Newspaper Clips

December 4, 2011

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New Experiment in Indian Science

Science education and research in India is undergoing a quiet but potentially huge transformation. A quantum jump in public funding and a new team of institution-builders are leading the charge

SHOME BASU

Researchers work at the Regional Centre for Biotechnology laboratory in Gurgaon, Haryana

PhDs Now

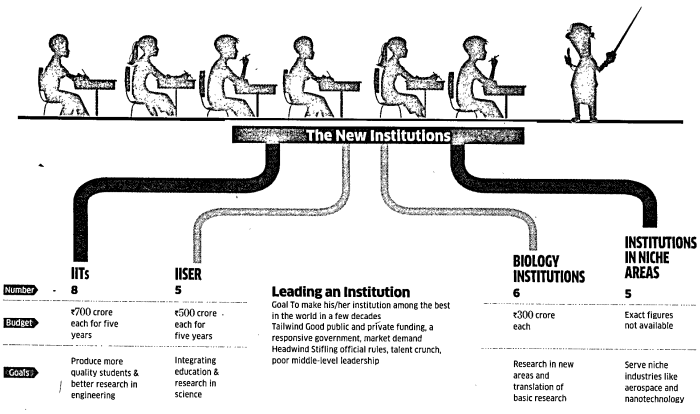
9,000

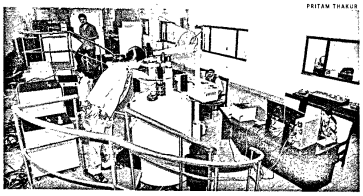
The number of science and engineering PhDs India produced in 2010, up almost 80% from the 5,000 PhDs produced in these fields in 2003

PhDs in Future

20,000

The government's annual target for science and engineering PhDs by 2020





PRITAM THAKUR

IISER Mohali is looking at collaborating with other institutes coming up in Mohali's "Knowledge City"

:: Harl Pulakkat

As a specialist in earthquake engineering, Sudhir Jain finds Gujarat familiar territory. He had done extensive work in the state following the earthquakes and helped in reconstruction programmes. That was mostly when he was professor of earthquake engineering at IIT Kanpur. Now he is on a different mission in Gujarat: to build an entirely new IIT at Gandhinagar. And he chose the assignment as much for his fondness for the state as for the opportunity to look at an old system with a pair of new eyes.

As a frequent visitor to Gujarat, Jain knew that things worked well there. The cities were clean and efficient and largely safe, and he could always find people who were eager to live in Ahmedabad. Spouses of professors could find jobs easily there and their children a good education. "When building an institution it is important to be in the right place," says Jain. Many institutions started in small towns had foundered over the years because no one wanted to live there. In Gandhinagar, Ahmedabad's twin city, Jain could stop worrying about selling the location and start focusing on his job.

His job is to build an IIT from scratch, as one of the eight new IITs the government is building. Jain has lofty aims: to build an institution that will be among the top 20 in the world in 50 years. As a beginning, he wants the IIT to break free from many self-imposed rules and assumptions. He could do this if he had some financial freedom, and so he is raising money through a foundation registered in the US.

Jain makes his students learn non-engineering subjects, get a taste of society, and do several other things not usually attempted in engineering institutions. Says Jain: "My electrical engineers will understand society better than those of previous generations."

Reimagining IITs

The IITs have long been known around the world for their teaching but they have a poor reputation for research. In a recent study of the top 20 engineering institutions in the world, Thomson Reuters found that the IITs had the lowest number of citations per paper between 1999 and 2009; they had 3.57 citations per paper compared to 10.50 for Stanford University, the highest for any engineering institution.

The new IIT directors and some of the old ones are now bent upon changing the research culture in India, which is also a good way of attracting talent. Says Uday Desai, director of the new IIT at Hyderabad: "If you create a research ambience smart people will join."

The fledgling IITs and other institutions in India are now trying to blaze a new trail. Like Jain, their directors go on fund-raising trips to the US, hire industry veterans to teach students critical skills, break down barriers between departments and network intensely with their colleagues in other institutions. You could also see them trying to woo outstanding Indian scientists working abroad.

"Post-independence, till today, we have got scientists who wanted to come back for family or nationalistic reasons," says K Vijay Raghavan, director of the National Centre for Biological Sciences (NCBS) in Bangalore: "Now we need to attract those who are doing excellent science but have no strong reason to come back." Indian institutions need them for a reason: the country's research and educational establishment is undergoing its biggest expansion since the 1960s. If everything works out, Indian science could be looking at a paradigm shift.

India is now building eight new IITs, five science institutions like the IITs, six biology research institutes, and several research institutions in niche areas. This is apart from institutions that are being renamed and remodelled and universities that have been planned but not yet started. This expansion has doubled the public investments in R&D in the past five years and increased the output of Indian science. In the global country ranking for publications, India has moved up from 15th position in 2003 to 9th in 2010. The number of science and engineering PhDs produced a year in India, at an abysmal level of 5,000 in 2003, has grown to over 9,000 in 2010. The government target is to generate over 20,000 science and engineering PhDs a year by 2020.

Lack of sufficient number of PhD students is a reason for the poor research performance of IITs, whose best students always used to go abroad. "When we used to teach at IIT Mumbai in the 1990s," says Seshadri, now CEO of the Bangalore-based startup Boltel, "all of us had offers from the best universities in the US. But our collective research output was nowhere near that of the best professors in the US." Seshadri now teaches a course in IIT Hyderabad on big data on cloud tech, as part of a series of fractional credit courses the institution has started where industry experts teach specialist topics. In the earlier era, students would have had to work for two years to learn such skills.

That Post-Independence Feeling

As India begins to recreate its R&D infrastructure, many older scientists spot the energy and enthusiasm they saw in the era after independence. Some leaders also take risks. Says RA Mashelkar, former director-general of the Council of Scientific and Industrial Research (CSIR): "I have never seen Indian scientific institutions innovate so much in the ways they function." Yet China, Taiwan and Singapore are ramping up their research much faster than India, which has a longer distance to travel than the others. "India has 17% of the world population," says Gangan Prathap, director of National Institute of Science Communication and Information Resources in Delhi. "We can claim to be on a par when we produce 17% of the world scientific output." Its current share is about 2.5%, while China has moved up from 1% in 1983 to 8% now.

The Four Stages

The British started the first era of scientific Institution-building in India when they set up the Presidency College and University of Mumbai in the 1850s. The second era started in the 1870s and lasted a few decades; it was driven by wealthy Indians who set up institutions like the Indian Association for the Cultivation of Science (where CV Raman did his prize-winning work), the Indian Institute of Science and the Banaras Hindu University. The third era started after independence when the government set up the IITs, many national laboratories and the space and atomic energy institutions. This era ended in the 1970s when Institution-building slowed down to a trickle.

The fourth started around 2006 when the government decided to build a series of science institutions like the IITs. Between the third and the fourth era Indian scientific output stagnated in quality as well as quantity. Government support for science declined after liberalisation and India's scientific infrastructure became outdated by the middle of the 1990s. All through the four eras, top quality science was done by exceptional individuals like Raman, SN Bose and Meghnad Saha against severe odds. In the second half of the twentieth century, the space programme and other technology missions succeeded against similar odds. In this context, there was no compelling reason to start so many new institutions. "We must be thankful to those who were super-smart or super-dumb and started these institutions," says Raghavan of NCBS. "Reasons why we will not succeed in new ventures remain valid, yet these odds can be overcome."

Rapid expansion of institution is creating a talent crunch. Major government decisions are taken too slowly; in their addresses to the Indian Science Congress, successive prime ministers had talked for 15 years about increasing India's R&D spending to 2% of the GDP, but it still hovers under 1%. It took over a decade to create the Science and Engineering Research Board, a body like the National Science Foundation in the US. Government rules continue to stifle decision-making. Yet energetic leaders have begun to push the official system hard.

The Vaccine Test

India's biotechnology industry had been showing signs of promise when MK Bhan took over as the secretary of the department of biotechnology. This pediatrician-turned administrator has been working feverishly for the past six years. "Bhan worked hard at making connections between laboratories," says Shrikumar

> *Abstract theoretical visions are not enough in the 21st century. You need practical applications"*
>
> *– MK Bhan*
>
> Secretary of Biotechnology, Government of India

Hindustan Times ND 04/12/2011 P-12

WEARING THE IT TAG

BRAND INEQUITY Three years after they began admitting students, the eight new IITs still function from temporary campuses, face several problems

Bhavya Dore
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Classes operating out of makeshift campuses, faculty shortages, unfilled seats: the slew of new Indian Institutes of Technology (IITs) are still struggling to match the conditions and reputations of their flagship predecessors. In 2008, the union human resources development ministry announced eight new IITs in a bid to set up institutes of excellence throughout the country, taking the number of total IITs to 15. Two weeks ago, the government said it would focus on quality, not quantity, in higher education and set up just four more IITs as laid out in the 12th five-year plan.

However, even as the new ones are announced, the second generation of IITs — in Hyderabad, Ropar, Patna, Gandhinagar, Indore, Bhubhaneshwar, Mandi and Jodhpur — are still struggling to get on their feet.

"Five or six IITs is the best the country can handle," said PV Indiresan, former director of IIT-Madras, who criticised the expansion when it was first announced. "I don't think any other country has expanded institutes of this kind at this rate; no one has multiplied — Harvard or Stanford. I doubt it is advisable."

His most trenchant criticism was about the inadequate staffing and the dipping student-teacher ratios at the new IITs. "Where is the faculty? Teachers used to know most students. Now there is decreased student-teacher contact," he said.

But it's not all bleak, and all the new IITs need is time, say former and present IIT directors. IIT-Guwahati, which was set up in 1995, and is among the newer of the old IITs, has seen its share of similar problems and scepticism. "There are issues when any new IIT starts," said Gautam Barua, director of IIT-Guwahati. "We had the experience of starting out 15 years ago. When we moved to the campus in 2000, within time everything had become smooth."

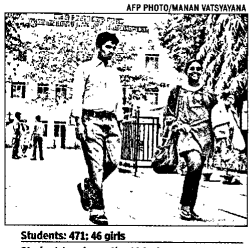
The problems have multiplied though, with a rash of new IITs all being set up together. They began admitting students three years ago, but not even one is operating from its own campus. *(See accompanying reports from each IIT).* "More were required but they probably shouldn't have started together," said Barua. "But four more won't matter."

Also, adding seats hasn't blunted the competition, which means the demand for an IIT education is as high as ever, despite an array of other options now available in India's growing economy. This year, for instance, 4.85 lakh students competed for 7,563 seats, which means that only 1 exam taker out of every 64 got in.

"The rationale was that some parts of the country don't have an IIT," said Bhaskar Ramamurthi, director of IIT-Madras. "There are so many good candidates who don't get through the JEE (Joint Entrance Exam), so 25,000 more students could do quite well at the IITs."

Bhubaneswar

AFP PHOTO/MANAN VATSYAYANA



Students: 471; 46 girls
Student-teacher ratio: 10 to 1
Seats this year: 120 seats; 7 vacant
Highest rank in the general category: 3,000
Lowest rank in the general category: 4,000
Placements: IIT Bhubaneswar has a placement cell and companies such as Tata Consultancy Services and Wipro have already visited the campus.

This was the first of the eight new institutes to start functioning, in July 2008, with seats for 40 students each in the civil, mechanical and electrical engineering departments. Classes started from the main IIT Kharagpur campus. The next year, the institute shifted to IIT Kharagpur's Bhubaneswar extension centre, from which it still operates. By 2014 it will move to the permanent campus in Aragul, 20 km from the state capital, says the institute's registrar.

This institute is the first IIT to have set up a separate marine campus to do research on rising sea levels, ecology, disaster management and fisheries. Located near Chilika Lake, about 200 km from Bhubaneswar, and called the School of Earth, Ocean and Environment Sciences, it began operating this year.

– Priyaranjan Sahu

"My batch, which was the first, is at a disadvantage because we don't have a full-fledged campus and laboratories. Also, we did not have seniors to guide us. But these [problems] have hardened us into finding our own way and making the most of what we have."
—KOUSTAV BANDYOPADHAY, vice president of the students' gymkhana

Patna

AP DUBE/HT PHOTO

Students: 495; 39 girls
Student-teacher ratio: 9 to 1
Seats this year: 129 seats, 5 vacant
Highest rank in the general category: 3,324
Lowest rank in the general category: 4,586
Placements: With the first batch of students now in the fourth year, campus recruitment has begun, with 25 companies visiting, of which Microsoft, Hero MotoCop and Tata Motors have already extended offers to six students.

Housed in buildings resembling army barracks on the New Government Polytechnic's premises in Patna, this institute does not have the feel of a college campus. It has been given 500 acres at Bihta, 25 km from the state capital by the Bihar government, but is waiting for the ministry of human resources and development to release the funds it needs to start constructing facilities there.

The temporary campus has four boys' hostels but the girls' hostel is located 2 km away, and the campus has virtually no sports facilities.

– Ruchir Kumar

"The best part is the good faculty and the high teacher-student ratio. But our sports activities are restricted because we do not have proper areas for indoor and outdoor games. As a student of the first batch, I did not get the feel of being on a college campus because everything was being set up from scratch."
— KUMAR SHILADITYA, vice-president of the students' gymkhana

Gandhinagar

Students: 490; 51 girls
Student-teacher ratio: 8 to 1
Seats this year: 120 seats; 4 vacant
Highest rank in the general category: 2,122
Lowest rank in the general category: 4,076
Placements: The first batch of BTech students will graduate in May 2012. The institute has invited nearly 100 companies, including Flipkart, Larsen & Toubro and Siemens.

Students of this IIT have been waiting to move into the promised 400-acre campus on the banks of the river Sabarmati in Palej village near Gandhinagar, but there has been no sign of construction activity on the proposed site since 2008, when the college was first set up.

The college currently functions from Vishwakarma Government Engineering College on the outskirts of Ahmedabad, a temporary set-up with a hostel facility but no faculty residence. Students live in private apartments at walking distance from the college, and seem to be happy with its facilities. Classrooms are air-conditioned, the mess provides food recommended by a nutritionist and formal sports are compulsory for first-year BTech students. IIT Gandhinagar had its flagship inter-college cultural festival, Blithchron, this year, which saw a footfall of more than 15,000 students.

– Mahesh Langa

"The campus is good. The college also has courses in the humanities and languages such as Urdu and French."
—AKSHAY JAIN, member of the students' body

Jodhpur

Students: 557; 60 girls
Student-teacher ratio: 9 to 1
Seats this year: 160 seats, no vacancies
Highest rank in the general category: 2,000
Lowest rank in the general category: 3,500
Placements: The first batch of students is now in the fourth year. The recruitment process has begun, with over 20 companies including Microsoft and Infosys visiting the campus.

Though IIT Jodhpur officially opened in 2008, classes were held in the campus of its mentor institute, IIT Kanpur. Last year, the students were moved to a transit campus in Mugniram Bangur Memorial Engineering College of Jodhpur. The campus does not have hostels and the residential faculty and students have been housed in private apartments about 12 km from the college. The institute has organised buses for students to travel to and from the college.

"Around 800 acres of land has been allotted a few kilometres from Jodhpur for the campus. The construction will start in a few months," said Vivek Vijay, assistant professor, "One of our aims is to make sure that there is no wastage of energy on our new campus. The institute has also installed solar panels on the roof of the temporary campus."

– HT Correspondent

"Though our college is 12 km from the campus we have buses that ply every fifteen minutes. Our campus is also spacious and hostel facilities are good."
—RISHI AIYYER, third-year mechanical engineering student

Mandi

Students: 340; 25 girls
Student-teacher ratio: 9 to 1
Seats this year: 120 seats; no vacant seats
Highest rank in the general category: 3,218
Lowest rank in the general category: 4,648
Placements: IIT Mandi has no placement cell as of now. The first batch will graduate in May 2013. The institute hasn't contacted companies for placements yet.

When it first opened in 2009, IIT Mandi had no campus of its own. The classes were conducted from the IIT Roorkee campus. In 2010 the students were moved to a transit campus in Mandi, a small town about 150 km north of Shimla in Himachal Pradesh.

The academic section of the institute is now housed in one of the buildings of Vallabh Government College and the administrative section is housed in a building that was once a hotel run by the state tourism department. The other buildings, including the hostels, have been leased from state government departments.

The authorities say that by 2013, the institute will have its own 538-acre campus at Kamand, 15 km from Mandi. The students, however, aren't complaining as the institute provides air-conditioned classrooms and most of the other required facilities.

– Naresh Kumar

"We are able to interact with the professors on a one-to-one basis as the student strength is very low. Also, despite teething problems, we have been provided with adequate facilities at the academic block as well as in the hostels. Sports facilities, too, are on a par with those available at other IIT campuses."
—SOURAV JAIN, head of students' representative body

Ropar

KESHAV SINGH/HT PHOTO

Students: 490; 40 girls
Student-teacher ratio: 9 to 1
Seats this year: 120 seats; 7 vacant
Highest rank in the general category: 1,339
Lowest rank in the general category: 4,092
Placements: Companies have started visiting the campus for placements. Software company Microsoft recently offered three students an annual salary of Rs 10 lakh each.

Located on a dusty lane, a few hundred meters off the busy national highway 21, IIT Ropar is a three-storey building that looks like an ordinary engineering college. The 25-acre campus that houses four hostels and a sports field is surrounded by upcoming residential localities on three sides, with houses and buildings rising around the boundary wall.

IIT Ropar offers degree courses only in three disciplines — computer sciences, electrical and mechanical engineering. It also offers a research facility for doctoral programmes.

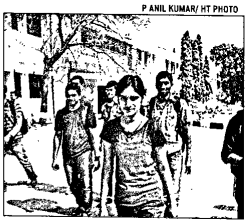
The students are waiting to shift into a bigger campus of more than 525 acres about five kilometres from the current location. Though the campus is not as vibrant as the rest of the IITs, few students complain. "We have everything a good institute should have except a history," said Akshat from Ghaziabad in UP, a first year student of mechanical engineering.

– Gurpreet Singh Nibber

"Our campus is very small as compared with other IITs. However, I think small is good. We all like it here. It is a quiet place and you get ample time to study."
—ARBAAZ SINGH, first-year student, computer engineering

Hyderabad

P ANIL KUMAR/ HT PHOTO



Students: 761; 100 girls
Student-teacher ratio: 9 to 1
Seats this year: 140 seats, one vacancy
Highest rank in the general category:1,500
Lowest rank in the general category: 3,506
Placements: Placements for the first batch of 140 students start this month. Fifty companies including Microsoft, Amazon, IBM, Philips and GE will be visiting the campus.

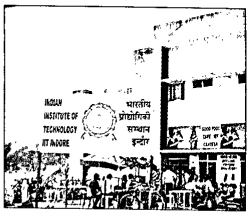
IIT Hyderabad's temporary 40-acre campus is located next to the Ordnance Factory, a gigantic defence department workshop responsible for rolling out tanks for the Indian army. The campus abounds in greenery thanks to the factory, which has planted thousands of trees over the years. The boys are housed in 270 rooms, and the girls in 60, all in spacious bungalow-like quarters that have five rooms each.

"The hostel is better than any of the old or new IITs. Only two students share a room," says Swasthi Rai, an MSc student. The new, permanent campus that will be spread over 580 acres is coming up in Kandhi, in the same district, by mid-2013. "We have focused on research and development and we have 35 sponsored research projects with a total budget of Rs 45 crores," said UB Desai, the director, "We have also started a liberal arts department and will be inviting eminent people from creative arts fields to teach classes."

– Ashok Das

"I stay in a big room in a bungalow surrounded by a garden. However, connectivity to the city is poor and we are cut off from the outside world."
— V NAMRATHA REDDY, final-year electrical engineering student

Indore



Students: : 410 students; 56 girls
Student-teacher ratio: 9 to 1
Seats this year: 120 seats, two seats are vacant
Highest rank in the general category: 1,500
Lowest rank in the general category: 2,400
Placements: The institute has a training and placement cell. The college has contacted several companies including IBM, Aisha Motors, Force Motors and Microsoft.

IIT Indore's campus is nothing more than a three-storey building with 'Devi Ahilya Vishwavidyalaya, Institute of Engineering and Technology' painted in bold letters on the façade.

In 2009, the Centre identified 525 acres of land at Simrol, 25 km from the city, for a permanent campus. However, in February 2011, the forest advisory committee rejected its proposal for diverting 80 acres of 'good' forest land for building the institute. Since then students have been housed in rented two-bedroom flats, a 30-minute bus ride away from the campus, and often have to depend on shuttle buses to get to the college. "We're running from pillar to post to get the land promised to us," said Pradeep Mathur, director. "We have recruited the top brains and have been able to attract a great deal of funding from the industry," he added.

– Karan Deep Singh

"We spend around 100 minutes in buses daily travelling to college. But the accommodation is better than other IITs. I stay in a furnished flat with other classmates. There is nothing like a campus either."
—JAYANT KUMAR, general secretary of the students' council

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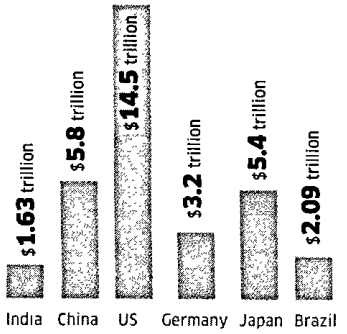
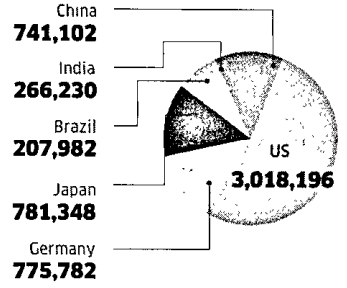
India vs the Best

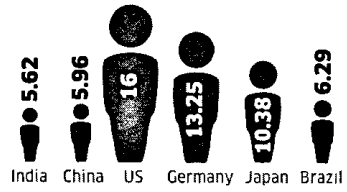
GDP (2010 IMF estimates)



Number of Research Papers a Year



Citation per Paper



Investments in R&D (in PPP dollar terms, total spend)

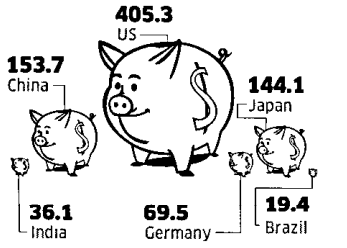
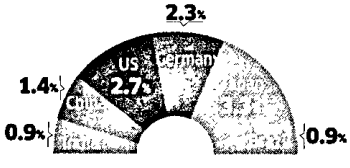


Fig in billion

R&D investment as % of GDP



Sources: Department of Science and Technology, Thomson Reuters, Unesco Science Report & IMF

Suryanarayan, former CEO of the Faridabad Biocluster.

Bhan realised that India's future was 'bigger than the present' and it had to be ready to grab its opportunities. The country clearly needed more institutions. But he also knew that the new institutions needed to be different from existing ones.

Bhan had clear goals: make India a world leader in vaccines, transform agriculture using our bio-resources, and create socially-relevant business models. Create the human resources and the knowledge to feed a $20-billion biotech industry by 2020. Build clusters that link education, innovation, entrepreneurship and new business models.

The Licence Challenge

While at the All India Institute of Medical Sciences, Bhan had co-developed the rotavirus vaccine for children. Two companies had licensed the technology but nobody had been able to manufacture it yet, although the virus is a leading cause of death among children. It is no wonder that Bhan planned the new institutes with applications in mind. "We thought that we needed to create an environment conducive to end-to-end research," says Sudhanshu Vrati, Bhan's collaborator on the vaccine, and now dean of the Translational Health Science and Technology Institute (THSTI) in the Faridabad cluster.

THSTI had a fine partner in its early days: the Harvard-MIT Health Sciences and Technology, an institution that integrated engineering, medicine, biology and chemistry. Close to THTSI were two specialised institutions: the Unesco Regional Centre for Biotechnology and the Centre for Biodesign. Also coming up in the cluster are the Vaccine and Infectious Diseases Research Centre and the Pediatric Biology Centre.

In Bangalore a smaller cluster is being developed around the NCBS, the new institutions being the Institute for Stem Cell Biology and Regenerative Medicine (InStem) and the Centre for Cellular and Molecular Platforms (C-Camp). Says Dinkar Salunke, director of the Unesco Regional Centre: "We need scientists who combine mechanical engineering with medicine, agriculture with climate science, instrumentation with biology. We do not have many such people now."

Strange Bedfellows

Those who conceived Independent India's major educational and R&D institutions immediately set them on two divergent paths: education and research. The IITs were the quintessential educational institutions. They focused on producing high quality engineering graduates but not on doing research. The national laboratories, largely under CSIR, focused on research but did not teach undergraduate students. This dichotomy denied Indian students research experience till well into their PhD programmes. They also denied researchers the stimulation of working with enthusiastic undergraduate students.

Early last decade, influential Indian scientists started persuading policy-makers to start a series of science institutions on the lines of the IITs, with the difference that they would focus on both education and research. The government set up five IISERs in 2006. Each had a budget of ₹500 crore for the first five years. They started operating from makeshift campuses while their own was being built. It was somewhat like the early days of independent Inia. "The IISERs are now very exciting places," says Roddam Narasimha, honourary professor at the Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR) in Bangalore. "The only time I have seen such enthusiasm was in IIT Kanpur in its early days."

N NARASIMHA MURTHY

A cluster is being developed around National Centre for Biological Sciences Lab in Bangalore

Pune Is Special

The IISERs have started making a mark on international science. IISER Thiruvanathapuram, set up in 2008, functions from the department of computer science building in the College of Engineering, an institution with modest infrastructure and known for its volatile political environment. But students there have left IISER alone to do its work in peace, and IISER scientists have started publishing in top journals already.

Many scientists in India regard IISER Pune as a special place to work. In its short existence of four years, it has published nearly 150 papers in top journals. The IISERs have started attracting talent from older institutions. "It is easy for a new institution to provide the infrastructure and freedom that good scientists seek," says IISER Thiruvananthapuram's director, Eluvathingal Jemmis.

IISERs have fuzzy department boundaries. "We were setting up schools of research earlier," says IISER Pune director K Ganesh. "Now I would rather set up departments like spectroscopy, surface science and systems biology that demand the application of several subjects." IISER Mohali, the most advanced of IISERs in terms of building its own campus, uses the social media for teaching and makes students design and own their experiments.

Rubbing shoulders with IISER Mohali are two new institutes: the Institute of Nano Science and Technology (INST) and the National Agri Biotechnology Institute (NABI). "There are no boundaries between IISER and INST," says IISER Mohali director N Satyamurthy.

Scramble for the Best Minds

Shiladitya Sengupta, an assistant professor at Harvard Medical School, keeps a close watch on the Indian scientific establishment. He had noticed that Indian academic institutions were at a loss to deal with the increasing number of resumes from scientists abroad. The directors wanted to hire the best scientists but seldom had the time to go through and investigate every resume the institution received. Sengupta then thought of a way out: a meeting of young scientists that heads of institutions in India could attend.

He started organising the Young Investigators Meeting in Boston from 2009. He also found sponsors from India. In three years he got 750 applications from young scientists, of which 125 were shortlisted. This year 66 scientists were chosen out of 250 applicants, and they made seven-minute presentations to 25 heads of Indian institutions. Then the directors briefed the scientists about their institutes.

Talent Moving Back

Of the 30 scientists who had made presentations in the first year, 27 are back in India. Several scientists got multiple offers from India this year. "I would not have known about the true opportunities in India without the meeting," says Rituparna Sinha Roy, who has recently moved from Harvard Medical School to IISER, Kolkata.

Scientists abroad have been moving to India for a while due to various reasons, but a large number of them still stay back in their jobs abroad. "The best minds do not apply for jobs," says Ganesh. "You have to seek and find them." Directors of labs are thus on hard-sell tours of the US and Europe, just like Vikram Sarabhai and others did in the 1960s.

Senior scientists think long and hard before returning. It took four years for NCBS to convince S Ramaswamy to come back last year from Iowa University as the CEO of C-Camp. "I finally decided that I could make a difference here and not in the US," says Ramaswamy. ■

Additional reporting by Sunanda Poduwal & Ullekh NP

Economic Times Kolkata 03.12.2011 P-1

At IITs, Placements Trump Slowdown

Facebook, Google, Sony & Rio Tinto rush to campuses with 10-20% higher salary packages

BRIGHT FUTURE: IIT-Madras grads at the placement office

SHREYA BISWAS & SREERADHA D BASU
NEW DELHI | KOLKATA

If this year's campus placement offers at India's premier technological institutes are anything to go by, it looks like corporate biggies have shrugged off the sense of gloom that slowing economic growth and tumbling stock markets have created.

The Indian Institutes of Technology (IITs) recorded a 10-20% jump in salaries at the final placement offers for students at Madras, Kharagpur, Bombay, Delhi, Guwahati and Roorkee.

The top offer thus far is an annual package of ₹75 lakh ($150,000) from social networking platform Facebook. A close second is US-based mobile gaming start-up Pocket Gems' ₹69.8 lakh ($135,000), followed by global miner Rio Tinto's ₹36 lakh and Japanese consumer electronic major Sony Corp's ₹30 lakh. Facebook has also made two offers of ₹67.2 lakh ($130,000) and six offers of ₹64.7 lakh ($125,000) across the IITs.

"The year definitely looks great. There is a lot of demand for students, especially from companies that want to train them to be global leaders in research and development. Salaries, too, have gone up 10-20%. The way the process has started, we don't see any market sentiment impacting it," said N Ramesh Babu, professor and placement advisor at IIT-Madras.

The placement process, which started on Thursday, will continue into April.

So far, 19 companies have completed the placement process, making 66 offers. Amazon, Schlumberger, IBM and ITC have been among the regulars on campus while new names on the block include Flipkart and EXL Service.

Rush at all IIT Campuses ▸▸ 9

Rush at All IIT Campuses

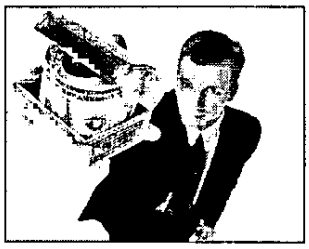
▸▸ From Page 1

The line-up of companies wanting to tap Indian talent also includes investment banking and securities firm Goldman Sachs, management consulting firms McKinsey and The Boston Consulting Group, Internet company Google, Shell Technologies, Swiss offshore drilling company Transocean, Deutsche Bank and Indian heavyweights HUL and ITC.

At IIT-Madras, 15 companies made 45 offers on Day 1. The highest was from Pocket Gems, which picked up three students at the same salary, followed by Facebook's offer for two US positions. Last year, the highest offer at the campus was ₹28 lakh from Transocean.

Goldman Sachs picked up 11 students at a pay package of ₹26 lakh while Sony Corp (Japan) snapped up five with salary packages of ₹30 lakh each. Transocean offered a pay package of/₹28 lakh to one student while Deutsche Bank picked up eight students at salary packages of ₹21.5 lakh. Google is offering ₹20-21 lakh.

The institute's Guwahati campus has landed the highest offer



until now amongst all campuses, from Facebook. "Three students have been offered packages of $150,000 (₹75 lakh) each for positions based in the US," said Saurabh Basu, faculty-in-charge training and placements at IIT-Guwahati.

"Microsoft has made 10 offers, of which two are in the US, at a salary of around $119,000 (₹61.55 lakh). Google has made two offers, of which one is in the US," he added.

The overall response has been better than last year. "More than 200 companies have already confirmed for December. Last year, a total of 280 companies had come till June," said Ravi Sinha, professor-in-charge, placements, IIT-Bombay.

The campus at Bombay is playing host to 5-10 new companies this year, including Works Application from Japan and American retailing company Target Corp.

Sinha, too, said that packages have gone up 10-20% compared to last year. The campus had The Boston Consulting Group, McKinsey, Goldman Sachs, Morgan Stanley, Deutsche Bank, Google, Facebook, Microsoft, P&G, Sony and Shell on day 1. Students bagged 130 offers.

At IIT-Kharagpur, Facebook made the highest offer at $125,000 to four students who will be based in the US. "The campus saw a total of 84 offers from 17 companies at the end of day 1, which had Opera Solutions, Rio Tinto, Schlumberger, Microsoft and HUL among the recruiters," said placement head SK Srivastava. "Day 2 had Intel, Nomura, American Express and Amazon, among others."

A similar placement start unfolded at IIT-Roorkee. Till now, 140 companies have signed up as compared with 120 last year. The highest offer on day 1 was ₹36 lakh from Rio Tinto, which was surpassed on day 2 by Facebook, which made two US offers for around $130,000 (₹65 lakh). Companies on day 1 included Rio Tinto, Schlumberger, Texas Instruments, Shell and ITC, while day 2 saw Cairn Energy and Paypal among others. Microsoft offered 12 jobs, of which eight were based in the US.

"So far, packages on an average have been 15-20% higher than last year," said IIT-Roorkee professor-in-charge placements, PK Jain. Last year, the average salary was ₹7.5 lakh across all programmes. This year, the institute aims to place 1,200 across all disciplines.

At IIT-Delhi, over 20 companies picked up 130 students, giving a boost to last year's salary average on the first day by 10%, offering similar packages as they did in other top campuses.

But the professor-in-charge of placements, Kushal Sen, sounded a note of caution. "We will do well this year, but given the market sentiments, we are keeping our fingers crossed. The start has definitely been good," he said. The institute has more than 220 companies registered with it for the process.

IIT-Kanpur, which started the process on Friday, has 200 companies lined up from across sectors. Of these, 25 are coming on campus for the first time. IIT-Kanpur has 950 candidates registered for placements this year.

Hindu Chennai 03.12.2011 P-9

It's raining dollars for eight IIT-Madras students

B. Aravind Kumar

CHENNAI: After many rounds of interviews through Skype all through the night, news broke at dawn on the IIT-Madras campus that eight students of computer science had been selected on a salary of a minimum $1,00,000 per annum to work for the world's new generation computer companies in the United States.

At 4 a.m on Friday, IIT-M's placement office received confirmation from the US offices of Pocket Gems, Facebook and Google of offers of $1,37,000; $ 1,25,000 and $ 1,10,000.

Prateek Gaur and C.H. Dinesh will join a team of young computer professionals developing games for mobiles for their start-up firm Pocket Gems, based in San Franciso.

"You will have a sense of ownership," said Mr. Gaur, excited about working for the start-up.

"As of now, the company's core team consists of the best computer science students from top US universities and I am looking forward to be part of this select group," said Mr. Dinesh, who has already developed Android-based applications during his internship.

"In the interview, they threw us the problems they face on a daily basis to find simple solutions that work effectively. They drive you to be the most efficient even in the interview," he said.

Tejaswaroop chose Google over Pocket Gems as he believes the net giant offers more options to pursue his career. M. Prathab, a native of Tuticorin, opted for Google instead of Facebook, for a lesser pay package. "I did my internship with Google and had a pre-placement offer as well." Learning computer science on the campus and specialising in C++ programming, he wants to work in distributed systems.

I. Sasi, P. Pratik and Chennai-boy Karthik are the other three who will be part of the Google team in the US. Mr. Pratik will be based at Mountain View, the Global Headquarters of Google. "It is because of my job profile as software testing engineer. The others will join as software developers at various locations. "Google offers wide areas to chase your dreams. You can switch teams and you won't be bored," said Mr. Sasi.

Another student of computer science, Sarang Bharadwaj will join Facebook.

A curriculum comprising core areas of operating systems, distributed systems and networking combined with electives in every area of computer science was of immense help, the students said.

Hindu ND 4/12/2011 P-5

IIM-C students choose Govt. sector for internship

Shiv Sahay Singh

KOLKATA: Fifteen students of the Indian Institute of Management Calcutta (IIM-C) have opted out of the Summer Placements process with some choosing to pursue their internship in Government organisations and some preferring to explore other opportunities, IIM-C officials said here on Saturday.

"This is an indication that students are trying something beyond the conventional approach. The students are trying to gain experience depending on their own interest," Professor Amit Dhiman, chairperson, placements, IIM-C told *The Hindu* after the completion of the summer placements for the 2011-13 batch which was also the largest batch so far. The participating companies included first timers like investments banks from Japan, Portugal and West Asia.

He said that the students looking for alternative avenues for career development have opted for internship in organisations like the Reserve Bank of India, Madhya Pradesh Government and start-up companies which are offering different profile to the students.

FINANCIAL EXPRESS ND 4/12/2011

p-6

INTERVIEW: PROF P RAMESHAN

DIRECTOR, INDIAN INSTITUTE OF MANAGEMENT (IIM), ROHTAK

'IIM's future vision is faculty and research'

Almost 10 months after he took charge of the newly established Indian Institute of Management (IIM) at Rohtak, **Professor P Rameshan**, *director of the only IIM in NCR, has a foreign tie up and doubling of batch size to his credit. Further, he has a 30-year mission to take the premier institute to the same levels as Nalanda University. In an interaction with* **Kirtika Suneja**, *he shares his vision for IIM Rohtak. Excerpts:*

How have the past ten months unfolded for the institute after you took over?
I joined the institute in November last year and the batch size then was 50. There was no regular faculty and faculty from IIM Lucknow, our mentor institute, used to come and teach. A computer centre was set up soon after and now we are developing a website also. On the faculty front, two rounds of recruitment have been made and we have eight regular faculty now. On the student front, we increased the batch size to 125, which is both an achievement and risk, as no other IIM has increased the batch size to two sections.

Are you still hiring more faculty?
Yes. The process is on and ten people have agreed to join us. So even if a few back out, we will have a faculty strength of around 12 soon. We shortlist faculty who have either at least one publication or are from good colleges with the willingness to have publications and do research. In fact, their promotions, probation declaration and regularisation will be tied to their research and publications.

Now that the institute is in its second year, how has the relationship with IIM Lucknow shaped up?
IIM-L continues to be our mentor. They helped us start and launch the institute. Their faculty is still teaching half courses here.

What about adding new programmes?
The first batch will pass out in March 2012 and we only have the post graduate programme (PGP) as of now. We plan to develop an executive programme next year and launch it by early 2013. Further, a fellow programme in management (FPM), which is a doctoral programme, might be launched by 2014.

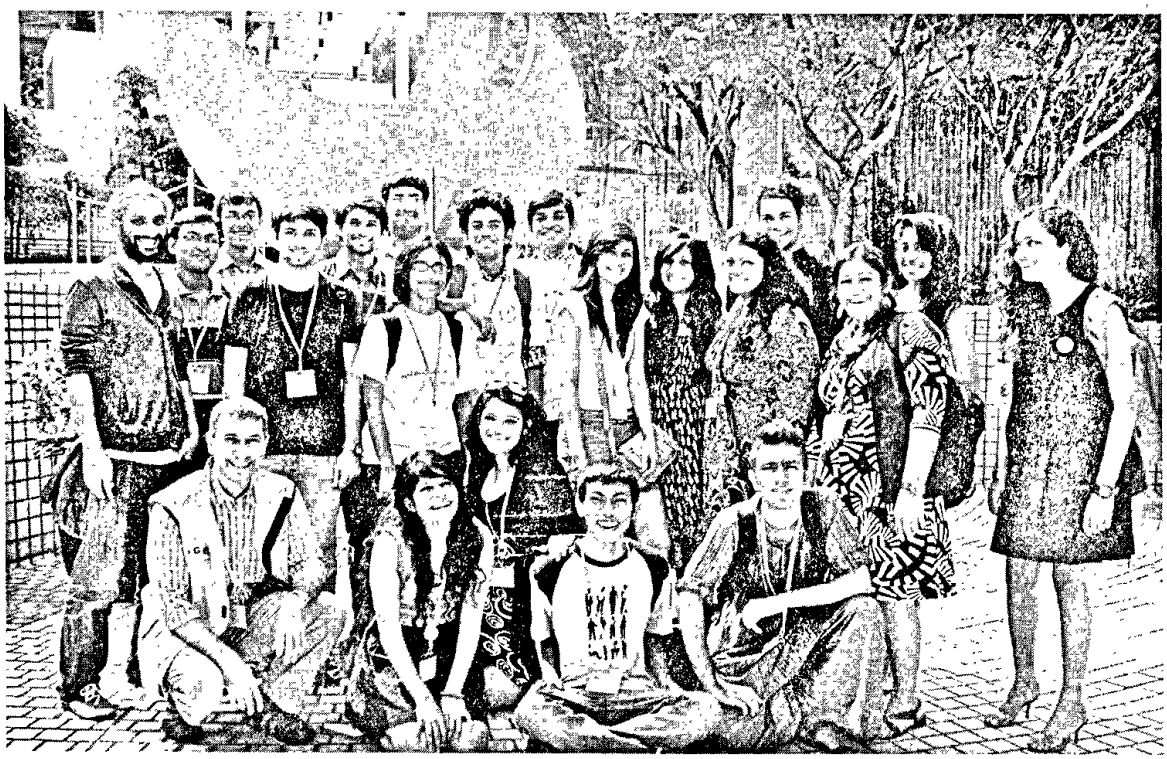
Yours is one of the few institutes to have a long-term mission for the next 30-40 years. What is the strategy for that vision?
The long-term vision focuses on faculty, research and publications. Knowledgeable faculty have their own theories, models and framework. They will do research and disseminate their own knowledge and thereby have publications and own case studies. We plan to achieve this by having a visible size of faculty and alumni.

WE PLAN TO DEVELOP AN EXECUTIVE PROGRAMME NEXT YEAR AND LAUNCH IT BY EARLY 2013. A FELLOW PROGRAMME IN MANAGEMENT, A DOCTORAL PROGRAMME, MIGHT BE LAUNCHED BY 2014

Like other IIMs, do you plan to set up centres of excellence catering to specialised fields?
Centres and specialisation are part of the long-term plan. Food wastage due to rotting foodgrain, social entrepreneurship, agricultural support to rural areas and indigenous technologies are our interest areas.

Any more foreign tie-ups in the pipeline after the one with Indiana University's Kelley School of Business from the US?
The partnership with Kelley includes academic exchanges at faculty and student levels, joint supervision of doctoral work and collective conduct of workshops and conferences, besides joint research work and joint delivery of courses. Going ahead, we will need proper alignment with someone to whom we can provide management inputs.

Business Standard ND 04/12/2011 P-10



The Srishti students and their advisers

BANGALORE

POPULAR SCIENCE

A team of art and design students, guided by two scientists and an artist, wins a prestigious science-and-society award

BS REPORTER

Here is a team that has created a splash at the Massachusetts Institute of Technology (MIT). The team, from the Srishti School of Art, Design and Technology looked at the environmental impact of genetic engineering and the ways in which local communities can be involved in practising science. The result was a prize at the World Championship Jamboree of iGEM 2011, held at MIT on November 5-7.

International Genetically Engineered Machines (iGEM) is a highly regarded competition held annually since 2003. In iGEM, students think about, and design, living biological systems. Previously restricted to US universities, it went international in 2006.

The 12-member Srishti team was guided by Yashas Shetty and received "basic scientific help" from Navneet Rai and Mukund Thattai of the National Centre for Biological Sciences (NCBS).

The team, composed of second-year art and design students, won the Best Human Practice prize, for postulating rules by which engineers can achieve maximal output with proper social responsibility.

The project was titled "Searching for the Ubiquitous Genetically Engineered Machines". The team asked this question: a century in the future, today's synthetic biology may become popular. What if bio-engineered organisms escape from labs and enter the environment? Would we then be able to evaluate how much they have spread?

WHAT IF BIO-ENGINEERED ORGANISMS ESCAPE FROM SCIENCE LABS?

The students realised that data were lacking. No one had ever researched bio-synthetic organisms in the environment. So, first they had to generate baseline data against which to compare future change.

The team collected nearly 300 soil samples from different parts of India. They learnt to isolate DNA from soil bacteria and produce it in bulk using the polymerase chain reaction (PCR) technique. They used a specialised technique to check whether any samples contained bio-engineered organisms. No sample had them.

The team mapped all the sites from which they had collected samples. By attaching a camera to a helium balloon, they obtained aerial pictures of each site. These pictures were tagged onto each site on their sampling map, along with the molecular results of each sample from the site. They designed a soil collection kit and a BioLab from commonly available materials.

Their work led them to important questions. For instance, can science be taken to ordinary people? Can people with little exposure to science help in synthetic biology projects? The team discussed the project with people in the areas where it had collected soil samples.

Thattai and Rai have helped guide Indian teams at iGEM since 2007. Apart from this Srishti team, the researchers have worked with students from other institutes, including IIT-Bombay and the Institute of Bioinformatics and Biotechnology, Pune. The Srishti team actually worked at the NCBS labs and also built a community lab to enable ordinary citizens to engage with the life sciences.

This is the second time Srishti students have won a prize at iGem. In 2009, the Srishti team won the Best Presentation Award for the Smell of Rain project in which team members cloned and created bacteria that produce the smell of freshly moistened earth. Thattai and Rai guided that team as well.

The art guidance in these art-and-science bridging projects was provided by Yashas Shetty, for many years an artist-in-residence at NCBS. The Centre regularly invites artists, historians, theatre practitioners and others to spend time on campus interacting with its scientists. Among the brighter results is this bridge-building and award-winning Srishti project.

Times Of India ND 04/12/2011 P-22

An Earth-like planet will be found in a year: Scientists

Dennis Overbye

Corbis

Cambridge, Mass: At least four times in the last few years, astronomers have announced they have found planets orbiting other stars in the sweet spot known as the habitable zone — not too hot, not too cold — where water and thus perhaps life are possible. In short, a so-called Goldilocks planet fit to be inhabited by the biochemical likes of us. None of these claims are without controversy, but astronomers who are making discoveries with NASA's Kepler spacecraft are meeting next week in California to review the first two years of their quest, which seems tantalizingly close to hitting pay dirt.

"Sooner or later, Kepler will find a lukewarm planet with a size making it probably Earthlike," said Geoffrey Marcy of the University of California, Berkeley, who spends his time tracking down candidates identified by Kepler.

"We're no more than a year away from such a discovery," he said. NYT NEWS SERVICE

Business Standard ND 04/12/2011 p-1

Aakash to open new windows for e-governance projects

AKSHAT KAUSHAL
New Delhi, 3 December

Aakash, world's most affordable tablet PC, may soon make its way into the country's power corridors and may help fight corruption. After showcasing his favourite gadget to the world leaders at Unesco and World Bank, Telecom and Human Resources Development Minister Kapil Sibal now wants all central ministries to use Aakash for their e-governance projects.

Sibal believes the tablet PC would help plug the leakages that cause corruption, if used in e-governance projects.

To further the project, Sibal has written a letter to all ministries to consider his proposal and requested each ministry to recommend applications for projects they want to be implemented through the tablet.

Speaking to *Business Standard*, Sibal said, "I want Aakash to be used as a platform of delivery. I have written a letter to all Cabinet ministers requesting them to let us know what kind of applications they want in Aakash."

Sibal believes that maximum leakages in governance can be plugged through the use of technology and similar to what he plans through Aakash.

"Intermediaries will be eliminated. And most of concerns of the people against corruption would be addressed if such a project is executed," he said.

Turn to Page 14

Aakash, the world's most affordable tablet PC. PHOTO: BLOOMBERG

Aakash to open new windows...

The tablet-PC, which was launched in New Delhi on October 5, has been developed jointly by Canadian company DataWind and Indian Institute of Technology, Rajasthan, under the HRD ministry's National Mission on Education.

The government is buying 100,000 tablets from DataWind at a price of ` 2,250 per unit. For the project, Sibal has also got the Unique Identification Authority of India head Nandan Nilekani on board. Sibal has asked Nilekani to develop an Aadhar application for the table PC. "It will be interesting to see how all these applications can be integrated," Sibal said. The Aakash tablet has a seven-inch display with 800-by-480 pixel resolution, 256 MB RAM, two GB flash storage, and a 366 MHz processor. The tablet runs on the Android 2.2 operating system.

Virat Vaibhav ND 4/12/2011 P-3

शोध केंद्र हरियाणा में बनेगा दिल्ली आईआईटी का नया शोध कैंपस

अब अपनी प्रतिभा निखार सकेंगे छात्र

■ विराट न्यूज।

नई दिल्ली। दिल्ली आईआईटी के छात्रों के लिए एक खुशखबरी है। छात्रों को अब अपने टैलेंट को निखारने का अधिक मौका मिलेगा। काफी लंबे समय से दिल्ली आईआईटी द्वारा की जा रही नए कैंपस की मांग को आईआईटी काउंसिल से मंजूरी मिल गई है। दिल्ली आईआईटी के छात्रों के लिए हरियाणा में नया शोध कैंपस बनाया जाएगा। जो सूचना एवं प्रौद्योगिकी के क्षेत्र में शोध की बढ़ती जरुरतों और मांग को पूरा करने में कारगर साबित होगा।

आईआईटी काउंसिल द्वारा स्वीकृति दिए जाने के बाद शोध कैंपस के लिए अब हरियाणा सरकार द्वारा आईआईटी दिल्ली को 10 एकड़ जमीन मुहैया कराई जाएगी, जिसके बाद शोध के लिए पहली बार आईआईटी का अलग से एक कैंपस स्थापित हो सकेगा। शोध कैंपस बन जाने के बाद आईआईटी के विद्यार्थी इस कैंपस का लाभ उठा सकेंगे। यह शोध कैंपस सेंटर फोर एक्सीलेंस के नाम से स्थापित किया जाएगा। आईआईटी दिल्ली के रजिस्ट्रार राकेश कुमार ने बताया कि इस नए कैंपस के निर्माण के संबंध में आईआईटी काउंसिल का स्वीकृति पत्र आ चुका है। इसके बाद अब हरियाणा सरकार को यह तय करना है कि वह शोध कैंपस के लिए कहां जमीन उपलब्ध कराए। श्री कुमार ने बताया कि कैंपस के निर्माण के लिए जमीन देने के लिए हरियाणा सरकार पहले ही अपनी स्वीकृति दे चुकी है , लेकिन अभी तक जमीन कहां मिलेगी, यह तय नहीं हो पाया है। बता दें कि आईआईटी का दिल्ली स्थित कैंपस 30 एकड़ में फैला हुआ है। यहां करीब रिहायशी क्षेत्र के अतिरिक्त 18 हजार शोध कार्य भी होते हैं, लेकिन यहां काफी समय से शोध कार्य के लिए और अधिक जगह और संसाधनों की जरुरत महसूस हो रही थी। इसी जरुरत को देखते हुए आईआईटी ने अपना एक अलग शोध कैंपस बनाने की जरुरत महसूस की। जानकारी के मुताबिक हरियाणा में सेंटर फोर एक्सीलेंस के नाम से बनने वाले नए शोध कैंपस में पूरी तरह से शोध से जुड़े ही कार्य किए जाएंगे। यहां एमटेक, पीएचडी और उद्योगों से जुड़े विभिन्न कार्यक्रम भी चलाए जा सकते हैं। नए शोध कैंपस के हरियाणा में खुल जाने से दिल्ली आईआईटी के छात्रों को न केवल शोध के लिए अच्छा माहौल मिल पाएगा बल्कि इससे दिल्ली आईआईटी का शोध के छात्र में नाम ओर ऊंचा हो जाएगा। नए शोध कैंपस के बन जाने से दिल्ली आईआईटी में छात्रों की संख्या में भी निश्चित रूप से इजाफा हो सकता है।

इस तरह के शोध केंद्र की जरूरत काफी समय से की जा रही थी, लेकिन यह जरूरत अब पूरी हुई है और इससे आईआईटी छात्रों के चेहरे खिल उठे हैं। छात्र इस नई सौगात को लेकर काफी उत्साहित हैं और उनके लिए यह किसी वरदान से कम नहीं है, क्योंकि काफी लंबे समय से यह सौगात मिली है, जिसके बाद आईआईटी छात्रों में आशा की नई किरण फूटी है।■