

## Newspaper Clips October 7-19, 2017

October 19

### **IISc Bangalore in Top 100 of Times World University Rankings 2018's New Engineering and Technology List**

<https://www.ndtv.com/education/times-world-university-rankings-2018-by-subject-iisc-bangalore-in-top-100-of-engineering-category-1764802>

**Indian Institute of Science (IISc) Bangalore was placed among top 100 in Engineering category in the recently declared Times Higher Education subject wise World University Rankings 2018.**

NEW DELHI: Indian Institute of Science (IISc) Bangalore was placed among top 100 in Engineering category in the recently declared Times Higher Education subject wise World University Rankings 2018. While Indian Institute of Technology (IIT) Bombay found its place in top 200, IIT Delhi, IIT Kanpur and IIT Kharagpur were placed in 201-250 band. This engineering subject wise ranking is led by Stanford University (United States), California Institute of Technology (United States) and University of Oxford (United Kingdom).

According to Times Higher Education's new ranking for the subject, Asia is home to more world-class universities in engineering and technology than North America.

Of the 500 universities included in THE's 2018 engineering and technology subject table, 132 institutions are from Asia while 127 are in the United States and Canada.

China's Peking University is the continent's top institution; it joins the top 10 of the ranking of Times World University Rankings 2018's new engineering list, after climbing five places to seventh. National University of Singapore, Singapore, which came second as the best university in QS Asia University ranking recently also found its place in top 10 in this list.

#### **Times World University Rankings 2018 by Subject: Top 10 in Engineering and Technology**

THE World University Rankings 2018 by subject: engineering and technology top 10

2018 rank	2017 rank	University	Country	WUR 2018 rank
1	3	Stanford University	United States	+4
2	1	California Institute of Technology	United States	+0
3	5	University of Oxford	United Kingdom	-2
4	4	Massachusetts Institute of Technology	United States	0
5	2	University of Cambridge	United Kingdom	+3
6	6	Princeton University	United States	0
7	12	Peking University	China	+21
8	<1	National University of Singapore	Singapore	+22
9	8	ETH Zurich - Swiss Federal Institute of Technology Zurich	Switzerland	+1
10	<1	Technical University of Denmark	Denmark	+10

**This engineering subject wise ranking is led by US's Stanford University and Caltech**

Stanford University (United States), California Institute of Technology (United States), University of Oxford (United Kingdom), Massachusetts Institute of Technology (United States), University of Cambridge (United Kingdom), Princeton University (United States), Peking University (China), National University of Singapore (Singapore), ETH Zurich - Swiss Federal Institute of Technology Zurich (Switzerland) and Imperial College London (United Kingdom) have been ranked among the top 10 educational institutions of this THE ranking.

From India, IIT Roorkee and IIT Madras was placed in 250-300 band while IIT Guwahati was ranked in 301-400 band.

Among the top engineering and technology universities, Jadavpur University, National Institute of Technology (NIT) Rourkela and Tezpur University was ranked in top 500.

### **Celebrating Diwali without crackers? Look what research says about real cause of pollution in Delhi**

<http://www.financialexpress.com/india-news/celebrating-diwali-without-crackers-look-what-research-says-about-real-cause-of-pollution-in-delhi/899496/>

Supreme Court of India decided to curb the effect of Diwali firecrackers on air pollution by banning their sale in Delhi. But are firecrackers the only reason which makes Delhi's air so foul?

Today on Diwali, if you are in Delhi, you will have to celebrate the festival without firecrackers. Supreme Court of India decided to curb the effect of Diwali firecrackers on air pollution by banning their sale in Delhi. But are firecrackers the only reason which makes Delhi's air so foul? There are varied conclusions drawn by various research and studies done in the recent past. One of the most important studies was published in the year 2003 by Ministry of Environment and Forests. The research was based on data collected from 1970-71 to 2000-01 and it said that in 30 years, vehicles' contribution to particulate matter in Delhi's air increased over three times (23 percent to 72 percent). However, several studies done after that year, differ on their assessments of the role played by vehicles in contributing to air pollution in the national capital, according to an Indian Express report.

According to the IE report, in 2007, three years before the Commonwealth Games, the state government was worried about the rise in a number of vehicles in the city. That year, Department of Environment and the Government of the NCT of Delhi sponsored a study that done by IIT Delhi. The study revealed that vehicles in the city increased dramatically from 2.3 million in 1975 to 4.2 million in 2004. It had estimated that the number will go upto 7.2 million in 2016. The study concluded that "control on emissions of pollutants from vehicular traffic necessitates the control on the new registration of commercial diesel vehicles in Delhi". It noted that the "emission of air pollutants [is] directly proportional to the number of vehicles and concentration of ambient air pollutants is also directly proportional to the emission of air polluting sources".

Furthermore, there was another study done in 2008 by Central Pollution Control Board (CPCB) with National Environmental Engineering Research Institute (NEERI). The study found that road dust was the largest contributor (52.5 percent) to particulate matter in the city's air. This was followed by

industries (22.1 percent). Interestingly, the study attributed only 6.6 percent of particulate emissions to vehicles.

Again in 2011, a project named Safar (System of Air Quality Forecasting and Research) was published in 'Atmospheric Environment'. The project was developed for air quality forecasting during the Commonwealth Games. The study done under the project found that road dust from paved and unpaved roads was the largest contributor to air pollution (55 percent), followed by residential sources (15 percent), transport and vehicular pollution (13 percent), industrial sources (12 percent), and power (5 percent).

Last year in January a "Comprehensive Study on Air Pollution and Green House Gases" was published by IIT Kanpur. The study focused on five components: air quality measurements, emission inventory, air quality modelling, control options and an action plan. The study, while underlining the role of road dust, also stressed on vehicular emissions. It said that moving vehicles contributed to over 50 percent of Delhi's air pollution, and road dust (38 percent), vehicular pollution (20 percent), domestic sources (12 percent), industrial sources (11 percent) came in later.

### **IIT-Roorkee working on smart grid**

<http://www.deccanherald.com/content/638413/iit-roorkee-working-smart-grid.html>

IIT-Roorkee is part of an Indo-US consortium working on a mega project for smart energy distribution system.

The \$ 75 million project, called US-India collaboration for Smart Distribution System with Storage (UI-ASSIST), is part of the Indo-US Joint Clean Energy Research and Development Center (JCERDC) and will work towards addressing pertinent issues related to the adoption and deployment of smart grids, including storage in the distribution network.

One of the most important aspects of this project is to bridge the gap between smart grid, storage and renewable energy research in order to facilitate its subsequent adoption.

IIT-Roorkee has been awarded a grant of Rs. 417.52 lakh. The consortium will be divided into two teams, the Indian Core team and the US Core team.

The Indian Core team comprises IIT-Kanpur, IIT-Roorkee, IIT-Delhi, IIT-Madras, IIT-Bhubaneswar and The Energy Resource Institute, New Delhi. The US Core team comprises Washington State University, Massachusetts Institute of Technology and Texas A&M University.

Speaking about the smart grid project, Prof N P Padhy of IIT-Roorkee said: "In 2012, India, in its peak summers, had to experience a serious blackout where the entire country was under dark for three days, except the southern part. This led to lot of socio-economic problems in the life of people across the nation.

The reason for this was an increase in demand and cascading failure of generators. In spite of understanding the importance of renewable energy, it is not possible to have large-scale integration

of renewable to the main grid due to its limited capacity. Thus, the concept of Microgrid has gained a lot of interest in recent days.”

### **IIT-B now part of Navi Mumbai airport project**

<http://www.dnaindia.com/mumbai/report-iit-b-now-part-of-navi-mumbai-airport-project-2554065>

The City and Industrial Development Corporation (CIDCO) has roped in Indian Institute of Technology Bombay (IIT-B) along with the Central Institute of Mining and Fuel Research (CIMFR) to be guided on carrying out blasting activities for cutting out Ulwe Hill in order to construct the Navi Mumbai International Airport (NMIA).

The blasting will bring down the hill to around 10 meters from the current 90 meters and will pave way for constructing the runway of the proposed international airport.

Bhushan Gagrani, Managing Director, Cidco, said, "We have roped in the Dhanbad-based CIMFR, which is an expert in the field of blasting, and have also roped in IIT-B for the same.

Though IIT-B does not have the expertise in carrying out blasting but activities that are carried pre and post blasting would be undertaken under the guidance and expert suggestion of authorities from the IIT-B."

The blasting activities also include carrying out of trial blasting.

### **October 18**

### **Asian University Rankings 2018: IIT Bombay top among Indian universities, IISc slips**

<http://theinsidercarnews.com/2017/10/18/asian-university-rankings-2018-iit-bombay-top-among-indian/>

On the other hand, the city's other public institution, the University of Mumbai, has slid to the 801-1,000 range from the 701-750 bracket a year ago. This is the second QS ranking in which NTU topped NUS - earlier this year, in the QS World University Rankings, NTU jumped two spots to take 11th place, while NUS dropped from 12th to 15th spot. IISc, which was placed 33 previous year, has fallen to 51 this time. Indian Institute of Technology (IIT) Bombay emerged the best Indian university in the Quacquarelli Symonds (QS) Asian University Rankings for 2018, which saw most of the top Indian schools slipping in their rankings in Asia. In the ranking report released on Monday, IIT-Bombay held the 34th rank, IIT-Delhi held the 41st and IIT-Madras held the 48th position. While IISc dropped 18 ranks, Calcutta University dropped 17 places to 125th in Asia. The university appears to be on a fast track to becoming a regional educational powerhouse as just last month, the university made it to the top 400, out of 1,000 universities from 77 countries, in the Times Higher Education (THE) World University Rankings 2018. Overall, the Institution improved on its 2016/17 performance by one place. Among other parameters, the institute scored 44.5 in faculty-student ratio and 96.3 in staff with PhD. The institute has a score of 88.1 in academic reputation, 97.5 in employer reputation,

44.5 in faculty student ration, 96.3 in staff with PhD, 89.6 in papers per faculty, 9.7 in worldwide faculty, 6.3 in global students, 10.9 in inbound exchange students, 9.1 in outbound exchange students, and 41.4 in citations per paper. Ben Sowter, research director, QS, said, "While the methodology of the Asia Rankings differs from the one of the World University Rankings, Nanyang Technological University is the top-performing Asian University in both lists, according to our metrics".

### **IIT Roorkee joins Indo-US consortium for smart energy distribution system project**

<http://indianexpress.com/article/education/iit-roorkee-joins-indo-us-consortium-for-smart-energy-distribution-system-project-4896385/>

The project has named US-India Collaboration for Smart Distribution System with Storage (UI-ASSIST) and it will work to address social issues related to deployment and adoption of smart grids including storage in the distribution network.

The Indian Institute of Technology Roorkee (IIT-R) has announced that it has become part of the Indo-US Joint Clean Energy Research and Development Center (JCERDC). It is working on a US\$ 75 million five-year project for smart energy distribution system, Smart Grids.

The project has named US-India Collaboration for Smart Distribution System with Storage (UI-ASSIST) and it will work to address social issues related to deployment and adoption of smart grids including storage in the distribution network.

To facilitate subsequent adoption, the project aims to bridge the gap between storage, smart grid and renewable energy research. The institute has been awarded a grant of more the Rs 4.17 crores for the project and will work to modernise grids by making them smarter and increasing their resilience and reliability.

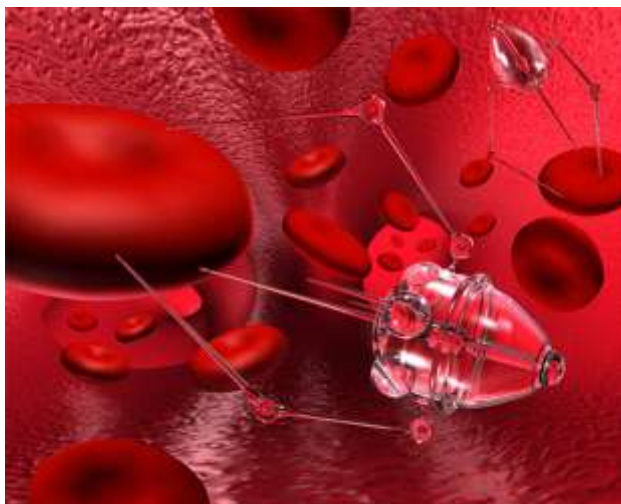
The consortium will be divided as Indian and US core teams. The US team will include Massachusetts Institute of Technology, Texas A&M University and Washington State University while the Indian team will consist of IIT Kanpur, IIT Delhi, IIT Roorkee, IIT Madras, IIT Bhubaneshwar and the Energy Resource Institute, New Delhi.

**October 17**

### **IIT -D researchers bank upon nanoparticles for drug delivery**

<https://www.biospectrumindia.com/news/58/9679/iit-d-researchers-bank-upon-nanoparticles-for-drug-delivery.html>

**Researchers have devised a simple method for achieving controlled and sustained release of drugs using a nanoparticle system.**



A group of researchers from Centre for Biomedical Engineering at Indian Institute of Technology (IIT), Delhi has devised a simple method for achieving controlled and sustained release of drugs using a nanoparticle system.

When conventional drugs are administered to the patients, these get easily cleared from the body and thus it becomes necessary for these drugs to be frequently administered. On the other hand, nanoparticles have been shown to be effective carriers of drugs. The nanoparticle system can increase the blood circulation time of a drug as well as help in targeting the drug to the disease site. This can help in improving the treatment efficiency.

The nanoparticle system developed by the research team shows a combination of release profiles, where there is an initial release of the drug, which on demand, can be accelerated using radiofrequency. Thus, the system can control when the drug has to be released. It is similar to loading few tablets in a reservoir and triggering when and how more drugs are to be released as per the requirement.

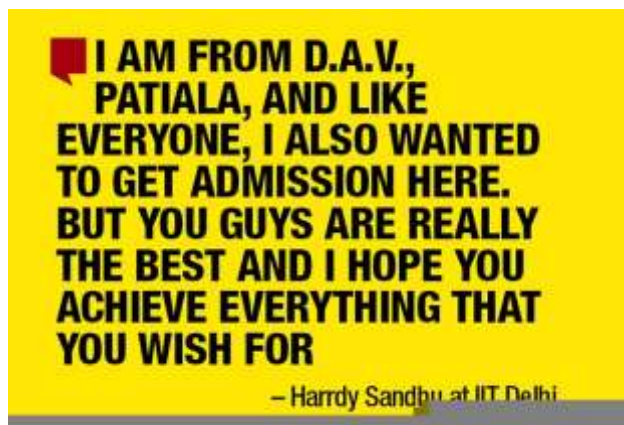
So, one can load different types of drugs used in combinatorial therapy and control the sequence of their release in body using the radio-frequency trigger.

### **IIT's rendezvous with Harrdy Sandhu**

<https://timesofindia.indiatimes.com/city/delhi/iits-rendezvous-with-harryd-sandhu/articleshow/61100612.cms>



Punjabi songs, dhols and singer Harrdy Sandhu dancing on the beats - IIT Delhi couldn't have asked for more on the first day of Rendezvous, the annual cultural fest of IIT-D. The singer performed on the first day of the fest as part of the Pro Nights. Like others, the singer also wanted to enter IIT. During his performance, he said, "I am from DAV, Patiala, and like everyone, I also wanted to get admission here. But you guys are really the best and I hope you achieve everything that you wish for."



#### **Soch was supposed to be my last song: Harrdy Sandhu at IIT**

Before singing 'Soch', the track that made him popular, Harrdy said, "This was supposed to be my last song. Iske baad itne paise nahi thay ki aur koi gaana bana pata. But because of the love that you guys have showered on me, I am able to continue in this field." After playing his popular tracks like 'Soch' and Backbone, the singer also entertained the crowd with songs like 'Channa Mereya' and 'Kabira'.



Harrdy Sandhu

#### **'He was the best person to open the pro nights'**

The amphitheatre at IIT-D was jam-packed as students danced and sang along with the singer. Nitesh Chaudhary, a student of Biotech from IIT-D, told us, "I am a big fan of his music. I think he was the best person and artist to open the first day of our Pro Nights."

Divya Garg, another student of Biotech, added, "The best part is that he sang other popular songs like 'Channa Mereya' and 'Maeri' during his performance. We loved it."

### **Bohemian rhapsody of art at IIT Delhi**

<https://timesofindia.indiatimes.com/city/delhi/bohemian-rhapsody-of-art-at-iit-delhi/articleshow/61100448.cms>



Colourful umbrellas, beautiful lamps and students dressed up in their best outfits - this was how IIT Delhi looked during Rendezvous, its annual cultural festival, which concluded yesterday. The theme for this year was A Bohemian Getaway and students ensured that the decor was in accordance with the theme representing Bohemian culture and lifestyle.



Along with the focus on decoration, the representatives from the Board for Recreational and Creative Activities (BRCA), which organizes Rendezvous each year, also organized various competitions at the fest. One such competition was the graffiti competition, where students painted the temporary wall-like structures in the institute's premises. The theme for the competition was Pop Art where students from different IIT branches and Delhi University took part. "Going by the theme, we created the mind of an artist and what all goes inside it. A part of it shows the meditative side and the creativity coming out of it. We have also added doodles in that," said Aashi Sandhu from College of Art.







**October 16**

### **IIT Madras gets world's largest combustion research centre**

<http://indiatoday.intoday.in/education/story/iit-madras-combustion-research-centre/1/1069497.html>

The world's largest combustion research centre was inaugurated at the Indian Institute of Technology, Madras today. It has been established at a total cost of Rs 90 crore.

Promising a giant boost to the Indian scientific community, the world's largest combustion research centre was inaugurated at the Indian Institute of Technology, Madras today.

The National Centre for Combustion Research and Development (NCCRD) was inaugurated by NITI Aayog member V K Saraswat in the presence of Prof Ashutosh Sharma, Secretary, Department of Science and Technology, a release by the Indian Institute of Technology, Madras (IIT-M) said.

#### **World's largest**

This is the world's largest combustion research centre, it said.

"With over 30 faculty members from six departments of IIT-M working on the project, this is the largest grouping of academic combustion researchers globally. In addition, the infrastructure facilities are also the largest for any combustion research centre in an academic setting globally," it said.

#### **Key points of interest**

- The NCCRD has been established at a total cost of Rs 90 crore
- NCCRD's research interests will cover automotive, thermal power and aerospace propulsion, besides fire research and microgravity combustion to minor extent
- The NCCRD has been established at a total cost of Rs 90 crore

- It will develop state-of-the-art capabilities in combustion research involving experts in the country
- The establishment of the centre will impart a major boost to the Indian scientific community and will provide an impetus to research in 'Alternative Energy and Environmental Protection' by focusing on effective utilisation of combustion as a means of thermo-chemical energy conversion
- NCCRD is supported by the state-run Science and Engineering Research Board of Department of Science and Technology (DST)

Saraswat was quoted as saying that NCCRD was one of the premier centres in the country. "The intention is to make it a knowledge base in areas like gasification, combustion, propulsion and automotive sectors. This is one of the best diagnostic centres in the country to understand combustion," he said.

"This centre will play a pivotal role in making sure that India has access to the latest technologies in all these areas," IIT-M Director Bhaskar Ramamurthi said.

### **October 15**

#### **Research and Enterprise park to be set up at IIT Bhubaneswar**

<http://odishasuntimes.com/2017/10/15/research-and-enterprise-park-to-be-set-up-at-iit-bhubaneswar/>

Bhubaneswar: Indian Institute of Technology (IIT) Bhubaneswar was granted permission to set up Research and Enterprise park on its premises here.

The permission and certificate have been provided by the Registrar of Companies (RoC) for establishing the proposed Research and Enterprise park at the IIT campus, informed IIT Bhubaneswar authorities.

Initially, the Research and Enterprise park will be functional inside IIT Samantpuri campus. Later, the institution will be shifted to permanent campus of IIT located on city's outskirts in Arugul.

The authorities have identified 70 acre at Arugul for setting up the Research and Enterprise park. All types of facilities will be available for the students for research at the centre.

The IIT Bhubaneswar will touch a new milestone in field of research and development, said IIT Bhubaneswar Director Prof RV Rajkumar.

It will help the meritorious students pursuing engineering, science and courses relating to agriculture to get new opportunity to step into the research, invention and enterprises, he said.

It will create a huge opportunity for expanding the start up activities, research and development of enterprises in Odisha. The Centre will also grant funds for the students towards skill development. The amount the premier institute is receiving for research, will be subsequently doubled, the authorities hoped.

While Prof Rajkumar will head the Research and Enterprise park, R&D division of IIT Bhubaneswar Dean RK Panda and Startup Centre PIC A Sharma will be appointed as the directors of the institution.

### October 14

#### **7th Pay Commission: Implementation of pay revision will hike teachers' salary in Rs 10,400-Rs 49,800 range**

<http://www.financialexpress.com/money/7th-pay-commission-attention-teachers-hrd-minister-prakash-javadekar-confirms-revised-pay-scales-will-be-implemented-from-this-date/894611/>

7th Pay Commission Teachers Salary: It was a big gift for nearly eight lakh teachers and academic staff of higher educational institutions when PM Narendra Modi led Union Cabinet cleared revised pay scales following the implementation of the 7th Pay Commission.

It was a big gift for nearly eight lakh teachers and academic staff of higher educational institutions when PM Narendra Modi led Union Cabinet cleared revised pay scales following the implementation of the 7th Pay Commission. The big development came last Wednesday. Now, most of the teachers, academic staff want to know that from when the revised pay scales will be implemented? HRD minister Prakash Javadekar has clarified that the approved pay scales would be applicable from January 1, 2016.

The decision will benefit 7.58 lakh teachers and equivalent academic staff in the 106 universities and colleges which are funded by the UGC and the union HRD ministry and also 329 universities which are funded by state governments and 12,912 government and private aided colleges affiliated to state public universities.

“In addition, the revised pay package will cover teachers of 119 centrally funded technical institutions — IITs, IISc, IIMs, IISERs, IIITs and NITIE,” a government statement said after the meeting.

“The implementation of the pay revision will enhance the teachers’ pay in the range of Rs 10,400 and Rs 49,800 as against the extant entry pay due to the implementation of the 6th Pay Commission for the pay of teachers. This revision would register an entry pay growth in the range of 22 per cent to 28 per cent,” the statement added.

“The Centre will bear the additional burden of the states on account of revision of pay scales. The measures proposed in the revised pay structure are expected to improve quality of higher education and also attract and retain talent,” Javadekar said.

The annual central financial liability on account of this measure would be about Rs 9,800 crore.

For state government-funded institutions, the revised pay scales will require adoption by the respective state governments.

## **Techies from IIT, MCA Grads Should Be Recruited As Cyber Crime Officials: Niti Aayog**

<http://odishatv.in/education/techies-from-iit-mca-grads-should-be-recruited-as-cyber-crime-officials-niti-aayog-248542/>

New Delhi: Graduates with specialisation in computer sciences and technological applications especially from reputed institutions like IIT should be recruited as cyber crime investigators, a Niti Aayog report has suggested.

The recommendations in “Building Smart Police: Background into the needed Police Reforms” report by the top policy making body is a part of reformative measures suggested to overhaul country’s police in the wake of new revolutionary digitised approach in fighting crimes.

### **October 13**

## **Chaayos raises \$2 million from Tiger Global Management**

<http://www.livemint.com/Companies/ypishVOzwiFDnygCHYwm9M/Tea-chain-Chaayos-raises-funds-from-Tiger-Global-Management.html>

The funds will be used by parent firm Sunshine Teahouse for expanding the chain of tea cafes, which it runs under the Chaayos brand



Chaayos CEO Nitin Saluja

**Mumbai:** Tea cafe chain Chaayos, run by Sunshine Teahouse Pvt. Ltd, has raised close to \$2 million from its existing investor Tiger Global Management in an internal round of funding, said two people familiar with the development.

Chaayos was founded in November 2012 by Indian Institute of Technology (IIT)-Mumbai alumnus Nitin Saluja along with IIT-Delhi graduate Raghav Verma. The Gurgaon-headquartered start-up has set up its tea cafes in cities such as Delhi-National Capital Region (NCR), Mumbai, Chandigarh and Karnal.

“Chaayos has recently raised funds from its main investor Tiger Global. The funds were raised through a rights issue, which was closed a few weeks ago. Tiger Global invested close to \$2 million in the company in the round. A few individuals also participated in the round,” said one of the two people cited above, requesting anonymity.

The funds will be used by Sunshine Teahouse for expanding the chain of tea cafes, which it runs under the Chaayos brand, he said.

“Another tea cafe chain, Chai Point, also raised some funds from its existing investors a couple of months ago and thus this fund-raise should help Chaayos keep up with the competition,” the person said.

Tiger Global declined to comment.

Saluja declined to comment on the fund-raise. “Being the leader of the chai cafe market, we have continuously improved customer experience by investing heavily in product development, technology and service. Chaayos is growing rapidly to reach the 50-cafe mark by end of this month,” said Saluja in his email response.

In the current financial year, Chaayos is well on its way to nearly tripling its revenues by growing to 70 cafes, he said.

“This growth is coming on the back of strong same store sales growth and high customer repeat, thus making us cash-positive. Tiger has been a very supportive partner on this journey because of strong fundamental growth,” Saluja added. Tiger Global first invested in Chaayos in May 2015, when it made a bet of \$5 million on the tea cafe chain.

In August, online portal Entrackr.in reported that Chai Point had raised an undisclosed amount of funding from its existing investors. Chai Point, run by Mountain Trail Foods, counts Eight Roads Ventures, DSG Partners and existing partner Saama Capital, as its investors.

The Bengaluru-based tea chain is currently operating in Bengaluru, Delhi, Gurgaon, Noida, Mumbai, Pune, Hyderabad and Chennai.

Others in the sector who have raised funds include Teabox.com, an online seller of premium tea, which raised \$6 million from venture capital firm JAFCO Asia and existing investor Accel Partners, along with Keystone Group Lp and Dragoneer Investment Group, *Mint* reported in March 2015.

## **October 12**

### **Shield for IIT, IIM higher pay**

### **- Faculty likely to continue earning more than varsity teachers**

<https://www.telegraphindia.com/india/shield-for-iit-iim-higher-pay-178205>

IIT and IIM faculty members and their fellow teachers at Centrally Funded Technical Institutions are likely to continue drawing a higher salary than those who teach in central universities and colleges even after the pay scale revision the Union cabinet approved yesterday.

Sources in the human resource development ministry told **The Telegraph** the higher pay package of teachers at the 119 CFTIs could be protected.

Some IIT teachers had voiced doubts whether they would continue to draw the higher scale because of the tussle between the government and the institutes over a move to raise resources internally.

The finance ministry had wanted all autonomous bodies to raise resources internally to meet 30 per cent of the additional requirement of funds to implement the revised pay scale. But most of the CFTIs had opposed it.

The HRD ministry sources, however, said the higher package for CFTI teachers was not likely to be linked to the resource generation target.

The Union cabinet had yesterday approved the Seventh Pay Commission package for teachers of central higher education institutes - universities, colleges, IITs, IIMs, NITs, IISERs and IIITs - raising the overall package in the range of 22 to 28 per cent. The package includes basic salary, grade pay and perks like medical and telephone allowances.

The ministry sources said the order would be issued after the cabinet secretariat officially conveys yesterday's decision.

The ministry had earlier set up a panel under Professor Ashok Mishra to suggest the scale for CFTI teachers. Another panel studied the recommendations before the finance ministry was consulted. After the finance ministry concurred the matter was sent to the cabinet, which approved the recommendations.

The revised scale will be worked out using a multiplication factor of 2.67 on basic pay for assistant professors and associate professors. For professors and directors, the multiplication factor will be 2.72 and 2.81, respectively, a source said, adding the grade pay and allowances would be subsumed under the package.

The All India IIT Faculty Federation, which had kicked off a protest earlier this week against the delay in announcing a revised package, today welcomed the government's announcement but demanded that details of the revised scale be made public. "The AIITFF feels that the recommendations of the Prof. Ashok Mishra committee and the report of the empowered committee should be made public," federation chief Prof. M.L.N. Rao said.

The Delhi University Teachers' Association (DUTA) said teachers were also apprehensive about service conditions under the revised scale. It is learnt that the new scale would be implemented

along with a tightening of the Academic Points Indicators (API), a system that links promotions to performance in various areas such as teaching and research.

"The (present) API system has denied promotions to the largest section of teachers and has encouraged a rat race for points, with disastrous consequences for the standards of higher education...", the association said in a media statement, possibly alluding to substandard research output in many colleges the API system had led to.

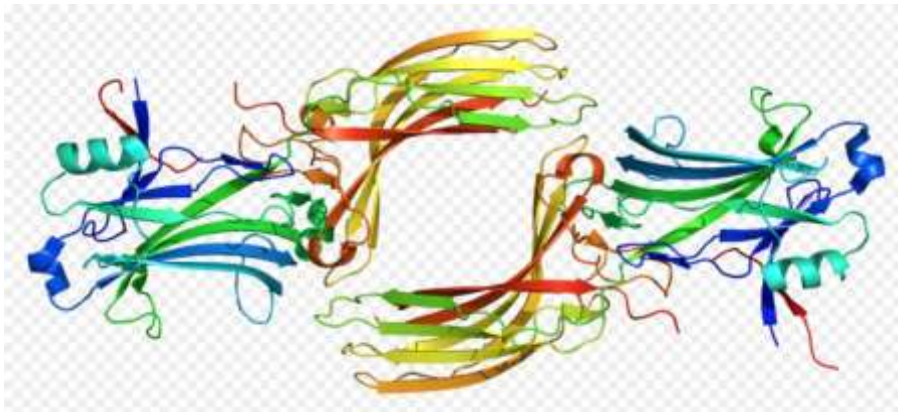
"The DUTA urges the UGC and the government to transparently finalise all details to the satisfaction of the teaching community and in the interest of quality higher education, at the earliest," it added.

## October 11

### **In Big Breakthrough, IIT Kanpur Team Builds Powerful Tool to Control Cell Signalling**

<https://thewire.in/186330/%CE%B2-arrestin-gpcr-cell-signalling-iit-kanpur-drug-development/>

**Scientists used artificial antibodies to stop a single signalling pathway among many controlled by the same protein – resolving a widely recognised problem in biology.**



The structure of  $\beta$ -arrestin. Credit: Emw/Wikimedia Commons, CC BY-SA 3.0

The inside of a living cell is a tangled web of interconnected pathways, where different kinds of data are ferried by millions of proteins. Decrypting a specific sequence of events in this chaotic mess is hard. Stopping or tweaking that sequence without touching any of the other pathways is even harder.

But scientists studying a vital signalling network have, for the first time, found a way to pinpoint and shut down a single chain reaction driven by a key protein without affecting the protein's other tasks. Specifically, they used artificial antibodies that bind to the protein and cut off a single pathway. The technique could be a powerful tool to precisely probe or rewire specific cellular events, according to its inventors.

Their results were reported in the journal *Nature Nanotechnology* on October 2, 2017.



“I think it is a very elegant study... a technical advance with interesting implications,” says Sandhya Visweswariah, a professor at the Indian Institute of Science, Bengaluru, who was not involved in the research. “I can see the utilisation in being able to understand biology better; maybe there will be more insight into the way pathways work, get turned on, etc.”

The network the researchers studied controls body functions such as sight, blood circulation and immune response, and is found in cells throughout the body. It is driven by proteins called G-protein coupled receptors (GPCRs). The hope is that the technique could help drug-development in the long term.

A majority of the cell’s activity is controlled by signals from GPCRs, which nest in the cell membrane and act as gatekeepers. They span the width of the membrane, with a docking spot outside and a tail that hangs inside the cell. When a ‘messenger’ molecule binds to the outer dock, GPCRs trigger changes in proteins that are attached to its tail (like a relay), which in turn affects another protein inside the cell and so on. Depending on what messenger binds to it on the outside, the ultimate result of this chain reaction is that the cell grows, multiplies or dies.

This relay is found in practically every organ, pulling the strings behind the body’s flight-or-fight response, the tightening of blood vessels or the rallying of defence mechanisms. The pharmaceuticals industry is keenly interested in tweaking their activity: about half of the currently prescribed drugs in the market act by targeting GPCRs.

One of the key players in the GPCR network is a protein called  $\beta$ -arrestin.  $\beta$ -arrestin keeps GPCRs in check by either binding to and cutting off their signalling or pulling them into the cell for digestion. Like many proteins that wear multiple hats,  $\beta$ -arrestin also drives other unrelated chain reactions, such as those involved in cell movement and programmed cell death. Interrupting just one or the other of its relationships with GPCRs without affecting its other tasks has proved challenging thus far, and is a widely recognised problem.

In this study, the researchers found that certain antibody fragments generated in the lab, called Fabs, were able to bind to  $\beta$ -arrestin and keep it from pulling GPCRs into the cell – while other actions went on uninterrupted. “Now we have a handle on selectively taking out one function while maintaining the other, and then we can study what happens to the cell, to the animal and so on,” says senior author Arun Shukla, an assistant professor at IIT Kanpur.

There are real-life scenarios where shutting down only one of  $\beta$ -arrestin’s functions could help. In patients with renal diabetes insipidus, for example, genetic defects cause  $\beta$ -arrestin to keep pulling GPCRs unnecessarily into the cell, ultimately upsetting the kidney’s water balance. Turning off just this action could prove useful in treating this condition.

To get antibody fragments that bind only to  $\beta$ -arrestin, Shukla’s team employed a technique that takes the genetic sequence of a fragment and fuses it with the DNA of viruses called bacteriophages. When

the virus makes its coat protein, it will also make the fragment and literally display it on the outside of its body. In this way, Shukla & co. created a 'library' with millions of viruses each displaying an antibody fragment. The whole library was then exposed to  $\beta$ -arrestin, and those that stuck to it were selected.

The researchers tested their approach on several GPCRs, such as those that control blood pressure, the flight-or-flight response and pain. They believe that it can be applied to most other GPCRs in the body as well.

Shukla suggests that their technique could also offer an edge over existing ones such as the popular gene editing tool CRISPR/Cas9.

CRISPR/Cas9 might, for example, bring about an effect similar to what the antibody does by introducing a mutation in GPCR. "However, what you are doing then is modifying the receptor all the time in the cell," says Visweswariah. "Here, if he has a way to control when the antibody is made by the cell, he can turn off the signal when he wants to" – the sort of control not possible with CRISPR/Cas9.

Shukla's team has been experimenting with lab-made antibodies that latch on to  $\beta$ -arrestin and GPCRs so that they can study them more closely. Recently, they were looking at how  $\beta$ -arrestin coupled with a protein called clathrin, which kicks off the reaction that pulls GPCRs into a cell. Shukla and his team were trying to get antibodies that lock GPCR,  $\beta$ -arrestin and clathrin into a tighter complex to take a closer look at how they interacted.

Instead, they stumbled onto antibodies that did the opposite: disrupt the complex by cutting off the  $\beta$ -arrestin-clathrin cross-talk – while leaving the  $\beta$ -arrestin-GPCR link untouched. "It was a bit of a serendipitous discovery," says Shukla.

Artificial antibodies are not new – but this is the first time that they have been used to shut down specific signaling pathways, according to Amitabha Chattopadhyay, a professor and GPCRs researcher at the Centre for Cellular and Molecular Biology, Hyderabad. He was not involved with the study.

Chattopadhyay points out several challenges to developing a generic tool that can fine-tune GPCR activity. For one, scientists don't entirely know what many of the 800 different types of GPCRs look like, let alone how they function. For another, their networks resemble complex electrical circuits with signals flowing in all directions. "The major experimental challenge would be to judiciously design and synthesise the antibody fragment so that there is no cross-talk with other pathways," he says. "Unfortunately, we don't know all the pathways yet."

Shukla's approach sidesteps some of these issues by targeting a well-known process that is believed to be common to most GPCRs, no matter what they look like. It could also be applied to other signalling systems. "If you have a protein similar to  $\beta$ -arrestin, then our conceptual framework can be applied,"

says Shukla. "If you can generate antibodies against that particular protein, which our technology can do, you can play with that signalling system as well."

## October 10

### **IIT researchers develop tool to synthesise new molecules**

<http://www.thehindubusinessline.com/news/science/iit-researchers-develop-tool-to-synthesise-new-molecules/article9896254.ece>

In what could be considered a boon for pharma and other chemistry-driven industries, researchers from the Indian Institutes of Technology in Delhi and Madras have developed a machine learning tool that can fish out new ways of synthesising novel molecules.

"Suppose you want to synthesise a new molecule and you know its structure from other studies, but not its potential method of synthesis, our tool lets you know whether an organism can help you make it or not," said IIT Madras biotechnologist Karthik Raman.

The algorithm that Raman and IIT Delhi computer scientist Sayan Ranu created does this by mining the repertoire of biochemical reactions available in public databases maintained by research groups across the world. The scientists who recently reported their work in the journal *Bioinformatics*, have aptly named the software tool Reactionminer.

Aravind Sankar, a dual degree student in IIT Madras' Computer Science Department, also contributed to the work.

"Given that so much information about different types of biochemical reactions in a variety of organisms is already available in the public domain, the knowledge captured in these repositories can be exploited to predict how a new compound can be made," said Raman, who is also with the Bhupat and Jyoti Mehta School of Biosciences at IIT Madras.

The tool would be particularly useful for chemical and pharma companies as well as for biologists who would like to explore why a biochemical reaction happens in a particular way when dozens of different chemical routes exist, said Ranu, who was with IIT Madras till December last year.

"The system that we developed offers (bio) chemists a way to play around and explore different options available to them. Typically, all such predictions are currently done by humans who depend heavily on what they have learned right from their school chemistry classes and go on to base themselves on intuition," said Ranu.

"With this tool, they can do it on a scale. They do not have to limit themselves to just one option or two. It is capable of giving them a number of options," he said.

"This is what machines are good at," Ranu explained.

To develop this software tool, which “learns” from knowledge available in public databases, the IIT researchers used Graph theory, a mathematical theory which in simple terms breaks down information into points, lines nodes and is commonly used by social scientists like sociologists.

The scientists used this to understand how chemical bonds are broken and formed to make new molecules and how enzymes act upon different classes of molecules.

Explaining it further, they said it was somewhat like Google Maps. When someone has to move from location A to location B, he or she is presented with a number of routes. But based on the mathematical modelling, Google Maps offers the person the fastest possible route.

And this happens inside our bodies too. For example, when we take food, it gets converted into sugar through a process called glycolysis. A particular chain of reactions occurs when the food is converted into glucose. Interestingly, this pathway is followed in most organisms, however big or small they are.

“This doesn’t mean there are no other possible pathways available. There are, in fact, hundreds of them. But surprisingly, it is conserved in most species,” said Raman.

Elaborating on its potential applications, Raman said it could find application in industries where metabolic engineering – where the metabolic machinery of a living organism is exploited to make molecules of import – is used. Currently, a range of chemical industries use bacteria like E. coli or fungi like yeast to synthesise industrially important molecules such as biopolymer or antibiotics.

“In 2006, there was a famous work in which scientists took the anti-malaria drug artemisinin and almost synthesised it in an organism – they stopped shy of just one or two final steps, which were carried out in chemical reactors,” he said.

As a next step, the IIT scientists plan to host an open web server based on their algorithm that could be used by anyone who is interested.

### **IIT-M urged to form bio-clusters in city to improve research**

<http://www.thehindu.com/news/national/tamil-nadu/iit-m-urged-to-form-bio-clusters-in-city-to-improve-research/article19830659.ece>

The Indian Institute of Technology—Madras could form a bio-cluster with institutions in the city, including a couple of hospitals to improve research, said Sowmya Swaminathan, Director General, Indian Council of Medical Research.

At the inauguration of the second block of the Bhupat and Jyoti Mehta School of Biosciences at the institute, she said the institute could form multidisciplinary consortia with various institutions in Taramani, and come up with translational products, making the best use of the available medical expertise in the city.

The institute’s state-of-the-art equipment could be used to find answers for the diabetes epidemic, given India’s diverse genetic population. The institute’s data science and the IT expertise could be

harnessed to look at demographic data, map hotspots and intensify control in infectious diseases, said Dr. Sowmya, who is also the Deputy Director General, World Health Organisation.

D. Karunakaran, head of the Department of Biotechnology, said the new block would not only offer additional laboratory space, but also house the Indo-German Sustainability Centre and the animal house.

The institute has a dedicated space for animal house besides the first of its kind community-driven National Cancer Tissue Biobank. The bank has over 1,500 samples collected from cancer patients in the city, S. Mahalingam, professor in the department, said.

IIT-M director Bhaskar Ramamurthi thanked the Mehta Family Foundation for their support.

## **October 9**

### **Fighting dreaded Chikungunya: IIT Roorkee researchers are working on a drug**

<http://www.financialexpress.com/education-2/fighting-dreaded-chikungunya-iit-roorkee-researchers-are-working-on-a-drug/886884/>

Researchers at the Indian Institute of Technology Roorkee have said they have discovered the antiviral potential of the drug piperazine and determined the mechanism to combat the deadly chikungunya, an infectious viral disease, which is transmitted to humans by mosquitoes infected with the virus.



The treatment focused on relieving the symptoms associated with the infection.

Researchers at the Indian Institute of Technology Roorkee have said they have discovered the antiviral potential of the drug piperazine and determined the mechanism to combat the deadly chikungunya, an infectious viral disease, which is transmitted to humans by mosquitoes infected with the virus. The research, published in 'Antiviral Research,' a journal of the Netherlands-based Elsevier group, talks about the potential of piperazine as a pharmacotherapeutic agent, and how binding these molecules to the hydrophobic pocket of capsid protein, present in chikungunya virus, offers a new perspective for therapeutic intervention, thereby inhibiting the spread of the virus.

“Piperazine is a drug commonly used in deworming treatments. Scientists discovered the antiviral potential of piperazine and determined the mechanism of inhibition of chikungunya virus using macromolecular crystallography. They found that piperazine binds itself well with the hydrophobic pocket on the alphavirus capsid protein. This pocket is key to the replication of the virus. The inhibition of this pocket prevents spread of the virus,” IIT Roorkee said in a statement.

Talking about the research, Dr Shailly Tomar from the Department of Biotechnology at IIT Roorkee said, “There is no vaccine or antiviral available for treating chikungunya. The treatment focused on relieving the symptoms associated with the infection. Developing a new antiviral drug molecule can take over a decade and that is the reason we are looking at repositioning existing, approved drugs and testing these to see if they might inhibit or kill pathogenic viruses.”

Dr Tomar said the research has shown that piperazine, a drug already in the market, is successful in curbing the spread of chikungunya virus in a lab setting. “We are testing the molecule on animals and hope to take this to clinical trials soon,” she added.

## **October 7**

### **Arabian Sea generating more moisture, fuelling heavy rain episodes: IIT-B study**

MUMBAI: When Mumbai and Hyderabad were brought to their knees by heavy showers on August 29 and October 3 respectively, a relatively new weather system was at play, says a study by a team from the civil engineering department of IIT-Bombay and other scientists.

"Moisture transport from the Arabian Sea" is the major contributor to these downpours, IIT-Bombay's Subimal Ghosh and the others said in a research paper published in Nature Communications earlier in the week. In other words, more moisture is being produced over the Arabian Sea than before; this is most possibly due to global warming that has led to increase in temperatures across the world.

Episodes of heavy downpour in central India — stretching from Mumbai to Bhubaneswar — have increased between 1950 and 2015 although the average monsoon rainfall here declined by 10%, the study said.

"Previous studies linked the rise in extreme rainfall events over central India due to an increase in the moisture content, which they linked to the rapid warming of the equatorial Indian Ocean," said the study. However, for the first time, the IIT study found that it isn't the Indian Ocean but the Arabian Sea that is producing more moisture. One study had linked the heavy rainfall spells to low pressure systems that developed in the Bay of Bengal.

"When there is a depression over the land, this moisture from the Arabian Sea rushes in, leading to

heavy showers," Ghosh told TOI. As Mumbai is closest to the sea, it bears the brunt of such weather changes.

The study found that extreme weather events had registered a threefold increase in the last 65 years. In fact, the study recorded that one such extreme event — say, 200mm rain within a couple of hours — now occurs at a frequency of once every year.

IIT-Bombay's civil engineering team also published another paper on Friday in Nature Scientific Reports that examined how moisture transport from the oceanic and terrestrial sources affects rain patterns. "Our studies will help better rain predictions," said Ghosh.