



## NEWS CLIPS

November 3-9, 2018

### Highlights of the Week@IITD

#### **IIT Delhi Confers Distinguished Alumnus Award 2018 on Sumant Sinha**

November 5, 2018, <http://indiaeducationdiary.in/iit-delhi-confers-distinguished-alumnus-award-2018-sumant-sinha/>



Mr. Sumant Sinha, Chairman & Managing Director of ReNew Power Limited, India's largest renewable energy IPP in terms of total energy generation capacity\*, has been honoured with the prestigious Distinguished Alumnus Award -2018, by the Indian Institute of Technology, Delhi. The award was handed over to Mr. Sinha during the 49th Annual Convocation of the institute at New Delhi on the 3rd of November, 2018, by industrialist Mr. Kumar Mangalam Birla and Prof. V. Ramgopal Rao – Director, IIT Delhi.

IIT Delhi selected Mr. Sumant Sinha for this honour, in recognition of his outstanding contributions in the fields of Corporate Business Development & Entrepreneurship, which have brought glory to the institute. Mr. Sinha received the Bachelor of Technology degree in Civil Engineering from IIT Delhi in the year 1987. He also holds a Post Graduate diploma in Management from the Indian Institute of Management, Calcutta and a Masters degree in International Affairs from Columbia University.

Speaking on this recognition, Mr. Sumant Sinha said, "I'm honoured to receive this award from my alma mater. This means a lot to me and I will be happy to contribute in any small way towards the

institute's advancement. My experience at the institute equipped me with the skills to engage with the best of minds across the globe and ultimately embark on a successful entrepreneurial journey."

### **IIT-Delhi alumni design innovative air filter device to fight air pollution**

November 5, 2018, <https://yourstory.com/2018/11/iit-delhi-air-filter-walmart-invests-india-business-daily-capsule/>

Fight Delhi pollution at just Rs 10! Entrepreneur Prateek Sharma, an alumnus of IIT-Delhi, made his fight against air pollution personal and won with Nasofilters, an innovative and cost-effective air filter device. It is the first commercial product by Delhi-based Nanoclean, which Prateek co-founded with Tushar Vyas and Jatin Kewlani. The affordable nasal filter is not conspicuous, and users simply have to cover their nostrils with the nearly transparent filter and wear it for up to eight hours.



Nanoclean team

### **378 PhD students get degrees at IIT-Delhi**

November 4, 2018, <https://indianexpress.com/article/cities/delhi/378-phd-students-get-degrees-at-iit-delhi-5433078/>

Businesswoman and social worker Anu Aga, the chief guest, made a case for personal wealth being used to solve society's problems.

The 49th annual convocation of the Indian Institute of Technology, Delhi, held on Saturday, saw 378 PhD students, among others, getting their degrees. This is an increase of over 20% from last year. A total of 2,064 students — 1,635 students men and 429 women — were awarded degrees.

Businesswoman and social worker Anu Aga, the chief guest, made a case for personal wealth being used to solve society's problems. "As young graduates, I am sure you aspire to be rich and powerful. There is nothing wrong with this dream provided you attain your goal adhering to moral and ethical values. What is more important is when you have the means, reach out in significant ways to mitigate some of India's social problems, not just through compulsory corporate social responsibility, but from your personal wealth and your personal involvement," she said.

IIT-D Director V Ramgopal Rao said, “Over 60% of registered students at IIT-Delhi are currently Masters and PhD students.”

## **IIT Delhi cuts tuition fee of international students drastically**

November 3, 2018, <https://www.livemint.com/Education/RMloXHjDH7qirvf5WIOVmJ/IIT-Delhi-cuts-tuition-fee-of-international-students-drastic.html>

***At present, 1% of the students at IIT-D are foreign students and the institution aims to take that number to 25%***



The tuition fee for undergraduate foreign students has been slashed by 31% and that of doctorate students by more than 96%. Photo: Mint

The Indian Institute of Technology Delhi (IIT-D) on Friday said it has decided to slash the tuition fee for undergraduate foreign students by 31% and that of doctorate students by more than 96%.

The rare reversal comes against the backdrop of IIT-D seeking to attract more foreign students to increase its global standing and become a more diverse institution than an India-focused engineering and technology school.

The move assumes significance as IITs were planning to double the tuition fee for foreign students from the current \$4,000 to \$8,000 per annum to keep pace with the global trend of foreign students being charged three to five times domestic students.

At the doctorate level, a foreign student will now pay ₹10,000 per annum instead of little more than ₹290,000 earlier.

For undergraduate foreign nationals, the yearly tuition fee will be ₹200,000 instead of ₹290,000.

“We are not looking to make money from students. Our board has approved the new fee structure to be effective from the next academic year. We want to internationalise the institution in terms of students, faculty and research collaborations,” said V. Ramgopal Rao, director, IIT-D.

“The tuition fee for foreign students will be the same as Indian students, which means a significant cut in the fee structure for them,” Rao said.

IIT-D is one of the Institutes of Eminence (IoE) shortlisted by the central government to become a world class university and improve its rankings in the global league table.

Internationalisation is a key component to improve global standings.

At present, 1% of the students at IIT-D are foreign nationals and the institution aims to take that number to 25% over a period of time.

Rao said his institution is looking at doctorate students from foreign countries in a big way. Other than slashing the tuition fee, the school will offer a special fellowship for these students to make IIT-D a study destination for foreign students, he said.

“To begin with we are going to offer 100 fellowships to foreign students next year and the number will grow each year. We aim to have around 1,000 foreign doctorate students over the next three to four years,” the director said.

The institution over the next few months will send teams of professors to countries in south Asia, west Asia, Africa and Europe to discuss with top universities how to create awareness and attract top talents as students and faculty, said M. Balakrishnan, deputy director of the institution.

The dearth of international students and international professors is a huge drag for IIT-D during global rankings and it is looking to improve this aspect, Rao said.

In the QS World University Ranking, IIT-D was placed at 172 and Rao said, if international aspects are improved, the institutions can easily rank among the top 100 universities in the world.

### **IIT-Delhi to start two new centres and ‘innovation Science Park’**

November 3, 2018, <https://www.hindustantimes.com/delhi-news/iit-delhi-to-start-two-new-centres-and-innovation-science-park/story-aDjUutWciDh1VuNzlgjLO.html>

***The institution aims to generate internal resources for several developmental purposes to meet standards in line with the IoE tag. However, it will get grants worth ₹200 crore per year from the government in the next five years***



The two new centres of IIT Delhi will be focus on solving contemporary issues of society.

Soon after earning the Institution of Eminence (IoE) status, the Indian Institution of Technology, Delhi (IIT-D) said it will set up two new units — Centre for Electric Vehicles and Centre for Cyber Physical System — and an ‘innovation science park’ at its campus next year.

IIT-D director V Ramgopal Rao announced the move on Friday and said, “The two centres will be focus on solving contemporary issues of society. For instance, electric vehicles can play a crucial role

in curbing pollution. But we do not use it due to their unavailability and inefficiency.. It will work on issues like bringing down their cost, reducing the charging time and improving the battery capacity.”

At the ‘Centre for Cyber Physical System’, IIT-D is planning to solve issues with the help of information technology (IT). “The centre will focus on connecting systems to internet that can provide data on which we can make accurate decisions to solve day-to-day problems. For example, to improve the productivity in agriculture, farmers should have the accurate information on how much water to put, exact soil moisture and what nutrient or fertilizer to use. And, to access that information we will need to deploy sensors that can collect the data and help the farmers to take intelligent decisions,” Rao said, adding both the centres will be supported by public and private industries.

IIT-D is also setting up an ‘innovation science park’ that will majorly contribute for the Defence Research and Development Organisation (DRDO). “The innovation park will be working on several verticals, but half of its researches will be done for the DRDO,” said IIT-D registrar Sandeep Chatterjee.

Besides, the institution aims to generate internal resources for several developmental purposes to meet standards in line with the IoE tag. However, it will get grants worth ₹200 crore per year from the government in the next five years. “IIT-D has come up with lots of innovative ideas to become self sufficient without raising the fee. We have recently come up with ‘student start-up action plan’ wherein the institute is funding their research in exchange of equity in their start-up. So if the company becomes successful in the future we will hold some equity in it. It can become a good source of revenue for the institute,” the director said.

### **Convocation Today**

Meanwhile, IIT-D is set hold its 49th convocation ceremony on Saturday. The theme of this year’s convocation is “women empowerment”. “Four of the eight guests of honour are women. We have even invited businesswomen Anu Agha as the chief guest,” Rao said. This year, 2064 students will be awarded degrees, of which 1,635 are males and 429 are female students. This year, the university will cross the benchmark of 50,000 alumni.

## **November 9**

### **Top faculty from IITs, NITs to hand-hold other engineering colleges**

<https://www.hindustantimes.com/education/top-faculty-from-iits-nits-to-hand-hold-other-engineering-colleges/story-C1DGn8BoYkfZ4TqPDdWNwO.html>

Under the mentorship plan 200 faculty members from the best technical institutions will be appointed as ‘margdarshaks’ for institutions struggling to get accreditations, a senior HRD ministry official said on condition of anonymity.

Faculty from the country’s best engineering colleges will work as mentors with hundreds of engineering colleges across the country that are laggards in terms of teaching techniques and curriculum, and which do not have enough and high-quality faculty. (HT File Photo)

Faculty from the country's best engineering colleges will work as mentors with hundreds of engineering colleges across the country that are laggards in terms of teaching techniques and curriculum, and which do not have enough and high-quality faculty.

The plan is part of a push by All India Council for Technical Education (AICTE) to ensure that at least half the programmes offered by engineering colleges in the country are approved by the National Board of Accreditation (NBA) before 2022.

An analysis by AICTE revealed that hundreds of engineering colleges have been unable to get their courses approved by NBA due to outdated curriculum, low emphasis on learning outcomes, and inadequate and poor faculty.

Under the mentorship plan 200 faculty members from the best technical institutions will be appointed as 'margdarshaks' for institutions struggling to get accreditations, a senior HRD ministry official said on condition of anonymity.

"The mentors will choose five to 10 institutions which are within 500 km radius of the nodal institution. They will try to help institutions clear NBA accreditation for at least two-thirds of the courses offered by them. The aim is that each of these mentors ensure that the institutions mentored by them receive NBA accreditation by 2022," the official added.

According to the plan chalked out by the ministry of human resource development and AICTE, mentors will be selected from the faculty of the top 50 institutions including the IITs and top NITs.

"Academic leaders of repute, including those have retired, who have the capacity to travel and train institutions and their faculty will also be chosen. The AICTE will then hold special training sessions for these mentors so that the focus on achieving the NBA accreditation process is clear," said the official.

The AICTE will then write to the institutions about the appointment of mentors for helping them reach the required standards of accreditation, the official said.

It is estimated that as many as 2,000 engineering colleges could come under the purview of this initiative, a second government official added, asking not to be identified.

Commenting on the HRD ministry's plan, University Grants Commission's former member Inder Mohan Kapahy said, "The quality spectrum, as far as technical education is concerned, is very diverse. There are institutes which excel like the IITs and NITs. And there are institutions which have mushroomed across the country, which may be comparatively lagging. So benchmarking, like that of NBA, is much needed. However, not every institution may not be in a position to get its courses accredited without guidance."

**November 8**

## **IIT Roorkee Researchers Make Breakthrough in Cancer Treatment**

<https://www.ndtv.com/education/iit-roorkee-researchers-make-breakthrough-in-cancer-treatment-1944460>

**An IIT Roorkee team has developed fluorescent carbon nanodots that can serve as theranostic agents for cancer.**



Dr. Gopinath and his team are planning next stage animal studies for further evaluation

An Indian Institute of Technology (IIT) Roorkee team has developed fluorescent carbon nanodots that can serve as theranostic -- a form of diagnostic testing employed for selecting targeted therapy - agents for cancer. Dr. P. Gopinath and his team from the Institute have extracted these nanosized (10-9 metre) carbon materials from the leaves of the rosy periwinkle plant.

Their work, supported by the Science and Engineering Research Board (SERB) and Department of Biotechnology (DBT), Government of India, has recently been published in the Journal 'Colloids and Surfaces B: Biointerfaces'.

The identification of cancer cells and their inhibition/destruction have been continuing challenges in the field of oncology and cancer drug research for many decades. In the past few years, nanotechnology has emerged as one of the most promising areas in cancer diagnostics and treatment and nanomaterials - materials having dimensions in the nanometre (10<sup>-9</sup> m) range - are being increasingly studied as agents in molecular tumour imaging, molecular diagnosis and targeted therapy.

Of the many types of nanomaterials studied, carbon nanodots show considerable potential, said a statement from IIT Roorkee.

"Carbon nanodot" refers to fluorescent carbon-based nanomaterials. Carbon dots, also called carbon quantum dots, are fluorescent materials that are well-suited as both therapeutic and diagnostic agents for cancer because of two unique characteristics - they are biocompatible and can be rapidly excreted from the body and exhibit low toxicity while producing reliable optical signal, the statement said.

Dr. Gopinath's team has synthesised carbon nanodots by heating the leaves of *Catharanthus roseus*, commonly called rosy periwinkle and *Vinca rosea*, in a process called "hydrothermal reaction".

The nanodots were found to exhibit strong fluorescence, which makes them suited for diagnostic functions, while also mediating anti-cancer activity, as was seen from in vitro studies.

"Such events of real-time image guided anticancer therapy by a single system open a new paradigm in the field of anticancer therapy", says Dr. Gopinath on the benefits of these theranostic tools.

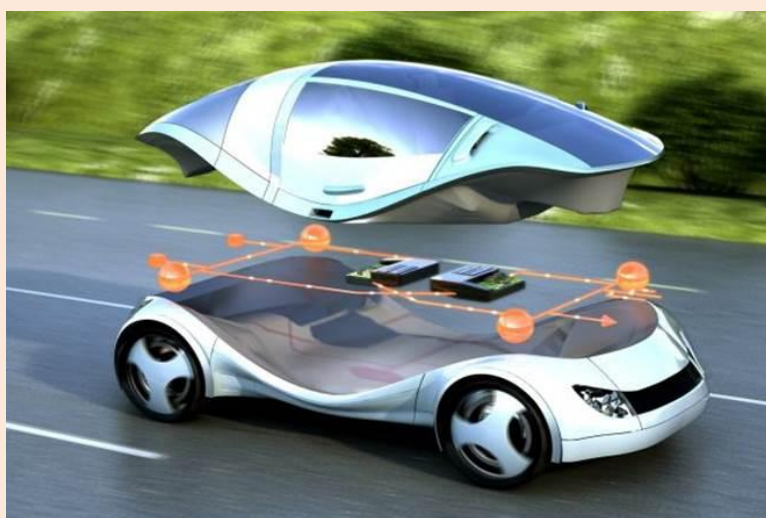
"With these nanomaterials, we can identify the cancer cells and track them by an imaging system simultaneously as the cells themselves are being eradicated in a precise 'surgical strike", he adds.

With these promising observations, Dr. Gopinath and his team are planning next stage animal studies for further evaluation of these nanomaterials in oncological applications, for both diagnostics and treatment.

### **Cars to use sunlight & water as fuel: IIT-Jodhpur's 'future fuel' inspired by Photosynthesis**

<https://www.financialexpress.com/auto/car-news/cars-to-use-sunlight-water-as-fuel-iit-jodhpurs-future-fuel-inspired-by-photosynthesis/1376127/>

Researchers and students from IIT Jodhpur have found a way to trap oxygen and obtain pure hydrogen using sunlight, water and catalysts. Over 700 catalysts have been an experiment to develop this future fuel.





Rising fuel prices, high pollution levels and the need for a cleaner fuel, Indian researchers in Indian Institute of Technology- Jodhpur have come out with a new innovative solution to develop a future fuel that uses sunlight and water to produce energy. Chemistry is a powerful tool for such new innovations and the team from IIT Jodhpur has found a natural way which is opposite of the process of photosynthesis in plants by which oxygen is produced says a report on Times News Network (TNN).

The Department of Chemistry, IIT Jodhpur's new research has found a way to break Oxygen and Hydrogen molecules in water by using a catalyst called Lanthanide. Lanthanide is used in this process to dupe oxygen and in the process, the pure hydrogen is left behind which can be used as a natural fuel and will have no emissions. The process is similar to hydrogen fuel cell technology.

The head of the Chemistry department at IIT-Jodhpur, Rakesh Kumar Sharma, also a leader in this project says that his researchers tried over 700 different types of catalyst combination to obtain the pure hydrogen. The way to acquire pure hydrogen currently is very expensive and involves burning of methane at an industrial level. This process also involves a temperature of over 1000°C to decimate CH<sub>4</sub> (Methane) and obtain Hydrogen. Rakesh Sharma said that this process increases global warming as it produces a lot of greenhouse gases.

The challenge here for researchers across the nations to acquire pure hydrogen is to trap oxygen. Rakesh further added that this is the first time his team has been successful in obtaining pure oxygen without any hydrogen at a very less price using Lanthanide. Hydrogen fuel right now is a very expensive proposition and costs almost four times than the petrol prices in India.

Implementation of this process on a larger scale is yet to be tried and the actual cost of production of hydrogen is unknown. The process requires sunlight which will see the cost of the future fuel being at par with current conventional fuel. If successful, this can be a groundbreaking technology and will see India getting many cars being powered by hydrogen fuel cell.

IIT-Jodhpur has applied for a patent of this process which is inspired by nature and is also developing a prototype for this model. The team will further also try using clay available in Rajasthan as a catalyst to bring down the cost of hydrogen fuel.

This is indeed some very good innovating and groundbreaking work done by Indian researchers and IIT-Jodhpur. This technology has the potential to bring down India's oil import bill and more importantly bring down the vehicular pollution in India.

## **November 7**

### **IIT-Jodhpur team produces 'future fuel' by using sunlight & water**

<https://timesofindia.indiatimes.com/city/jodhpur/iit-jodhpur-team-produces-future-fuel-by-using-sunlight-water/articleshow/66531646.cms>

IIT-Jodhpur has taken a major leap towards developing a future fuel in a natural way by a process exactly opposite to photosynthesis in plants. The chemistry department of the institute has leveraged abundantly available sunlight for this process wherein water is broken into oxygen and hydrogen.

Catalyst lanthanide used in this process traps oxygen while the pure hydrogen is left, which can be used as zero emission natural fuel.

A team led by Rakesh Kumar Sharma tried over 700 types of catalyst combinations for obtaining pure hydrogen unlike in the process prevalent presently.

"Presently, hydrogen is being produced on an industrial level using methane but the process is quite expensive and requires a temperature upto 1,000-1,200 degrees centigrade to obtain hydrogen," said Sharma, terming it a contributor to global warming through production of green house gases.

He further said that many researches across the globe have been taking place in the direction of obtaining pure hydrogen but no success has been achieved so far as oxygen is also produced in the process and that remains untrapped.

"This is for the first time that we have succeeded in obtaining oxygen-free pure hydrogen, which means a pure and quality fuel, that too at a very low price," Sharma said. The hydrogen fuel available today costs about Rs 150-200 per litre which is a huge price in comparison to conventional petrol.

According to Sharma, the actual cost of producing hydrogen using the new process will be known only after it is produced on a large scale. But given the fact that it uses sunlight, it will be at par with current fuel prices or lesser.

Sharma said that automobile giants like BMW and Honda have made cars which run on hydrogen but they couldn't gain popularity due to the high price of this fuel. IIT-Jodhpur is now developing a prototype of this model and has applied for a patent of the process, which is fully nature inspired.

Sharma's team, which has harnessed Rajasthani clay in many of its researches, is now working on using this clay as a catalyst in this process with a view to bring the cost of hydrogen fuel dirt down.

Sharma said this research will help in realization of the national dream of reducing country's dependence on fuel imports by 30% as well as inching closure to cheap and natural alternative fuel in India.

## **IIT-Mandi Innovates Eco-Friendly Fuel That Prevents Forest Fires, Boosts Local Livelihoods!**

<https://www.thebetterindia.com/163916/iit-innovation-green-fuel-environment-india-news/>

**A low-cost heating solution for cold winters, this innovation is also less harmful to the environment in comparison to wood or coal!**

Pine needles have resulted in massive forest fires in the Himalayan region of Himachal Pradesh over the past three years. These forest fires, assisted by the fact that pine needles decompose very slowly and are highly inflammable, are causing irreparable harm to the local environment and biodiversity.

Fortunately, researchers at the Indian Institute of Technology (IIT) in Mandi, have found a way to address these concerns by collecting the once waste, yet pure, pine needles, and using them alongside other biomass sources to manufacture briquettes and pellets which residents can use for heating purposes during cold winters.

“These briquettes provide more heat at a low cost and are less harmful to the environment in comparison to wood or coal. In many small- and large-scale industries, the briquettes can be used as a fuel in place of wood and coal. It can also be used to cook even food,” said Dr Arti Kashyap, Principal Project Investigator at the institute’s Centre for Uplifting Himalayan Livelihood, in a conversation with The Tribune.

“The centre has set up its own briquette and pellet production plant on the IIT-Mandi campus. The Government of Himachal Pradesh has announced a subsidy of 50 % up to 25 lakhs for one unit on capital expense for a pine needle-based plant. This assistance can be obtained by giving a letter [to] the office of the Regional Forest Officer,” she added.



Locals collecting pine needles on the ground.

Aside from declaring a subsidy for locals who can get involved in the collection of pine needles, the government has also explicitly stated its intention to assist in the collection process.

However, these efforts are a part of saving this eco-sensitive region from the dangers of pine needles, and it’s imperative that citizens, government and those with the necessary technical expertise find other means of finding solutions. Moreover, this isn’t the first instance of locals using pine needles for biomass production.

## **IIT-M, 11 institutions to set up chairs in IP**

<https://www.thehindubusinessline.com/news/iit-m-11-institutions-to-set-up-chairs-in-ip/article25438370.ece>

**Centre seeks timeframe for posting professors**

A dozen institutions, including the Indian Institute of Technology Madras, have been accorded approval by the Department of Industrial Policy and Promotion (DIPP) under the Commerce Ministry to set up Chairs on Intellectual Property (IP) to encourage study, education and research in intellectual property rights (IPR).

India is a signatory to the agreement on Trade Related Aspects of Intellectual Property Rights, the most comprehensive agreements on IP that took effect on January 1, 1995.

The Centre framed the National IPR Policy of 2016 to establish a holistic atmosphere, conducive to exploiting the full potential of IP for social, economic and cultural development.

One of the policy's main objectives was to strengthen IP chairs in educational institutions of higher learning to provide quality teaching and research, develop teaching capacity and curriculum and evaluate their work on performance-based criteria.

### **Promoting outreach**

The Scheme for Pedagogy & Research in IPRs for Holistic Education & Academia (SPRIHA) was thus set up to promote outreach on IP matters, organise seminar and workshops, develop inputs, research and inculcate a long-standing recognition and respect for one's IP and others' IP in the students' minds. The DIPP, in an order issued on October 16, has asked the selected institutes to set up IP Chairs to provide detailed financial proposals according to SPRIHA with a timeframe for nomination of the IPR Chair Professor.

List of institutions to set up IP Chairs are: IIT Madras, Tamil Nadu; National Law University & Judicial Academy, Guwahati, Assam; Gujarat National Law University, Gandhinagar, Gujarat; National Law School of India University, Bengaluru, Karnataka; Cochin University of Science & Technology, Kochi, Kerala; Maharashtra National Law University, Mumbai, Maharashtra; Punjab University, Chandigarh, Punjab; National Law University, Jodhpur, Rajasthan; Nalsar University of Law, Hyderabad, Telangana; IIT Roorkee, Uttarakhand; West Bengal National University of Juridical Sciences, Kolkata, West Bengal; \* National Law University, Delhi.

## **November 6**

### **IITs see rise in PPOs as placement season nears**

<http://www.newindianexpress.com/nation/2018/nov/06/iits-see-rise-in-ppos-as-placement-season-nears-1894756.html>

The first phase of placement at the IITs takes place in the first two weeks of December every year.

WITH the annual placement season about to start in a few weeks, the country's premier technology institutes, namely the Indian Institutes of Technology (IITs), are hoping for even better prospects this year, especially as most of them have been flooded with a higher number of pre-placement offers (PPOs) as compared to last year.

The first phase of placement at the IITs takes place in the first two weeks of December every year.

“Students are being individually approached with jobs until placement officially begins on campus. Students decide to either accept the offers or wait for something better through the official placements. It is their choice,” an official from the IIT-Bombay placement cell said.

IIT-Madras received 130 pre-placement offers this year as compared to 114 last year , a jump of 14 per cent. The Department of Management Studies, IIT Madras, which coordinates its own internships and placements, has also recorded an increase in PPOs during 2018-19.

“The good number of PPOs is hopefully indicative of a strong placement season. The steady increase over the years in PPOs also points to the value placed by recruiters on the internship program,” said a senior official in training and placement cell at the Institute.

Most PPOs this year have been from sectors such as research and development, analytics, consulting and finance and fast-moving consumer goods.

“Many companies tend to wait till the campus interviews to share their final offer. However, over the last few years, PPOs are a rising trend, and the number of students accepting PPOs has also increased,” said an official from the IIT-Delhi placement cell. She also said, like every year, many offers have also come from the information technology sector.

Last year, IIT-D had received 180 PPOs, of which, 91 offers were accepted. This year, the institute has already received 151 offers and many more are still in the pipeline. “Over the next month, these figures will change, and the final count will definitely be higher as compared to 2017,” added the IIT-D placement official.

Officials at various IITs also said that the institutes were hoping to get up to 10 per cent increase in placement offers this year. Last year, several students from IIT Delhi and Kanpur had hit the headlines for receiving packages of over a crore per year.

### **IIT Madras develops human-centric business model to improve efficiencies**

<https://economictimes.indiatimes.com/industry/miscellaneous/iit-madras-develops-human-centric-business-model-to-improve-efficiencies/articleshow/66519449.cms>

IIT Madras has developed a human-centric business excellence model that helps manufacturers and the service industry to become competitive. Called Suzhal Management System (SMS) Business Excellence Model, it helps significantly improve business efficiencies, make companies more competitive and in the process further the government’s ‘Make in India’ mission.

The model has already been used by small and large-scale industries and implemented across sectors, ranging from leather-processing and automotive manufacturers to India Post and Indian Railways. Several companies have scaled up the training programme to include more employees in their group. Recently, Southern Railways had some of its engineers trained in using SMS and implemented multiple projects.

The Suzhal Management System has been used extensively to not only enhance processes but also bring about disruptive and innovative products. Many organisations have sent their employees to IIT Madras to be skilled in the processes of SMS to help build organisational capabilities. “This business excellence model is applicable across several sectors from service, manufacturing and all process-

oriented manufacturing companies and product development,” said Prof. Venkatesh Balasubramanian, department of engineering design, IIT Madras.

The model integrates human factors, lean tools and job rotation to address various interface issues such as man-machine, machine-method and man-method. After getting them in control, SMS helps provide a framework for facilitating work on materials.

One of the core ideas in developing SMS is to focus on intrinsic triggers for strategic implementation and human factors and ergonomics (HFE). Understanding HFE becomes essential from the perspective of standardising one of the most complex factors in manufacturing—human beings. The model helps understand skill deficit, deskilling of processes and thereby bringing about reliable low-cost automation. It has been continuously evaluated in various industry contexts to test for its agility, fidelity, robustness and ease of implementation.

### **IIT-Bombay team creates tiny bubbles for cancer drugs that can make chemo pain-free**

<https://theprint.in/science/iit-bombay-team-creates-tiny-bubbles-for-cancer-drugs-that-can-make-chemo-pain-free/145702/>



Patients receiving chemotherapy

**IIT-Bombay team has devised a drug carrier that can be used in combination with chemo to deliver treatment to exact site of tumour, keeping healthy cells safe.**

IIT-Bombay scientists have developed a therapy whereby two microscopic “bubbles” can deliver drugs straight to tumours, thus reducing the amount of healthy cells that would be affected in chemotherapy.

The mice on which the study was carried out reportedly demonstrated a 100 per cent survival rate.

The research has been published in the journal *Scientific Reports*.

Cancer has affected humans for millennia, and, so far, chemotherapy has proved to be one of the most effective treatments.

However, cancer cells tend to multiply quickly and chemotherapy simply targets the cells that are dividing.

This means that even healthy cells that aren't affected by cancer will be targeted by chemo drugs, which induce suicide in cells. Thus, whether the treatment is effective or not, the patient invariably tends to be in a lot of pain.

To improve the accuracy of drugs — so they target only an infected tumour and not healthy cells — as well as to reduce cancer cells developing immunity to drugs, lots of experimental work is underway around the world on 'combination therapy'.

These include the administration of two or more drugs to treat the same disease. With cancer, this is increasingly becoming the norm.

### **Ball-shaped carriers**

The IIT-Bombay team has devised a drug carrier that can be used in combination with chemotherapy to deliver treatment to the exact location of a solid cancerous tumour, keeping healthy cells safe.

The study has been performed on both lab-grown cells (in-vitro), as well as animals (in-vivo), with promising results.

The injectable consists of two microscopic ball-shaped carriers attached together: The smaller one is a capsule that will contain the potent drug to fight a cancer cell, and the bigger one a gas bubble that will act as a tracker that can be seen using ultrasound imaging.

The latter is 500 nanometres in diameter, and known as a "nanobubble", while the drug carrier is about 200 nanometres and called a "nanocapsule".

The tiny blobs will have two different effects in the body. First, they will be able to allow tracking through ultrasound as they travel through the bloodstream.

We can monitor their progress and wait for them to reach the precise point of the cancerous tumour. When they hit the region where the affected tumour is, ultrasound therapy can be administered to the exact target area. This process is known as guided cancer therapy.

The second occurs as tissues loosen when ultrasound is applied to the right spot. As the tumour area is administered ultrasound, the tumour tissues relax. The gas bubble undergoes multiple expansions and contractions, before eventually bursting.

The tiny nanocapsule has now been given an easy passageway to enter the tumour, thanks to tissue expansion. The capsule is made up of lipids that occur naturally in our bodies, and thus they are compatible to deliver the drug within the tumour at a precise location.

### **'Improved targeting'**

“This research presents an image-guided, ultrasound trigger-responsive platform for improved tumour cell targeting, along with real-time monitoring of the disease,” said Rinti Banerjee from the department of biosciences and bioengineering at IIT-Bombay, who led the study.

The two individual bubbles aren't a new invention. Both technologies exist independently. But they have not been used in conjunction before for treating cancer.

“To the best of our knowledge this is the first time a smart combination therapy with a pro-apoptotic biomolecule, a drug, and nanobubbles have been used together,” said Banerjee.

The study showed that ultrasound with the combination of the two bubbles is much more effective than any other combination of treatments and components.

Ultrasound image-guided therapy and ultrasound application therapy are growing fields in cancer research, and this study could help expedite more efficient treatments based on this technology.

## **November 5**

### **WiFi or cellular data? IIT-B scientists offer a way to choose**

<https://www.thehindubusinessline.com/info-tech/wifi-or-cellular-data-iit-b-scientists-offer-a-way-to-choose/article25429053.ece>



Team says its algorithms will enable optimal use of networks

Users of mobile data are always in a dilemma; what to choose — a WiFi or cellular network — for better data connectivity? Such questions may soon be a thing of the past if a team of researchers at the Indian Institute of Technology Bombay (IIT-B) has its way.



The scientists at IIT-B's Electrical Engineering Department have come out with a set of algorithms for network service providers to efficiently manage the choice of network for mobile devices.

Today, WiFi is available in most public places, thanks to hotspots. Although generally WiFi provides higher data speed compared with cellular network and is cost-effective, data rate starts to drop as more people connect to a single hotspot. On the other hand, if the number of data connections increase in a cellular network, it may lead to voice call blocking. The next generation 5G communications technology tries to address these limitations of mobile telephony, said the IIT-B scientists in a statement.

"But at present, these limitations are for real. Currently, there is no coordination between a WiFi network and 4G network. The decision to choose between either of the two networks is taken by the user. Our algorithms make it possible for the operator to take over this job," said Arghyadip Roy, a doctoral student with Abhay Karandikar, Professor, IIT-Bombay who recently took over as the director of IIT-Kanpur.

"The system that we have proposed on the other hand can give the network operator a chance to judiciously allocate better data transfer rates and quality of voice calls to the consumers," Roy told BusinessLine. It provides a central controller that can be used by the operator to monitor the connections at each cell tower or WiFi access points and decide if a data or voice call should be served using mobile network or WiFi.

"Controlling the access networks through a central, cloud-based controller is the future of mobile networks. People want to have the entire picture of the network and make decisions based on that," said IIT-B professor Prasanna Chaporkar, who along with Karandikar and Roy authored the paper which appeared in the IEEE journal Transactions on Vehicular Technology recently, in a statement.

The scientists said their idea was to find a way to make maximum utilisation of the system. That way, each user can get the best data rate possible while ensuring that the fraction of voice calls blocked stay within specified limits.

### **For App to Check Air Quality Index, Delhi Students Win US Award**

<https://www.ndtv.com/india-news/for-app-to-check-air-quality-index-delhi-students-win-us-award-1943346>

Their app, called Air Cognizer is simple to use and free. It will prove to be very useful people cities like Delhi, the society that gave away the award said.



The students have developed an inexpensive, portable and real-time air quality analytics application.

A team of Delhi-based engineering college students has won a competition by US' prestigious Marconi Society for developing an innovative mobile application that estimates the quality of air in one's neighbourhood by analysing the images taken by a smartphone camera.

The team, which won \$1,500 for their solution, developed an inexpensive, portable and real-time air quality analytics application: Air Cognizer. In this, a user uploads an image taken outdoors with half of the image covering the sky region

The application developed by Tanmay Srivastava, Kanishk Jeet and Prerna Khanna of Bharati Vidyapeeth's College of Engineering won the top spot in the contest organised in India under the Celestini Program, supported by the Marconi Society, according to an official release issued by the Mountain View, California-based Marconi Society.

The Celestini Program, named for the hill in Italy where Guglielmo Marconi conducted his first wireless transmission experiments, is run by winners of the Society's annual Young Scholar Awards, who work with technical undergraduate students in developing countries, to use technology to create social and economic transformation in their communities, it said.

"Using image processing techniques, features are extracted and the machine learning model estimates the Air Quality Index (AQI) levels for the user's location. The machine learning model is deployed on smartphones using Tensorflow Lite and Machine Learning (ML) Kit from Google," the release said.

An Android app of the same name is available at Google Play.

"Air Cognizer is simple to use and free -- and will prove to be very useful for citizens in cities like Delhi, where air pollution is particularly acute now," the Marconi Society said.

In India, the Celestini Program was started in 2017 in partnership with IIT-Delhi by Aakanksha Chowdhery, an ML Engineer with Google AI, who was selected as a Marconi Young Scholar in 2012 for her work in high-speed last-mile internet connectivity.

## **How IIT-Hyderabad became one of India's Top 10 engineering colleges**

[https://www.business-standard.com/article/education/top-faculty-rigorous-research-propels-iit-hyderabad-to-distinction-118110400494\\_1.html](https://www.business-standard.com/article/education/top-faculty-rigorous-research-propels-iit-hyderabad-to-distinction-118110400494_1.html)

The second-generation IITs are not only outperforming the older peers in terms of attracting marquee names, but also when it comes to rankings and salaries being offered

A vibrant research culture, top faculty, tie-ups with leading academic institutions around the world, and a relentless pursuit of ambitious goals, are some of the reasons why the Indian Institute of Technology-Hyderabad (IIT-H) has stood high in the rankings this year.

The IIT-H is among the top 10 engineering institutes in the National Institutional Ranking Framework of the Ministry of Human Resource Development, coming in at No. 9. In fact, IIT-H, one of nine second-generation IITs set up by the government a decade ago, was the only younger sibling that made it to the top 10.

The institution also came in at 16th place, ahead of some of its peers, in the recent UK-based QS India specific rankings 2019.

The first signs that IIT-H was making a name for itself emerged about five years ago when it became known for being popular with students and faculty, despite its newcomer status. “Our goal is to reach to the top league of IIT-Bombay, IIT-Delhi, IIT-Madras, and the Indian Institute of Science-Bengaluru. We are not there as yet,” said IIT-H Director U B Desai.

The sheer size of the campus alone speaks of ambition; it will eventually accommodate 20,000 students, double the size of IIT-Bombay, Madras, and Delhi.

As with any institution of higher education, the quality faculty distinguishes IIT-H and explains its academic and research performance. It’s not just that the faculty-student ratio is a healthy 1:13. It’s also the policy of faculty hiring throughout the year, as and when the management spot the right talent, rather than a need-based policy driven by faculty shortage.

According to Desai, the institute has been able to instil a strong sense of ownership and commitment among the faculty by extending them the academic freedom they need within the campus. “Some of us had offers from the older IITs, but we came here because we have a wider scope to contribute to the growth of a young IIT as compared to an established institute,” said Ch. Subrahmanyam, dean of academic programmes.

IIT-H currently has 2,600 students, almost a third of them in PhD programmes. The student numbers in the other second-generation IITs set up at the same time remains at around 1,500. “We may reach the full capacity strength of 20,000 over a period of 20 years. I expect that the current student strength would nearly double in the next five years,” said Desai.

Apart from an excellent campus and faculty, IIT-H has been doing well on other parameters: investing in research infrastructure, engaging in innovation in courses and curricula, acquiring an international dimension (it has collaborated with at least 50 overseas institutes), and the quality of its research.

The institute has published 3,000 research papers with one transfer of technology and filed nearly 85 patents. Desai said the effort is on to raise the quality of future research publications and citations to the level of international recognition.

The desire to excel in research is based on the realisation that research is the key differentiator among institutions of higher learning. This realisation has been backed by investments in research infrastructure and modern lab equipment. The campus has 110 laboratories, of which 50 are exclusively for research.

The outcome of this focus on research is that IIT-H claims that its ongoing research into 5G technology has been the best in the country. Battery and solar power technologies are among the other important research areas undertaken by the respective departments.

Electrical engineering and computer science are the two top areas of research, followed by chemistry, physics, and biomedical subjects. The total research funding being extended to all individual projects at the institute is to the tune of ~3.5 billion, according to Desai. Funding generated through industry collaboration is additional.

New courses are constantly being devised and offered to keep the curriculum fresh and relevant. Besides offering 'fractal academics' (continuous evaluation) to students and providing a wide choice on topics outside their core area, the institute launched new machine learning and artificial intelligence courses before other IITs. It was also the first to launch an M.Tech programme in data science for working professionals.

Its record on campus placements and internships is also something that students look at closely when they choose where to apply. Last year, about 100 companies visited for campus hiring. In all, 426 students were registered for placements during 2017-18. The previous year's students received 268 placement offers according to the data provided by the placements department.

Last year, a computer science graduate from IIT-H was offered an annual package of ~15 million through campus hiring.

A fat salary is not the be all and end all for Sumit Yempalle, who is doing a Master's in design. It is the 'intellectual buzz' at IIT-H that keeps him hooked. "What's amazing is the international exposure and the advanced research facilities. Lot of interesting things keeps happening on the campus all the time," he said.

#### **IIT-H: CASE STUDY**

- Ranked among top 10 engineering colleges in National Institutional Ranking Framework
- Ranked among top 20 Indian institutes in latest QS rankings
- Published 3,000 research papers, filed 85 patents

- 110 laboratories, of which 50 are exclusively for research
- 2,560 students; 850 are in PhD programmes
- Student-faculty ratio of 1:13, one of the best among IITs

### **November 3**

## **We are able to compete with many countries on faculty pay: R Nagarajan, professor, IIT Madras**

<https://economictimes.indiatimes.com/industry/services/education/we-are-able-to-compete-with-many-countries-on-faculty-pay-r-nagarajan-professor-iit-madras/articleshow/66492918.cms>

R Nagarajan, professor at the chemical engineering department of IIT Madras and the first dean of international & alumni relations, has been reaching out to professors and researchers abroad to find suitable faculty. He tells ET how the alumni are helping IITs find global talent and the challenges in tapping into a global talent pool. Edited excerpts:

### **Are systemic changes being put in place to attract more foreign faculty members to IITs?**

The ministry of human resource development wants the IITs to encourage innovation. For that, we need global researchers and faculty from diverse geographic, cultural and social background. To attract top researchers, like the US graduate schools, we have to focus on foreign faculty and that change in mindset is happening at the IITs. But to move up in the global rankings, we also have to attract foreign students, too. Alumni can also play a role in attracting foreign faculty and we are reaching out to them to help identify people.

### **Do you have any foreign faculty members at IIT-Madras?**

Out of 600 faculty members, we have 15 who are foreign passport holders. And of the total number, only five are not of Indian origin. This number is obviously too small and we aspire to hire at least 15% of our faculty – over 50 – from overseas. Of course, we will recruit academicians for the right reasons – because they are best in their field, regardless of nationality.

### **Are you able to offer salaries that are attractive for foreigners to relocate to India?**

Our salaries are attractive and we are able to compete with many countries in terms of attractive packages. In fact, besides the US, the UK, Germany and Australia, our salaries are globally competitive. Besides, living conditions on campus are world-class and we provide international research facilities. Religious and cultural diversity and India's vibrant democracy also attract many scholars.

### **Does India offer any advantages when compared with other countries?**

Education is highly subsidised at the IITs, especially for postgrad and PhD students. This means that funds can be utilised for other purposes such as building infrastructure and labs. Besides, the cost of

living in India is low and faculty members get attractive vacations and sabbaticals. The government's affirmative stand on OCI card holders is also attractive for that segment

## **Aristotle University confers honorary doctorate on IIT Guwahati Director Prof Biswas**

<https://nenow.in/education/aristotle-university-confers-honorary-doctorate-on-iit-guwahati-director-biswas.html>

Prof Biswas took over charge as the Director of the IIT Guwahati on September 6, 2013



Gautam Biswas, Director IIT Guwahati.

Aristotle University of Thessaloniki in Greece on Friday conferred honorary doctorate degree on Prof. Gautam Biswas, the Director of Indian Institute of Technology Guwahati (IIT Guwahati).

Informing this on its official Twitter on Saturday, IIT Guwahati stated: "Prof. Gautam Biswas, Director, IIT Guwahati, was awarded Honorary Doctorate degree by the Aristotle University of Thessaloniki, Greece on Friday."

Prof Biswas took over charge as the Director of the IIT Guwahati from his two-term predecessor Prof Gautam Barua on September 6, 2013.

Prior to his appointment as the IIT Guwahati Director, Biswas was the Director of CSIR-CMERI (Central Mechanical Engineering Research Institute).

Prof Biswas earlier served as the Professor of Mechanical Engineering at IIT-Kanpur and was the occupant of GD and VM Mehta Endowed Chair of Mechanical Engineering there.

Prof Biswas, who is well known for his deep involvement in research, has worked in the areas of computational fluid mechanics and heat transfer.

He has also been involved in numerical modelling of convective transport and conjugate problems in complex geometries.

Prof Biswas has also developed techniques for handling free surface flows, bubble formation in film boiling, dynamics of falling drops and turbulent transport.

The Aristotle University of Thessaloniki, which is the sixth oldest and among the most highly ranked tertiary education institutions in Greece, was founded in 1925.

It is named after the philosopher Aristotle, who was born in Stageira, about 55 km east of Thessaloniki. It is the largest university in Greece and in the Balkans.

### **IIT Guwahati hosts Japan Education Fair**

<https://nenow.in/education/iit-guwahati-hosts-japan-education-fair.html>

**It mainly focused on higher studies in Japan, student exchange programmes and internships.**

IIT Guwahati organized a Japan Education Fair in collaboration with the University of Tokyo, New Delhi Office recently.

The event was organized at IIT Guwahati campus and was attended by students and faculty members of the institute.

It mainly focused on higher studies in Japan, student exchange programmes and internships.

Representatives from top universities in Japan and the industry highlighted the benefits of studying in that country.

They also said that today education in Japan is being provided in English and many foreign students study there.

Masahiro Kobayashi, First Secretary at the Embassy of Japan in India asked students to select Japan as a destination for both study and work based on the rules Indians have to follow for applying for work permits or permanent residency in that country.

He also said that Japan's wish to have Indian students merges well with the Look East policy of the Govt of India.

The representatives present at the event were from prestigious universities like University of Tokyo, Yokohama National University, Saitama University, Ritsumeikan, Gifu University and companies like Hitachi.

A one-day bilateral symposium was held with Yokohama National University which witnessed paper presentations from the faculty members of the university and IIT Guwahati.

### **Samsung India conducts 8th Innovation Awards 2018 at IIT-Hyderabad**

<https://www.thestatesman.com/books-education/samsung-india-conducts-8th-innovation-awards-2018-at-iit-hyderabad-1502703894.html>

The awards were presented by Dr Alok Nath De, Senior Vice President, Samsung R&D Institute, India – Bangalore.



Samsung India conducted the 8th edition of the Samsung Innovation Awards 2018 at the Indian Institute of Technology (IIT), Hyderabad in association with its Entrepreneurship Cell. Samsung Innovation Awards aims to recognize and reward innovations that have the potential to revolutionize everyday living.

The first prize went to Kannan Chandrasekaran for his self-learning bot that can read through and understand data in an extremely short time and provide responses for questions asked about that data in any form or language, making it easy for users to find information in an easy manner.

The second prize went to V.Sushmitha, Anand Kadu and Dr Sushmee Badhulika for developing a low-cost platform for personal health care that is enabled by easily available devices such as a smartphone and could be mounted on a wearable device as well.

The vision of the team is to enable easily accessible and low-cost healthcare in remote parts of India.

A team comprising G. Hanu Phani Ram, Praveen Kumar Poola and Prasanth Panta won the third prize for their idea of using a smartphone-based method to study cells for early detection of oral cancers.

The awards were presented by Dr Aloknath De, Senior Vice President, Samsung R&D Institute, India – Bangalore.

The top three winners received prizes worth INR 1.5 lakh, INR 1.2 lakh and INR 80,000 respectively, while the other four finalists received awards of merit from Samsung.

This year's awards received a strong response, with 22 teams submitting their ideas. The final teams demonstrated their projects to jury comprising Dr Aloknath De, Dr MV Panduranga Rao, Associate Professor and Head, Department of Computer Science and Engineering, IIT Hyderabad and Dr Ajit Bopardikar, Senior Chief Engineer, SRI-B during the course of the event.

Dr Aloknath De, Senior Vice President, Samsung R&D Institute, India – Bangalore said-“Since its inception eight years ago, Samsung Innovation Awards have witnessed highly creative solutions with great technological and social applications. Bright young minds of the country need to choose impactful problems, think of innovative solutions and pursue step-by-step implementation. This year too, students of IIT-Hyderabad have submitted powerful ideas that made shortlisting winners a difficult yet delightful challenge. Samsung has been supporting deep-tech innovation over the years and we believe such opportunities alongside joint courses and emerging technology labs at top institutions will help take our vision forward,”



The 8th edition of Samsung Innovation Awards was initiated seven months ago. Students from IIT-Hyderabad were invited to submit their innovative ideas in IoT and related technology areas.

The shortlisting process was jointly conducted by professors from IIT-Hyderabad and researchers from SRI-B, who selected the seven finalists.

The winning projects were selected based on the degree of implementation of the proposal, prototype implementation, final product realization, business/market impact and the demo.

Professor Antony Franklin, Faculty Member at IIT-Hyderabad said-“Established in the year 2008, Indian Institute of Technology Hyderabad (IITH) has taken huge strides in research and education. Invention and innovation has been the governing vision for IIT-H. Over the past 3 years, IIT-H has an active collaboration with Samsung India on various academic activities, including jointly offered courses and hands-on labs. This year, Samsung Innovation Awards is being conducted here and the spirit and theme of this event is very well aligned with our vision. We are grateful to Samsung India for the continuing collaboration,”

### **Pune-based alumnus of IIT Bombay shares insights about his alma mater**

<https://www.hindustantimes.com/pune-news/pune-based-alumnus-of-iit-bombay-shares-insights-about-his-alma-mater/story-uK58sLriAxJZ2kUpUk7g1J.html>

Suneet Chitale, Pune-based prominent alumnus of Indian Institute of Technology, Bombay (IIT-B) shares his insights about how his alma mater has evolved over the years and how he is looking forward to the activities planned for the 60 years completion of the institution



Suneet Chitale at his office in Baner in Pune

Cracking the entrance exams for the Indian Institute of Technology is no more about merit, it is about strategy, says Suneet Chitale, Pune-based prominent alumnus of Indian Institute of Technology, Bombay (IIT-B). He shares his insights about how his alma mater has evolved over the years and how he is looking forward to the activities planned for the 60 years completion of the institution.

While discussing about the hype around getting admissions into IITs, he said, “ A majority of students are not completely sure of what they want to do. In our times, IIT served like as an open space to discover oneself, for the best minds in the country. Today, however, it is about cracking the code through strategy, thanks to the coaching centres.”

He added that the dearth of seats in IITs across the country has fuel the hype and has provided a lucrative business opportunity for the coaching centres.

“Businessmen smell an opportunity and use it. But, honestly it is a waste. The goal should be to get good and relevant education, not to just land yourself in IIT, just for the brand name. Parents as well as students should understand that. The cumulative amount spent every year on these coaching centres would indeed surpass the entire budget of the IITs,” he said.

Chitale belonged to the 1984 batch of Mechanical Engineering at IIT-Bombay, which was the last batch to have the 5-year-course. Now as the president of the alumni association of IIT-B Pune Chapter, Chitale organises various networking sessions and workshops on various interdisciplinary topics, for the alumni at Pune. One of its prominent events, ‘Innovations’ in 2010 showcased the innovation of Arunachalam Muruganatham, better known as the Padman.

On November 3, members of the association will assemble at this year’s biggest event, the diamond jubilee celebrations of their alma mater at Conrad Pune, at 6 pm.

### **IIT Roorkee team uses tamarind seed protein to treat chikungunya**

<https://www.thehindu.com/sci-tech/science/iit-roorkee-team-uses-tamarind-seed-protein-to-treat-chikungunya/article25413180.ece>



The NAG molecule binds to the TCELL protein and prevents the protein from binding to the virus, says Shailly Tomar (left).

### **Researchers are planning to test protein on animals to prevent and treat the infection**

Researchers have found that a protein found in tamarind seeds reduces the infectivity of chikungunya virus by 64% and the virus RNA levels inside infected cells by nearly 45%. Based on the promising results obtained through in vitro studies, the researchers are planning to test the protein on animals to prevent and/or treat chikungunya infection. Currently, there are no drugs to treat chikungunya or any vaccine to prevent it.

The study published in the journal *Virology* has for the first time confirmed that the sugar moiety on the surface of alphaviruses has a role in infectivity; this is known for other viruses such as HIV and influenza.

### **Virus compromised**

The team led by Shailly Tomar from the Department of Biotechnology at the Indian Institute of Technology (IIT) Roorkee found the tamarind protein (tamarind chitinase-like lectin or TCELL) binds to

the sugar moiety (N-acetylglucosamine or NAG) present on the surface of chikungunya virus. When TCELL protein binds to the NAG sugar moiety it nearly coats the virus particles thus preventing the virus from binding with the receptors on the host cells. Since binding to the host cell receptors, which is the first step in the infection process, is nearly prevented, the ability of the virus to infect the host cells is compromised.

Based on structural studies carried out by Pravindra Kumar's team at IIT Roorkee it became clear that the TCELL protein specifically binds to NAG sugar molecules. "Since tamarind seeds are traditionally used in Ayurveda to treat many ailments and conditions, we wanted to know the molecules in the seed. Two proteins were found in abundance. Based on amino acid sequence, we found one protein has both anticoagulant and blood thinning properties while TCELL, which is a lectin protein, binds specifically to NAG sugar molecules," says Prof. Kumar, who is a coauthor of the paper.

"We wanted to study if TCELL binds to chikungunya virus through the NAG moiety. Our hypothesis was that if the TCELL protein binds to NAG, the virus will not be able to attach and interact with host cell receptors leading to less infection," Prof. Tomar says.

The team first demonstrated the ability of the TCELL protein to bind to the NAG sugar moiety found on chikungunya and Sindbis virus, which too belongs to the alphavirus genus.

Binding of TCELL to chikungunya virus through the NAG sugar moiety was then confirmed by first treating the protein with the NAG molecule and then incubating the NAG-treated protein with the virus. "We found that the NAG molecule binds to the TCELL protein and prevents the protein from binding to the virus," Prof. Tomar says. "This helped confirm that TCELL binds to chikungunya virus through NAG."

They found that chikungunya virus treated with the TCELL protein showed nearly 64% reduction in the ability to infect host cells. But in the case of NAG-treated TCELL, the reduction in chikungunya virus infectivity was just 14%. "Like antibodies that bind to the virus surface and neutralises or prevents the virus from binding to the host cells, the TCELL protein binds to NAG and prevents the virus from interacting and infecting the host cells," she says.

TCELL protein of different doses was incubated with the virus for different time periods. They found that 100 micromolar of the protein incubated with the virus for just 30 minutes was sufficient to cause 64% drop in infectivity.

Explaining why only 64% reduction in infectivity was seen when the virus was treated with the protein, Ramanjit Kaur from IIT Roorkee and first author of the paper explains: "Besides NAG, there could be other sugar molecules through which the virus interacts with the host cells. Also, there may be other receptors on the host cells which allow the virus to get into the cells."

The antiviral effect of the protein was also assessed by measuring the RNA levels inside the infected cells. Treatment of the virus with TCELL led to a reduction of 45% chikungunya RNA levels inside the host cells.

“The TCELL protein can bind to glycan found on nearly 30 members of the alphavirus genus. So the finding of this study has huge implications,” Prof. Tomar says. Based on the findings of this work, Prof. Tomar and Prof. Kumar have filed a patent for chikungunya antiviral composition consisting of TCELL protein.

## **IIT Roorkee lends its expertise for sustainable maintenance of Purana Qila lake**

<https://www.indiatoday.in/education-today/news/story/iit-roorkee-purana-qila-lake-divd-1381607-2018-11-03>

***An IIT Roorkee team analysed data from various sources including Archaeological Survey of India and data available in the public and academic domains for the Purana Qila lake study.***

IIT Roorkee has lent its expertise to rejuvenate and maintain the Purana Qila lake with a plan to minimise seepage of the lake water by lining the lake bed with an impermeable membrane of Ethylene-Propylene-Diene Terpolymer and through a well-designed rainwater harvesting and ground water recharge system and creating a sustainable habitat.

### **Maintainance by DTDC**

The Purana Qila Lake is spread over 7 acres. From 2012 to 2017, the Delhi Tourism and Transport Development Corporation (DTDC) maintained water in the lake for boating by pumping water from the ground and allowing direct runoff to enter the lake during rainfall.

Concerns existed about the possibility of gushing of treated waste water from various neighbouring STPs lines without further required treatment.

### **ANALYSIS OF PURANA QILA LAKE BY IIT ROORKEE**

An IIT Roorkee team analysed data from various sources including Archaeological Survey of India and data available in the public and academic domains for the study.

The team examined the site details and found that the water that was maintained for boating was of poor quality and had excessive algal growth.

Seepage of water of such poor quality into the subsurface would have adversely affected the groundwater quality in the vicinity.

Once the boating operation and external pumping of water to the lake were stopped, the lake has since dried up completely.

During the subsequent rainy season, the lake was mushy at best and did not have standing water.

**The IIT Roorkee team headed by Prof Bhanu Prakash Vellanki analysed the NBCC proposal and recommended a plan of action. "Laying of the 1.5mm EPDM membrane below the lake bed was advised to reduce the seepage to the subsurface drastically. Synthetic liners such as the EPDM membrane have been extensively used in the West for the creation of artificial ponds for aesthetic purposes, canal lining, reducing seepage of lake, aquaculture pond lining, swimming pool lining, etc. Based on various preliminary calculations, we came to the conclusion that the lake is not prone to flooding during peak rainfall events.**

Dr Vellanki strongly emphasised the need for maintaining water quality of the lake, for the project to bear the desired results. This requires further treatment of the treated wastewater that is planned to be utilized to maintain water in the lake.

#### **About Purana Qila**

The Purana Qila is now newly restored with basic conserving and restoring activities, deepening of the lake and has contributed to the visual appeal of the structure.

Purana Qila has been one of the major tourist attractions in the national capital and a large number of visitors throng the historical site.

### **BMC to seek IIT-B's aid for pothole-free roads**

<https://www.hindustantimes.com/mumbai-news/bmc-to-seek-iit-b-s-aid-for-pothole-free-roads/story-UYphkbaYcPqQI58KH1Mx7M.html>

*The BMC will soon seek the guidance of the IIT in Mumbai to provide better roads in the city, which will last longer without potholes. The civic body hopes that the institute's expertise will help in designing roads and also in training the staff, if required.*



The BMC will soon seek the guidance of the IIT in Mumbai to provide better roads in the city, which will last longer without potholes.

The Brihanmumbai Municipal Corporation (BMC) will soon seek the guidance of the Indian Institute of Technology (IIT) in Mumbai to provide better roads in the city, which will last longer without potholes.

The civic body hopes that the institute's expertise will help in designing roads and also in training the staff, if required.

A senior civic official from the roads department, requesting anonymity said, "It is too early to say anything as we are yet to discuss this plan with IIT experts. However, we are positive about this plan. IIT is known for its engineering expertise and we intend to benefit from the same, especially to sort out the consistent issue of potholes."

The civic body's main focus would be to seek help in tackling potholes, uneven surfaces and also help in road designing, he said.

The official further said, if needed, the BMC staff would also be trained according to the experts' suggestions for better roads.

Vijay Singhal, additional municipal commissioner, BMC, said, "Yes we plan to use the expertise of IIT, and it is a good thing. I am sure with IIT's help, the BMC will further improve road quality."

However, activists are sceptical about this plan and say it will not work because the problem is not with the BMC's engineering, but with their conscience.

James John, activist from Action for Good Governance and Networking (AGNI) said, "The engineers recruited by the BMC are civic engineers. If the BMC has to take help from IIT, does this mean that the civic engineers are not educated enough to build good roads? If the civic body has a clear conscience, then it can build good roads."

### **Alumni son's gift to IIT Kharagpur arts hub**

<https://www.telegraphindia.com/states/west-bengal/alumni-sons-gift-to-iit-kharagpur-arts-hub/cid/1673700>

#### ***This is the second instance of a non-Iitian making a contribution towards the institute***

An IIT Kharagpur alumnus's son has contributed \$73,500 — Rs 50 lakh at the present exchange rate — to the Centre for Classical Arts, an offbeat field in an institute known for its technical and scientific pursuits.

The Centre that seeks to archive the teaching methodologies of Indian classical music.

The institute has earlier received donations for setting up schools in telecommunication, management and other such fields but this is the first time that funds have come for such an uncommon area of study.

This is the second instance of a non-Iitian making a contribution towards the institute, an IIT official said.

Shiven Malhotra, who works in the field of strategic investment in San Francisco Bay Area, attributed his choice of beneficiary to his association SPIC MACAY (Society for the Promotion of Indian Classical Music And Culture Amongst Youth).

"I have been associated with SPIC MACAY from the time it started and Kiran Seth, the driving force behind it. I have seen the impact it has made on our youth through schools and colleges and I just wanted to make sure that this legacy is carried on," said Malhotra, who graduated in economics from University of California, Santa Cruz.

"Bengal has a rich tradition of music and culture and I know that IIT Kharagpur will be a great home for these artistes to do some interesting research," said the Doon School passout.

In making the contribution, Malhotra has followed in the footsteps of his father Arjun Malhotra, who founded the GS Sanyal School of Telecommunication at IIT Kharagpur in 1996.

Malhotra senior is currently the chairman of SolMark and a software solutions firm, Magic Software Inc. “I am sure you would see donations from alumni children and others who believe in some technology or cause where institutions such as the IITs can take the lead. I do believe the younger generation is not just interested in ‘religious’ donations but are looking to get involved, monetarily or otherwise, in causes and technologies that will improve the quality of life for them and others,” he said.

IIT Kharagpur had collaborated with classical musician Ajoy Chakrabarty in April to record and digitise masterclasses on key Indian ragas at the Centre. IIT Kharagpur director Partha Pratim Chakrabarti had then said that the institute would fund the project but external funding was welcome.

Malhotra’s contribution is the first instance of external funding for the Centre.

The Kharagpur institute will soon receive another hefty donation from an alumnus. Partha S. Ghosh, a former partner at McKinsey & Company and now professor at Tufts University, signed a memorandum of understanding signed with IIT on October 2 and pledged to contribute 1 million dollar to the institute.

“I firmly believe that in the next 25 years the world economy will undergo profound changes never experienced before. Industries and governments will need to reinvent the basic tenets of capitalism implying the fundamental transformation of industry and economic models,” Ghosh said.

The academy would develop programmes to nurture leadership qualities in individuals, organisations and ignite the young minds for a larger goal in life.

“This would enable in leaders of various walks and segments of life to share their perspectives and help instil in individuals the power to prosper their leadership potential, making it a vibrant self-sufficient academy with a global reputation,” said director Chakrabarti.