinatorial Chemistry and Technologies, Molecular Design (CC/CT & MD) and Their Application to Exploit Biodiversity under the aegis of ICS-UNIDO, Trieste, Italy, during 15-17 December 2006. The main focus of the workshop was to build awareness and capacity as well as to strengthen the links between academia and industry in India and South East Asian countries with particular attention on application of CC/CT & MD techniques to explore the nearly virgin biodiversity in Asia. Fifty participants comprising scientists and technologists from six different countries including Japan, Italy, China, Thailand, India and Vietnam, both from academia as well as industry, participated in the workshop. Highly informative 22 lectures were delivered by 15 authoritative national/ international

speakers in six sessions, covering practically all aspects relevant to smartly explore the biodiversity using the combinatorial approach with a special visit to NCL's Combi Chem-Bio Resource Centre.

In the inaugural session, Dr B.D. Kulkarni, Dy. Director, NCL, delivered his welcome address and briefly explained the utility of combinatorial approach in the field of Chemical Engineering. Prof. Stanislav Miertus, Chief of Pure and Applied Chemistry, ICS-UNIDO, Italy, spoke on goals and programmes of ICS-UNIDO, on CC/CT/MD in India and South East Asian countries. Dr M.K. Gurjar, Head, Organic Chemistry Division, NCL, explained the essence of NCL programmes, present research activities and the futuristic plans. Dr N.P. Argade of NCL and convener of the workshop, discussed the green therapy with an emphasis on conversion of leaf to capsule by reverse pharmacological approach using the rich *Indian*

Ayurvedic System of Medicine.

Prof. Javed Iqbal, Vice President, Dr Reddy's Research Foundation, Hyderabad, delivered the first talk highlighting the use of combinatorial chemistry approach both in academia and industry with several case studies. Prof. P. Seneci from Milan University, Italy and an ICS-UNIDO expert, talked about the use of CC/CT/MD in natural product research and their applications in diagnostics and biotechnology. Dr G. Terstappen, Vice President, Sienabiotech from Italy, gave two lectures on High Throughput Screening (HTS) in Natural Products research. Prof. Kenji Mori from Tokyo University, Japan, gave an authoritative multidimensional talk on natural product research and biodiversity. Dr M. K. Gurjar gave an overview of research activities in Organic Chemistry Division of NCL. Dr Ganesh Pandey from NCL gave an elegant lecture on global strategies towards the total synthesis of

complex bioactive natural products. Prof K.N. Ganesh, Director, IISER, Pune, talked on combinatorial oligonucleotides and applications. The participants from China, Thailand and Vietnam,



Prof. Kenji Mori from the University of Tokyo introducing Prof. Seneci from Milan University, Italy



Prof. K.K. Bhutani, NIPER, Chandigarh, delivering his talk



respectively spoke about the diversity oriented synthesis, the status of bird-flu research in Thailand and why collaborations are essential. The researchers from Pune, Prof. D. D. Dhavale, Dr P. Tripathi, Dr S.P. Chavan, Dr S. Hotha and Dr A.A. Natu discussed the synthesis of bioactive natural and artificial product scaffolds. Dr K.K. Bhutani from NIPER, Chandigarh, talked about the unexplored rich biodiversity in the North-East region of India. Overall, a very healthy churning of combinatorial science covering identification of plant species, isolation of plant material, fractionation, high throughput screening, lead identification and optimization by the synthesis of focused combinatorial mini-libraries inclusive of pseudo natural products and natural product hybrids was successfully done to reach the conclusions.

A round table discussion was held for the further development of this field and enhance cooperation between the various participating countries. The participants agreed that the impact of natural products in Drug Discovery is an accepted reality and the genesis of ~ 50% drugs in the market is in Chemistry of Natural Products. Prof. R.S. Mali and Prof. Kenji Mori expressed the urgent need to scientifically explore the biodiversity in Asia to get new molecules with the better known and unknown bioactivities as a chemist's arsenal against the health problems of 21st century and that CC/CT/MD have a great potential to accelerate the process of discovery of novel therapeutics. Prof. Mori also added that the synthesis of focused pheromone libraries will be a meaningful exercise to challenge the Nature. The workshop enabled the formation of a useful network of scientists under the aegis of ICS-UNIDO, which can act as a junction to cooperate with each other to bring the results of their work into useful, sustainable and environment-friendly products.

NAL participates in Aero India 2007

Opened at the Yelahanka Air Force Station on 7 February 2007, the Aero India 2007 was the sixth in the series of this prestigious biennial event.

As in the past, this year's show also included a large number of exhibitors from leading industries in the field of civil and military aviation. The show included both air displays and static exhibits of a wide variety of military and civil aircraft. The magnificent flying machines gripped Bangalore's eyeballs in rapt attention. A power packed aerial fiesta was provided by F-18 E and F-18 F Super Hornets, Gripen JAS 39, F-16, Falcon, Mig-35 AKA, MiG 29M OVT, Sukhoi, ALH Dhruv, Sarang team, Surya Kirans, Jaguar, TEJAS, IJT, etc.

The main attraction for National Aerospace Laboratories (NAL), Bangalore, in the sixth international aerospace and defence exhibition was to see NAL's *Saras PT 1* and *Hansa* take their rightful place in the Indian skies. The metallic birds mesmerized every one with their poise, flexibility and grace.

NAL stall also attracted large crowds with its colourful posters, mockups, and multimedia presentations on plasma screens.



NAL's Hansa and Saras PT1 flying during Sixth International Aerospace and Defence Exhibition



Annual Day Celebration

NBRI celebrates Annual Day

THE National Botanical Research Institute (NBRI), Lucknow, celebrated its 53rd Annual Day on 26 October 2006. Dr S. Nagarajan, Chairperson, Protection of Plant Variety and Farmers' Right Authority (PPV&FRA), Government of India, New Delhi, was the Chief Guest and Prof. C.L. Khetrpal, Director, Centre for Biomedical Resonance (CBMR), SGPGI, Lucknow, presided over the function.

Delivering the Annual Day lecture on 'Increasing farm income through policy options', Dr Nagarajan remarked that India had 23% of its population below the poverty line and one per cent increase in agricultural GDP per capita would lead to a 1.6 per cent increase in the income of the poorest one fifth of the population. Emphasizing the need for the improvement in farming sector, he suggested that agricultural growth should be accelerated further to keep the food price affordable by the 240 million people below the poverty line and to protect the future generations against food shortages. "By 2025 another 1.4 billion people will be pushed in this bracket and will have to be cared and protected against food shortage", he added. Expressing concern over the hard days ahead, Dr Nagarajan said that growth in food production has been static since 2000, while international germplasm exchange and testing has been declining and there was no replacement to old varieties released long back. The other important factor, he pointed out, was the alarming state of rural illiteracy in our country. "Even in 2000, in the age group of 5 to 9 years,



Prof C.L. Khetrpal, Director, CBMR, SGPGI, Lucknow, releasing the book on Amaryllis. Also seen (from left) are: Dr Rakesh Tuli, Director, NBRI, Dr S. Nagarajan, Chairperson, PPV and FRA and Dr J. K. Johri, Scientist, NBRI

43% of the rural female and 36% of rural male children were totally illiterate", he informed. "Since futuristic agriculture would be knowledge-based this will become a drag force for agricultural advancement", he commented. Dr Nagarajan further emphasized the need to strengthen breeding programmes for stressed agroclimatic conditions to offset the developmental disparities prevalent in different states of our country. Substantiating his views, he said that despite rice being cultivated in almost all states, only Tamil Nadu, Orissa, Andhra Pradesh and Maharashtra have taken up focused efforts for breeding for resistance to disease and pests. He further suggested that for the fragile areas prone to erratic weather and pest outbreak, as a strategy, varieties of different durations were necessary. He informed that out of total of 652 rice varieties released so

far, only 38 were drought resistant varieties. Dr Nagarajan cautioned that the present dependency of field crop improvement on overseas material for variety development is a form of 'research vulnerability'. "Biotechnological interventions are not primarily targeted to save the world from hunger as it is not risk free nor it guarantees a sustainable development", he added. He further suggested that R&D efforts should also focus on protecting the intellectual property rights of the farmers. Emphasizing the importance of protecting the plant breeders' rights, Dr Nagarajan advocated for accelerating agricultural development in the country, stimulating investment for research and development in public/private sector for development of plant varieties and suggested to facilitate the growth of seed industry which will ensure the availability of high quality



Dr S. Nagarajan, Chairperson, PPV & FRA, New Delhi, handing over the nutraceutical technology transfer documents to Shri Ashok Malhotra, Executive Director, Alchemist Ltd, Patiala

seeds and planting material to the farmers. He dwelt in detail about Plant Variety Protection and Farmer's Right Act (PVP&FRA), the codex alimentarius and geographical indications. Narrating the geographical indications, Dr Nagarajan said that the TRIPS Agreement set forth standards to regulate international intellectual property protection and enforcement and established international minimum standards for the protection of geographical indications. He further said that geographical indications improved the income of farmers, retained the rural population in less favoured remote areas, protected consumers against acts of unfair competition by ensuing correct labeling information and acted as a vehicle for producers to compete on quality rather than quantity. The fast growing Indian economy is now attracting many nations to have a

partnership share of the Indian market. India becomes global since it has a huge agricultural, natural and human resource base, he concluded.

Prof. C.L. Khetrapal in his presidential address entitled "Enhanced yield and quality improvement in agriculture: a scientific approach" spoke on the various applications of proton NMR in science with a special emphasis on agricultural sciences. He said that proton NMR was first used in agricultural and soil sciences way back in 1950's for the study of hydration in food stuffs and has now been successfully employed in determining the total oil content in individual seeds with the aim of selecting the best seeds for plant breeding. Such a fast and nondestructive method provided a means to increase the average oil content of corn 2.25 times than the traditional selection method, resulting

in gains over five generations that would have otherwise taken 20-30 generations, he explained. Some other applications include separation of complex organic matter extracts/soils, study of root structure and pathology, geographical identification of origin and quality of wine for official wine testing, he added. He further elucidated that the isotopic NMR analysis has also been used to check the quality and authenticity of fruit juices by first converting the sugars into ethanol by controlled fermentation and subsequently employing the deuterium NMR. Recently, it has been employed as a powerful tool in identifying and quantifying plant metabolites either *in vivo* or in tissue extracts, he informed. "The simple physical technique, therefore, assures valuable scope in agricultural sciences but unfortunately these have not yet been exploited to any significant extent in India. NMR is a valuable tool with ample opportunities and requiring multidisciplinary involvement of the human resource", he concluded.

Earlier, Dr Rakesh Tuli, Director, NBRI, welcomed the Chief Guest Dr S. Nagarajan, Prof. C.L. Khetrapal and other dignitaries and presented the progress report of the institute, for the year 2005-2006. Highlighting the various R&D accomplishments, Dr Tuli informed that historically this year was a very special year as NBRI got the prestigious 'CSIR Technology Prize' for the development of BT-cotton technology. Two other highly coveted national awards, namely, 'Innovative Young Biotechnologist Award' and 'INSA Young Scientist Award' went to one of NBRI's young scientists - Dr Samir V. Sawant, he informed.

Highlighting the progress of NBRI in the area of Plant Biodiversity & Conservation Biology, Dr Tuli said



Annual Day Celebration

during the reported year, NBRI made a number of floristic surveys and plant diversity assessments in various regions of the country. Molecular and systematic studies on *Astragalus rhizanthus* complex and *Oxytropis* spp. were initiated to establish their correct identity, taxonomic position and relationship of the species as well as to study their genetic variability. The collections of *Astragalus*, made from the frigid climate of high altitudes in Himalayas will now be examined by the physiology group to discover the secrets of how life exists in extreme stress, Dr Tuli elucidated. He further reported that NBRI was carrying out extensive work to map the immense biodiversity of the country and attempting to profile poorly explored lower plants. According to him an extensive database of plant species with remote sensing tools would be the futuristic reality.

Summarizing the work of Molecular Biology & Genetic Engineering area, Dr Tuli said that NBRI had been making efforts towards the development of technologies for using plants for the expression of industrially important proteins. One of these is the expression of the therapeutic protein Alpha-1-antitrypsin (AAT) which has great potential for therapeutic applications in patients with genetic disorder for decreased AAT production. A strategically designed AAT gene was chemically synthesized and transformed into tomato under the control of CaMV35S promoter, he said. The second therapeutic protein on which NBRI has been working is the rabies virus coat protein. In this case, the aim is to examine the feasibility of developing an edible vaccine against rabies, he informed. The institute has developed transgenics of cotton, grain



Dr Rakesh Tuli, Director, NBRI, presenting the institute's annual report

legumes-chickpea, pigeon pea, tomato and ground nut with one or more of the δ -endotoxin genes - *cry1Ab*, *cry1Ac* and *cry1EC*. The scientists have evolved out-of-box ideas in designing artificial promoters. He was optimistic about developing novel gene constructs and achieving tightly regulated, and yet, high level expression of target genes in transgenic plants. He further said that to understand the molecular basis of fruit ripening, several important genes were identified by differential screening methods. Most important amongst these genes include the MaMADS box gene that is known to be an important developmental regulator of ripening, he reported. Several interesting genes that are differentially regulated during petal abscission in rose and petal senescence in *Gladiolus* have also been identified. In the field of molecular virology three new isolates of *Cucumber Mosaic Virus* were identified from chrysanthemum, tomato and banana. A sensitive nested PCR was developed for the detection of a phytoplasma associated with yellow leaf symptoms of *Catharanthus roseus*, which will be useful in regenerating phytoplasma-free *C. roseus* plants.

NBRI has expanded its activities under the national mission for finding

alternatives to fossil fuel. NBRI is networking with 20 other institutes for developing the largest germplasm of *Jatropha curcas*, he stated. Advanced physiological tools are being developed to screen the germplasm for evaluating drought tolerance, photosynthesis and water utilization efficiency under conditions of water stress. Such varieties are most critical to finding a cost competitive solution to the energy crisis through biodiesel, Dr Tuli said.

In the area of Phytochemistry, NBRI has developed a black herbal hair dye for the first time. The dye is safe, eco-friendly, non-irritant, non-toxic and non-allergenic, he pointed out. In the field of Agricultural Microbiology, the scientists have developed highly effective blend of novel strains of *Pseudomonas*, *Bacillus* and *Trichoderma* to serve as bio-control agents for agricultural crops, flowers and vegetable crops. A number of technologies comprising stable formulations have been developed by NBRI. *Rhizobium* and phosphate solubilising bacteria (PSB) technology was licensed to the Department of Agriculture, Government of Uttar Pradesh. *Bacillus* based technology was transferred to Biotech International Ltd. (BIL), New Delhi and Balaji Crop Care Pvt. Lts, Hyderabad. *Trichoderma* based technology was transferred to Gujarat Agro Products Corpn. and Balaji Crop Care Pvt. Ltd, Hyderabad.

In multiinstitutional network projects in the area of 'Drug Discovery' and 'Newer Scientific Herbal Preparations for Global Positioning', a total of 1620 samples of 70 extracts were made from 17 medicinal plants chosen as per the traditional Ayurveda literature. Important leads have been obtained for anti-dementia activity in



one of the plants identified by NBRI, Dr Tuli said. Commenting further about the achievements in the field of Pharmacognosy and Ethnopharmacology, he informed that a product for deterrence from cigarette smoking – called ‘Anti-Cig’ based on the concept of ancient texts and pharmacognostical and toxicological studies and using a number of plant species was also developed.

In the area of Genetics and Plant Breeding and Agrotechnology, exemplary progress was made by NBRI in selecting elite lines of poppy with distinct chemotypes. Recombinants having morphine up to 25%, thebaine up to 8%, codeine 6.5%, narcotine 12% and papaverine up to 6% have been isolated. Such high contents of thebaine and codeine are the first report in opium poppy, and are more than 300% higher than in the existing cultivars, Dr Tuli informed that in the NBRI’s quest of ‘Plants for Future’, cloning genes of the alkaloid biosynthesis pathway in poppy has been initiated. The aim is to develop approaches in marker assisted selection and transgenics for developing designer plants for specific non-narcotic alkaloids for therapeutic applications, he explained.

On this occasion, Nutraceutical technology comprising four nutraceutical products, Nutra-Diab, Nutra-Lact, Nutra-Preg and Nutra-Child was transferred to M/s Alchemist Ltd, Patiala.

The chief guest released the Annual Report 2005-2006 of the institute on this occasion. Four other NBRI publications, viz., ‘Amaryllis’, ‘Maousami Poudhe’, ‘House Plants’ ‘Vigyan Vaani’ were also released.

Dr S.P. Singh, Scientist-F, proposed the vote of thanks.

Short Course on Aircraft Conceptual Design

As a prelude to the International Conference on Trends in Product Life-Cycle Modeling, Simulation and Synthesis during 18-20 December 2006 in IISc, NAL, ADA and HAL jointly organised a three-day short course on Aircraft Conceptual Design by Dr Daniel P Raymer, President, Conceptual Research Corporation, USA during 14-16 December 2006 at S R Valluri Auditorium, National Aerospace Laboratories (NAL), Bangalore. This course focused mainly on aircraft design and would help the aeronautical community in bringing out new ideas in the ongoing design activities and development of next generation aircraft.

Dr Raymer is a recognized expert in the areas of Aerospace Vehicle Design and Configuration Layout, CAD Methodologies and Design Education. He is also author of the best-selling textbook “*Aircraft Design – A Conceptual Approach*” and recipient of Rockwell Engineer

of the Year and the AIAA Summerfield Book Awards.

Dr Raymer in this course discussed layout skills required for the initial design of new aircraft concepts and emphasized practical aircraft design including configuration layout development and design “rules of thumb” as well as the analytical tasks of design such as aerodynamic analysis and vehicle sizing. The course also included other topics of special interest such as stealth design, VSTOL, helicopter design, design optimisation and carpet plotting, and use of computers and CAD in conceptual design.

Over 100 participants from the various IITs, universities and Defence Laboratories from all over the country participated in the three-day course.

Feedback from participants showed that the course was very useful for persons in the design arena.



Inaugural session of short course on Aircraft Conceptual Design



Prof. Virander Singh Chauhan delivers S. S. Bhatnagar Memorial Lecture at IICT

THE fourteenth Bhatnagar Memorial Lecture was delivered by Prof. Virander Singh Chauhan, Director, International Center for Genetic Engineering and Biotechnology (ICGEB), New Delhi, at the Indian Institute of Chemical Technology (IICT), Hyderabad, on 'Trends in malaria vaccine, drug and peptidomemetics research'.

Dr Chauhan, whose research interests include malaria immunology, mechanism of action of antimalarials, antimalarial drug development and design and synthesis and function of conformationally restricted peptides, spoke in detail about the malaria vaccine being developed by his research group at ICGEB. He informed the gathering comprising academicians, industrialists and scientists from sister laboratories that malaria was back with a vengeance in India and its prevalence was high in Orissa, Chhatisgarh and Assam. The disease was causing more than one million deaths each year, mostly in Africa. High hopes were being pinned on the vaccine developed by ICGEB at New Delhi, whose first phase clinical trials would start in about one and a half year after testing its toxicity in animals.

Earlier, Dr J. S. Yadav, Director, IICT, welcomed the speaker and highlighted the achievements of IICT and its future action plans. He said that the institute had received grants for setting up two national facilities – one for detecting heavy metals in herbal products and another for drug discovery.

Dr Ashok D. B. Vaidya delivers Founder's Day Lecture at IICT

Dr Ashok D. B. Vaidya, Medical & Research Director, Swamy Prakashnanda Unani Ayurveda Research Centre (SPARC), Bhartiya Vidya Bhavan, Mumbai delivered the Founder's Day Lecture on 13 November 2006 at the Indian Institute of Chemical Technology (IICT), Hyderabad on 'Reverse Pharmacology of Natural Products for New Drugs : A Paradigm Shift'. The lecture was part of the Indo-US Conference on 'New Bioactive Molecules in Pharmaceutical Research – Contribution of Natural Products'.

Dr Vaidya, a former WHO consultant and a member of the Advisory Panels of ICMR, CSIR, DBT, CCRAS and several top drug companies, spoke in detail about the reverse pharmacology for the development of new drugs using natural products. Dr Vaidya said that reverse pharmacology had been used successfully by his group to develop new drugs in the area of diabetes, malaria, cancer and neurodegenerative disorders. He explained the new trends in the area of pharmacology and pharmaceuticals and said that natural products had come out victorious over synthetic compounds. Major national and international companies are putting more emphasis on the



Dr Ashok D. B. Vaidya, Medical & Research Director, SPARC, Bhartiya Vidya Bhavan, Mumbai, delivering the Founder's Day Lecture on 'Reverse Pharmacology of Natural Products for New Drugs: A paradigm Shift' at IICT

natural products than the synthetic material.

Earlier, welcoming a large gathering of delegates, members from academia and industry and IICT scientists, Dr J.S. Yadav, Director, IICT, explained the importance of the lecture, which is organized every year in honour of late Dr S. Husain Zaheer, former Director, IICT (erstwhile CLSIR and RRL, Hyderabad) from 1948 to 1962 and later the Director General of CSIR from 1962 to 1966. Dr Yadav lauded the extraordinary services and outstanding leadership provided by Dr Zaheer in making IICT one of the top institutes in the area of Chemistry and Chemical Technology.



National Award for Innovative Product Development to CFTRI

The Central Food Technological Research Institute (CFTRI), Mysore, has been awarded the National Award in product development, instituted by Coconut Development Board (CDB), Government of India, Kochi. The award was received by Dr V. Prakash, Director, CFTRI, at the hands of Shri Sharad Pawar, Union Minister for Agriculture, Consumer Affairs & Food and Public Distribution, in a function held as part of the World Coconut Day celebration on 2 September 2006 at National Council of Agriculture Science Centre, ICAR, Pusa, New Delhi. Shri Vayalar Ravi, Union Minister for Overseas Affairs, presided over the function. Smt. Radha Singh, Secretary, Ministry of Agriculture, Government of India and Smt. Minnie Mathew, Chairman, CDB, were also present along with other dignitaries. Shri Pawar later visited CFTRI stall in the exhibition arranged for the public as part of the celebration.

This award is to recognize and promote excellence in coconut cultivation, innovative methods in coconut farming, product development, product improvement, quality improvement, product diversification and marketing.

The citation to CFTRI reads as “*The technologies for processing of coconut into desiccated coconut and dehydrated coconut milk powder have been developed by the CFTRI. The institute has also developed and received patents for the process for detachment of coconut kernel from its shell using dehydration technique, a process for the preservation of deodorized coconut sap (neera), a nonthermal process for the preparation of tender coconut water concentrate and a process for the preparation of dietary fibre from coconut residue. CFTRI has also developed a process for the preparation of coconut honey from coconut sap, a novel coconut sap concentrate, a continuous grating machine for coconut and a process for coconut sap spread*”.

Some of the technologies have been successfully transferred to industry and a few more including that for Virgin coconut oil are in the pipeline. Currently, CFTRI is focusing on value addition to coconut based products.

Prof. Ramachandran Gold Medal to Prof. T. P. Singh

CSIR's Prof Ramachandran Gold Medal for Excellence in R&D in Biological Sciences for the year 2006 has been awarded to Professor T.P. Singh, Distinguished Biotechnologist and Professor, Department of Bio-Physics, All India Institute of Medical Sciences (AIIMS), New Delhi, for his exemplary contributions in the areas of protein structure determination and new drug discovery.



This award, instituted by CSIR in 2004 in the memory of Prof. G.N. Ramachandran a pioneer in Protein Chemistry and the founding father of Structural Biology in India, is awarded every year to a scientist for excellent contribution to fundamental or applied research in biological sciences.

Professor Singh has made internationally leading contributions on the structure and function studies of lactoferrin proteins, serine proteases, phospholipase A2 enzymes, plant proteins, secretory glycoproteins and lactoperoxidases. His group has evolved into an excellent centre on structure-based drug design. Currently, his group is working on several lead molecules against inflammatory disorders and breast cancer.

Dr V. Purnachandra Rao elected INSA Fellow

Dr V. Purnachandra Rao, Scientist F, National Institute of Oceanography (NIO), Goa, has been elected a Fellow of the Indian National Science Academy. Dr Rao has been working in the field of sedimentology at NIO for the last 26 years. His current research interests pertain to the role of microbial organisms on the formation of authigenic minerals, including phosphorites, dolomites and oolites. He has contributed significantly to the understanding of late quaternary sea level changes and neo-tectonic activity along the western margin of India.

Dr Rao has 55 research publications in various journals of national and international repute. He is also a Fellow of Indian Academy of Sciences and recipient of several awards and honours during his career at NIO.



Dr A. Ajayaghosh chosen for Ramanna Fellowship

Dr A. Ajayaghosh, Scientist, Regional Research Laboratory (RRL), Thiruvananthapuram, has been chosen for the Ramanna Fellowship-2006. The Fellowship has been instituted recently by the Department of Science and Technology (DST) to honour and encourage scientists who have made significant contributions to Science and Technology. The fellowship, consisting of an extra salary of Rs 5, 000 per month and a research grant of Rs 10,00,000 per year for three years, goes to Dr Ajayaghosh in recognition of his contributions to the field of chemical sciences.

Dr R. Sankaranarayanan selected for Swarnajayanthi Fellowship

Dr R. Sankaranarayanan, Group Leader, Centre for Cellular and Molecular Biology (CCMB), Hyderabad, has been selected for the Swarnajayanthi Fellowship: 2005-06 by DST, New Delhi. He is an eminent structural biologist and has established the state-of-the-art x-ray crystallography facility in CCMB. He is also a recipient of the International Senior Research Fellowship of the Wellcome Trust, UK in Biomedical Science.

Dr B. Ramalingeswara Rao awarded Indira Gandhi Priyadarshni Award 2006

Dr B. Ramalingeswara Rao, Scientist, National Geophysical Research Institute (NGRI), Hyderabad, has been awarded Indira Gandhi Priyadarshni Award 2006 by National Unity Conference, New Delhi. Shri P.R. Kyndiah, Union Minister for Tribal Affairs, presented the award to Dr Rao on 18 November 2006. He has been awarded for identifying the Buffer Mechanism of Buckingham Canal that has saved thousands of people of Coastal Andhra Pradesh from the fury of 26 December 2004 Tsunami.



Dr Rao has also suggested that the Buckingham Canal should be renovated for the mitigation of Tsunami hazard along the east coast for next 100 years. His research findings were published in *Current Science*. He is presently engaged in the field of earthquake and hazard mitigation studies.

Recognition to NPL Scientist in Asia Pacific Metrology Programme (APMP)

The 22nd APMP General Assembly and Related Meetings International Conference on Advances in Metrology : AdMet06 conference was held during 11-16 December, 2006. Over 550 delegates participated and deliberated on the metrology related issues

Dr Vikram Kumar, Director, National Physical Laboratory (NPL), New Delhi, was elected as Chairman, DEC (Developing Economies Committee) and Member, APMP Executive Committee

Dr R.P. Singhal, Scientist G, NPL, was elected as Chairman, APMP TCL (Technical Committee) for the year 2007-2009.



Dr V. Balaram gets Manthripragada Medal for 2006

Dr V. Balaram, Deputy Director, National Geophysical Research Institute (NGRI), Hyderabad, has been awarded the 'Smt Manthripragada Sita Devi – Sri Rama Rao Medal' for 2006 from the Indian Society of Applied Geochemists (ISAG), Hyderabad for his outstanding contributions to the field of Analytical Geochemistry during 1996-2005. These studies have brought in a remarkable transformation in the fields of geochemistry, mineral exploration, environmental sciences and standard reference materials in India during the last two decades.

Dr Balaram has carried out extensive work on various aspects related to trace element geochemistry, analytical geochemistry, gold, platinum group elements (PGE) and base metal exploration studies in a few Precambrian terrains of India and Madagascar using ICP-MS. Dr Balaram's contributions pertain to: Identification of mineralized zones for gold, PGE and base metals in some parts of India, Central and Northern

Madagascar; Evolving models for genesis of chemical precipitates, such as banded iron formations, cherts and manganese nodules, through space and time; Establishment of a highly sophisticated Geochemical Laboratory at NGRI with the state-of-art analytical equipment such as F-AAS, GF-AAS, ICP-MS, EPMA and other instruments, which is the first of its kind in India, for generation of precise analytical data required in many earth and environmental science studies; Design and development of methods for the generation of highly precise and accurate data of REE and several other trace elements, including PGE, gold and their pathfinder elements in rocks, minerals, ores and other geological materials critical to geochemical, mineral exploration and environmental studies and Development of Indian reference materials (geological and environment).



Dr V. Balaram receiving Manthripragada Medal for 2006 from Dr B. R. Arora, Director, Wadia Institute of Himalayan Geology, Dehra Dun

UKIERI Award for Dr Ahmed Kamal

Under the UK-India education and research initiative, the UKIERI Standard & Major Awards were announced on 18 January 2007 at the British Council, New Delhi, in the presence of Rt Hon Gordon Brown, MP, and Chancellor of the Exchequer. Amongst 261 applicants for the Standard Awards from universities and research centers and teams in the UK and India which underwent over 850 peer reviews, 23 research proposals were selected. A research grant of UK £ 150,000 has been awarded for a project proposal between Dr Ahmed Kamal, Deputy Director, Indian Institute of Chemical Technology, Hyderabad and Prof. Andrew David Miller, Imperial College Genetic Therapies Centre, London, on Biomedical Solutions for India and UK for Discovering Next Generation Anti-infective Drugs.



Dr Kamal and Prof. Miller will combine their expertise to discover novel small molecule antibacterial drugs based on peptide-nucleic acid and nucleoside analogues. The approach will be adaptable to addressing targets for antituberculosis, antiviral and antimalaria.

This UK-India combination is a part of a complete project involving Germany-UK-India. Further, in this UK-India collaborative programme, students from India will get an opportunity to work and get trained in European research environment. Joint patents before commercialization will be protected as novel inventions.

