



## NEWS CLIPS

October 27- Nov 2, 2018

### Highlights of the Week@IITD

#### **Green Plates from Paddy Stubble: IIT-D Innovation Fights Pollution While Making Farmers Richer!**

October 27, 2018 <https://www.thebetterindia.com/163063/iit-delhi-innovation-air-pollution-smog-news/>

“The most basic fact which causes crop stubble burning, especially paddy straw, is the unavailability of its market. Unlike other agro-residues like wheat straw and bagasse, paddy straw is not used as an industrial raw material or even cattle feed.”

Winter is coming, and Delhi is already getting enveloped in the smog that smothers it every year. Firecrackers burst during the Diwali week, and stubble burning in villages in Punjab and Haryana are the major contributors.

According to a report in the Business Standard, this post-harvest custom is contributing to 20-30% of Delhi’s air pollution!

It’s a common understanding that this harmful method to dispose of paddy straw needs to be done away with. But from a farmer’s point of view, there really aren’t many options.

The Better India spoke to IIT-Delhi alumnus Ankur Kumar about a pilot unit they have developed that could potentially end this polluting custom.

“The most basic fact which causes crop stubble burning, especially paddy straw, is the unavailability of its market. Unlike other agro-residues like wheat straw and bagasse, paddy straw is not used as an industrial raw material or even cattle feed.

Therefore, any cost in collection, transportation and storage always exceeds the market compensation, so farmers choose to burn it,” Kumar said.



The farmers needed a sustainable solution to replace their stubble-burning methods which could also be profitable for them. For a common farmer who depends on the seasons and the markets to give him an income to last an entire year, spending a few thousand rupees every winter to collect and transport his “waste” residue isn’t affordable.

And so, a team in IIT-Delhi developed a unit that could take this residue and convert it into raw material for urban industries that make eco-friendly products such as pulp-paper and biodegradable tableware.

In this regard, they have developed a process of converting paddy straw (agro-residue in general) into different grades of pulp, which can be used as raw material for various end applications like making paper, biodegradable tableware, fabric, bioethanol etc.

“At present, our focus is on making pulp which is good enough to make biodegradable tableware. Because of the plastic ban in several cities, the demand of compostable tableware has increased exponentially, therefore fetching a premium price which is good enough to compensate at least Rs 5,000/acre to farmers, in return for their straw.

This is equivalent to 100% profit to the farmers as the cost of collection, transportation etc. is around Rs 2,500/acre,” elaborates 22-year-old Kumar.



The team has named the disposable tableware made from this pulp, KhaofECO. Made from agro-waste, they decompose easily, leaving no threat to the environment.

Adding to that, Pracheer Dutta who studied textile engineering from the premier institute, said, “I think we are the missing piece of the puzzle of solving the agro waste burning problem. We make tech to enable the uptake of agro waste, and also fill the voids in the market chain one by one. We are in the business of saving the environment.”

The team aims at empowering farmers to collect and transport their agro-residue to local entrepreneurs for a profit. These entrepreneurs will then turn the straw into pulp and sell it off to businesses that make biodegradable products from them.

Kanika Prajapat, the third team member from IIT-Delhi, told The Better India that the technology they developed adds value in rice straw to be potential stock material.



She says, “I believe the innovation lies in the overall concept of using agro residue to make different products. The business model is designed in such a way that the environment is kept at the highest priority, whether it’s reducing straw burning, utilising agro residue, making pulp technology green or reducing non-biodegradable plastic tableware.”

What started as a summer project back in 2014, has now turned into a full-fledged business idea. The team, headed by Dr Neetu Singh and PVM Rao, both professors at the institute, are looking forward to extending this pilot machinery into a commercial unit.

For this, they are proactively looking for private or government funding. You too can help them reduce one of the biggest contributors to Delhi’s winter air pollution. Send an email to Ankur at [ankur@kriyalabs.co.in](mailto:ankur@kriyalabs.co.in) for the same.

With Diwali around the corner as well as the season of harvest, two major polluters will be in full force. If farmers start adopting this method of using their agro-waste to make biodegradable products, not only will they reduce their contribution to the capital’s smog, but will also earn a profitable income while doing so. Great news for farmers, locals and entrepreneurs, IIT-Delhi’s innovation certainly is promising!

As Prajapat concludes, “At each step, our primary focus is always on reducing harmful impact on the environment.”

## **November 2**

### **IIT-R showcases its innovation, incubation**

<http://www.thehansindia.com/posts/index/Young-Hans/2018-11-02/IIT-R-showcases-its-innovation-incubation-/435691>



IIT-R showcases its innovation, incubation

Indian Institute of Technology Roorkee (IITR) is showcasing its Innovation and Incubation facilities at the 14th Higher Education Summit 2018, a Global Conference & Exhibition being held recently at

Vigyan Bhawan, New Delhi. The event has been instrumental in enhancing exposure to opportunities and increasing international visibility for collaboration in higher education and projecting India as an educational Hub.

Academics from IIT Roorkee will be meeting with delegates from 50 countries during the event. IIT Roorkee in its exhibits at the stall highlighted the support available at the institute for Innovators and researchers, support for Intellectual Property Rights and a conducive environment to study, research, innovate and convert ideas into concrete realities.

Prof Pravindra Kumar, Associate Dean, Corporate Interactions said, "The event is part of IIT Roorkee's efforts to take its academic excellence to an international audience. The Innovation and Incubation combined with the industrial consulting opportunities at IITR provide an excellent base for researchers and innovators looking for a global platform. By combining world class faculty with world class mentorship and extensive industry partnerships, IIT Roorkee provides the ideal launch pad for students looking to excel." The TIDES, an IIT Roorkee Business Incubator is showcasing three of its start-ups at the event:

Aeva Home Automation, an IOT based home automation company, which offers a suite of products, including Smoke sensors, voice remotes, motion sensors, smart lock door, CCTV cameras. Zuinik Energies inverter topology lowers the stresses on capacitors and improves power quality. Fermentech Labs, which produces enzymes and high calorific pellets from fermented agro-waste. Prof Arumugam, Associate Dean, International Relations, Prof Pravindra Kumar, Associate Dean, Corporate Interactions and Azam Khan, CEO TIDES are leading the efforts at the event.

The summit will bring together key stakeholders including policy-makers, educationists and industry for deliberations and knowledge sharing and provide a forum for facilitating partnerships and effective collaborations.

In addition to the conference, there will be about 200 exhibitors from top-of-the-line Indian and Foreign Institutions showcasing their products and programs. More than 1500 participants including 300 hosted foreign delegates from Africa, Middle East, SAARC, CIS, BRICS, EU, Canada, USA, UK etc. are expected to participate in the conference.

### **IIT Mandi set to make high speed nano chip for first time in India**

<http://www.millenniumpost.in/nation/iit-mandi-set-to-make-high-speed-nano-chip-for-first-time-in-india-325597>

Indian Institute of Technology (IIT) Mandi, which has emerged as one of country's pioneering institute set-up in 2009, is all set to make a high speed nano chip, first time in India, for country's millions of mobile phone users.

The Institute has set-up a Rs 50 crore state-of-the-art Centre for Design and Fabrication of Electronic Devices (C4DFED), which was inaugurated by R. Subrahmanyam, Secretary, Higher Education in the Ministry of Human Resource Development (MHRD), New Delhi. It's at this centre, the Institute will take-up manufacturing of nano-micro 2D & 3D fabrication workshop for manufacturing series of electronic and bio-medical devices and applications, nano/micro-chip will be one of the proposed innovations.

Till now, India doesn't have set-up such facility for manufacturing high speed nano/micro chips even as country has a largest number of mobile phone users, which need high speed data transfer facility for video chatting, voice calls and messaging on real time basis, says IIT Mandi professors.

Institute Director Prof. Timothy A Gonsalves and Prof Satinder Sharma, an assistant professor, Computing and Electronics said at Mandi on Thursday that chip, which IIT Mandi, will manufacture going to bring a new technological revolution in India.

The Institute has imported machinery and other equipments required for manufacture of the nano/chip from US, Germany and Europe. It has also tied-up with a Chandigarh based private company for help for next three years. The centre will first manufacture nano/micro chips for only strategic government organisations viz DRDO, ISRO and BSSC.

At a two-day international workshop, held at IIT Mandi, the Institute also brought together leading engineers, industrialists, scientists and student researchers from all over the world to discuss the progress and future trends in Nano/Micro 2D and 3D fabrication technology, used in the manufacture of electronics and biomedical devices.

Some of other luminaries who are sharing their ideas and knowledge at the workshop include Dr. Vivek Singh from Intel Corporation USA, Prof. V. Ramgopal Rao, Director of IIT Delhi, Prof. B. R. Mehta, also of IIT Delhi, Prof. Enakshi Bhattacharya and Prof. Nandita Dasgupta from IIT Madras, Prof. M. Jagadesh Kumar, VC of JNU, Delhi, Prof. Habil. Jörg Schulze from Germany, Prof. Kuen-Yu Tai from Taiwan, Dr. M. S. M. Saifullah from Singapore, and Prof. Ashok Srivastava, LSU, USA and Dr. Patrick Naulleau from Lawrence Berkeley National Laboratory USA.

Sharing an industry perspective at the workshop, Vivek Singh of the Intel Corporation USA said, "People want to be connected to a world of opportunity. Our job is to provide connectivity and education. We can play a crucial role in improving education by enhancing learning and teaching outcomes. I want all the young minds sitting here to consider that they will be bringing about change in the world."

## **November 1**

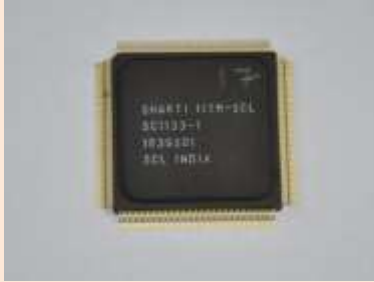
### **IIT-Madras creates 'Shakti', India's first microprocessor**

<https://timesofindia.indiatimes.com/city/chennai/iit-m-creates-shakti-indias-1st-microprocessor/articleshow/66454041.cms>



India's first indigenous microprocessor may soon power your mobile phones, surveillance cameras and smart meters.

'Shakti', designed, developed and booted by Indian Institute of Technology Madras, and with a microchip fabricated in the Semi-Conductor Laboratory of Indian Space Research Organisation (Isro) at Chandigarh, will reduce dependency on imported microchips and the risk of cyber attacks making it ideal for communication and defence sectors.



Prof Kamakoti Veezhinathan, lead researcher at IITM's RISE laboratory, said the design originated from an open source instruction set architecture, a set of basic instructions a processor understands, called RISC V, which makes it customisable to any device.

"We have done a normative design to show the feasibility. Different devices may need different type of hardware and may be even new features or instructions. All those aspects will now become easy now with our new design," he said.

Bluespec, an open-source high level synthesis language, went into making the chips, he added.

The brain of all computing and electronic devices, many such microprocessors that are connected are used to operate larger high-speed systems and super computers.



India's first indigenous microprocessor 'Shakti'

In July, an initial batch of IIT-M-designed 300 chips, 'RISECREEK', was fabricated at Intel's facility at Oregon, US, and later booted the Linux Operating System. Now, fabricated in the country, the microprocessor is completely indigenous.

However, Prof Veezhinathan said, the technology is different. The microprocessor fabricated in India was in a 180nm facility, while the one in the US was in a 20nm. lab.

“180nm, though outdated, is relevant as many applications across the world look for limited frequency. You do not need a washing machine or a surveillance camera running at one gigahertz. This chip can be used for any application where conventional power is available. While the other that we fabricated in the US earlier consumes less power and hence can be used in mobiles,” he said.

The microprocessor has already attracted the attention of Indian industry, and IIT-M is in touch with more than 13 companies involved in strategic and commercial applications.

The team is now ready with ‘Parashakti’, an advanced microprocessor for super computers. “The super scaler processor will be ready by December 2018. It will go into desktops and 32 of them interconnected can go into supercomputers.”

**October 31**

### **IIT Ropar's Huge Strides in Medical Technology**

<https://timesofindia.indiatimes.com/city/ludhiana/iit-ropars-huge-strides-in-medical-technology/articleshow/66438743.cms>













IIT Ropar, which was envisaged as a technology business incubation unit (TBIU), is carving out a niche for itself as the centre for developing new technology, especially for space and defence programmes.

The institute is also focused on region-specific research and development in water resources management and cancer research. It is also working on a project to establish a Bio-X Consortium to address big challenges in healthcare and medicine.

IIT Ropar director SK Das, the consortium can be used in smaller cities to rule out cases of cancer. “As Punjab has a high prevalence of cancer, especially in cities and towns where high-end diagnostic

equipment are not available, this Bio-X Consortium can be used to manage patients and the disease. The project is being undertaken in collaboration with IIT Mandi and PGIMER, Chandigarh. Once approved for commercial use, it would provide low cost cancer detection facilities across state which is grappling with high number of cancer cases,” he added.

## ONGOING INNOVATIONS

- 
**Intoxicated State Detection**
  - Automatic method for estimating if a person is drunk
  - Method achieves > 80% accuracy in detecting a drunk person. It capitalizes on visual cues
- 
**Detecting Group-level Emotions**
  - Deep learning based solutions.
  - Applications: Take better group images with the knowledge of group emotions
  - Auto summarize events based on emotions and image importance
- 
**Walking aid for aged people**
  - Variable height adjustment
  - Variable angle for aiding different kinds of tasks that requires partial sitting
- 
**Alarm for deaf**
  - Water would sprinkle over the face of those persons who are found to be sleeping at a specified time
  - This concept is originally designed for those students who sleep a lot
- 
**Bicycle exercise equipment**
  - A mobile system that can be fitted with any bicycle
  - Can be used along with cardiovascular monitoring equipment
- 
**Boiler-tube Coatings**
  - Various types of coatings have been developed and characterized for boilers.
  - The database developed is highly reliable as the results have been obtained in actual boiler conditions, that's why General Electric (GE) is testing and planning to commercialize some of the developed coatings in collaboration with his group under IMPRINT programme
- 
**Automatic Eye Gaze Prediction**
  - Where is the user looking?
  - Deep learning based solution
- 
**Hot -n- cold jacket**
  - Can retain heat or keep cold for long duration
  - Have internal piping system to pour hot or cold liquid
  - Can retain heat or cold for several hours
  - Originally designed for military application, this jacket can be provided to patients with fever in hospitals without ACs or heating systems
- 
**Bone measuring alignment device for knee surgery**
  - Knee replacement is a surgical procedure to replace weight-bearing surfaces of knee joint to relieve pain and disability
  - Knee joint is replaced with artificial joint called prosthesis
  - Surgeon needs to know the natural angle between the transepicondylar axis (TEA) and posterior condylar axis (PCA), which is different for different patients
  - Angle should be measured accurately, to ensure that there is no post-surgery complications
- 
**Converting stubble into acoustic boards**
  - The institute plans to hand over patented technology free of cost to state industry and farmers

In the field of surgical aids, IIT Ropar is developing a bone-measuring alignment device for knee surgery. As knee replacement or knee arthroplasty is a surgical procedure to replace the weightbearing surfaces of the knee joint to relieve pain and disability, the surgeon needs to know the natural angle between the transepicondylar axis (TEA) and posterior condylar axis (PCA) which is different for different patients. The angle should be measured accurately, to ensure that there is no postsurgery complication like persistent pain, stiffness and laxity.

The computer vision and machine learning for human behaviour analysis is another project that the IIT is working on. Intoxicated state detection can provide an automatic method to estimate if a person



is drunk. The method has achieved more than 80% accuracy in detecting a drunk person as it capitalizes on the visual cues.

The institute is also developing a walking aid for aged people that can be used for variable height and angle adjustments for different kinds of tasks that require partial sitting. The other projects that the IIT faculty is working on include an alarm for the deaf with features like water sprinkler for the face, a mobile system fitted with any bicycle that can be used along with cardiovascular monitoring equipment.

Das said the institute was engaged in the field of education and research and provides science-based engineering education to produce quality engineer-scientists. The institute, apart from establishing a robust teaching environment, is keen to facilitate and support cutting-edge research in a variety of areas.

It has also set up a robotic centre, called "PUNJRobotics" to coordinate local activities in robotics and also to link up with regional, national and international activities. Two PUNJRobotics studios are coming up where high-energy robots such as industrial, defence and agricultural robot applications and low-energy robots such as service robots where close human-robot interaction is essential, will be worked on.

### **October 30**

#### **IIT's internship ups chances of pre-placement offers**

<http://www.newindianexpress.com/cities/chennai/2018/oct/30/iits-internship-ups-chances-of-pre-placement-offers-1891682.html>

According to the data provided by IIT, only 69 students got these offers three years ago and since then this number has been steadily increasing mainly due to its internship.

The number of pre-placement offers in IIT Madras has seen a steady increase since last year as 130 students from core departments have received such offers in 2018-19 when compared to 114 students in the previous year, said an official statement from the institution.

<b>Pre-placement offers (PPO) at IIT-M</b>	
<b>YEAR</b>	<b>PPOs</b>
2015-16	69
2016-17	73
2017-18	114
2018-19	130

According to the data provided by IIT, only 69 students got these offers three years ago and since then this number has been steadily increasing mainly due to its internship. “The good number of these offers is hopefully indicative of a strong placement season. The steady increase over the years also points to the value placed by recruiters on the internship programme. During the internship period, students get a chance to display their skills to prospective recruiters,” said Manu Santhanam, advisor from Training and Placement Department of IIT Madras.

Of the total six companies that offered job propositions to students, Qualcomm and Samsung Research selected a highest of 19 and 16 candidates respectively. Sixty one per cent of the total pre-placement recruitment belonged to the Research and Development sector, while Analytics, Fast-Moving Consumer Goods and IT recruited 19,14 and six per cent respectively.

The Department of Management Studies which coordinates its own internships and placements also recorded an increase in such offers during 2018-19, added the statement. From a mere eight students in 2015-16, the offers have increased and this year 22 students from the department were recruited. Recruiters include companies such as Accenture, VIP Industries, Dell, Ford, Amazon, IBM, Tiger Analytics, Royal Bank of Scotland and more. “We work with firms that offer challenging projects and multiple job profiles to our students. We also support MSMEs and non-profit firms through our departmental initiatives,” said Usha Mohan, placement coordinator, Management department.

### Major sectors that offered PPOs in 2018-19

- Core and R&D: 61 per cent
- Analytics, consulting and finance: 19 per cent
- FMCG (Fast-Moving Consumer Goods): 14 per cent
- Information Technology: 6 per cent

### Companies that offered highest number of PPOs

- Qualcomm: 19
- Samsung Research (Noida, New Delhi, Bengaluru combined): 16
- Microsoft: 9
- Goldman Sachs: 8
- ITC Ltd: 7
- PPO from Start-ups (Aether Energy): 1

## We will launch Clensta's waterless FMCG products for B2C market next year: Puneet Gupta

<https://www.dnaindia.com/business/interview-we-will-launch-clensta-s-waterless-products-in-april-next-financial-year-puneet-gupta-2680728>



Puneet Gupta

Incubated in IIT Delhi, this two-year old start-up Clensta – derived from a combination of two words viz. 'clean instantly' – is a classic 'Made In India' venture that's revolutionising personal hygiene without the use of water. The idea not only address the issue of hygiene but also helps save water, something the entire world is working towards. An IIM Calcutta alumnus, Puneet Gupta, founder and chief executive officer, Clensta International Pvt Ltd, in conversation with Ashish K Tiwari, speaks about the unique waterless technology solution offered by the company, distribution in the business-to-business (b2b) space, addition of business-to-customer (b2c) vertical and future plans. Edited excerpts...

**Could you briefly tell us how this waterless personal hygiene business idea really shape up?**

I have been in defence services earlier working on a few projects with them. During the tenure I observed that our soldiers posted in areas like Siachen had no option when it came to maintaining personal hygiene in such extreme weather conditions and difficult terrain. My interactions with the various senior generals there was basically the starting point of creating a personal hygiene solution that didn't require use of water. Extensive work was done on changing the fomulation, ingredients, concentration to make our product. When applied/ massaged on the body our product absorbs all the molecues of dirt, oil, grease etc. and can be easily wiped away using a towel. While water was earlier required to remove the molecules that's not the case with our solution. That's how it becomes a waterless personal hygiene solution.

**How did you fund the venture? What's the current ownership structure?**

Raising funds wasn't easy in the initial stages as nobody was willing to invest at that time. So, when I proposed to IIT Delhi about what I wanted to do, they accepted it and gave me access to all the required infrastructure facilities, equipment and machinery worth \$20 million. Their support really helped in the research and formulation for this product. So the venture was incubated in IIT Delhi, which also funded the research. We also have Anurag S Rathore, chemical faculty at IIT Delhi as part of the core team. As for the intellectual property (IP)/ patent ownership is concerned, it is completely with by Clensta International. IIT Delhi is a shareholder with minority equity of 5% in the company. The balance 95% is held between the company, myself and a few other investors including the Indian Angel Network (IAN) and IAN Fund that has made a recent, undisclosed investment in the company.

**Is the product/solution a first of its kind globally?**

There is no direct competition globally. So as such, it is a first of its kind in the world. Having said that, there are some similar products available but it's more like a dry shampoo (akin to products by British hairdressing salon chain Toni & Guy), which is also called waterless shampoo. A cosmetic/ beautification product, it is targeted primarily at people (working women) who cannot wash their hair daily and are still required to well-maintain it. In our case though, the product offers a comprehensive hygiene wherein you can use it continuously for six months. That's the key difference with our waterless technology.

**So besides defence services, this product can be useful in other areas as well?**

Definitely. In fact, defence forces across the globe are already using our products. Additionally, there are various verticals like hospitals (in India and overseas), railways, airlines, adventure enthusiasts/

campus, lodging/ hostels, immigrants etc. who have been targeted with this product and have found great level of acceptability. In fact, the commercialisation of this product only began in February 2018 as prior to that, we were primarily doing research (funded by IIT Delhi) and working on finalising the product/ solution for use. We still have a lot of ground to cover in terms of making it available to the end consumers.

**How does it compare in terms of usage and pricing?**

A person will most likely use 20-25 ml of waterless body bath solution and the same would be true for waterless shampoo too. So quantity wise our products are on the higher side compared to 10-15 ml for body wash and 5 ml for shampoo. On the pricing front though we have a much more attractive proposition compared to various reputed brands and are priced at Rs 499 including 18% goods and services tax (GST). One also needs to take into account the 250-odd litres of water getting saved through use of our products. In fact, we have requested the government to consider the water saving aspect and bring us either in the 5% GST bracket or offer complete exemption from taxes. If that happens, pricing will reduce significantly making our products total value for money.

**Are you manufacturing the products inhouse or have outsourced it?**

The lab-grade manufacturing is being done inhouse and the commercial-grade manufacturing is being outsourced to Mumbai-based Cheryl Laboratories. The contract manufacturer (Cheryl) also makes for a host of Indian and multinational firms and we have a dedicated line for our products with a daily capacity of 2 lakh bottles.

**On the distribution front, are your products available across India/globe?**

At this point of time, India is covered and we are available across most metros. Globally, we have recently signed an agreement for 11 countries including MENA region and South Africa. We have also launched a global office in Netherlands. On the distribution front, since the target market is defence, paramilitary forces, hospitals and so on, we have not gone to modern trade as yet. We are working with a set of distributors that work mainly in the b2b space. We are also receiving encouraging inquiries from consumers who are interested in buying our products and will very soon be launching in the b2c segment through regular distribution channels as well as e-commerce.

**Will you have separate brands to address the b2b and b2c markets?**

The brand will be Clensta, which is an abbreviation of the words clean instantly. We will take a single brand approach for distribution all across India and the globe.

**How soon is the b2c part of the business happening?**

We will launch it in April next financial year. This will be done through stores of Future Group, Decathlon, Apollo Pharmacy and so on. We have already negotiated contracts with some of them to make our products available through their stores. Once the b2c part kicks in, we might have to increase the production capacity. Cheryl already has 11 factories and one of them could get dedicated to our line of products.

**What are your plans to increase the product offerings going forward?**

At this point, we have two products and by April next year we may add three more products to the portfolio. One of the products will be a waterless tooth paste. It will be an edible solution for dental/oral care. This will address the issues faced by patients in hospital who are unable to maintain a good dental/oral hygiene. People working in submarines will also benefit from this. Waterless anti-mosquito body bath will be another innovative offering. Consumers using this product will not face mosquito bites for 24 to 36 hours from its use. Water less washing for clothes/ apparels will be another interesting product.

**How do you see the fast moving consumer goods (FMCG) biggies responding to your line up of products?**

Developing a similar line up for existing FMCG majors will not be that easy. It cannot be built overnight and will take nothing less than 18 to 24 months for any player to even come closer to what we are offering. So we already have a first mover advantage here.

**Has any of the existing players approached you for a possible association?**

We already have a memorandum of understanding (MoU) in place with L'Oréal. The nitty-gritties are still being evaluated and worked out though.

**Will Clensta continue to be an independent firm? What are the possibilities of it becoming a part of a larger firm that's aggressively growing its FMCG piece?**

As a founder, I'll definitely like to scale up the business and it's very important to do it as fast as possible. I wouldn't want to use up a lot of time setting up a distribution base, logistics, etc. That's where acquisitions and partnerships come in and play a crucial role. There are certain terms that we'd like to be agreed to before getting into any partnerships as such. There is a lot left to do in the waterless technology space and we'd like to do that on our own. We are absolutely fine being part of a larger FMCG entity but will want to retain our individuality while operating as an independent business unit under their umbrella.

## **Unnat Bharat Abhiyan: Unlocking the job market for rural youth**

<https://www.financialexpress.com/opinion/unnat-bharat-abhiyan-unlocking-the-job-market-for-rural-youth/1365937/>

Rural technology adaptation will be boosted if it also generates employment through manufacturing units, supply and distributor networks.



There are success stories from Unnat Bharat Abhiyan. Examples include the development of a biogas conversion kit for diesel engines by IIT Delhi.

**-By SD Gupta**

The purpose of education, as enunciated by John Dewey and Gene Carter, is “to transfer knowledge and prepare young people to participate in democratic society.” Expectations from higher education are becoming demanding with complex societies asking for greater skills and capacities. The government’s Unnat Bharat Abhiyan deems to create a new learning model for the youth by utilising the raw intelligence of learners in esteemed institutions of higher learning towards the development of communities that surround them, in particular rural communities.

### **A collection of anecdotes**

There are success stories from Unnat Bharat Abhiyan. Examples include the development of a biogas conversion kit for diesel engines by IIT Delhi, the utilisation of paddy straw into bio-power generation through biomethane and bioethanol production, the modified bio-sand water treatment plant by NIT Manipur and so on. Some of these have managed to solve real problems such as sewage disposal, waste and water management, energy sources, organic farming, provision of basic amenities, and convergence of remote technologies. Students get to learn the practical aspects of the sciences taught in the classroom, while communities benefit. They also learn problem-solving skills, get feedback and obtain market inputs from grassroots populations. These are relevant industry skills.

### **Holes in the story**

About 68% of India’s population resides in areas classified as ‘rural’. Farming is not the only activity that drives sustenance in rural society. These communities need the same basic civic amenities that urban residents enjoy. The lone incentive-driven programme that supported community development initiatives in villages, the MGNREGA, has been considerably diluted, despite earning praise from economists such as Jean Dreze and Amartya Sen. A large number of NGOs are already involved in developing technologies for rural areas. But these technologies have hardly touched the lives of general rural people. With a population of 250 million, rural areas have a high degree of market potential. Many developmental organisations, apart from universities, are developing technological and social solutions for rural communities. But there is no concrete example of any such initiative changing lives.

### **The urban bias**

The problem with most of these programmes is they carry an urban bias and assume that benefits will trickle down to the masses. Social aspirations of these communities are not given due importance in technical applications. Most of these technologies are made with commonly available resources that aim to keep these ecosystems self-dependent. For example, there are easy-to-make chulhas and bullock carts. Comparable approaches in urban areas do not expect people to construct their own scooters or stoves. Also, developers of these technologies are only able to make minor improvements to existing systems. For example, most people prefer to cook food over a steady blue flame. There is a clearly present demand, but little work has been done to produce a steady blue flame from firewood or biomass. There seems to be a gap between the perceptions of national laboratories and research institutions, which have the technical resources but little knowledge of market demand; NGOs on the ground have knowledge of social aspirations and demand but no technical resources to act on them. There are clean and unadorned machines such as the bicycle that could provide a viable mobility solution for movement of light goods and passengers. A broad network of suppliers and easy availability of spare parts exist and provide ideal

conditions for the proliferation of this simple machine. Yet there is no government support to finance bicycle purchases or improve frames and load-carrying capacities.

### **Redesigning the model**

Rural development should best be realised by involving all stakeholders right from inception, market research, concept design and product distribution. Central funding can be obtained along existing lines. Industry linkages need to be established so that the mechanism of consumer demand comes into play. Convenience, and not ethical values, is the basis of market demand. Rural technology adaptation will be boosted if it also generates employment through manufacturing units, supply and distributor networks. Most people agree that higher education has a unique symbiosis with society. Continuous engagement between the two is necessary to sustain progress and growth.

Establishing a balance of education and transforming knowledge into skill and measuring the success of development programmes needs meticulous assessment. A robust registration of outcomes on a national platform will help understand the virtual success of all efforts. While governments need to be vigilant of the practices that institutions are adopting, each institution must come up with a self-assessment mechanism by unlocking the job market for rural youth. Employment generation is how a working plan can metamorphose into an iconic programme that will last as a model to follow for the years to come.

### **IIT Hyderabad launches interdisciplinary Liberal Arts Minor in ‘Artificial Intelligence and Humanity’**

<https://www.indiatoday.in/education-today/news/story/iit-hyderabad-launches-minor-in-artificial-intelligence-and-humanity-1378689-2018-10-30>

*The Minor at IIT Hyderabad is among only a handful of such initiatives globally in wanting to proactively take on questions regarding artificial intelligence (AI).*



The Indian Institute of Technology (IIT) Hyderabad’s Department of Liberal Arts has launched a Minor in ‘Artificial Intelligence (AI) and Humanity’.

Indian Institute of Technology Hyderabad’s Department of Liberal Arts has launched a Minor in ‘Artificial Intelligence (AI) and Humanity’. AI has been an exciting area of research and innovation for the scientific community for the better part of a century now.

***But the present moment is particularly important because the influence of AI on everyday lives is growing exponentially -- the way people interact with their bodies, their immediate environments, their societies, and the state are all increasingly mediated through AI.***

At this crucial point in its history, therefore, it is necessary to understand, question, and shape ways in which AI technologies are being incorporated into the fabric of everyday life.

"There is so much excitement about AI these days, about their transformative potential in terms of ushering in nothing short of a fourth industrial revolution. And indeed, we are already beginning to see the permeation of AI-based chatbots and such into routine everyday transactions," **said Dr Aalok Khandekar, Assistant Professor of Anthropology/Sociology, Department of Liberal Arts, IIT Hyderabad, speaking about the unique aspects of the Minor.**

"Many of the projected uses of AI are also really exciting: I was recently involved in discussions about what AI might mean for pursuing sustainability goals, for example. **And several wildlife conservation experts that I spoke with are truly enthused by the possibilities that machine learning can enable in terms of cataloguing biodiversity,**" he added.

#### **How the new Minor at IIT Hyderabad will work?**

- The AI and Humanity Minor is open to students from the **second year onward**
- The 12-credit Minor includes foundational courses in the history, philosophy, sociology, and psychology of technology, as well as courses focusing on the social, political, economic, and legal implications of AI, at a global scale
- As part of the AI and Humanity minor, **students will also undertake team-based project work**, supervised jointly by faculty across liberal arts, design, and engineering departments, to further explore the socio-technical dimensions of AI



The AI and Humanity Minor at IIT Hyderabad will expose students to exciting opportunities and challenges presented by AI.

#### **How will the AI and Humanity Minor help students?**

The AI and Humanity Minor at IIT Hyderabad will expose students to exciting opportunities and challenges presented by AI. Students will benefit from thinking beyond the purely technical aspects of AI.



***Humanities and social science scholars will team up with engineers and designers to offer wide-ranging interdisciplinary perspectives on AI and Humanity as part of this newly launched Minor by the Department of Liberal Arts.***

#### **Faculty team handling the Minor in Artificial Intelligence and Humanity'**

The faculty team handling this Minor include:

- Dr Aalok Khandekar (Department of Liberal Arts)
- Dr Nandini Ramesh Sankar (Department of Liberal Arts)
- Dr Anindita Majumdar (Department of Liberal Arts)
- Dr Haripriya Narasimhan (Department of Liberal Arts)
- Dr Mahati Chittem (Department of Liberal Arts)
- Dr Aravind Kumar Rengan (Department of Biomedical Engineering)
- Dr Sumohana Channappayya (Department of Electrical Engineering)
- Dr GVV Sharma (Department of Electrical Engineering)
- Dr Vineeth Balasubramanian (Department of Computer Science and Engineering)
- Prasad Onkar (Design Department)

#### **Challenges posed by the rise of artificial intelligence (AI)**

At the same time, however, **Dr. Aalok Khandekar** said that there were also daunting challenges that AI poses to questions of privacy, equity, labour, and jurisprudence.

How, for instance, do we rethink fundamental categories such as risk and liability cornerstones of how we have organized the insurance industry for so long in the case of autonomous vehicles?

***With greater penetration of AI, what kind of market disruptions are we likely to witness in countries like India especially, where the vast majority of the labour force continues to work in the informal sector? How should we best manage such disruptions?***



With greater penetration of AI, what kind of market disruptions are we likely to witness in countries like India especially, where the vast majority of the labour force continues to work in the informal sector?

**"The AI and Humanity minor at IITH is among only a handful of such initiatives globally in wanting to proactively take on these questions** more in the mode of collectively figuring out rather than having pre-made answers to pre-defined problems (as is often the case in teaching programmes). And we do this through interdisciplinary lenses, through a focus on technology-in-the-making rather than conducting post facto analyses," **said Dr Khandekar.**

### **About IIT Hyderabad**

- Indian Institute of Technology Hyderabad (IITH) is one of the six new Indian Institutes of Technology established by the Government of India in 2008
- In a short span of fewer than 10 years, the institute built on an imposing 570-acre campus and has been ranked among the top ten institutes for three consecutive years in the National Institute Ranking Framework (NIRF) released by the Ministry of Human Resource Development (MHRD), Government of India
- IIT Hyderabad has 190 full time faculty, 2,550 students of whom 20 per cent are women, more than 100 state-of-the-art laboratories and nine research and entrepreneurship centers
- The institute has a strong research focus with more than Rs 350 crore of sanctioned research funding while PhD scholars account for about 30 per cent of total student strength.
- IITH students and faculty are at the forefront of innovation with more than 1,500 research publications and patent disclosures, 300 sponsored/consultancy projects and 50 industry collaborations
- IITH has MoUs with 50 universities in the US, Japan, Australia, Taiwan and Europe
- IITH has been leading pioneering change in pedagogy with fractal academic programmes that encourage interdisciplinary learning spanning innovative technology, fundamental science, liberal arts and creative arts like photography, theatre and painting.

### **IIT Kharagpur-Technical University of Munich to push for hi-tech mobility in India**

<https://www.devdiscourse.com/Article/technology/235290-iit-kharagpur-technical-university-of-munich-to-push-for-hi-tech-mobility-in-india>

The two-day workshop that started on Monday has been organised by IIT Kharagpur and the Technical University of Munich (TUM) in the context of the newly-established Indo-German Collaborative Research Centre on Intelligent Transportation Systems - a joint centre of the IIT and TUM located within the campus

With more than 90 per cent of innovation in the automotive domain currently happening in electronics and software, an Indo-German cooperation can create new technologies and solutions not only for India but also for the global market, an expert said on Monday.

"The focus of innovation today is on intelligent software for safety, driver assistance, comfort and entertainment. Combining the software and Artificial Intelligence (AI) expertise of India with the

manufacturing leadership of Germany can bring about transformational benefits to both the countries," IIT Kharagpur's Dean of Sponsored Research and Industrial Consultancy Pallab Dasgupta said at a workshop here.

The two-day workshop that started on Monday has been organised by IIT Kharagpur and the Technical University of Munich (TUM) in the context of the newly-established Indo-German Collaborative Research Centre on Intelligent Transportation Systems - a joint centre of the IIT and TUM located within the campus here.

Dasgupta said the mobility landscape in India is undergoing a rapid transformation.

"On one hand the existing modalities of transportation have their unique challenges and on the other hand, it is great opportunities for both Indian and German industries and for them to work together.

"While German automotive technologies are a brand in itself, Indian software prowess is now also acknowledged all over the world. With more than 90 per cent of innovation in the automotive domain currently now being in electronics and software, an Indo-German cooperation can create new technologies and solutions not only for India but also for the global market.

"At this Center and with appropriate collaborations with industry partners in India and Germany, we are looking forward to shaping our research goals and schemes for long-term sustainability of the Center," he remarked.

This workshop, supported by the Indo-German Science and Technology Center (IGSTC) and the German Federal Ministry of Education and Research (BMBF), has brought together various transportation experts from Indian and German academia and industry, as well as policymakers and law enforcement agencies.

They will discuss potential solutions in the domains of Intelligent Solutions for Transportation Integration, Technologies for Electric Vehicles and Batteries, and Systems and Software Challenges in next generation vehicular technologies.

"Future transportation solutions in India must be developed with a holistic view of the wide milieu of options available in Indian cities, and integrated end-to-end solutions will make public transport in India more reliable and comfortable, and reduce the dependency on private vehicles" opined Professor Samarjit Chakraborty of TUM.

## **October 29**

### **IIT Guwahati researchers use aloe vera to separate oil from water**

<https://nenow.in/environment/iit-guwahati-researchers-use-aloe-vera-to-separate-oil-from-water.html>

*The researchers were able to separate both light (kerosene) and heavy oil from water using membrane*



The IIT Guwahati, which from time to time draws attention for research activities, has again made headlines for using aloe vera gel, which inherently has superior oil repelling (oleophobic) property, for the first time to separate oil from water.

A report published on Sunday by The Hindu stated that a researchers' team led by Dr. Uttam Manna from the Department of Chemistry at Indian Institute of Technology (IIT) Guwahati, so far researchers have only been mimicking the structure of naturally existing materials such as fish scales to achieve super oleophobicity.

The IIT-Guwahati researchers have proved that use of aloe vera gel-based coating modified with some molecules was sufficient to make the surface of substrates extremely oil repelling.

The IIT-G team led by Dr. Manna used the thick gel contained in the leaves of aloe vera plant to convert a commercially available porous material that is oil-loving (oleophilic) to become extremely oil-repelling by coating it with the gel, said the report.

According to the report, like a drop of water that nearly retains its spherical shape when placed on a lotus leaf, the commercially available material coated with the gel exhibited high oil contact angle of about 150 degrees under water. It has been reported that the greater the oleophobic nature of a surface the higher will be the contact angle and more spherical will be the shape of the oil droplet.

The report quoted Arpita Shome from IIT Guwahati and first author of a paper published in the 'Journal of Materials Chemistry A' as saying: "We were surprised seeing the gel exhibit super-oleophobicity. But even more surprising was that the gel retained super-oleophobicity even after we exposed it to several harsh conditions." The two other authors of the paper are Adil Majeed Rather and Dr Uttam Manna.

As per the abstract of the paper published on 'Journal of Materials Chemistry A': "Aloe vera mucilage (AVM), which mainly consists of an immobilized aqueous phase, is strategically exploited for achieving extremely oil repellent and durable coating. The nature-inspired coating — that derived from AVM and appropriately modified through Michael addition reaction, is capable of sustaining various challenging chemical (pH 1, pH 12, surfactant water, sea water, river water) and physical (150% tensile deformation, scratching and other abrasions) exposures—without compromising the embedded underwater superoleophobicity. Further, such material was successfully exploited for gravity-driven

and eco-friendly separation of oil/water mixtures—in various severe practically relevant physical and chemical circumstances.”

The researchers, as per the report, were able to separate both light (kerosene) and heavy oil from water using the membrane.

The report quoted Dr Manna as saying: “We were able to use the membrane repeatedly for at least 25 times to separate oil from water and the efficiency of separation remained above 97%.”

The membrane retained its efficiency to separate oil and water even under harsh conditions of extreme pH, high salinity, and low and high temperatures.

## October 27

### **From Nanomaterials to Ultra-thin graphene sheets, IIT Roorkee has developed many scientific advancements**

<https://www.indiatoday.in/education-today/featurephilia/story/nanomaterials-ultra-thin-graphene-sheets-iit-roorkee-divd-1376737-2018-10-27>

*Nanomaterial research takes a material science-based approach to nanotechnology, leveraging advances in materials metrology and synthesis which have been developed in support of microfabrication research.*

IIT Roorkee is one of the prestigious Indian institutions in India and has excelled with remarkable projects going under its different departments. One of its departments is 'Department of Chemistry' which has now come up with some highlights of its scientific contributions and research activities like Nanomaterials, ultra-thin graphene sheets and many more.

**India Today Education** had a conversation with **Prof Anil Kumar, Department of Chemistry from IIT Roorkee** about some highlights of scientific contributions and research activities.

**IIT Roorkee's Chemistry department** has made several innovative contributions to the research in Physical Chemistry, covering a wide range of topics in chemical kinetics, photochemistry, radiation chemistry and nanochemistry.

#### **What are Nanomaterials?**

**Nanomaterials** describe, in principle, materials of which a single unit is sized from 1 to 1000 nanometres but usually is 1 to 100 nm.

Nanomaterials research takes a material science-based approach to nanotechnology, leveraging advances in materials metrology and synthesis which have been developed in support of microfabrication research.

**Over the last 25 years, we have developed a wide variety of nanomaterials including carbonaceous, metals, semi conductors and their composites of varied dimensionalities, sizes and shapes having significant potential as energy materials through research projects funded DST and CSAR, New delhi.**

- said Prof Anil Kumar

**This work was initiated by us in late eighties in India and since then has made several important contributions to this area drawing global attention.**

**About Ultra-thin graphene sheets**

***Lately, we have synthesised ultra-thin graphene sheets, nanoribbons reduced graphene sheets and their Ag decorated nanocomposites as well as a few layers of thick N-functionalized rGo.***

- said prof Kumar

**The present work in Chemistry department of IIT Roorkee**

***Our present investigations are mainly focused on developing greener/biocompatible nanohybrids and integrated nanostructures with enhanced multifunctional features, addressing some environmental issues.***