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*A Newsletter of Foundation For Innovation And Technology Transfer*, Indian Institute Of Technology, Delhi

# FITT FORUM

## EKLAVYA - the Technology Channel

Indian Institutes of Technology has proudly announced the creation of a new **Technology Channel - EKLAVYA**. The channel was inaugurated by **Prof. Murli Manohar Joshi,** Honourable Minister, HRD, S&T and Ocean Development **on 26th January, 2003**. This is a joint initiative of IIT's and IGNOU and is catalyzed by Ministry of Human Resource Development.

It is a channel dedicated to technical education and shall run programmes generated at different IITs. This channel shall mark the beginning of a new era in the dissemination of technical education in the country. The vision is to share the knowledge and expertise with all and to bring about true socialism in engineering education cutting across all boundaries. IITs want to come close to students, particularly the students pursuing the degrees in various disciplines in the area of technology and engineering.

**EKLAVYA** epitomizes the true spirit of learning and dedication. So irrespective of wherever a student is, he or she will be able to share the resources available at IITs and that too, without any Guru Dakshina because it is a free-to-air channel. The student's motivation and enthusiasm are the only pre-requisites. It being a totally digital transmission, the student will receive crystal clear images.


*Shusma Swaraj, Honourable Minister (I&B) GOI, addressing the distingushed gathering during the launch of EKLAVYA channel at IGNOU, New Delhi. (Sitting from left to right: Dr. R. Sreedher (Director, EMPC - IGNOU); Prof. R.S. Sirohi (Director, IIT Delhi); Prof. H.P. Dikshit, (VC - IGNOU) and Dr. M.M. Joshi, (Honourable Minister HRD, GOI)*

***What actually shall be beamed?***

Eklavya shall be bringing to students the actual IIT classrooms virtually at their door steps. The channel is designed to carry video courses in different disciplines generated at various IITs on weekdays and special interest programmes on sundays. Currently, eight complete courses are being run in parallel, contributed by *IIT Delhi, IIT Kharagpur and IIT Madras* and are repeated in the same sequence without a break. Courses from other IITs shall also be made available in future. It is currently, a 16 hours-a-day affair for all the seven days of the week from 10. 00 AM.

*Contd. on page 4*

### *Highlights of this Issue*



## From the Desk of the Managing Director

*In this issue of FITT Forum, two significant events that happened in the last few months have been highlighted, each of which are technological landmarks for India. First, the inauguration of the Technology Channel at IIT Delhi in association with IGNOU is a giant step in the arena of* ***Distance Learning****. Second, the celebration of 50 years of IIT System at San Jose in California signified international branding of IIT. FITT plans to team up with CII to organise a grand pan IIT Industry-Alumni Enclave later this year.*

*In another significant development, interest among IIT students, especially those graduating this year and young faculty members, on the Institutes' Technology Business Unit Program (TBIU) appears to have grown considerably. The first student-faculty led technology Start-up M/S KRITIKAL Solutions is on the verge of a break through in developing a number of high-tech products. At the same time the IPR and Technology Transfer Activities in the Institute have picked-up. FITT Forum is privileged to provide a platform for disseminating information on all these fronts.*

*Wishing all the readers world peace and prosperity in the comming days.*

***Dr. A.K. Sengupta, MD, FITT***

# TECHNOLOGY BUSINESS INCUBATION UNIT (TBIU)

## R & D Unit of Kritikal Solutions Inaugurated

On 20th November 2002, the R&D unit of KritiKal Solutions Private Limited was inaugurated in the auspicious presence of the Guest of Honour, **Mr Vijay R Kirloskar** (Chairman, Board of Governors, IIT Delhi) and the Chief Guest, **Dr R S Sirohi** (Director, IIT Delhi). *KritiKal Solutions (P) Ltd.* is a Delhi based student-faculty led startup founded on Aug 5th 2002, with the support of FITT, IIT Delhi.

**Dr Sengupta**, MD, FITT welcomed the gathering and outlined FITT's efforts in promoting entrepreneurial activities. **Prof.B.N.Jain**, Dean, Alumni Affairs and International Programme, gave a brief talk on the start of this activity in IIT Delhi, and the role that alumnus can play in fostering the spirit of entreprenuership in IIT Delhi. **Prof Anshul Kumar**, Chairman, KritiKal Solutions, introduced the "KritiKal" team, its vision and the projects currently underway at KritiKal.

**Dr R S Sirohi**, oulined the various steps that the IIT administration has taken over the past few years to encourage the transfer of science and technology to the market, and extended IIT Delhi's support for entreprenuerial activities.


*Prof B.N. Jain, Mr. V. Kirloskar, Prof. R. S. Sirohi, Prof. Anshul Kumar and Mr. D. Sekhon at the Kritikal Solutions Unit of TBIU*

*Mr V. Kirloskar inaugurating the R&D Unit of Kritikal Solutions*

Mr Kirloskar applauded the efforts of IIT and FITT in cultivating entrepreneurial spirit and ethos, and wished the Kritikal team the best for the road ahead. The event concluded with the ribbon cutting, diya lighting, visit to the R&D center and vote of thanks by **Mr Dipinder Sekhon** (CEO, KritiKal Solutions Private Limited).

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## IIT Delhi develops security scheme

New Delhi: The Computer Science & Engineering Department of IIT Delhi has developed a comprehensive scheme for security of sensitive building and premises. The system will automatically screen underbellies of vehicles entering the premises to detect any tampering to fix bombs etc. This is meant to replace the present manual mirror based checks. A two-part car-owner identify system to prevent unauthorized entry of vehicles and of vehicles driven by unauthorized operators will also be done automatically without stopping the vehicle. This project was carried out in association with a technology startup established under the Technology Business Incubation Unit (TBIU) programme of the Institute facilitated by the Foundation for Innovation and Technology Transfer (FITT), the autonomous Industry Interface organization of IIT Delhi. Seven students of the SCE department who graduated in June 2002 launched the technology startup, Kritikal Solutions, for development of high-tech products and solutions.

*The Economics Times 29-09-2002*

## Mission Kritikal

**These seven mavericks have decided to sail on their own dreamboat**
Their excitement is palpable. All in their early 20s, seven IIT students have launched Kritikal Solutions, — 'Kriti' (creation) and Kal, meaning tomorrow or future.

Armed with dual degrees in Computer Science and Engineering, zero capital and virtually no market validation, these young men are confident of developing cutting-edge tools in embedded software, computer and sensor networks. Mind you, this is the first technology start-up, established by IIT students, under the tutelage of Foundation for Innovation and Technology Transfer (FITT), the indus arm of the institute. Thanks to the entrepreneurial spirit unleash during the dotcom era and its subsequent demise, there could now be a few 'true' success stories coming out of the IITs, close on the heels of the phenomenal success of 'Simputer', which was launched by the students of *IISc, Bangalore.*

"We had a gut feeling that this idea might work and here we are," says the disarmingly fresh-faced, 22-year old CEO of Kritikal Solutions, **Dipinder Sekhon**, who turned down an offer from Mobileye (an Isareli company specialising in computer vision) to follow his dream. The students bounced their idea off a few Professors, who agreed to throw in their might and arrange a meeting with the FITT Chairman — and, bingo! the idea fell into place. The company was registered and portfolios assigned, with **Jatin Sharma** as the CFO, **Soumyadeb Mitra** as the CTO (80%), **Nishant Sharma**, also as the CTO (balance 20%) and **Ashwani Gautam**, Anoop G and the second Nishant Sharma handling the rest of the operations.

"Our vision and graphic division has been active for the past de cade. But earlier we didn't have such a strongly motivated stu team," is the reaction of a bemused **Professor M. Balakrishna** Head, Computer Science and Engineering, IIT-Delhi.

One of their projects, that recently got approval from the Ministry o Information and Communication Technology, is to do with a security system device for scanning the underbelly of moving vehicles. This is to avert a 'December 13' kind of Parliament attack. The second project underway is an embedded digital photocopier that sits on the network and gets hooked to all office paraphernalia. This device could cost Modi, Kritikal's client, one-third the amount it is presently paying Xerox. On the anvil are a Digital Talking Book for the visually impaired and some FPGA solutions for improving computer vision and networking applications. "One success story is all it will take to roll out a few more entrepreneurs," hopes Prof. Balakrishnan.

*Radhika Sachdev*
*HT Horizon, Hindustan Times dated 30-10-200*

# TECHNOLOGY BUSINESS INCUBATION UNIT (TBIU)

## INRM Consultants Pvt.Ltd

*INRM Consultants Pvt. Ltd.*, is a startup company, incorporated by faculty and alumnus of IIT Delhi, under the Technology Business Incubation plan of IIT Delhi. INRM provides Integrated Natural Resource Management Solutions, which are at the cutting edge technology and therefore, highly scientific to provide the area specific solutions to very complex problems.

The company is engaged in making these solutions highly user-friendly and interactive by bringing in the *GIS interface*. Founded in 2001, the R&D unit of the company is located in the TBIU Complex of IIT Delhi.

*The business of the company is spread over the following major segments:*

* Product development
* Technical services
* Training material development

The product development for tailor made solutions involve GIS, remote sensing, GPS technologies and natural resource modeling. The company also indulges in information generation on various natural resource entities through indirect assessment using modeling.

*...nical services* related to

Modeling and natural resource management

* Database design and management, data processing and management of spatial, remotely sensed and GPS data
* Web based solutions for integrated natural resource management
* Highly technical and value added information.

Training material development for Web-based and CDROMs for GIS applications and other areas related to GIS is taken up on client's request. Specialised tailor made training programs are also developed and conducted.

*Some of the areas in which INRM has expertise are:*

* Integrated watershed management
* Hydrological & ground water modeling
* Environmental Impact Assesment
* Rainwater harvesting
* Agriculture forecasting etc.

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## Retirement

### Prof. A. Varadarajan

**Prof. A. Varadarajan,** Department of Civil Engineering has retired from the Institute service on attaining the age of superannuation on January 31, 2003. Dr. Varadarajan joined the Deptt. of Civil Engg. in 1974 as lecturer, and subsequently he became Assistant Professor in 1975 and Professor in 1984.

### Prof. N. D. Kaushika

**Prof. N. D. Kaushika,** Centre for Energy Studies joined IIT Delhi in 1979 as an Assistant Professor in CES. He was promoted to the posts of Chief Scientific Officer in 1995 and Professor in 1997. Prof. Kaushika retired on 31 January, 2003.

## First injectable male contraceptive developed

*New Delhi May 28.* India has successfully developed a male injectable contraceptive — ***RISUG*** — which will be available on doctor's prescription within six months after the current multi-centric Phase III trials are over. The contraceptive, considered the first of its kind in the world, is much in demand even in countries abroad. Besides Canada, the United States, Germany and South Africa have evinced interest in the drug-based single shot contraceptive, which is reversible.

**Sujoy K. Guha**, professor, Biomedical Engineering, Indian Institute of Technology, who developed the injectable over 25 years in collaboration with the Indian Institute of Medical Research and the All-India Institute of Medical Sciences, told *The Hindu* that the contraceptive had been patented in India, the U.S., Bangladesh, Malaysia, Thailand, and "almost in China".

**A pilot joint venture*** has been set up for the development of the product with the Indian Drugs and Pharmaceutical Limited. Dr. Guha said and added that talks were in an advanced stage with two international drugs manufacturing companies abroad.

In India, the entire package, including the drug along with a specially designed syringe, was likely to cost Rs. 100. Abroad, the price would be fixed at $ 500.

"This is a proud moment for the nation," the Union Minister for Health and Family Welfare, **C.P. Thakur**, said here while officially announcing the introduction of the injectable. "Finally a new contraceptive for males has been designed indigenously. It is now time to draw the attention of men to their social responsibility in terms of the significant role they can play in population stabilisation by adopting this minimally invasive, non-toxic, reversible contraceptive. Undoubtedly, a marriage of science, technology, medicine and biology has resulted in this remarkable development."

RISUG — short for *Reversible Inhibition of Sperm Under Guidance* — is only once injected into the scrotum of the male resulting in destruction of the fertilizing ability of the sperms without any adverse impact on male sexuality. Moreover, reversibility does not require surgery. RISUG acts by generating small electrical charge on interaction with the body fluids and alters the normal negative electrical charge on the sperm leading to enzyme changes and disintegration of sperms. The only side effect noticed initially in some subjects was a slight swelling of the scrotum for about three weeks.

The Drug Controller of India's approval of Phase I and Phase II clinical trials has confirmed the safety and efficacy of the injectable. The data of Phase III trials on 132 subjects has been submitted to the Ministry of Health and Family Welfare. Extended Phase III trials are now on in the Lok Nayak Jayaprakash Hospital, the Deen Dayal Upadhayay Hospital, the Mehrauli Medical Centre, all in Delhi and the Jaipur Medical College.

*Gargi Parsai, The Hindu, 23-10-2002*

* ***Note : The RISUG unit is in the TBIU Complex in IIT Delhi***

## Entrepreneurship Conclave

The Indian Institute of Technology (IIT), Delhi, under the leadership of **Vinayshil Gautam**, Dalmia Chair, professor at Department of Management Studies, IIT-Delhi organised a National Seminar on '***Entrepreneurship Management in an era of Liberalised Environment: Future Directions of Growth***' on January 4-5, 2003.

*Contd . on page 4*

..... **Entrepreneurship Conclave** *(Contd. from page . (3)*

The seminar could not have been timelier, given the current debate in the country regarding the nature and impact of liberalisation

Amongst the distinguishing features of the seminar was its ability to attract all major entrepreneurship related institutions for the two-day discussion. The National Entrepreneurship board; the National Science and Technology Entrepreneurship Development Board; the National Small Industries Cooperation, Entrepreneurship Development Institute, Ahmedabad; practising entrepreneurs, Entrepreneurship Associations, United Nations Development Programme (UNDP) and more, were represented at the highest level.

**S K Tuteja**, secretary, Ministry of Small Scale Industries, in his inaugural address, explored the different shades of entrepreneurship, talking of agricultural economy, industrial economy and knowledge economy He moreover, dealt upon the requirements of entrepreneurship and projected the future directions. Dennis Lazarus, on behalf of UNDP, outlined the international experiences with liberalisation.

What came out strongly at the seminar were variations at the local level in response to the impact of liberalisation.

*Education Times,The Times of India, 13 January, 2003*

## IIT developing fabric to help heal damaged body parts

*New Delhi*: Textiles is not only about fabrics, but can help in medical problems also. The textile technology department at the Indian Institute of Technology here is working on a process of organ transplants, which could do away with the need for donors.

"The main problem often with organ transplants is rejection," said associate professor (polymers and textiles) **Bhuvanesh Gupta**, who is working on the project along with **Nishat Anjum** and **Nilesh Revagade**. He added: "But we are using tissue engineering, where we take healthy cells from the partly damaged organ itself and allow these to grow into new tissue."

They are working on a fabric made from knitted polymers, " which is elastic and bio-stable".

He explained: "We are experimenting with regenerating the urinary bladder and this fabric stretches and contracts along with the organ. We are modifying the textile to make it receptive for cells to grow."

Gupta's team is being helped by **Prof J Hilborn** of *Uppsala University*, Sweden. Work on the project has been going on for three years and it may take about four years more for completion.

"If it works, the possibilities will be enormous. We could regenerate many parts of the human body," said Gupta.

Research on tissue engineering is going on all over the world.

"We have developed bio-degradable, poly-lactic acid fibre which can be knitted into fabric. The complete structure comprising the knitted and harvested tissue will be then transplanted on to the organ. The synthetic fabric dissolves in due course, leaving behind a perfect tissue patch," he said.

On future projects, Gupta said: "We are also working on a material for nerve regeneration. Hollow, braided structures will serve as guide channels for repairing damaged nerves," he added.

The IIT does lot of projects for various organisations, including MNCs as well as the central and state governments.

"Food processing, particularly food preservation, electrified vehicles and high-capacity buses are some of the projects we have on hand," said IIT-D director **Prof R S Sirohi**.

*Hena Shah, Times of India 20-11-2002*

..... **EKLAVYA Channel** *(Contd. from page (1)*

to 2.AM through midnight. The details of the courses and the 16-h schedule for the month of February and March , 2003 are available a IIT-Delhi Website *www.iitd.ernet.in*

**The details for Down Link** :

The EKLAVYA- Technology Channel finger prints every nook an corner of this vast country through INSAT 3C Satellite on C band (7· degrees East), Down link frequency 4165 MHz., Symbol rate 26.00 SPS, FEC ½, Polarization Horizontal.

The students are advised to contact their friendly cable operator t provide this channel so that the student could watch his or her favo ite course / programme in the cozy environs of the student's hom The student's institute can also receive this signal directly with little investment on a small dish antennae and a decoder (IRD). A that is needed is

1) 12 feet / 8feet diameter perforated dish antennae
2) C-band LNBC
3) C-band feed horn
4) Low loss RF Cable Analog
5) Integrated receiver decoder (IRD) for Digital reception
6) Television set

Incidentally, the channel activities are being coordinated by IIT D

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## IGNOU's technology channel inaugurated

*New Delhi Jan.* 26. The Union Human Resource Development Mi ister, **Murli Manohar Joshi**, today inaugurated "Gyan Darshan-III", the technology education television channel of the Indira Gand National Open University, in the Capital besides the four "Gyan Vani FM radio channels which will operate from Bangalore, Coimbator Lucknow and Vishakhapatnam. The Union Information and Broa casting Minister, **Sushma Swaraj**, was also present on the occasio Envisaged to reach every nook and corner of the country throu INSAT 3C satellite, "Gyan Darshan-III" will telecast high quali lectures, delivered to engineering students of IITs by its faculty, over 3.5 lakh engineering students studying in 1,200 engine colleges across the country. With the launch of this exclusive nel completely dedicated for technology education, the numb channels in the bouquet of "Gyan Darshan", India's national educ tion channel, has now risen to three.

"**Gyan Darshan-III**" is a joint initiative of the Union Ministry of H man Resource Development, the Indian Institute of Technology a the IGNOU which will have an initial daily telecast of 16 hours, wou be increased to 24 hours. Any educational institution in the count can directly get the technology channel with basic infrastructure. "Gyan Vani" is a radio cooperative devoted on FM frequency establishing 40 FM broadcast stations across the country decentralised model for education and development. IGNOU is t nodal agency for the "Gyan Vani" channel, but the 40 centres will essentially independent and the channel will be decentralised in str ture and functioning. The "Gyan Vani" are already functional Mumbai, Lucknow, Bhopal and Allahabad.

*The Hindu 27 January , 20*

# IIT NEWS IN MEDIA

## Robots demystified !

**Even school children can learn to make primitive robots, says Dr. S. K. Saha, Associate Professor, Mechanical Engineering, IIT-D.**

***Can Robotics be taught in schools as a subject?***

Of course! In fact, quite a few Indian schools already have a robotics Lab, like DPS R.K. Puram, which has one called Shogun. If schools don't have such a lab, they can set it up with the help of the Lego Mindstorm. These are Lego blocks, which have been fitted with the Massachusetts Institute of Technology (MIT) installed sensors and motors controllers. The Mindstorm comes for only Rs. 13,000 per kit. Seven-eight such kits are sufficient for a small sized school lab – setting up the lab should not cost more than Rs. 1-2 lakh. The kit can be purchased from Mahindra Intertrade Inc. in Mumbai. Apart from schools, all engineering colleges in India and abroad have one or two courses on Robotics in their Mechanical, Electrical and/or Computer

***But, isn't Robotics about artificial intelligence and other complex subjects?***

It is, but only at the advanced level. At the basic level, the important components are electrical, electronical and mechanical, controlled through a computer interface. Thus, children can easily learn to devise burglar alarms and other such electronic gadgetry in school labs!

***How can awareness on the subject be enhanced?***

By providing kids with the necessary infrastructure and organizing competitive events. For instance, IIT-Powai holds an annual contest in Robotics called Yantriki (the next one is scheduled for January 2003). **Prof. A Mukherjee** of IIT-Kanpur also runs a programme called "Build Robots and Create Science (BRICS) in activities, along with a few of my students in IIT Delhi.

***Which are the most well-known Institutes for research in Robotics?***

All the seven IITs (Delhi, Kanpur, Powai, Chennai, Kharagpur, Guwahati Roorkee), besides Jadavpur University in Kolkata and a few RECs abroad, I would name MIT, Stanford and CMU in the US; McGill University and the University of Toronto in Canada; and the University of Berlin and Stuttgart in Germany. Besides, England, Japan, Korea and China are also known in the field.

***What are the job opportunities? Do we have industrial applications of Robotics in India?***

Not at the moment. But Robotics has the potential to effect applications in small and medium scale industries in the future. For that to happen, the important thing is to first build student interest, preferably at the school level.

***Tell us more about the Mechatronic Lab that you have set up at IIT-Delhi.***

Robotics is just one area of interest at the *Mechatronics Lab*. We have about 0-9 Robots (5 were bought while our students made the rest). Even with readymade robots, our students have devised some new applications. Please *visit www.angelfire.com* for more information. Recently, we bought a new robot for Rs. 6 Lakh. This robot was made by *Systemantics India,* a Bangalore-based Company. Systemantics is now going to export the robot to the US market for US$ 15,000. The cost of manufacturing it in the US would be around US$ 25,000. So you can judge the potential that this field has in India.

*HT Horizon, Hindustan Times 23-10-2002*

## Youth rate IIT the best, IIM second

***The Indian Institute of Technology (IIT)*** wins hands down as the best academic institute in the country today, polled young Indians between 16 and 24.

The survey, conducted by Taylor Nelson Sofres (TNS) Mode exclusively for *Hindustan Times* among young Indians in Delhi, Mumbai, Bangalore, Kolkata and Chandigarh, found that the IITs emerged as the institutes that **Generation Now** rates at the top.

Thirty-seven per cent of our respondents said they consider IIT the best academic institution in the country today. The Indian Institute of Management (IIM) comes second with 11 per cent of the vote. Delhi's All India Institute of Medical sciences (AIIMS) makes it to the third place with seven per cent of the vote.

The National Defence Academy (five percent of the vote) in Pune is rated fourth while Bangalore's National Law School (4 per cent), BITS, Pilani (three per cent) and Roorkee (two per cent) come at fifth, sixth and seventh place.

AIIMS, however, made it to second place in Delhi and Chandigarh. In Bangalore, the National Law School got third place (fifth overall) as the most preferred academic institute (following IIT and IIM). And Mumbaikars voted for the NDA (fourth overall) in second place after IIT. IIM polled the most votes in Bangalore and Kolkata.

Generation Now considers management the most desirable career option. Twenty-six per cent of our respondents said it was their top choice, followed by IT and computers (23 per cent). Engineering comes in third place (18 per cent), followed by Medicine (nine per cent), and CA (eight per cent).

The civil services (five per cent) and teaching ( four per cent) emerged the least prefferd career options.

For Girls, however, the top three choices are: IT/computers, Management and, tied in third place, teaching, engineering and Medicine. Boys expressed different preferences. For them, engineering topped the list, followed closely by management, IT and computers. *None of the boys interviewed said they wanted to teach.*

Our respondents were also asked how keen they were to study abroad. In cities 40 per cent students said they are very interested in going abroad, another 24 per cent said they were 'somewhat' interested. In other words, well over half our student population will, given the opportunity, prefer to study abroad.

Only 27 per cent have no interest at all. Boys (42 per cent) more than girls (38 per cent) said they are very interested in studying abroad. In terms of age groups, those in the 16-18 year group showed the highest interest in studying in a foreign university.

Students in Kolkata showed the most interest in going abroad, followed by those in Chandigarh. Students in Cosmopolitan Mumbai were the least inclined to study abroad.

The US is the most favoured destination: 56 per cent of those who said they wanted to go abroad wanted to study there. The UK comes next (20 per cent) though Australia (14 per cent) and Singapore (three per cent) also figure.

When it comes to where urban youth wants to settle down: over half our respondents said *given the chance they would prefer to live in a foreign country.*

Clearly, the brain drain is likely to go on.

*Namita Bhandare, Hindustan Times , 28 January 2003*

## R&D needs more youngsters, says Joshi

*New Delhi*: Improving the quality of research and development is the focus area for the government. Human resource development minister **Professor Murli Manohar Joshi** speaks of the various efforts his ministry is making.

***The number of scientific papers India is producing has declined drastically in the last 20 years, while China and Korea have increased their output. How do you explain this decline?***

It has not gone down but has remained the same. We cannot simply go by quantity, we must also see the quality. There can be 2,000 papers which are not cited in prominent journals or are not cited even once. Whereas there can be 500 articles which are being cited and recited. So there is a difference.

***But what needs to be corrected is that fewer number of younger persons are contributing?***

This is where it is pinching. Unless younger people contribute more to the research stream, our number of papers will not go up. This trend has to be corrected.

***So, what are you doing about it?***

We are discussing it with top scientists and vice chancellors, This issue will be taken up at the vice chancellors meeting on 23rd November.

One agenda item is why the younger lot is not joining mainstream science. We are trying to analyse whether it is purely because of lack of facilities or scholarship opportunities. The number and amount of scholarships has been nearly doubled in CSIR, similarly an expansion of scholarships by UGC is on.

The Department of Biotechnology, Science & Technology are also expanding their scholarships. So a larger number of avenues are open and a larger number can join the research stream. We are also trying to inculcate the spirit in IITs by including a condition in their funding patterns that 50% of their output should be research oriented.

***What is the kind of research that will be given weightage while considering funding?***

The kind of research depends on the institute. For example if it is the Indian Institute of Science, then it will be both. If it is the University of Roorkee then it will be mostly on the engineering side. If it is a university like Delhi, or Benaras Hindu University, it will be more basic research. Some universities will have a good mix of both.

***Private industries are contributing very little to R&D efforts...***

We have been interacting with such industries that have a potential for starting in-house R&D facilities. Most of the pharma companies have their in-house R&D and are in league with laboratories.

The trend of investing substantially in R&D is visible in the pharma industry. But even other industries have understood that if they are to be competitive and have to survive, then they must have their own technological development avenues and processes.

So the investment is now coming. Generally when we talk of investment from the industry we talk of corporate houses. But a large number of medium and small scale industries are also involved. This is generally missed. If you take that into account there will be substantial investment by industries in R&D. It would now be at 30%, formerely it was 20-22%. The government provides 70% of the investment

The government would like to increase the amount it gives for R&I to 2% of GDP.

This year, the budget for S&T has increased, We have given mor weightage to research-oriented projects.

***What about a greater linkage between industry, academia an research?***

We have emphasised to industries that if they invest in R&D at th university level, then they will be able to have better researchers.

They can go to the campus, identify universities where they woul like to invest. For example, the chemical industry can invest in Uni versity of Pune and National Chemical Laboratory in Pune, this give you immediate linkage. An initiative which I have been involved i the introduction of professionals in the management of IITs an NITs (formerly regional engineering colleges).

The condition is that the professional must be an industrialist hin self, or have been running an industrial house based on R&D, c must be running an institution of engineering or technical learnin So, **Professor S. K. Joshi**, formerly of CSIR, is chairperson of II Roorkee, and **Mr Sanjeev Goenka** is the chairperson of IIT Kharagpu

***What specific measures are you taking to promote R&D?***

We have been promoting research through the India Innova Fund. The innovation can be from the grassroots, someone work... in the agricultural field. If he comes with a commercially viable inn vative idea, we will fund it.

You will be surprised to know of a case where a person who can b called a dropout, designed a machine to separate cotton shell an seed in an efficient manner. We funded his idea, It is now fully fun tional. In one year he earned Rs 50 lakh, all it required was our initi investment Rs 5.5 lakh. We have been involved in transfer of tec nology for pharma companies.

Biotech companies have been helped by the government financiall Even the Reva car received help from the government.

***How does upgrading RECs to National Institutes of Technolo (NITs) improve the quality of engineering education?***

Upgrading RECs to NITs was done to produce greater number high grade technologists.

This could not happen by establishing 1 or 2 new IITs, An IIT wou cost anywhere between Rs 700 to Rs 1000 crore.

Now, in Rs 200 crore, 17 institutions have been upgraded. T institutions will approach IIT standards in 4 or 5 years.

The idea was to achieve the objective and be economically viabl and affordable. These institutions have the infrastructure and fa ulty but need an improvement. With professional management a more autonomy the standards will improve.

We plan to upgrade several other institutions if we get the fund, W are negotiating some funds with the World Bank, Already 50-60 i stitutions have been identified. Once you improve a large number institutions for undergraduate studies, then higher institutions lil NITs and IITs will devote more time to research. When the span much broader you get a larger number of students coming into t system.

*Urmi A Goswami, , The Economic Times, 14-11-20*

# SCIENCE AND TECHNOLOGY NEWS

## Industry to get tax sops to invest in R&D

Science, medical and engineering institutions will get new and easy funding modes to promote research.

**The Science & Technology Policy 2003**, released by the Prime Minister at the *Indian Science Congress 2003* on Friday, promises to double the S&T outlay to 2 per cent of the GDP and unshackle scientific establishments from bureaucracy.

According to the policy which stresses the human and economic faces of S&T, this investment will be raised through industry contribution as well as public resources towards the end of the Tenth Plan or 2007. The document much awaited by the research fraternity says. In return, industry will be allowed tax and non-tax incentives to invest in R&D. A task force, to be set up under a proposed *apex S&T Advisory Body*, will suggest the fiscal measures that can be applied to involve the industry in R&D promotion. The Advisory Board itself will have industry representatives and guide policies and programmes of the Government.

The private sector will be encouraged to adopt and fund institutions and their courses and to get marketable technologies from them in return. To promote industry-research linkages, autonomous Tech-ogy Transfer Organisations will be created within national labs a- universities.

The goal of this will be to improve the global market share of Indian hi-tech products through new industry-friendly policies, quality and IPR support. Coming long after the 1983 Technology Policy, S&T Policy 2003 aims to put new life and dynamism into research institutions and improve the country's scientific talent pool. It is meant to be a road map that integrates science and technology with societal concerns, according to the HRD and S&T Minister, **Dr Murli Manohar Joshi,** who spoke at the inauguration of the Indian Science Congress 2003.

All science-based ministries and departments will be run by scientists or technologists in order to rid them of bureaucratic spokes. It talks of new support, funding mechanisms and modern infrastructure that will be put in place; certain percentage of outlays of each socio-economic Ministry will be allocated for S&T activities. States will come up with linkages and mechanisms to solve their regional problems.

Science, medical and engineering institutions will get new and easy f- ing modes to promote research. To improve the talent pool in -e three areas, select colleges, departments and universities will get special support for at least 10 years and also enjoy flexible mechanisms to hire faculty. Labs in schools and colleges will get suitable support.

For some years now, scientists such as **Dr C.N.R. Rao** have been voicing concern over the private sector, especially IT, luring young talent away from scientific careers. The policy aims to reverse the flow through incentives and innovative schemes and an assured career in industry and academia. Similarly, scientists of Indian origin will be offered incentives to return to India.

Researchers in Government bodies will be allowed to move within industry, institutions and labs to improve skills and opportunities.

The policy targets 15 coherent objectives with sustainable solutions for food, nutrition, agriculture, environment, water, health, energy security.

*Business Line, 4 January, 2003*

## The New S&T Policy 2003

The Government of India has just announced a new National Technology Policy 2003, the highlights of which are the following.

1) The S&T Outlay is to be enhanced to 2% of the country's GDP by the year 2007 from the current level of around 0.8%

2) This investment will be raised through industry contribution as well as from public resources.

3) Industry will be allowed a new set of tax and non-tax incentives to invest in R&D ( *No legislative steps to make it compulsory though, at least for the profit making Companies*)

4) The private sector will be encouraged to adopt and fund institutions and their courses and in return get marketable technologies developed

5) Autonomous Technology Transfer Organisations will be created within selected National Labs and Universities ( *A few already exist eg in IIT Delhi, IISc in Bangalore etc*)

6)All Science based Ministries and Departments in the Government will be run by Scientists or technologists in order to get rid of beaurocratic interference.

7) Certain percentage of outlays of each socio-economic ministry will be allocated for S&T activities

8) Science , medical and engineering schools will get new and easy funding modes to promote research and build up infrastructure, get special support for next 10 years and enjoy flexible mechanisms to hire and improve talent pool in faculty

9) Non resident Scientists and Technologists will be offered incentives to return to India

10) Researchers in Government Bodies will be allowed to move within industry, institutions and labs to improve skills and opportunities

***NB. Italicised portions in Bracket are our own comments***

## Awards and Honours

**(1) Prof. R S Sirohi gets Pt. Jawaharlal Nehru National Award:**Prof. R. S Sirohi is selected for the ***Pt. Jawaharlal Nehru National Award*** in the field of Engineering & Technology for the year 2000 by the Department of Science & Technology, Govt. of Madhya Pradesh. This award carried a cash award of Rs. 1.00 lakh besides a Citation.

**(2) Dr. Vinayshil Gautam**, Department of Management Studies has been bestowed the ***ARTDO International Management and Human Resource Development Award for 2003***. This has been done in view of his "***Outstanding contribution to the growth of management education and human resource development particularly in the Asia pacific region***". The preceding recipients include persons such as Mr. Kofi Anan, Mr. Masaki Imai.

**(3)** The Name of **Dr. A.K. Keshari**, Dept. of Civil Engg figured in ***The Marquis Who's Who in the World***, nineteenth edition, 2002 as a biographical record for his outstanding achievement in his academic and research field.

and **Dr. Keshari**, acted as a member of panel of experts for reviewing projects and conducted a technical session on ground water and related areas in the joint R&D session of ***Indian National Committee on Hydrology (INCOH) and Indian National Committee on Hydraulics (INCH)*** organized by Ministry of Water Resources, GOI.

**(4) Dr. K S Rao Awarded:** The paper entitled "***A quantitative Rock Weathering Classification for Geotechnical Engineering Practice***" by Dr. K. S. Rao and A. S. Gupta of the Department of Civil Engineering has been adjudged by the Indian Society for Rock Mechanics and Tunnelling Technology. The award was presented by Er. A. K. Goswami, Secretary, Water Resources at the inaugural function of INDOROCK Conference on 28th November 2002.

# SCIENCE AND TECHNOLOGY NEWS

## Grants to IITs will depend on performance

*New Delhi*: Accountability seems to be the new byword in the department of education. Institutes of higher technical education, especially the *Indian Institutes of Technology (IITs)* are being made accountable for government grants. The government proposes to link the grants to performance levels of the IITs.

At present all IITs receive equal grants from the government — about Rs 65 to Rs 70 crore of plan fund — irrespective of the size, number of students, and output of the institute. The department of education recognises that the era of socialism is over. At the same time it accepts that education is not the same as involvement in the hospitality sector. So while the government can withdraw from the business of running hotels, it cannot withdraw completely fro the field of education.

What is needed is a rationale for funding education, especially higher technical education in the country. The department of education understands that at this point, efforts have to be made to develop a philosophy of funding education which balances budget and responsibility. Therefore, the government proposes to introduce the golden mean of supporting higher education by linking productivity to performance.

The proposed funding pattern is the performance-based funding. For disbursement of non-plan funds, it proposed that weightage be given to the number of students. There is no reason why an IIT that has not tried to improve its student intake should receive the same amount as an IIT where student intake has gone up.

The idea is not to push IITs on a student recruitment drive, but to ensure that per student expenditure does not fall to a level where efficiency and productivity are affected. Another factor that will determine productivity is the quality and quantum of post-graduate research. While generic research will also be given weightage, it will be far less than that given to cutting edge work. The proposed weightage for generic research is 5%. As regards plan funds, that will be decided on the basis of future plans. Another criterion for determining the level of funding, would be the ability of the IIT to generate funds on its own through industry involvement. This would also help promote cutting edge research and development.

The change may seem drastic. However, the government does not want the move to this new system to be sudden. To ensure a smooth transition, the department proposes to provide ad hoc transition grants. Another idea behind this change in funding pattern is to ensure greater internal autonomy. A performance linked funding it is believed, will help ensure better utilization of funds and greater efficiency.

*Urmi A Goswami, The Economic Times , 09-10-2002*

## Joshi's stick for IITs: No funds without research

*New Delhi, December 4*: The Indian Institute of Technologies (IITs) are in for a major overhaul. The HRD Ministry will provide funds to the IITs only if 50 per cent of the money is spent on research projects.

And this is no empty threat. It came from the HRD Minister **Murli Manohar Joshi,** who is supposedly basing his "latest policy" on the IIT restructuring on the review committee which has been accepted by the IIT Council.

"The funding being given by the Ministry to the IITs will in future be provided only if 50 per cent of the money asked for is to be spent o research projects. We ourselves have to invent technologies, im proving upon something borrowed from abroad will not serve th same end," Joshi said, giving the policy his favourite swadeshi tinge

At present, each of the seven IITs get anywhere between Rs 90 an 100 crore every year as part of the plan and non-plan allocation fron the Central Government.

Under Joshi's "formula-based funding" system, the IITs (which en joy one of the best brand values in the international market) will hav to focus more on research and post-graduate courses. And the un der-graduate courses which dominate the IIT-faculties' schedule ha to make way for research or "they are out" as a Ministry official saic

"In the last 50 years, we've produced enough graduate engineers We need researchers who can give us new products/designs. W can't go on feeding foreign universities with skilled engineers t develop microchip for them while we remain where we are," said V.S Pandey, Joint Secretary, HRD, in charge of Technical Education, saic

Though the existing under-graduate engineering courses will not b rolled back, new courses will not be introduced either.

"If one IIT manages to enroll 100 post-graduate students as com pared another which has 50, the former will get more funds," Par explained, adding that the IITs have to increase the ratio of ur graduate to post-graduate by 1.5:2.5.

"It is a simple strategy. More research students, more funding. Ea lier we had ad hoc funding and as result the country's capability t develop indigenous design have suffered," the official said.

So, no more uniform annual fund package. "The only way to ir crease research input is to tie it up with the annual grant," one of th expert committee members said.

The Ministry points out that compared to the number of PhD-stu dents enrolled in one of the best technical institutes in the US, th MIT, the IIT-record is abysmal. "Whereas MIT produces 100 Phl students a year, the IIT rate is below 50. But student strength is mo or less same — 45,000 in MIT and 42,000 in IITs," Pandey said.

*Santwana Bhattacharya , Indian Express, 5-12-200*

## Scientific temper gets booster shot

In an obvious tilt towards scientific research and development, th ***Union Budget 2003-04*** has bestowed on the *Department of Scien and Technology* Rs. 800 crore, an increase of Rs. 175 crore.

The ministry of science and technology comprising the *Departme and S&T, Scientific and Industrial Research and Biotechnolog* was allocated Rs. 290 crore more-that is Rs. 1,580 crore for 2003-04 The *Department of Scientific and Industrial Research* got Rs. 52 crore and the Department of Biotechnology got Rs. 260 crore. Th DST which has got the maximum hike will be channeling Rs. 21 crore into multi-disciplinary research in science and technolog programmes under the *Science and Engineering Research Counc* while Rs. 150 crore would go towards the creation of pharmaceutical research and development support fund.

According to government sources, a detailed plan on how to utiliz the Pharma fund will soon be forwarded to the Cabinet by th *Department of Science and Technology.* It is learnt that *Shanth Biotechnologies* is planning to commercialise two major hepatiti vaccines and anti-malarials through this Fund.

*Sudha Nagaraj, The EconomicTimes, 4 March, 200*

# IIT NEWS IN MEDIA

## Mathemagician at MIT: Indian wins 'Junior Nobel'

***IIT graduate Madhu Sudan's work tackles problems, 'important and deep'***

*New Delhi, September 21*: India's techies routinely use their knowledge of mathematics to try and create the next big thing, their first million—or the next. But one Indian has won international acclaim for doing nothing more than brilliant maths, part of a breed faithful to pen and paper.

**Madhu Sudan**, a native of Chennai and *IIT Delhi graduate* (class of 1987) has won the 2002 Rolf Nevanlinna Prize, one of the world's most prestigious awards in mathematics. It's also termed the junior Nobel in mathematics, awarded as it is for "both existing work and the promise of future achievement," according to the International Mathematical Union.

Sudan, 35, is an associate professor at the *Massachusetts Institute of Technology (MIT)* and was recognised for his groundbreaking work in theoretical computer science. He was presented with the award last month in Bejing at a meeting of the International Mathematical Union addressed by the Chinese President **Jiang Zemin** with 4,000 people in attendance.

Some of the problems Sudan—whose sister is a bank manager in v Mumbai and father a retired government officer in Delhi—has ved have practical applications, but many are purely advances limited to the realm of arcane mathematical research.

The *Mathematical Association of America* says Sudan has made important contributions, among other more theoretical fields, to error-correcting codes.

These codes play a major role in making digital communication high-quality and reliable: from music recorded on CDs to satellite transmissions to internet communications. His achievements come immediately after an IIT Kanpur computer science professor, **Manindra Agrawal**, 36, and his two PhD students garnered international attention last month for cracking a problem—*checking whether a number is prime or not*—that's dogged mathematicians since the time of the ancient Greeks and Chinese.

Indian mathematicians acknowledge that attention is coming this way after a long time. "We haven't had a **Ramanujam** for quite a while," says **Renuka Ravindran,** head of the department of mathematics at Bangalore's Indian Institute of Science, referring to **S A Ramanujam**, one of India's greatest mathematical geniuses who died i :ode, Tamil Nadu, in 1887.

lumber of American institutions see genius in Sudan. "Madhu Sudan has made important contributions to several areas of theoretical computer science," says a statement from the American Mathematical Society. "His work is characterised by brilliant insights and wide-ranging interests."

His boss at MIT, **John Guttag** says, "Madhu combines enormous technical virtuosity with a rare gift for choosing problems that are both important and deep."

For a culture that conjured up the zero—as we love to remind the world—Indian mathematicians have faded from public attention. But since mathematics is today the base of everything from aircraft design to computer software and hardware, mathematicians are at work everywhere. So India's techies are by definition strong users of applied mathematics. But people like Sudan and Agrawal are computer scientists who use their mathematical knowledge for the lesser-known thrill of simply creating a new algorithm—instead of writing a new code for a computer. "Right now I am too happy doing what I am doing to try the hectic path of a tech company," Sudan told The Sunday Express from Cambridge, Massachusetts. "If I do pursue such a path, it would be because I have a technical idea that becomes an obsession with me."

Half a world away at IIT Kanpur, Agrawal, who too does not have techie ambitions from his knowledge of computer science, says he just enjoys playing around with prime numbers and algorithms. "Just trying to solve them," says this plain, modest Allahabadi, "is a lot of fun." **Carl Pomerance**, a mathematician at the leading research facility of Bell Labs, told The New York Times: "This algorithm is beautiful." Another called it "crisp and lovely."

It is this search for beauty and elegance in numbers that drives the young breed of Indian mathematicians. "It's very difficult to pinpoint the beauty of mathematics," says Neeraj Kayal, 22, one of the two Ph.D students in Agrawal's team. "It's like when you see a piece of art and are struck by it but don't know how to express it."

All of them have seen colleagues flee academia and fill the ranks of wannabe entrepreneurs and tycoons, glued to their computers, circuit boards and chips. "The nicest thing," says Kayal, "is that you require only pen and paper."

*Samar Halarnkar, The Indian Express 22-09-2002*

## Engineers switch goals

**Siddhartha Jariwala** is a B Tech from the Delhi College of Engineering. He worked with Escorts for five years and his last designation was as a manager.

Today, Jariwala is pursuing *Master of Business Administration (MBA)* programme from the *Department of Management Studies (DMS)* at the *Indian Institute of Technology (IIT) - Delhi.*

Ditto is the case of **Divyaman Srivastava** who did B Tech from the Institute of Engineering and Technology, Lucknow, joined Telco in 1995 and finally quit the organisation in 2001 to pursue MBA from the same department. These are no isolated cases as B-schools in the country are witnessing a deluge of engineers pursuing MBA programmes. So, is this a recent trend of engineers pursuing MBA and even opting for a mid-career switch?

**Rajat K Baisya**, an industry veteran and head of the DMS, IIT-D said: "Engineers are pursuing MBA for the past two decades. The trend started when industry preferred recruiting MBAs' as managers. The DMS has above 95 per cent students from engineering discipline." **Sandipan Deb**, managing editor, *Outlook* and an alumnus of *IIT-Kharagpur and Indian Institute of Management (IIM),* Kolkata admitted that engineers, after doing their MBAs take up purely managerial jobs, which have little to do with engineering.

He remarked, "Even if you pursue a career in engineering, after some years a significant part of the job content becomes managerial in nature, in the sense that you have to lead teams, look at the financial aspects of the projects, apart from other things. A management degree gives you an edge."

Baisya observed, "Engineering is a comprehensive and holistic course that covers a much wider range of subjects for all-round personality development that helps engineers to face and adjust well in varied functions and environment."

Deb said: "An MBA student can get more out of management education if he has some work experience. However, the flip side is

*Contd. on page 10*

## IIT NEWS IN MEDIA

**..... Engineers switch goals** *(Contd from page 9)*

that during placements, someone with two years of work experience may end up getting the same designation and salary as someone with an MBA but no experience."

In a globalised economy, lucrative salaries at the managerial level have played a major part in luring engineers to pursue MBA. However according to Deb, other than software, India does not offer jobs, which can keep a good engineer excited and satisfied and this is a prime reason that they migrate to US. He remarked, "Pay scales for MBAs in most companies are higher than pure engineers. MBAs are preferred for top jobs unless the company's core business is engineering." *Amit Kr Chandra, The Time of India, 23-09-2002*

### The men behind Veer Awas complex

*New Delhi Nov. 2* .While taking to a life in "Veer Awas" housing complex inaugurated at Dwarka here on Friday by the Prime Minister, what most families would — like most of those who attended the inaugural function — overlook, is the international technology which has gone into the making of houses for the families of those killed or seriously injured during the Kargil war.

Supervised by three professors of the Indian Institute of Technology — **G.V. Rao, V.B. Deshpande** and **G.S. Benipal** — the construction work at the complex has been undertaken by Delhi Development Authority in the most modern manner using hollow concrete blocks instead of conventional bricks. This has not only provided better insulation and greater strength to the houses, it has also reduced the cost of plastering.

As **Prof. Deshpande** told The Hindu, for IIT, which has provided consultancy for the housing project, this is the fourth such venture. "We had taken up a pilot project in Vasant Kunj where four such housing blocks were constructed using compressed cement blocks. Thereafter, 2,016 houses for economically weaker sections (EWS) and 500 shops were built in Rohini. Besides, over 500 Self Financing Scheme units were also taken up using this technology in Haiderpur."

Pointing to the advantages of the technology, Prof. Deshpande said with the concrete blocks the construction is stronger than the one done with bricks. The blocks measure 40 cm by 20 cm by 20 cm with two hollows in the middle. Thus, while each of them is equal to eight bricks, their weight remains less.

*In the event of an earthquake the lighter weight helps in protecting the building.* Also the hollows, which give the rectangular block the shape of "8", help in making walls along the passages since concrete can be put through these hollows for increasing the height of the structure.

Prof. Rao informed that the blocks, which have been used in the complex for making the three-storey houses, could in fact help in erecting buildings over 20 storeys tall. Also, he said, the life cycle cost of these buildings is less due to the durability of the blocks and the fact that they do not require external plastering.

"The construction conforms to Australian-American standards. It does not require any shuttering and that is the reason why this complex has come up at such an amazing pace," he mentioned.

The IIT team is presently engaged in assisting various construction agencies to implement this new technology. The professors said the Bureau of Indian Standards is also preparing a new code draft along with the Delhi Development Authority for adopting this methodology to ensure safer housing in earthquake-prone Delhi.

*Gaurav Vivek Bhatnagar, The Hindu 03-11-2002*

## FITT NEWS

### FUND Allocation by FITT for IITD Activities

FITT has decided to allot fund for setting up laboratories witl specialized equipment etc. in technology areas like Biomedical Biotechnology, Fibre-science, rapid phototyping laser technolog etc.; infrastructure augmentation in Technology Business Incubato and for providing assistance to young entrepreneurs to develo their enterprise; supporting research programmes mooted by th members of the faculty in the Institute; support the cost of filing o national/international patents for protecting the the intellectua property generated in the institute, and related expenditures organising/supporting national and international conferences t facilitate the dissemination of information addressing technologica issues and for commissioning award for best industry relevant PhD and M.Tech/MS Work.

### Setting up Laboratories at IIT Delhi

Allocated fund for the laboratory set-up has to be met out of the funds accumulated in FITT for use by 31-03-2003. The laboratories proposed to be funded are as follows:

* *FITT Advanced MEMS CAD Laboratory*- for develor MEMS based sensors and RF systems for a variet applications in space, defense and general communicatio industry at CARE, IITD (proposed by **Prof. S.K. Koul**)
* *FITT Laboratory in Medical Textile* –to procure the R Plasma Unit and Tensometer equipment at DTT, IIT Delh (proposed by **Dr. Bhubanesh Gupta**)
* *Specialised Laboratory in DBEB*- towards the cost c procurement of Spectropolarimeter at DBEB, IIT Delh (proposed by **Prof. Saroj Mishra, Head**)
* *FITT Laboratory for Research in Pharmaceutica Biotechnology*- for procuring two numbers (each of 5 litre capacity) Bio-reactors for Plant Cell Cultivation at DBEE IIT Delhi (proposed by **Prof. V.S. Bisaria**)

### Support for Ph.D./M.Tech/MS Programme

FITT has decided to commission the ***"FITT Excellence Award"*** *fc Best-Industry Relevant Applied work* as part of PhD./M.Tech./M Programme. The following criteria has been adopted for these aw

(i) For awards on Ph.D Project the eligibility will be for dissertat which have been approved for awards of degree between 1st Apri 2002 and 31st January, 2003 will be considered.

(ii) For M.Tech/MS (research) projects, candidates whose project dissertations are approved for award of degree between December 2002 and 31st January, 2003 will be considered.

### Five Fs of FITT


*1. Friendliness 2. Flexibilit*

*3. Freedom 4. Focus*

*5. Facilitation*

# SMART MATERIALS

*A Technical Article by Samrat Mukherjee, Research Scholar, Dept. Textile Technology, IITD*

**Introduction :** Response to stimulus is a basic process of living systems. Based on the lessons from nature, scientists have been designing useful materials that respond to external stimuli such as temperature, pH, light, electric field, chemicals ionic strength, etc. These responses are manifested as changes in one or more of the following: shape, surface characteristics, solubility, formation of an intricate molecular self-assembly, a sol-to-gel transition and so on. Such structures are called "Smart" and such materials referred to as "Smart materials".

Also referred to as Intelligent Materials, Active Materials and Adaptive Materials, such materials have evolved over the past decades with increasing pace during the 1990s.

Based on their response, the classification of materials can be done as follows:

**Classification system for smart materials and systems**

| Category | Fundamental material characteristics | Fundamental system behaviours |
|---|---|---|
| ***Traditional materials:*** *Natural materials (stone, wood) fabricated materials (steel, aluminium, concrete)* | *Materials have given properties and are "acted upon"* | *Materials have no or limited intrinsic active response capability but can have good performance properties* |
| ***High performance materials:*** *polymers, composites* | *Material properties are designed for specific purposes* | |
| ***Smart materials:*** *Property-changing and energy exchanging materials* | *Properties are designed to respond intelligently to varying external conditions or stimuli* | *Smart materials have active responses to external stimuli and can serve as sensors and actuators* |

*Source: Encyclopedia of Smart Materials : Wiley*

**Classification of Smart materials:** Smart materials can be divided into two groups. One group comprises the "classical" active materials as viewed by the academic community and is characterized by the type of response these materials generate. Upon application of a stimulus the materials respond with a change in shape and/or in length of the material. Thus input is always transformed into strain, which can be used to introduce motion or dynamics into a system. Smart Polymers responsive to solvent composition, pH and temperature are being utilized for potential applications like chemical valves, shape memory, as well as biomedical applications including artificial organs and drug delivery systems.

The second group consists of materials that respond to stimuli with a change in a key material property, for example electrical conductivity or viscosity.

Some of the interesting application of smart materials in different fields are outlined below:

**Biotechnological applications**

Protein partitioning : Smart polymers are attractive for biotechnological applications. Smart polymers can be useful in downstream processing because they facilitate preferential partitioning of proteins between two phases by undergoing phase transition with little change in the environment's properties. The advantage of these techniques is that the principal chemical composition of the solution remains unchanged, thus eliminating a step to remove salts and specific effluents.

Protein purification techniques: Smart polymers undergo fast and reversible changes in microstructure triggered by small changes of medium property (pH, temperature, ionic strength etc.). These properties of smart polymers were exploited for the development of new protein purification techniques: affinity precipitation, affinity partitioning, and temperature-induced elution in dye-affinity chromatography.

**Biomedical applications**

Recent advances in the design of stimuli-responsive polymers have created opportunities for novel biomedical applications.

Stimuli-responsive changes in shape, surface characteristics, solubility, formation of an intricate molecular self-assembly and a sol-gel transition enabled several novel applications in the delivery of therapeutics, tissue engineering, cell culture, bioseparations, biomimetic actuators, immobilized biocatalysts, drug delivery and thermoresponsive surfaces.

***Smart pressure bandages :*** Polyethylene glycols bonded to various fibrous materials such as cotton and polyester possess the intelligent properties of thermal adaptability and reversible shrinkage. Reversible shrinkage involves imparting a "dimensional memory" to the material such that when the material is exposed to a liquid (e.g., water) it shrinks in area. Such materials could be used for pressure bandages that contract when exposed to blood, thereby putting pressure on a wound

***A smart suture :*** A smart suture that ties itself into the perfect knot is a potential medical application for new biodegradable plastics with "shape memory". Developed at MIT and the University of Technology, Aachen, Germany, the materials are also biocompatible, or safe for use in a living animal.

***Hydrogel :*** Hydrogels exhibit plastic contraction with changes in temperature, pH, magnetic or electrical field, and have a vast number of applications, for example soft actuators in the biomedical field or for controlled drug release.

*A Smart Shirt with application in defense, telemedicine developed at Georgia Tech.*

***Smart shirt :*** Developed by Georgia Tech along with Sensa Tex, Inc., "Smart Shirt," is a T-shirt that functions like a computer, with optical and conductive fibers integrated into the garment. The shirt monitors the wearer's heart rate, EKG, respiration, temperature, and a host of vital functions, alerting the wearer or physician if there is a problem. The Smart Shirt also can be used to monitor the vital signs of law enforcement officers, fire men, astronauts, military personnel, chronically ill patients, elderly persons living alone, athletes, and infants.

*Contd. on page 12*

# PATENT ACTIVITIES AND TECHNOLOGY TRANSFER AT FITT

## IIT Delhi Technology Transfer through FITT

In the Month of January 2003, two Technology Transfer agreement have been executed with Industries which are as follows:

1. Licence Agreement dated 23rd January, 2003 executed between FITT and **M/s Aromatrix Flora Pvt. Ltd.**, New Delhi for transfer of Technology on " **Low Molecular Weight (upto 400 Mol. Wt.) Organic Compound using Liquid Carbon Dioxide extraction process**" developed by **Prof. S N Naik**, Centre for Rural Development and Technology (CRDT), IIT Delhi

*Dr. A.K. Sengupta, MD(FITT) Exchanging Tech Transfer Agreement with Mr Asish Shankar, Director (M/s Aromatrix Flora Pvt. Ltd.)*

*Dr. A.K. Sengupta, MD (FITT) Exchanging Tech Transfer Agreement with Mr. Amitabh Ghosh, Director (M/s Innovative Engitech Pvt. Ltd.)*

2. Licence Agreement dated 30th January, 2003 executed between FITT and **M/s Innovative Engitech (P) Ltd.**, New Delhi for transfer of Technology on "**Pilling Tester based on Digital Image Processing**" developed by **Prof. B K Behera**, Dept. of Textile Technology(DTT), IIT Delhi.

**..... Smart Materials** *(Contd. from page 11)*

**Textile applications**

***Highly visible polyester yarns for improved visibility :*** Trevira (D) spun dyed filaments in radiant orange and radiant yellow have been used for hazard warning clothing. With spin dyeing, the colour fastness is excellent and the yarns are also convincing in terms of textile and ecological properties.

***Electricallty conductive cellulose filaments :*** A variant of Lycra has been developed which incorporated electrically conductive cellulosic fibres and can be used to reduce electrostatic charge in textile material.

Other applications:

***Biomimetics :*** Ideas abstracted from pine cone scales and stomata have been used to develop a smart textile, which can change its thermal and moisture vapour permeable properties according to the weather.

*Contd on page 17*

## Patent filed during October 2002 to February 2003

Nine applications have been filed and ready to file since octobe 2002. It is to be noted that all IPR related activities in IIT Delhi i coordinated by FITT

| SNo. | Title of the Invention | P.Inventor/ Deptt./Centre |
|---|---|---|
| 1. | A Machine/System for Horizontal Directional Drilling | Prof. P.M.V. Rao DME |
| 2. | Fabrication of Recessed Micromechanical Structures on (100) Silicon Wafers | Mr. Prem Pal, CARE |
| 3. | Process for the Development of Energetic Binders (Azido polymers) using novel dipolarphiles | Dr. I.K. Varma CPSE |
| 4. | Design of a broadband dispersion compensation fibre for DWDM transmission | Prof. B. P. Pal, Physics |
| 5. | A novel Rustgard and Process for making the same | Prof. A. K. Ghosh, CPSE |
| 6. | A Topcot for a Rustgaurd | Prof. A. K. Ghosh, CPSE |
| 7. | A novel neem based biopestiside | Mr. Aditya Jhuli Std. DBEB |
| 8. | Spinning of PLLA by Dry Jet wet spinning method | Prof. Bhuvanesh Gupta, DTT |
| 9. | A PCT application for T7 RNA Polymerase Integerated Corynebacterial System & Method for making the same | Dr. J. K. Deb, DTT |

## Technologies developed at IIT Delhi for commercialization

Some of the selected technologies developed by IIT Delhi for commercialisation are

| S.No. | Title of Invention |
|---|---|
| 1. | Vibration Measurement/monitoring system using digital pattern interferometer. |
| 2. | Covalently cross linked alginate based wound dressing material and method for its preparation |
| 3. | Intrinsically gain flattened Erbium Amplifier |
| 4. | Detection and removal of contaminants in cotton |
| 5. | A method for co-polymerisation & Homo-polymerisation o Oligomeric Wastes obtained from Nylon - 6 production, and products thereof |
| 6. | Computer software for design of reinforced concrete column |
| 7. | Method for Dyeing of cotton with indigo and products thereof |
| 8. | Preparation of Ultra High Molecular Weight Poly (oxyethyleneoxyterphthaloyl) and products thereof (Preparation of PET and its products) |
| 9. | Development of Anti Corrosive Coating |
| 10. | Development of Environmentally Degradable Polymers |

*For further enquiry, please get in touch with:*
*Managing Director*
*FITT, IIT Delhi, Hauz Khas, New Delhi - 110016*
*email: sengupta@fitt.iitd.ernet.in*

# WORKSHOP/SEMINAR/CONFERENCE/MEETING

## 30 Years of Industrial Consultancy and Sponsored Research in IIT Madras

A symposium on Industry Academia Partnership in Technology Development was held at IIT Madras on February 22-23, 2003 to mark 30 years of IC&SR Centre in that Institute. In addition, the occasion was also to felicitate **Prof. V.S. Raju**, former Director of IIT Delhi, who superannuated recently. The symposium was inaugurated by **Prof. P. V. Indiresan**, the eminent educationist and former Director of IIT Madras. **Sri A. Ramakrishna**, President (Operations), and Dy. Managing Director, L&T-ECC gave a keynote address on the symposium theme at the Inaugural Session. Present Deans of R&D of IITs in Bombay, Delhi, Roorkie and Madras, as well from IISc., Bangalore and some of the past incumbents, Dean (IC&SR) of IIT Madras made presentations.

A number of eminent persons from Industry and R&D organisations of Defence and CSIR also spoke on this occasion. **Dr. A.K. Sengupta,** MD (FITT) spoke on the FITT experience and was also one of panellists in the discussion on Future Directions.

*Dr A. K. Sengupta recieving the Memento from Prof. Ananda–krishnan Ex VC, Anna University at IIT Madras Symposium.*

## XX IASLIC National Seminar

**Mr.Partha Bhattacharya**, Executive Consultant (ID) FITT attended the XX IASLIC NATIONAL SEMINAR on "***Digital Information Systems and Services***" from Dec 27 to Dec 30, at Punjabi University, Patiala. The seminar was inaugurated in the afternoon of December 27, and was attended by distinguished dignatories. **Dr. Jagtar Singh**, Reader and Head, Deptt of Library and Information Science, Punjabi University was the Organising Secretary of the Seminar. Mr.Partha Bhattacharya presented a paper titled Role of FITT Information Center For the Assistance of Small Entrepreneurs at the SIG (special interest group) meet during the seminar.

*Mr P Bhattacharya EC, FITT giving lecture during XX IASLIC Seminar in Patiala*

## Symposium on Large Deformation in honour of Professor N.K.Gupta

A symposium on '**Large Deformation**' was organized by friends, colleagues, and students of **Professor Narinder Kumar Gupta**, Professor of Applied Mechanics at IIT Delhi, to honour and felicitate him for his contributions in the area of Large Deformation and Impact Mechanics on the occasion of his 60th birthday on September 1, 2002 at India International Centre, Lodhi Road. The symposium was attended by more than 150 top scientists of the country including those from Defence and Aeronautical Laboratories, Universities, IIT's, and Automobile & Aircraft Industry. This bears an eloquent testimony to the recognition that Prof. Gupta enjoys amongst the fraternity of scientists. Rich tributes were paid to him by eminent scientists and colleagues including **Prof. D V Singh**, former Vice Chancellor Roorkee University, **Prof. R.C. Malhotra**, former Director IIT Kanpur, **Prof. A.Ghosh** former Director IIT Kharagpur, **Prof. R.S.Sirohi**, Director IIT Delhi, **Dr. K.Ramchand**, Distinguished Scientist and former Director CABS, **Sh M.Sidhana**, Director ADRDE Agra, colleagues from IIT Delhi, including **Prof.G.S.Sekhon** and **Prof. R.K.Pandey, Prof. S.D. Bisaria**, formerly at REC, Srinagar & NCERT and also a former teacher of Prof.Gupta. At the symposium, over 50 research papers were presented by the participating scientists representing various prestigious Defence and other Organizations of India. The presentations, organized over two parallel sessions were of high quality and dealt with plasto-mechanics of both metals and composite materials, under quasi-static as well as dynamic loading. The study of these aspects is very important and finds applications not only in the area of engineering design but also in areas such as forming crashworthiness of road and air vehicles, and design of protective armours.


*Prof. N.K. Gupta recieving Award of Honour for his contribution in the area of Large Deformation and Impact Mechanics*

The symposium was followed by a dinner at India International Centre that was attended by noted scientists, engineers and academicians from around the country. **Dr.Karan Singh** graced the occasion as the Chief Guest and highlighted Professor Narinder Gupta's achievements in an eloquent speech

## FITT MISSION

To be an effective interface with the industry to foster, promote and sustain commercialisation of Science & Technology in the Institute for mutual benefits

# WORKSHOP/SEMINAR/CONFERENCE/MEETING

## Lecture on Academic Institution as a knowledge Enterprise

**Dr A. K Sengupta,** MD, FITT gave a lecture titled ***"Academic Institution as a knowledge Enterprise"*** in Sant Longowal Institute of Engineering & Technology (SLIET) Campus, Sangrur, on 7 September, 2002.

*Dr. A.K. Sengupta MD (FITT) receiving Momento during the Seminar in Sant Longwal Institute of Engineering & Technology (SLIET)*

## Development of Courseware for Embedded Systems

Considering the importance of and market demand for trained manpower in Embedded Systems, FITT has undertaken as an internal project of development of courseware in Embedded Systems. A group of faculty members from three Departments/centres of IIT Delhi are involved in this development project. On completion of the development of courseware and lab manuals etc. FITT would offer high-end, specialized courses in Embedded Systems from June – July 2003 for industry. *For furher details contact: Dr (Ms.) U. Nagchaudhuri, EC, FITT, IITD, Ph: 26597164,* naguttara@yahoo.com

## Training Programme on Fibre Optics and Networks

A two-week intensive course on Fibre Optics And Networking for a batch of 24 telecom Engineers from Oil and Natural Gas Commission (ONGC) was conducted by the Fiber Optics Group of the Physics Department during February 3-17, 2003 under the aegis of FITT. The course covered fundamentals of fiber optics and a host of special topics like optical amplifiers, DWDM transmission, DWDM components, broadband networks, fail-safe optical networks, infrared

*An overview of the Training Programme on Fibre Optics and Networks for participants from ONGC*

open air LANs, submarine optical cables for broadband communication, optical network planning, optical fiber sensors and instruments, etc. Each day the morning session was devoted to theory classes and post-lunch sessions were devoted to laboratory demonstrations including one visit to C-DoT's optical transmission laboratory. Besides IITD faculty experts in this area from the Physics and EE Departments, experts from C-DoT, FLAG, Renka India, and CGCRI (Kolkata) presented several guest lectures. Prof. A.K. Ghatak and Prof. B.P. Pal coordinated the course.

## IITD - BIOCON Interaction

**Dr. A. K. Sengupta,** MD (FITT) visited Bangalore on September 24, 2002 with a view to launch a consolidated interaction initiative between IIT Delhi and M/s. BIOCON India Ltd., one of the leading Biotechnology companies in India. He had a two-hour meeting with **Dr. (Ms.) Kiran Majumdar Shaw**, the CMD of BIOCON and made a presentation on innovation and technology transfer activities in IIT Delhi, with specific emphasis on the Institute's R&D strength in biotechnology, bio-process pilot plant and laboratories, bio-informatics and super-computing for gene-to-drug sequencing.

Subsequent to the visit of MD (FITT) to Bangalore, two senior executives of BIOCON, namely, **Mr. Srikumar Suryanarayana** (President, R&D) and **Dr. Arun Chandavarkar** (President, Group Manufacturing) visited IIT Delhi on 21-22 October, 2002 to explore enhancing collaboration with the Department of Bio-Chemical

*Dr. A. K. Sengupta MD(FITT) and Dr. (Ms.). Kiran Majumdar Shaw, CMD BIOCON India Ltd. addressing the faculty & students of IIT Delhi during her visit to TBIU at IIT Delhi*

Engineering and Bio-technology (DBEB). This was followed by a visit to IIT Delhi by Ms. Majumdar Shaw herself on 6th November, 2002. She devoted half a day in the Department, addressing the students and faculty members at the TBIU Conference Room and visiting major facilities in the Pilot Plant and other laboratories. She also met **Prof. R. S. Sirohi**, Director of IIT Delhi.

In her *address to the students and faculty,* **Ms. Kiran Majumdar Shaw** dwelt on the expanding horizon of Biotechnology in the 21st century and extolled the virtue of entrepreneurship in this exciting field to the young scientists. She spoke briefly on the early days of BIOCON which was started in the 1970s with "Industrial Enzymes from Papayan" as its first product, and the emphasis that the fledgling company put on R&D from the beginning. Over the years BIOCO has expanded its business through intense technology developme efforts in the areas of fermentation, microbial enzymes and recombinant proteins, phyto-pharmaceuticals, vaccine products, bulk drugs like Insulin, plant and animal cell culture for human therapeutic study, oncology and biomarkers, gene therapy and bio-informatics. The key to successful industrial R&D is conceptualization through to commercialization, which requires foresight, funding, focus (and more focus) and freedom for scientists to innovate. In USA, where bio-technology revolution happened first, almost all valuable products and technologies got initiated in the research laboratories of universities and academic institution. India is now on the threshold of becoming a world player in Bio-technology, and there are more than 160 bio-tech companies in this country. Many more companies will come into being in the next ten years. Ms. Majumdar Shaw exhorted the students to be R&D oriented and adventurous, and seriously consider the career of entrepreneurship by launching

*Contd. on page 15*

..... **IITD-Biocon Interaction** *(contd. from page 14)*

technology start-up companies like she did in the seventies. Half the pleasure of an entrepreneur is in facing the (apparently) unsurmountable challenges and overcoming the survival problems. In this regard, she praised the initiative of IIT Delhi in launching the Technology Business Incubation Programme, which can provide the budding entrepreneurs hand-holding assistance and sense of fall-back option. She offered full mentorship of BIOCON to IITD Incubatee start-up companies. BIOCON has in the recent past established partner relation with at least six start-up companies in Bangalore.

M/s. BIOCON India has since proposed 3 or 4 BIOCON fellowships for final year students in the 5 year dual degree programme in the DBEB of the Institute, starting from the academic year 2003-2004.

The Department has also sought the help of BIOCON in upgrading the existing pilot plant and setting up of a miniature version of the BIOCON patented solid state Fermentation reactor.

## Indo-British Workshop on Collaborative Research in Telecommunications

Indo-British Workshop on Collaborative Research in Telecommunications was held at IIT Delhi on September 23, 24 and 25 2002 under the aegis of FITT with **Prof. Surendra Prasad**, Electrical Engineering Department as the coordinator. British Council invited and organized the second Telecom Mission to explore opportunities for joint academic research as well as Indo-UK partnership in training and education in Telecom area. The mission had eight telecom experts from various leading British Universities and Corporates. DST sponsored the workshop at IIT Delhi to bring together the visiting UK experts and various Indian academics from IITs, National Institutes of Technologies and telecom companies in India, in the workshop mode.

The objective of this workshop was to deliberate on issues such as current reach and limited access of telecom network in India and R&D required to improve it drawing upon British experience. This workshop was to determine the areas where India and UK could identify, plan and execute R&D projects of mutual interest, and provide appropriate training in telecom.

## International Conference on Ecodesign

The three year **Indian European Ecodesign Programme** hosted the **International Conference on Ecodesign** on 26th –27th November 2002 at the India Habitat Centre, Lodhi Road, New Delhi. This international conference being the final activity of the project, attracted participants from industry, NGOs, government, chamber organizations, ecodesign experts from Europe, faculty of technical and design schools from India and abroad as well as scholars from the international research community. The conference was attended by 150 delegates and experts were invited from nine countries.

The conference was inaugurated by the Lt. Governor of Delhi, Shri Vijai Kapoor. Delivering the opening speech on the occasion, the Lt. Governor said: "ecodesign and sustainability must go hand in hand. This programme will go a long way towards making India a major player in global economy". The inaugural lamp was lit by the Lt. Governor **Vijai Kapoor**, a representative of the Dutch Ambassador and **Dr AK Sengupta**, Managing Director FITT.

The objective of the conference was to heighten the awareness of all stakeholders in the field of Ecodesign and to engage them in evaluating environmental challenges and developing strategies for a sustainable future. The conference also showcased Ecodesign projects undertaken by the stakeholders (Corporate, NGOs and other organizations). The conference covered different issues like: Sustainable Tourism, Waste Minimisation and Recycling, Sustainable Transport, Ecodesign in Engineering and Practice, IT and Sustainable Solutions, Corporate Social Responsibility, Product Service East West Sustainable Solutions and Ecodesign Methodology and Education. The two day conference was addressed by leading Indian and International experts on environment, sustainable development, waste management and public transportation.

The programme (IEEP) aimed to promote ecodesign in India and develop capability among Indian companies, design professionals engineers and universities. The development of the Ecodesign Network through exchange of knowledge and experiences in ecodesign was one of the main activities of the EU-funded IEEP.

*For further details contact:*

*Prof. G V Soumitri,*
*IDDC, IIT Delhi, Ph: 26591153*

## Symposium on "Open Source Software initiative and Business Opportunities"

*A symposium on* ***"Open Source Software initiative and Business Opportunities"*** *was organised by FITT,* held on 20th February, 2003 at TBIU Conferece room at IIT Delhi. Mr. Robert Adkins (President) and Ms. Alolita Sharma (CEO) of cWare Inc., California, discussed new thinking in business models for global software products and technologies. Limitations of traditional software business approaches urgently require new market paradigms. Free and Open source software and technologies are utilised for business.

*For further details contact:*

*Dr( Mrs) U Nagchaudhuri, EC(HRD),*
*FITT, Ph: 011-26857762*

## Management Skill Formation Program for Entrepreneurial Ventures

This program is being held from 17th Feb 2003 to 30th May 2003 at IIT Delhi, in association with *Small Industries Development Bank of India (SIDBI).* The main objective of the course is to develop Prospective SSI Managers and Entrepreneurs. The eligibility for this course is Graduate or equivalent in any discipline. Industries are welcome to sponsor their employees.

*For further details contact:*

*Harish Chaudhry, Program Coordinator,*
*(Room No. IV – 305), DMS, IIT Delhi, Hauz Khas, New Delhi-16.*

## FITT Fund for ICMARD 2003

FITT helps in funding and organizing seminars, workshops, exhibitions, conferences, etc. Recently, FITT funded ICMARD 2003 *(International Conference on Management of Research and Development)* which was organized by Department of Management Studies ,IIT Delhi held on 10-11 January, 2003 at IIT Delhi. The theme of the conference was the *'management of R&D in the new millennium'*. The main objective of the conference was to provide the participants insights into conceptual and practical aspects of technology and innovation practices and its relevance to Indian contexts. **Prof. D.K. Banawet** was the conference coordinator.

# FORTHCOMING CONFERENCE/EVENTS/SEMINARS IN IIT DELHI

## Symposium on IPR Awareness by FITT (27 March 2003)

FITT is organizing a "*Symposium on IPR awareness*" at IIT Delhi on 27 March, 2003 in association with the *Patent Office, Delhi*.The symposium will focus on government of India's policy on IPR related issues. This symposium will provide an opportunity to faculty, researchers, students of IIT Delhi and corporate sectors to be aware of the Govt of India policies on IPR.

*For further details contact:*

*Mr. Mohit Mahajan, EC (IPR & TT), FITT, IIT Delhi,*
*email:* mahajanipr@rediffmail.com, *Ph: 011-26597116*

## 8th International Symposium on Plasticity and Impact Mechanics (16-19 March, 2003)

The IMPLAST 2003 is the eighth Symposium in a series of meetings on Large Deformation. This Symposium will be held in New Delhi between 16-19 March, 2003. The aim is to provide a forum for scientists, engineers and designers in universities, scientific laboratories and industry to share their research findings in fundamental and applied aspects of the mechanics of large deformations of metallic, composite and cellular materials and structures at low, medium and high rates of deformation.

The Symposium will honour Prof. NORMAN JONES on his 65th birthday. The programme will consist of invited lectures, special sessions and contributed papers. The proceedings will be published prior to the symposium.

*For further details contact:*

*Prof. N.K.Gupta, Dept. of Applied Mechanics, IITD*
*Tel: 91-11-26591178, email*:nkgupta@am.iitd.ernet.in.

## International Conference on Laser Applications and Optical Metrology - ICLAOM-03 (1-4 December, 2003

This conference will be held on 1-4 December, 2003 at New Delhi, funded by FITT and organised by IIT Delhi. The conference provides an international forum for students, teachers; Industrial Applications of Laser and Opticals Metrology. It is an opportunity to present and observe the latest research results and emerging ideas in these areas. All papers submitted to this conference will be peer reviewed by National/International Advisory Committee. Acceptance will be based primarily on the originality and usefulness of the research work in the Industry and Laboratory.

*For further details contact :*

*Prof Chandra Shekhar, Chairman, ICLAOM - 03*
*IDDC, IIT Delhi, Haus Khas, New Delhi - 110016*
*Ph: 91-11-26597116 email*: iclaom@iddc.iitd.ernet.in

## International Conference on CAD, CAM, Robotics And Autonomous Factories (11-13 August, 2003)

The Conference is co-sponsored by Jagan Institute of Management Studies (JIMS), Hero Honda Motors Limited, The Tata Iron and Steel Company Limited, CMC Ltd., Three S Solutions Ltd and IBM Ltd. The conference will be held on 11-13 August 2003, and is to bring together researchers and practitioners from Government, Industry and Academia interested in the multi-disciplinary fields of design and productivity aspects of advanced manufacturing systems involving CAD, CAE, CIM, Parametric Technology, AI, Robotics, AGV Technology, etc. to discuss and exchange views about the latest advancements and to address productivity enhancement issues.

*For further details contact :*

*Prof. R. Sagar, Convener INCARF 2003*
*Central Workshop, IIT Delhi, Huaz Khas, New Delhi 110016*
*Telephone: 26596709, 26591466, Fax 26862037, 26855227*
*email:* rakesh_sagar@hotmail.com , incarf2003@yahoo.com

## First International Conference on E-governance (10-13 December, 2003)

This International conference will be held on 10-13 December, 2003 at IIT Delhi, which is sponsored by IIT Delhi with a theme "Information Technology for Development". Electronic government is very timely development being recognized as a potential driver as well as enabler in the way governance can be reinvented to deal with problems efficiently and deliver the services in a more responsive and responsible manner. e-Government solutions are meant to ensure a more connected infrastructure across federal, state, and local government organizations. There are several issues that concern researcher worldover. Purpose of ICEG- 2003 is not only to provide a forum of discussing research findings, strategies, policies, and technologies supplemented by the learning from the innovative experiments to enable business of government. It also aims to resolve agenda for future research/activities and give impetus to this.

*For further details contact :*

*ICEG 2003 Secretariat, Department of Management Studies,*
*IIT Delhi, Hauz Khas, New Delhi -110016 (India)*
*Ph: +91 11 26591173, 26596407, email*: egov@dms.iitd.ernet.in
*& Dr. M P Gupta Conference Coordinator,*
*email:* mpgupta@dms.iitd.ac.in

## 11th National Conference on Machines and Mechanisms (NaCoMM-2003) -(18-19 December, 2003

The National conference on Machines and Mechanisms is held every two years under the auspices of the Association of Machines and Mechanisms (AMM). It will be held on 18-19 December, 2003 at IIT Delhi. This is one of the most important occasions during which researchers, designers, and practicing engineers working in the area meet and exchange ideas. The peer-reviewed papers are published in the proceedings of the conference and some of the selected papers may appear in the journal of Mechanism and Machine Theory published by the International Federation of the Theory of Machines and Mechanisms (IFToMM).

*Address for communication*

*Dr. S.K. Saha, Organising Secretary, NaCoMM-2003*
*Dept. of Mechanical Engg., IITD, Hauz Khas, New Delhi -1*
*email:* saha@mech.iitd.ernet.in, nacomm2003@yahoo.co.in
*Tel: (011)659 1135/6320;*http://in.geocities.com/nacomm2003

## Short Term course on Introduction to Bioinformatics and its Applications (21-22 March, 2003)

Sponsored by Department of Biotechnology Government of India the cousrse will be held on 21-22 March, 2003 at DBEB, IIT Delhi The 2-day short course is going to introduce Bioinformatics, its scope and applications to the persons of varied background

*Address all correspondence to*:

*Prof. G.P. Agarwal, Course Coordinator*
*Dept. of Biochemical Engg. and Biotechnology*
*IIT Delhi, Hauz Khas, New Delhi-110016 India*
*Tel: 011-26591005, 26591001,*
*email*:gopal@dbeb.iitd.ernet.in

**For further details visit IIT Delhi website www.iitd.ac.in**

# TECHNOLOGY NEWS OF IIT DELHI

## Electrical Energy Audit Facility At IIT Delhi

India is facing grave crisis due to acute shortage of Electrical Energy and ever growing demand. With 80,000MW of installed capacity country needs an additional 80,000MW during the next five years. Bulk of the electricity is consumed by industrial sector followed by agriculture, domestic and commercial applications. More than 70% of the electricity is consumed by domestic appliances. Even a 5% saving in electricity will prevent the need to install power plants of a few thousand MW. Energy conservation has now become a necessity with government of India formulating mandatory Energy Audit and Energy conservation regulations.

Considerble energy saving is possible through proper choice of equipment's and their effective use. Data of energy consumption pattern through energy audit for any given appliction is essential to evolve conservation measures. Since diagnosis proceeds treatment and not an end in itself, one should find technical solution for the problem of inefficient energy use. In view of the above, a State of the art 'Electrical energy Audit and Energy Conservation' facility has been established at IIT, Delhi with a loan of Rs. 75 lacs from World ank through ICICI.

**acilities Established**

*Following facilities/laboratories have been established*

1. Energy Instrumentation facility
2. Computerized test facility for Energy Converters and Drives
3. Computation and CAD facility for Energy System
4. Electrical Machine Design Centre

**Electrical Energy Audit:**

Electrical Energy Audit for difrent establishements can be carried out by the sophisticated Instrumentation and Data acquisition facility comprising of following instruments and accessories.

1. PLC based data acquisition system for testing motor & drives
2. Instrumentation facility
   - i. Power Analyzer
   - ii. Oscilloscopes
   - iii. Clamp on Current/Voltage/Power Meter
   - iv. Non-Electrical Quantity Meters
   - v. Tester
   - vi. Energy Meter
   - Computer Aided Design Software

*or further details contact:*

*Prof: S. S. Murthy (Head)*
*Dept. of Electrical Engg., IIT Delhi, New Delhi - 110016*
*Ph: 26591071, email*: ssmurthy@ee.iitd.ernet.in

## ChemSPARC™ Kicks off Pilot Plant Production Facility

In looking at opportunities for value-added products, the Chemica Business initiated a product/application development cooperatio with the Department of Chemistry, IIT Delhi in 2001. As a result o the joint developments from this initiative, the ChemSPARC™ R& I Division(Chemical Speciality Products & Applications Researcl Center) was set up in October 2001, with the objective to catalys development of innovative, marketable new products/processes i the Chemical Business.

ChemSPARC™ is presently located in Gurgaon alongwith Shriran Environment and Allied Services(SEAS). It has two well equippe wet chemistry laboratories and staffed with six researchers supporte by **Prof HM Chawla** of IIT Delhi and his team.

**Mr. S. K. Agarwal,** ED-Chemicals is heading the division.

ChemSPARC™ is currently active in several application developmen programs such as:

- # Water & Wastewater treatment- Organics/colour removal, Fluoride removal, Oil-water separations, Odour removal
- # Specially macrocyclic compounds- calixarenes, crown ethers lactones
- # Specially natural products- Products such as 'Lac' based products
- # Process development/scale up- Design, Development, Optimisation Scale-up and Implementation

In context of specialty macrocyclic compounds, ChemSPARC™ has developed innovative, cost-effective processes to produce at bench scale highly sophisticated speciality chemical compounds called Calixareness and their derivatives. Calixareness have a unique bucket-like structure with hydrophobic binding pockets on the upper rim and spherand-like cation binding sites at the lower rim. These molecules can be tailored for separation and other processes such as sensors, catalysts, intermediates, etc. in a wide range of application in the industry.

Having met with success at bench scale manufacture, and with encouragement from international buyers, ChemSPARC™ has set up a pilot plant in Gurgaon. This pilot plant will not only optimize processes for calixarenes but also other specialty products under development at ChemSPARC™.

The first trial batch was taken after a puja organized at the plant location on 8th July 2001. **Mr Baldeep Punia, Dr N J Singh, Prof H M Chawla and Mr Vinod Trivedi** performed the puja along with other members of the ChemSPARC™ team.

*Source: Shriram News, August 2002*

## .....Smart Materials *(Contd. from page 12)*

***Improving recyclability of polymers :*** Some polymer matrices include smart fibers which have chemicals that ultimately assist in de-naturing, degrading or destroying the polymeric structures by depolymerization or chemical reaction to improve recyclability of the polymer material.

**Other applications:**

***Road repairing :*** Smart matrix materials may be used to repair roads and potholes. Smart release fiber-containing uncured material is added to a pothole and an agitation or pressure release curative agents from the interior of fibers provided in the matrix material to facilitate adhesion and curing of the pothole repair mass to the substrate road surface.

***In countering radioactive rays :*** Composite containment structures can be used to counter radioactive or chemical waste materials. Fibres with chemically sensitive coatings or radiation sensitive coatings may be provided which are adapted to release scavenger compounds when radiation or chemical waste is detected.

**Conclusion :** Applications of stimuli-responsive, or 'smart', polymers in very recent areas like delivery of therapeutics, tissue engineering, bioseparations, sensors or actuators are an indicatior of the potential and rapid progress in this area. The numerous applications they have been put to, no doubt that "Smart Material" hold a real good promise for the future.

*Extracted from Employment News 16-22 November, 2002,*
*By Samrat Mukhopadhyay, Research Scholar, Deptt. of Textile Tech. IITD*

# FITT PROGRAMMES

## HRD Programmes

Since 2002 and till now, 6 customised HRD programmes were held under the aegis of FITT. A list of HRD programmes completed during the past few months and forthcoming courses is given below:

| S.No | Title | Sponsors/Participation | Date & Venue | Co-ordinator & Deptt. |
|---|---|---|---|---|
| | **HRD Programmes (Concluded)** | | | |
| 1. | Indo-British Workshop on Telecommunication | Sponsored by DST, New Delhi | 23-25 September 2002, IITD | Prof. S. Prasad, EE |
| 2. | A Training Program on Mechatronics Technologies | Sponsored by Samtel Colour Ltd., Ghaziabad | 17 December2002 to 25 January 2003 (for six days), IITD | Dr. I. N. Kar, EE<br>Dr. S. K. Saha, ME |
| 3. | Mixed Signal Designing Issues & Technology | Sponsored by National Semiconductors Ltd., Bangalore | 16-19 December 2002, National Semiconductors Ltd., Bangalore | Prof. D. Nagchoudhuri, EE |
| 4. | Use of SWAT Model in Basin Level Planning | Sponsored by Water Sector Restructuring Project, Lucknow | 16-21 December 2002, IITD | Prof. A. K. Gosain, CE |
| 5. | International Course on Transportation Planning & Road Safety | Sponsored by INRETS France, WHO, Ford India Ltd. | 14-21 December 2002, IITD | Dr. Geetam Tiwari, TRIPP |
| 6. | Training programme on Fibre Optics and Networks | Sponsored by ONGC, Dehradun | 3-14 February 2003, IITD | Prof. A. K. Ghatak, Physics<br>Prof. B.P. Pal, Physics |
| | **Forthcoming Programmes** | | | |
| 1. | Training Programme in Coir Geotextile Testing | Sponsored by Central Coir Research Institute, Kerala | 13-16 March 2003, IITD | Prof. G. V. Rao, CE |
| 2. | Design Issues in ADC & DAC | Sponsored by National Semiconductors Ltd., Bangalore | 27 - 31 March 2003, National Semiconductors Ltd., Bangalore | Prof. D. Nagchoudhuri, EE |

## Technology Development Projects/Consultancies At Fitt

**List of some major Technology Development Projects/Consultancies at FITT during the last few months**

| S. No. | Title | PI | Deptt. | Client |
|---|---|---|---|---|
| 1. | High density Cell Formentation & Stability Studies on Bio-fertilizers. | V. S. Bisaria | DBEB | International Panacea Ltd. |
| 2. | Minolta-BI- (Technical Advice) | Santanu Chaudhury | Electrical Engg. | Network Programs (India) Ltd. |
| 3. | Evaluation and Performance of Hollow fibre Membrane Based PP | A. K. Ghosh | CPSE | Applied Membrane Technology Inc. |
| 4. | Surgical Safety Scalpet | L. K. Das | IDDC | Jai Surgicals Ltd. |
| 5. | Studies on Erosive Wear Resistance of Hard Facing Alloys | J. Bijwe<br>V. K. Agarwal | ITMMEC | NTPC, NOIDA |

**List of Some Technology Transfer since Oct. 2002**

| | | | | |
|---|---|---|---|---|
| 1. | Low - Molecular Weight (upto 400 Mol. Wt.) Organic Compound using liquid carbon di-oxide extraction process | S. N. Naik | RDAT | Aromatrix Flora Pvt Ltd |
| 2. | Pilling Tester on Digital Image Processing | B. K. Behera | Textile Technology | Innovative Engitech. (P) Ltd. |

# SPONSORED RESEARCH AND INDUSTRIAL CONSULTANCY, IRD UNIT

**List of some major Consultancy Assignments undertaken by IRD Unit, IIT Delhi from August' 2002 to January' 2003**

| S. No. | Project Title | Sponsor Name | P.I. Name |
|---|---|---|---|
| 1 | Design Drawing for raising pondage by .0 M of wazirabad barrage (CW06096) | Delhi Development Authority | N. K Garg, Civil Engg. |
| 2 | Developemnt of long Term Hazard planning, management and Vulnerability Reduction Action Plan for Cyclones (CW05986) | Govt. of Andhra Pradesh | A.D. Rao, Centre for Atmospheric Science |
| 3 | Multilingual web design and browing tool (CW006105) | Media Lab Asia | B. Chandra, Mathematics |
| 4 | To develop a Training Manual for Road Traffic injury prevention (CW05980) | World Health Organisation | Dinesh Mohan, Centre for Bio-medical Engg. |
| 5 | Technology Development for collecting bone and tissue properties and development of human body FE Model - Phase - I (CW05991) | Japan Automobile Research Institute | Anoop Chawla, Mechanical Engg. |
| 6 | To Design and Develop a Multilingual Open Source Interface to GIS System Developed at CSDMS (CW06104) | Media Lab Asia | Saroj Kaushik, Computer Science & Engg. |
| 7 | Retrofitting of Municpal Utility Building (Six Hospital Buildings) (CW06008) | Municipal Corporation of Delhi | S.N. Sinha, Civil Engg. |
| 8 | Development of an equipment for objective valuation of structural distortion of light weight canopy fabric for parachute application (CW06098) | ARDE Ministry of Defence | B.K. Bahera, Textile Technology |
| 9. | Assessment of condition of road over bridges on Ahmedabad Varodra expressway and their remedial measure-phase I (CW05939) | National Highway Authority of India | S.N. Sinha, Civil Engg. |
| 10 | Creation of GIS facility at NTPC-Implementation strategy (CW05878) | NTPC Ltd. | A.K. Gosain, Civil Engg. |
| 11 | Design and development of solted state interlocking system using 2 out of 3 architecture (CW05888) | HBL Nife Power Systems Ltd. | Vinod Chandra, Electrical Engg. |

**List of some major Industrial R&D Programme undertaken by IRD Unit, IIT Delhi from August' 2002 to January' 2003**

| | | | |
|---|---|---|---|
| 1 | India Livable Communities Initiative (RP01494) | Institute for Transportation and Development Policy | Geetam Tewari, Civil Engg. |
| 2 | Dynamic/Cyclic Soil properties of Delhi Region(RP01493) | Dept. of Science and Technology | Venkata Ramana Gunturi, Civil Engg. |
| 3 | Fund for Improvement of S&T Infrastructure in Universities & Higher Educational Institutions in Engine and Unconventional Fuels Lab (RP01495) | Dept. of Science and Technology | Avinash Chandra, Centre for Energy Studies |
| 4 | A Methodology for Synthesis of ASIP Based Multiprocessor SoCs (RP01482) | Naval Research Board, Ministry of Defence | Anshul Kumar, Computer Science & Engg. |
| | Novel studies on Propagation and Signal Processing of Thermal Waves for defect localization with applications to Non-destructive Characterisation (RP01469) | Naval Research Board, Ministry of Defence | Suneet Tuli, Centre for Applied Research in Electronic |
| 6 | Funds for Improvement of S&T Infrastructure in Universities and Higher Educational Institutions (FIST) on Advanced Polymeric Materials (RP 01490) | Dept. of Science and Technology | Veena Chaudhary, Centre for polymer Science & Engg. |
| 7 | Technology Development for Laserinduced Periodic structures on III-V Semiconductors (RP 01491) | Dept. of Science and Technology | S. C. Abbi, Physics |
| 8 | Structural Electronic and Gas-Sensing Properties of SnO2 : Ag Composite Nanoparticle Thin Films (RP01488) | Dept. of Science and Technology | Bodh Raj, Physics |
| 9 | IC Compatible Piezoelectric Thin Films for Sensors (RP01478) | Defence Research and Development Organisation | Sudhir Chandra, Centre for Applied Research in Electronics |
| 10 | Raman & Photoluminescence Spectrocopy of Laser Etched Semiconductors (RP01467) | Dept. of Science and Technology | A.K. Shukla, Physics |
| 11 | Air Quality Modelling of Vehicular Traffic in Delhi (RP01492) | D.S.T. (Earth System Science Division) | Pramila Goel, Centre for Atmospheric Science. |

# GOLDEN JUBILEE CELEBRATION OF THE IIT SYSTEM

The IIT System celebrated its Golden Jubilee at San Jose in California's Silicon Valley, USA on January 17-18, 2003. Human Resources Development Minister **Dr. Murli Manohar Joshi,** Microsoft Chairman **Bill Gates**, US Ambassador to India **Robert Blackwill**, Stanford University President **John Hennesy**, Directors of all seven IITs of India along with hundreds of IIT alumni graced this occasion. It was a D-day for all IITians since the first IIT was established at Kharagpur in West Bengal in 1951.

Human Resources Development Minister **Dr. Murli Manohar Joshi** was the chief guest. Giving the keynote address, Microsoft Chief Bill Gates showered praises on India's powerhouse of knowledge and confessed that it was a humble experience for him to participate in the celebration. "Great honour for me. After all I am not 50 years and I never graduated from college-yet. I do not know if I will be able to change it as I am busy right now," Gates remarked. IIT is an "incredible institution" whose impact has been worldwide. "The computer industry has benefited greatly from the tradition of the IITs." added Gates. Two of Microsoft's vice-presidents are from IIT, while many more are serving the company at different levels.

**John Chambers** of CISCO rated IIT among the best in the world, while **Jeff Bezos** of Amazon called it " a world treasure". "IIT products have made a great difference to his company", he said .

CBS news in its "*60 minutes*" feature programme on IITs remarked : "*Put Harvard, MIT and Priceton together, and you begin to get an idea of the status of this school in India... IIT may be the most important university you've ever heard of*".

India's first ***Prime Minister, Pt. Jawaharlal Nehru***, set up the first campus at Kharagpur in West Bengal in 1951 in a complex that was previously a prison during the British Raj. The IITs were " to provide scientists and technologies of the highest caliber- to help build the nation towards self-reliance in her technological needs", Nehru had said. As centers of excellence for higher education, research and development in science, the first IIT at Kharagpur was follwed by IITs in New Delhi, Chennai, Kanpur, Mumbai, Guwahati and Roorkee. Till date IITs have produced thousands of engineers of excellence, many of who now occupy top positions in the corporate world. "IIT has not just produced techies but they have made their presence felt in almost all fields- bureaucracy as IAS officers diplomacy as high commissioners, as entrepreneurs and even as politicians" says **Prof. Sanjay Govind Dhande** , Director *IIT Kanpur*

Two distinguished IIT alumni took the opportunity to announce major donations to their Alma Mater. **Vinod Khosla,** co-founder of Sun Microsystems, announced a $ 5 million contribution to *IIT Delhi*. **Avi Nash**, Advisory Director of Goldman Sachs, announced a $ 1 million donation to *IIT Mumbai*. Many others have done it already. The tradition of "giving back" to their alma-mater is well established among the IITians. A move is a foot to launch a "**Pan IIT**" foundation in USA.

## Engineering change

***Celebrate the IIT jubilee by all means but ensure that India benefits from the brand***

When the stars of the world of technology converge on Silicon Valley for the 50th birthday bash of the Indian Institute of Technology (IIT), Kharagpur, touted as the launch-pad for Brand IIT globally, the children of India's prized cradles of tech must remember to make it more than just a networking fund-raiser to wow **Bill Gates**. Born in a prison, IIT Kharagpur, along with the Delhi, Mumbai, Kanpur, Chennai, Guwahati and Roorkee institutes, is rated on a par with leading-edge engineering colleges around the world. Outside India, the IITian is hot property. Not surprising this, considering that only the best brains get in — many with the sole purpose of getting out of the country, as some would be tempted to point out. The vision that gave birth to the IITs — to turn India into a technology superpower — remains largely unfulfilled. Consider this: the entire technology, including the carriages for the Delhi metro railway system, has been imported from South Korea. And if India is recognised as a source for software code-writers, better known as programmers, the IITs didn't have much to do with that although many of their alumni do call the shots in t global IT and telecommunications companies.

It's not hard to figure out why the Indian technology engine continues to splutter and wheeze mid-way half a century after it was cranked up on the road to superpowerdom. The IITs have been providing cheap but world-class engineering education to thousands of bright middle-class kids with stars (and stripes) in their eyes. Most of them have overseas jobs or acceptance letters from US universities for post-graduate courses even before they graduate. Not surprisingly,

India has over the past five decades exported possibly the best minds honed at great expense and subsidy to the US, without getting much more than homilies about its world-class institutions in return. In a protected economy that confused profit with profiteering, there was little scope for an industry-academia partnership. Corporate-driven research was almost unheard of, with the result that the findings of the lab rarely made it to the market. Of course, there wasn't much of a market either.

The past decade of reforms, for all the bumbling, has created atmosphere conducive to change. Research is increasingly bei funded by the private sector, although corporate spending in this area remains a piffling fraction of that in the developed world. Researchers are coming out of dark corners to be profiled on glossy covers of business magazines. And, there seems to be a trickle of IITs' prodigal sons and daughters heading back home to help kickstart the new knowledge economy. The anniversary gala could be leveraged by the institutes to tie up with cutting-edge technology institutes like Stanford and MIT for web-enabled virtual platforms for joint research. Apart from hawking cost-effective research to global megacorps, they could drive home the message that India's knowledge economy is ready to roll. And invite Bill Gates to the next anniversary party at Kharagpur, instead of the Silicon Valley.

*The Indian Express 27 December 2002*

## Pan IIT Organisation board constituted

***Plans Afoot For Stronger Bonding Among Members And Creating A Global Network***

Even as a strong global IIT brand becomes reality in the follow-up to the recent high-profile 50th anniversary celebrations in Silicon Valley, loyalty for their own alma mater is also stronger than ever before among the alumni of India's Seven premier tech schools. In fact, for ex-IITians, it is often a question of blood being thicker than water.

The IIT community as a whole, in India and globally, acknowledge the importance the Pan IIT Organisation, which was set up at a brain-storming session at Standford, Connecticut, in May 2002 and had the next meeting in October 2002 in Washington DC. However, it was at a formal meeting after the recent IIT's 50th celebrations that the board has been formally constituted.

Says **Professor Bijendra Jain**, a faculty member of IIT-Delhi and ex-student of IIT-Kanpur, who was present at the meet: "Apart from the high profile branding of IIT education, Pan IIT will also create a bonding among the community and strong global network which goes well beyond just organizing picnics and dinners."

Highlighting the need for the organisation, **Vinod khosla**, partner of leiner Parkins Caufield & Byers says: " The IIT's 50th celebrations ve generated a great sense of pride and loyalty towards the IITs. The sense of ownership and belonging that an event like this generates will cause people to think about what they got from the IITs and what they owe back in return."

But other prominent IITians like **Arjun Malhotra**, co-founder of HCL and chairman & CEO of TechSpan sees a strong case for strengthening alumni network of one's own IIT, which in his case is IIT-Kharagpur. Incidentally, while Khosla has become the single largest donor of his $5 million endowment for a school for IT research at IIT-Delhi which is his alma mater, Malhotra is one of the biggest donors to the IIT-KGP endowment fund initiative, Vision 2020 which has set a target to generate $200 million by the year 2020 for IIT-KGP. Vision 2020 has already generated $25 million.

"The alumni of IIT-KGP has always been generous and ours was the first foundation to get substantial endowments. Now, with the new mission in place, we will work towards making our alumni network even stronger. We are roping in members from chapters around the US for the IIT KGP Foundation. That way, it doesn't remain restricted the Silicon Valley area," says Malhotra.

fact, even as the Pan-IIT Organisation had a meeting at San Jose after the IIT's 50th celebrations, so also the *IIT-KGP Foundation* members, who met at Santa Clara in the Valley. " Our chapters in Australia, Kuwait and Singapore have also been very active lately with their presidents involved in the Vision 2020. And in India, while our chapter in Kolkata has always been strong, we are building a stronger presence in Mumbai and Bangalore as well."

Interestingly, while the Pan IIT movement gains strength in the US, it is yet to take off in India. Says **Dr M N Faruqui**, an alumnus of IIT-KGP and now Professor of the IIT Foundation there: "In India, so far, individual IIT associations, definitely remain stronger. IIT-KGP, for instance, has a 1,100 strong active member base in Delhi. In fact, in the Indian situation, a *Pan IIT Organisation**, when it is formed, could go towards strengthening the R&D base and helping the faculty as well as the government. But for alumni bonding, it is always likely to loyalty to one's own IIT first."

And it's that strong loyalty factor that Malhotra feels in suggestin that the first Pan IIT meet in India, which is being organised b Infosys chief **Narayan Murthy**, should be held in Kolkata as th tribute to the IIT-KGP alumni network there.

In the US, however, the trend is more towards convergence. Say **Prof. Jain**: "The IIT-Delhi alumni in Dallas has just launched a chapte which has also brought together alumni from other IITs. This ha made the organisation much stronger in number."

* *For further details please visit:* http://www.iit.org/

*Ishani Duttagupta, The Economic Times, 10 February 200*

## All brain, no brand: At 50, IIT gets some jazz

***Gates, Alumni To Raise Pitch***

*Mumbai*: What's making the likes of **Bill Gates, Rajat Gupta, Victo Menezes, and Vindi Banga** gather in Silicon Valley in the secon week of January? Some of the world's highest-flying professional are coming together to promote a brand — and no, it's not a new new, geeky thing. It's 50 years old, but this is the first formal attemp to create and promote awareness about the Indian Institutes o Technology, put together by IIT's mega-watt celebrity alumni.

Says McKinsey's **Rajat Gupta**, an alumnus of IIT Delhi, "Brand IIT in general has lagged behind the quality of the alumni and it is tim to correct this discrepancy." It's perhaps most fitting that the 50t anniversary of the first IIT — IIT Kharagpur, which was set up at a erstwhile prison camp — should be celebrated in Silicon Valley, witl American TV's 60 Minutes and the world's richest man in attendance After all, the IITs have produced the likes of **Victor Menezes**, vice chairman of Citibank, **Rajat Gupta**, managing director of McKinsey Kellogg Business School's **Mohanbir Sawhney**, venture capitalis **Kanwal Rekhi**, **Vinod Khosla**, Former US Airways chief **Rakesh Gangwal**, MS **'Vindi' Banga**, chairman of HLL, **Nandan Nilekani** o Infosys... the list could go on. Not to mention that the Silicon Valley IIT alumni association can probably muster much larger numbers than Kharagpur's.

"While an IIT is among the top five global educational institutions an MIT or a Stanford are better recognised brands," says Silicor Valley-based **Dilip Venkatachari**, president Cashedge and a 1981 batch IIT Madras alumnus, who is one of the main co-ordinators of the event. An aberration which the organisers of the IIT 50 hope will be corrected in the years to come. BusinessWeek, in a cover story, called IITians the "hottest export from India." IIT50, largest event ever staged by all IITs under a common aegis over the 17th and 18th of Jan is an attempt to convert the success of IITians into lasting benefits and mindshare for the IITs themselves. Says **NR Narayana Murthy**, chairman Infosys and a speaker at IIT50, "Brand promotion is important for every institution, including the IITs." Mr Narayana Murthy will share the podium with the likes of **Bill Gates** and **John Hennessy**, president of Stanford, among other guest speakers and alumni across all IITs.

The scale and importance being attached to the event can be seen by the fact that the directors of all the seven ***IITs (Kharagpur, Madras, Bombay, Kanpur, Delhi, Guwahati and Roorkee)***, are flying in for the occasion, and discuss their collective vision for the IITs. And while it may be some time before Brand IIT acquires its rightful place in the pantheon of haloed academic institutions, there is no doubting that this January will see the congregation of some of the best and the brightest that India has produced to chart the course of Brand IIT.

*The Economic Times 26 December , 2002*

# GOLDEN JUBILEE CELEBRATION OF THE IIT SYSTEM

## Two alumni donate $6 million to IIT

*New York Jan. 19.* Two Indian Institute of Technology (IIT) alumni have donated $ 6 millions to their alma mater as a "give back" during its golden jubilee celebrations.

General partner at *Kleiner Perkins Caufield & Byers* and co-founder of *Sun Microsystems*, **Vinod Khosla**, and advisory director of Goldman Sachs, **Avi Nash**, announced donations of $ 5 millions and 1 million respectively to *IIT Delhi and IIT Mumbai.*

The "gift" by Mr. Khosla is the largest by a single individual in the history of the institution.

"This donation will be utilised to establish a School of IT graduate and post-graduate students," said Director, *IIT Delhi,* **R.S. Sirohi**.

Appreciating the contribution made by Mr. Nash for research laboratories, endowments for chair professorships and awards for faculty and student excellence at the chemical engineering department, *IIT Mumbai* Director, **Ashok Misra**, said, "Avi's donation will go a along way in enhancing the research capabilities of the department."

Over 2,300 alumni from the United States, Europe and India, several of whom hold top positions in the industry, attended the celebrations.

At the function organised in Cupertino in California, several luminaries from the field of information technology, including Microsoft chairman, **Bill Gates**, lauded the role played by the IITs and spoke about great opportunities they had in future.

Among those who attended the golden jubilee were the Managing Director of *McKinsey and Company*, **Rajat Gupta**, senior vice-chair man of *Citigroup*, **Victor Menezes**, CEO-designate of *Vodafone*, **Arun Sarin**, and founder and chairman of *Infosys*, **Narayana Murthy**.

*The Hindu , 20 January 2003*

## IITian who have done Bangalore proud

IIT-50 to mark 50 years of the Indian Institute of Technology is being held in the City on Sunday. Here are the profiles of some distinguished alumni of Bangalore and what they feel about the IITs and their importance.

**R. Gopalakrishnan** studied at *IIT, Kharagpur,* was with Levers for 31years and is now Executive Director of *Tata Sons Ltd.* The IIT brand equity is what he is concerned about. "The years at IIT have had certain effects on the behaviour of IITians: openness, simplicity, self-belief, competitiveness and thinking outside-th-box" he says.

**Som Mittal,** President and CEO of *Digital GlobalSoft*, is a 1973 graduate from *IIT, Kanpur.* He is a former Chairman of CII and current Vice Chairman of CII and current Vice-chairman of *NASSCOM.* "IITians have a great role in India's development by working in the government, academia or industry with great opportunities like never before. They may actually be the change agents in whatever roles they are in, says Mr. Mittal.

**Ajay Bharadwaj** is President of *Biocon India* and 1982 graduate of *IIT, Delhi.* He went to the U.S. on a fellowship, but decided to come back in 1985. The IITs have not only contributed enomoulsy to the country's scientific talent pool but the image of the country as well, he say "Even those who left India at the peak of their career are now heading global companies .. As the Indian economy grows, many may well come back or bring big investments into India. With two more IITs coming up in recent years and at least 16 states clamouring for, it's strict admission criteria should remain, he said.

**Ravi Uppal,** Vice, Chairman Managing Director, and Country Manager, *ABB India*, studied at *IIT, Delhi.* After an earlier stint with ABB, he was Managing Director, *Volvo India*, and developed Volvo's operations here. He is a member of the CII National Council and is on the Board of the CII National Institute of Quality, Bangalore.

"Having Studied at IIT and IIM (Ahmedabad), I can say with conviction that we have some of the best institutions in the world... IITs continue to attract the finest students and churn our the cream of technology talent, sought after by the corporate world," he says. The curriculum now must incorporate trends and issues like sustainability, environmental and social concerns, corporate governance and human sensitivities, Mr. Uppal feels. Such institutes could also facilitate practical learning through cooperation with the corporate world.

**Nandan Nilekani**, CEO of *Infosys Technologies*, graduated from *IIT, Powai,* and says of the most important reason for the global reputation for excellence of IITs is the outstanding achievements of its graduates. "This has been possible because the students were selected on merit and this should continue," he says.

*The Hindu, 16 February, 2003*

## On the Global Map

***After IIT Delhi Harvard was a cakewalk***

He is one of the foremost IITians in terms of achievements globally but is not without a sense of drama when talking of his alma mater. "I acted in 17 plays while I was at *IIT Delhi* and that taught me a lot," says **Rajat Gupta**, managing director, *McKinsey Worldwide*, when asked about what he learnt at the IITs.And while that may or may not be in jest, there is no doubting his involvement with putting his alma mater on the global stage. Despite his busy schedule, he has found time to be involved with the brand IIT effort. He has been part of a group which have drawn up a list of suggestions and met up with IIT directors and government officials to ensure that brand IIT goes from strength to strength.

So what are the reasons behind the fabulous success of brand IIT? Gupta is emphatic in his reply "Meritocracy! It is a very selective process of admission and as a result the IITs are an outstanding concentration of talent." He believes that intrinsically the IITs are just as good as an MIT or a Stanford if not better and that the secret of their success in no small measure lies in the exemplary integri[illegible] that has been maintained by the Joint Entrance Examination conduc[illegible] every year. Observes Gupta, who went to *Harvard Business Schoo[illegible]* after *IIT Delhi*, "After *IIT Delhi*, Harvard was a cakewalk."

Besides the rigorous academic training that one gets at the IITs, Gupta believes it is the overall experience that differentiates the IITian from the average engineer in India. Says Gupta, "The peer group is outstanding and at the end of four years you come out believing that you can do anything that you set your mind to. And this takes you far when you go out into the corporate world.". While he really does not need to flaunt his IIT badge anymore, Gupta says that even today eyebrows are raised when people discover that he is from an IIT. He illustrates the pull of brand IIT by saying, "Bill Gates seldom agrees to speak at events but the moment we told him about the brand IIT event he agreed to come instantaneously."

Gupta believes that while the IITs have achieved a lot they cannot afford to rest on their laurels. Says Gupta, "In the last fifty years the IITs have barely grown by one per cent and that is a big concern

**.....on the Global Map .** *(contd from page 22)*

area." He believes that the next two per cent who don't make it to the IITs are just as good and in a sense the IITs are missing an opportunity to develop more talent. The real challenge however he believes is the lack of young faculty and the fact that the IITs are too much of a teaching institute. IITians the world over have now joined forces and given the cumulative talent that is working on strengthening the brand, the IITs will undoubtedly manage to retain their standing as one of the foremost global educational institutions.

*The Economic Times, 15 January, 2003*

## Techno Beats On The Sash

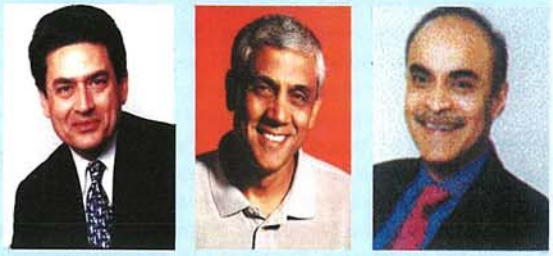
**The IIT-50 bash by the alumni saw the who's who laud the institution. Can the techies now take it further?**

America's most-watched television news programme, ***60 Minutes***, described it as "the most famous university that you have never heard about". And there's still more that Americans may not be aware of. A few thousand of its alumni are in esteemed positions—on the board of Fortune 500 companies or heading some of them, and teaching at Ivy League schools. Two of them are key aides to the two richest people in the world, **Bill Gates and Warren Buffett**. The search tool that millions around the world use every day—Google—has an indirect connection with it. Google's founders were graduate students of a professor who in turn was an alumnus. The 'most famous university' is a recognised brandname in technical, political and economic circles. And it won't be long before Main Street USA hears about it—the **Indian Institute of Technology (IIT).**

*Bill Gates of Microsoft at the IIT 50 function in USA*

** source : Outlook 3 Feb, 2003*

Last week, Silicon Valley-based IIT alumni played hosts to a celebration—of 50 years of the founding of the IIT—in what was termed a "pan-IIT celebration". Praises flowed freely from the who's who list of invitees including Gates, ambassador **Robert Blackwill**, **Prof John Hennesey** of *Stanford University* and **Chancellor Berdahl** of the *University of California*. John Chambers of Cisco Systems ...e IIT a world-class institute label, while Jeff Bezos of Amazon ...lled it a "world treasure". Ambassador Blackwill said that India, a rising great power, owes it to the contributions of IITians. "The formidable group of alumni," as Victor Menezes, senior vice-chairman, Citigroup, described it, turned out in their hundreds to support their alma mater, and some even made generous contributions to the institution that moulded them into successful engineers, entrepreneurs and academics. Some like **Rajat Gupta** *(McKinsey)*, **Arun Sarin** *(Vodaphone)*, **Desh Deshpande** *(Sycamore)*, **N.R. Narayana Murthy** *(Infosys)*, **Vinod Khosla** *(Kleiner Perkins)*, **Purnendu Chatterjee** *(ex-advisor to George Soros and chairman, Chatterjee Group)* **and Kanwal Rekhi** *(Ensim)*, were easily recognisable. Others, like the genial-looking **Ajit Jain** who heads *Buffett's Berkshire Hathaway* reinsurance business, chose to maintain a low profile, catching up with old friends and enquiring if they still played bridge. Then there was **Bharat Desai** of **Syntel,** totally at home since he has kept in touch with the alumni and the IIT faculty on an active basis. "Where IIT helped me the most is in helping me to think with clarity and rigor, mostly through interactions with some very bright people," he told Outlook.



*Three IIT Delhi Alumni Stalwarts*

*Rajat Gupta (1971) Vinod Khosla (1976) Manvinder S. Banga (1975)*

Gates, the keynote speaker who also inaugurated the celebrations, praised the IITs and said he was against any tampering with the merit selection system for admitting students at the world-renowned institution. Gates mentioned that he had two IIT grads in vice-president positions. One of them, **Anoop Gupta**, an *ex-Stanford professor,* is Gates' technical assistant. Two days before the event, Microsoft announced that Gupta would head the recently-formed business unit, Real Time Collaboration.

Said Blackwill: "We can think of India today as a technological force in the world. That vision is owed greatly to the contribution IIT has made...You (the IITans) could be the hottest export India has ever produced." Embedded in their praise for India's technological prowess was a key question: is this enough for India to emerge as an economic superpower in the 21st century?

Meanwhile, the celebrations itself ended on a high note with the alumni and their family members replaying the now famous segment from 60 Minutes. For many, it was a nostalgic trip down memory lane, the transformation from callow youths to confident young men and going on to make a name for themselves in various parts of the globe. As **Mahadevan Mani (earlier M. Balasubramaniam)**, assistant executive officer, *National research Council, Washington DC*, described it: "The IIT-50 meeting was a very impressive event, a watershed in inter-IIT relations. The people I met were enormously proud to be IITans and energised to support the pan-IIT movement." It was also a launching pad for several initiatives to strengthen the brand image and help in research collaboration between the IITs and other universities in the US and elsewhere.

Mani summed it up: "If we can sustain the cohesion reflected here and successfully act on our collective vision as alumni of a world class institution, we will become a tour de force in enhancing India's well-being and engagement with the US and the rest of the world." Now that the IIT alumni have defined their charter, it is up to them to step up to the plate and deliver on the promise. "You are the crucial component in the transformation of the US-India relationship," said ambassador Blackwill. The US-India trade relationship, which he described as "flat as a chapati", needs a leavening agent. What better than the IITs and their alumni.

*Kamla Bhatt, Outlook February 3, 2003*

# INVITATION FROM FITT TO STUDENT ENTREPRENEURS

## Incubation for Student-Faculty Led Technology Start-Up Companies in IIT Delhi

The students of Indian Institutes of Technology are well known for their panache for entrepreneurship after graduation. It has been estimated that of some twenty thousands alumni of IIT Delhi over the last forty years, 20% or more have established their own enterprises. In the Silicon Valley in USA, there are some 500 millionaires of Indian origin, many of whom had their academic grooming in IITs. The entrepreneurial efforts of most of IITians could be attributed to their project work in academia, during the Doctoral, Masters or even the Undergraduate programmes. The initial foray into business (to be your own boss and boss of many others) began in many cases, in the Incubator environment in the Universities and supported later by Venture Capital companies or Angel Investors.

IIT Delhi has launched an "***Incubation Programme for Student and Faculty led Incubation Start-ups***" in an effort to boost entrepreneurship development and promotion of technology transfer/commercialization of R&D outputs in the Institute. Under the Student-Faculty Led Incubation Programme, students who have graduated from IIT Delhi will develop advanced technology over a period of six months to two years soon after they graduate. The development takes place at IIT Delhi under the guidance of, or in partnership with, "***their erstwhile project supervisor(s)***". It primarily builds upon the research work the student(s) have carried out during their final year project or thesis. It uses existing resources within department labs. Each start-up will seek financial inputs in the form of pre-venture capital to cover salaries, travel, equipment and other expenditure. Alternatively, the start-up can approach the Institute/ FITT for seed support in the initial stage.

From the viewpoint of graduating students and faculty members, the objective for a technology start-up is to ultimately transit into a business that markets a product or service. Alternatively, the start-up may be acquired by an existing company. Or, it may sell or license the technology to an existing company and subsequently dissolve itself. Graduating student(s), faculty member(s), IIT and the funding agency would each have a corresponding share in the "equity" of the technology start-up. At the end of the "incubation period" it is expected that IIT may opt to sell its equity to graduate(s), the venture capital firm, or to any other investor(s).

Following the rationale in the proposal, a start-up in the name of **M/s. KritiKal Solutions Pvt. Ltd. (KSPL) has already been incorporated as a company under the Indian Companies Act, 1956.** The start-up involves 5 faculty members and 7 graduate students of the Computer Science & Engg. Deptt. of IITD amongst its Board of Directors. KSPL is involved in the development of products and technology in areas of Embedded Systems, Real-Time Applications, Security Systems, Computer Vision and Network Emulator. The incubation programme has commenced in September, 2002 in the Technology Business Incubator located in the DBEB Extension, Block-I, IITD. Built-up office modules, commissioned/installed with communication network, Internet connectivity, Business Centre, Conference. Room, Committee Room, reception are provided to the start - ups in their incubation venture. KSPL has been provided with initial seed money to sustain them through the development phase along with infrastructure support in the form of equipment/accessories to spearhead the development. In addition to this, FITT is providing the techno-managerial support/assistance in the initial stage to KSPL to aid the incubation programme.

Students aspiring to be entrepreneurs/business leaders and having a vision to enter the commercial world with products/applications as spin-offs from technology, developed by student-faculty as part of B.Tech., M.Sc., M.Tech., M.Des., M.S. (Research) and Ph.D. can approach FITT for necessary guidance in this regard. Once the business proposition for a targetable market with the products applications leveraging on the technology pursued are clearly established, the necessary assistance/support shall be provided by FITT in networking the techno-commercial parameters for converting the student-faculty group into a company armed with necessary instruments for the incubation operations. Last but not the least FITT shall attempt to source the initial seed money as well as provide the start-up with the necessary techno-legal support to the incubat programmes.

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