There is nothing magical about the flip of the calendar, but it represents a clean break, a new hope, and a blank canvas.

Happy New Year 2024

-Jason Soroski
IIT-Delhi project looks to make biotherapeutics more accessible


Costs are likely to come down by 50-75% with the deployment of platform targeting manufacturing

Biologic drugs used to treat cancer and other auto-immune disorders are often beyond the reach of patients, due to their high prices. But IIT-Delhi has developed a platform that strikes at one of the key reasons for the high price—manufacturing.

Biotherapeutics are seen to be “100 to 1000 times more expensive” because of the cost of manufacturing, says Professor Anurag Singh Rathore, Indian Institute of Technology (IIT- Delhi). Rathore was principal investigator for a project that created a continuous processing platform to make biologic drugs. The process reduces cost of manufacturing by 50 to 75 percent, he said.

“Continuous processing is not new in manufacturing,” Rathore told businessline, pointing to sectors like semiconductors and computers, for example. But when drugmakers shift from batch processing to continuous processing, it can bring down cost, thereby improving access to patients, he says. In fact, it also helps keep the quality of the product more consistent, he says, touching on a point of concern for the bio-pharmaceutical industry.
Rathore was recently awarded the Tata Transformation Prize for healthcare, given by Tata Sons and The New York Academy Sciences. He was one of three winners from 169 entries recognised for innovations in healthcare, food security, and sustainability. The award comes with a ₹2 crore purse.

IIT-Delhi has collaborated with Ipca and Biocon, Rathore said, creating customised platforms for them. Collaborations involve multi-year agreements and a licensing fee, he said, adding that the team was open to partnering with more drugmakers in the country and abroad. About 15 patents have been filed on this novel approach, he added.

The shift to continuous processing would require a significant investment, including a possible overhaul of the old system or creation of a new facility, Rathore explains. However, this would be one-time and the company would subsequently be making more of the product, getting a return on its investment, he added.

There is cost and complexity involved and resources are needed, including a more skilled workforce, he says. “A typical biopharma facility costs ₹200-1000 crore (depending on the size) and a continuous facility will cost the same. Retrofitting a batch facility to convert it into a continuous facility will cost anywhere about ₹50-200 crore,” he explains.

The tech-transfer involves ensuring the manufacturer gets it right to be able to produce more affordable products, and getting regulatory approvals, he points out.

As the IIT-Delhi team looks to take this platform from the lab into more real-world settings, Rathore says, they are also planning to apply continuous processing to VLP (virus like particles) for vaccines and CAR-T which used in cancer therapy.

Vishwakarma Awards 2023: IIT Delhi, Maker Bhavan Foundation to conduct finale on Jan 6

The finale of the Vishwakarma Awards will be held at eDC IIT Delhi on January 6, 2024.

The Indian Institute of Technology, Delhi (IITD) is partnering with the Vishwakarma Awards for Engineering Innovation to conduct an annual competition to crown and champion technology innovators from science and engineering colleges in India.
The Vishwakarma Awards 2023 is co-organised by the WIN Foundation in partnership with IIT Delhi. The finale of the Vishwakarma Awards will be held at eDC IIT Delhi on January 6, 2024.

This award is conferred upon the students with the best innovation in each track/theme. This year’s tracks are water and sanitation, smart mobility, and clean tech. Innovations are evaluated on their suitability to solve a real-world problem.

Selected teams will receive financial assistance for prototyping, mentorship from industry experts, and a platform to present their solutions. Additionally, finalist teams recognised for “best product design” and “most innovative solution” in each track will qualify for additional support, including the chance to pursue an MBF fellowship for the further development of their prototype into a marketable product.

The objective of this competition is to motivate student teams to create inventive solutions addressing real-world challenges within the fields of water and sanitation, clean technology, and smart mobility.

**IIT-D professor explores mind-body problems, brain function simultaneously**


Dr Varsha Singh an associate professor of psychology with her students

**Imagine a psychologist and a mechanical engineer/economist working together, or a psychologist in a management institute. If you are still guessing about their work, you will be puzzled to learn about Dr Varsha Singh (46), an associate professor of psychology at the Indian Institute of Technology Delhi (IIT-D).**

Born and raised in Pune, Singh always had a natural inclination towards reading and observing the world around her, though her family was “purely non-academic, conventional and religious”, with her father serving in the police and her mother a homemaker.

She trained in kathak and science and grew up with two brothers, whose experience of the family was very different from her own. A huge extended family made a fertile ground for her sagacity regarding the variation in human behaviour, even in the same environment.

Singh entered into the field of psychology -- a humanities/arts subject -- after faring well in science at school. She went on to earn a PhD at IIT Bombay. The credit for fanning the flame of curiosity belongs to her many wonderful teachers, Fergusson College, and the British Library where she would immerse herself in the world of infinite knowledge. International students in the college exposed her to myriad human perspectives and experiences.
Officially belonging to the Department of Humanities and Social Sciences, this cognitive scientist’s workspaces are now scattered across IIT-D and AIIMS New Delhi. Engineering students tweak machines to measure brain activity, biology students find links between mood disorders and cognition, and psychologists’ study how a patient’s cognitive abilities are affected by epilepsy and other diseases or injuries -- all under her watchful eyes.

“It is not easy, you have to study twice and work twice or thrice as hard to fulfil the rigorous standards of two separate disciplines,” she cautions.

An interdisciplinary researcher belongs to neither discipline, yet shoulders the responsibility of correctness and relevance for both.

“I do not mind doing it. It is so much fun, it excites me to watch even the most subtle bit of information come up after the hard work.”

When interdisciplinarity tests her limits, Singh’s intrinsic curiosity to understand the variety in human behaviour and what drives it motivates her.

Does she get requests to collaborate for studies on the effects of breathing, meditation or yoga, now that mindfulness is such a buzzword? Yes, but not all mind-body questions have answers. The effects of yoga and meditation on the mind are too complex to be measured by quantitative techniques of cognitive psychology. So, many projects do not take flight. Nevertheless, in order to make significant progress or impact, it is imperative to use proven methods to solve new problems, she says.

As much as psychology can intimately inform real life, it is hard to find participants to study the most pertinent questions for ethical reasons.

Singh then resorts to animal models and initiates collaboration with biology labs. Similarly, exclusive reliance on self-report measures for understanding stress poses a problem of denial and desirability (people do not want to acknowledge or admit to experiencing stress).

She then draws upon the collaboration with life science labs to examine saliva samples to determine stress hormone (cortisol) levels.

The laboratory provides a controlled environment necessary for the robustness of outcomes, besides solving the gender gap prevalent in research of this nature. In the lab, both male and female baby mice can be monitored, while we may not get an equal number of subjects of either sex in the real-world scenario. In fact, the underrepresentation of female subjects is a major challenge in the field of psychology and cognitive science.
Sex differences in cognition and physiology are sensitive areas of research. “It is politically loaded… we have to be very careful not to let misinterpretations seep in. That the biology of males and females is different is beyond doubt. But when such differences are found at the level of their brain function or cognition, the implications, and thus repercussions, could be much more far-reaching,” Singh treads cautiously.

In the few very first independent investigations of her career, Dr Singh gauged the effectiveness of the national-level Common Aptitude Test (CAT), the IIM entry mechanism, at the Indian Institute of Management, Kozhikode. The performance and placement outcomes of candidates were correlated to their initial CAT scores. Could CAT scores predict placement outcomes? Yes and no.

People with high CAT scores did well in quantitative courses that rely on working memory but this did not translate to higher pay packages. Instead, performance on the qualitative courses that demanded problem-solving skills and a holistic perspective (big-picture thinking) was a more accurate predictor of the pay scales offered during placements. Additionally, Singh noticed that females tend to perform better in qualitative courses because they draw more from nuanced thinking.

Better working memory and better problem-solving skills are two distinct abilities considered as two of the four modules of any cognitive processing, but tests, specifically multiple-choice questions, tend to rely more heavily on working memory than other domains. Incidentally, males and females have disproportionate capabilities in these two domains. To be inclusive, tests could have proportional reliance on domains other than working memory.

Genders show differences in risk-taking behaviour as well. It might feel intuitive that women would avoid risks, while men would be prone to cheating on exams or what experimental economists call partner-deception. However, unlike the Western developed countries, there are fewer studies addressing deception and cheating in the Indian population.

Singh studied gambling behaviour during her PhD, and her interest in risky behaviour like deception (lying) led her to perform her own analysis on pooled data from the West, but it was not clear what the origins of those differences were. Was it social conditioning, or the need to survive? Could it be rooted in psychology or physiology? If both, then in what measure? Her research suggests that hormonal differences between the sexes may affect decision-making, especially information processing related to risks-rewards, as is seen in certain rodent studies.

Although the above studies were possible because female subjects were available, Singh was not always that lucky. Female participation for her ongoing sleep deprivation study was near impossible. “We needed to monitor them at 2.30 a.m., so no one agreed. We tried giving money, but it did not work. Even those staying in hostels did not participate.”
Singh then spoke with multiple small groups of women to make them realise how the effects of prevalent prescription drugs on female physiology remain unknown due to the lack of women participants in trials. The side effects of drugs come to light after women in large numbers suffer after using them. Such relatable discussions convinced more to participate.

“Small wins,” she says humbly.

Despite the relevance of her investigations and a steady flow of grants, Singh faces a high attrition rate among PhD scholars. “Demanding more from my students is my way, though maybe dysfunctional, to prepare and protect them [against future challenges]; you can neither bypass the journey nor rush it,” she reasons.

The higher standards are applicable furthermore because of the interdisciplinary nature of the work — these are riskier zones where higher and more niche validations must be sought, for example, in international conferences. Of the many valuable things, Singh guarantees are unquestionable training and abundant learning opportunities. “I do everything in my power to retain a girl student.”

“So now, after trying to convince new students how cool and amazing this work can be, I am starting to tell them early on to go find what gives them joy, where they would want to burn the midnight oil and do that instead of toiling miserably in research,” she adds.

Managing expectations through honest discussions and formal Q&A is on the top of Singh’s list. Academia — a field largely governed by ethical principles — helps her choose her work in ways that enable a fulfilling work life. All the undesirable spill-overs that research brings into her personal life as a single mother are over-compensated by the simple and stable life and the privilege to live on a safe, beautiful campus, giving her twin sons a hopeful picture of the world, where their will is above all.

“She is this knowledgeable, funny, incisive and sarcastic person who displays this refreshing intellectual honesty,” remarks Dr Sujoy Chakravarty, a behavioural economist at the Jawaharlal Nehru University and Singh’s collaborator of nine years.

Singh has been instrumental as a co-guide in some of Chakravarty’s PhD students’ work, which includes gender-based differences.

“She is a true argumentative Indian,” he adds, “but insightful in an unconventional way”, which he ponders is possibly a product of her non-mainstream training trajectory.

He describes Singh as one of the most self-driven, quality-conscious and rigorous scientists he works with. During academic argumentation, sometimes she is the one “taking the more rational economic stance and
me taking a more affective, behavioural stance. We always joke that I am the closet psychologist and she is the closet economist,” he quips.

Singh’s own students admire her dark humour and share her love for (dark) coffee, sometimes visiting her home for elaborate meals together. Yes, she can be very tough, but her care more than makes up for it.

**IIT Delhi students receive over 1,000 job offers in Phase 1 of placement drive**


As of now, more than 370 organisations across sectors offering 700-plus job profiles have registered to hire IIT Delhi students.

The Indian Institute of Technology (IIT) Delhi students have received around 1,050 job offers, including pre-placement offers (PPOs), with around 1,000 students being uniquely selected after the conclusion of Phase 1 of the placement season for the academic year 2023-24, stated a report in The New Indian Express. Over 50 international offers (including PPOs) were received by students from around 20 international organisations across geographies spanning Hong Kong, Japan, the Netherlands, Singapore, South Korea, Taiwan, the United Arab Emirates, the United Kingdom, and the United States.

Top recruiters on the campus in this phase in terms of the number of students offered jobs include Air India, Microsoft, Texas Instruments, Goldman Sachs, Bajaj Auto, and Ola Electric.

Speaking about the ongoing placement season, Prof R Ayothiraman, Professor Incharge, Office of Career Services (OCS), said, "Though it was anticipated to be a difficult year, we have done reasonably well in Phase 1 of the placement session. We gratefully appreciate the recruiters believing in our students' talent and potential and providing offers at this scale. We congratulate the students for being strong and giving their best."

As per the report shared by the IIT on Thursday, the students are mostly placed in Core (Technical) sector, followed by the IT sector, which is also core to some departments like Computer Science, Mathematics and Computing and so on. Further, roles in Management are core to students in the Management Studies Department.

Dr Anishya O Madan, Industrial Liaison Officer, Office of Career Services, IIT Delhi, said, "As expected this year, the core sector has picked up more students than previous years. We wish to thank and acknowledge all participating recruiting organisations for reposing their faith in our students. We welcomed recruiters hiring across domains. We look forward to this positive hiring trend continuing for the rest of the season."

The Office of Career Services, IIT Delhi, is striving to get more and more companies/profiles in Phase 2, which would start in mid-January, Prof Ayothiraman added.
The placement season spans from December to May for the full-time hiring of the institute's undergraduate and postgraduate students.

As of now, more than 370 organisations across sectors offering 700-plus job profiles have registered to hire IIT Delhi students. Of these, processes have been completed for over 450 job profiles in this phase; others will be scheduled in the next phase, Dr Madan added.

The efforts of the entire OCS team, including staff, student coordinators, and volunteers, coupled with the industry players across multiple domains resulted in a conduct of the selection processes.

Top recruiters at IIT Delhi:
Air India
Microsoft
Texas Instruments
Goldman Sachs
Bajaj Auto
Ola Electric

WorldQuant announces team from IIT, Delhi as winners of 2023 International Quant Championship
WorldQuant, a global quantitative asset management firm, announced the completion of the 2023 International Quant Championship (IQC). The three-stage, team-based quant competition took place on WorldQuant’s BRAIN platform, where over 30,000 participants from 100+ countries built alphas* and competed for cash prizes from a pool of over $100,000. Nihar Patel and Vaibhav Gupta, the talented young students from the Indian Institute of Technology, Delhi emerged as the winners of 2023 International Quant Championship organised by WorldQuant Asset Management.

12 teams from 12 countries, including Canada, China, Hungary, India, Malaysia, U.K., U.S., Singapore, South Korea, Spain, Taiwan, and Vietnam, participated in the 2023 IQC finals, the last of the three stages of the competition. The highest scoring national and regional teams from stage two were invited to the Bahamas to participate in a live challenge and presentation to determine the overall IQC winners. Participants were judged based on the criteria of their alpha creation and diversification approach, originality of ideas, logic of their selections and alpha performance.
“At WorldQuant, we are continually seeking ways to expand access to opportunities for talent worldwide,” said Igor Tulchinsky, Founder, Chairman and Chief Executive Officer of WorldQuant. “The impressive turnout of competitors in the IQC exemplified the Caliber of quantitative talent across the world. Their hard work and innovative ideas were inspiring, and I look forward to seeing what the future holds for WorldQuant BRAIN and quants worldwide.”

“Congratulations to the top three 2023 IQC winning teams, who represented leading universities including the Indian Institute of Technology Delhi, McMaster University and Edinburgh University,” said Nitish Maini, WorldQuant’s Chief Strategy Officer. “The students’ quantitative talent and ways in which they expressed their novel thinking was commendable. I look forward to seeing how WorldQuant will continue bridging the gap between talent and opportunity.”

WorldQuant’s BRAIN platform is an interactive, web-based simulation platform fuelled by data and technology where users can test alpha ideas in real time. High-performing BRAIN users have an opportunity to be considered for research consultant positions. Through BRAIN, consultants have access to resources to learn about quant finance, participate in competitions, submit alphas for potential compensation and connect with experienced quants and other consultants on the platform. The BRAIN platform has over 80,000 users and more than 3,000 consultants globally, who can utilize over 125,000 data fields to generate alphas and other algorithms and contribute to the larger WorldQuant effort. Learn more about BRAIN and sign up here: https://www.worldquant.com/brain/.

IIT-D study: Climate change strongly affects future fire weather danger in Indian forests

December 18, 2023

A study by IIT-Delhi warned that warming temperatures will increase the danger of fire in many Indian forests. IIT Delhi researchers developed a very high-resolution data set of future climate projections and used that data to calculate the Fire Weather Index (FWI) for forest regions of India. The results showed that forests in Central and South India and the Himalayan region will see significant increases in FWI by the end of the century. The fire season in these regions will also increase by 12-61 days.

As per the abstract of the study, human activity is causing the earth’s climate to change in unprecedented ways. Atmospheric temperatures are rising rapidly and will continue to rise in the future. “Days with severe fire weather danger will increase by up to 60% in dry forests but will reduce by up to 40% in humid forests.”

For countries like India, it suggests fragmented forests and diverse eco-climates, standards and mitigation strategies must be developed at regional instead of national level, as it stated that “the fire season will be longer by 3–61 days across the country and the pre-monsoon fire season will become more intense over 55% of forests.”

The study stated that almost 21% of India is covered by forests that are home to a wide range of species making Indian forests a biodiversity hotspot and are extremely diverse ranging from arid to alpine. It noted that forest fires occur throughout the year except for the peak monsoon period. “According to climate projections, India will experience a warming of 4.4–4.8 °C by the end-century as compared to the 1976–2005.

The IIT-Delhi researchers developed a very high-resolution data set of future climate projections and used that data to calculate the FWI for forest regions of India. The results showed that forests in Central and South India and the Himalayan region will see significant increases in FWI by the end of the century.
According to the researchers, these findings align well with the conventional wisdom that higher temperatures increase forest fire hazard.

Interestingly, the study showed that not to be the case in all forests. Humid tropical forests in the Western Ghats and parts of the North-East, where rainfall and humidity are projected to rise, will experience lower FWI despite the warming.

Somnath Baidya Roy, professor and head of the centre for atmospheric sciences, and a co-author of the study, said: “We must study forest fires in India at a high degree of granularity to properly represent the diversity in climate and forest types across the country. Course resolution global scale studies simply don’t work for us.”

The study was published in Communications Earth and Environment, a highly ranked journal from the Nature Springer group.

**IIT-Delhi Abu Dhabi: 25 seats in inaugural course; admission process, job prospects explained**


Graduates will join the IIT alumni network, who have played crucial roles in companies like Google, IBM, and many others: Top official
The Indian Institute of Technology Delhi Abu Dhabi’s (IIT-Delhi Abu Dhabi) inaugural batch will offer 25 seats, a top official has said. The programme at the first international campus of IIT-Delhi will see both Emiratis and international students enrol, he told Khaleej Times in an exclusive interview.

“Potentially, we will look into increasing the number of seats in response to a sustained rise in demand,” said Dr Ahmed Sultan Al Shoaibi, acting executive director of Higher Education Sector, Abu Dhabi Department of Education and Knowledge (Adek).

Scheduled to start in January 2024, IIT-Delhi Abu Dhabi will offer a master’s programme in Energy Transition and Sustainability (ETS).

**Admission and selection process**

Authorities have implemented a “thorough” admission procedure to ensure a “comprehensive and fair student selection process”.

Candidates will be evaluated based on their qualifications, language proficiency, and academic performance. A four-year bachelor’s degree in engineering or a related field, such as physical science, chemistry, environmental science, or earth science, is a prerequisite. “For students holding a three-year bachelor's degree, they must complete a two-year master's programme in the specified science field. The admission cutoff is a CGPA of 7.5/10, a 3.0/4.0, or graduating with a percentage of 75 and above,” the official explained.

Candidates with less than one year of work experience must score at least 350 in the Graduate Aptitude Test in Engineering (GATE) or a minimum quantitative score of 150 in the Graduate Record Examination (GRE). They will also have to take an admission test to demonstrate knowledge of engineering concepts linked to energy and sustainability.

“Proficiency in English must be completed through EmSAT, TOEFL, or IELTS. Exemptions apply for those who have completed their education in an English-medium institution from English-speaking countries.

“Shortlisted candidates with less than one year of experience will sit for a written test, while those with more experience can proceed directly to an interview.”

**The programme**

The two-year master's programme covering four semesters will offer specialisations in ‘Technologies for Decarbonisation’ and ‘Economics, Policy, and Planning for Energy Transition’.

“During the first year, students will explore core subjects like energy systems modelling and analysis, economics and financing of energy transition, in addition to foundation courses in engineering mathematics,
thermal engineering, electrical engineering, and process engineering,” said Dr Ahmed. “In the second year, students will undertake a supervised industry internship, followed by individual projects aligned with their chosen specialisations. Upon programme completion, graduates from the Abu Dhabi campus will join the distinguished IIT alumni network, who have played crucial roles in global companies such as Twitter, Google, IBM, and numerous others.”

**Campus, amenities and faculty**

The programme will be initially offered at a temporary campus adjacent to Zayed University. The campus will serve as the operational base until the permanent one is ready, said the official.

“The campus will accommodate specialised research centres with a focus on vital areas including sustainable energy, climate studies, computing, and data sciences,” said Dr Ahmed.

Accommodation will be available on IIT Delhi Abu Dhabi’s campus, the official added.

For the inaugural academic year, faculty from IIT Delhi will also be “seconded” to deliver the programme at the Abu Dhabi campus. “We look forward to attracting local expertise to join the faculty and contribute to the next stage of IIT-Delhi Abu Dhabi growth journey.”
Career path

The UAE has been seeing a growing demand to pursue higher education and careers in sustainability. “To meet this demand, the programme is structured to enrich students' core knowledge in technologies supporting renewable energy, thus contributing to sustainable economic development.”

The master’s programme is designed to equip students with the “advanced skills” needed for the emerging job market. “Graduates from IIT-Delhi Abu Dhabi will be well-prepared to excel in industries such as clean energy technology and engineering, procurement and construction (EPC), with diverse opportunities in system designing, commissioning, operation, maintenance, and manufacturing.”

The programme’s alumni will be ready to make a “positive impact” with relevant NGOs and think tanks, engaging in policy advocacy, contributing to startup ventures, and exploring innovative energy solutions.

Future programmes

According to the official, other academic programmes will be offered, including bachelor's, master's, and PhD, during its initial years.

“The establishment of research centres will follow suit, delving into critical areas such as Energy and Sustainability, Artificial Intelligence, Computer Science and Engineering, Mathematics, and various other engineering and sciences disciplines. The specific timeline for the introduction of these courses and offerings will be announced later,” added Dr Ahmed.

IIT Delhi’s Sonipat, Jhajjar campus being developed in a phased manner: Government


At IIT Delhi (Sonipat) campus, there are two facilities presently, the IIT Delhi Technopark (I-TEC) and Central Research Facility (CRF) that are fully functional

The Indian Institute of Technology (IIT), Delhi (IIT-D) is working on increasing its campus facilities in Jhajjar and Sonipat in Haryana. In a written reply in the Parliament’s winter session, Subhas Sarkar, Minister of State in the Ministry of Education said that the project is being undertaken in phases.

At the IIT Delhi (Sonipat) campus, there are two facilities presently, namely, IIT Delhi Technopark (I-TEC) and Central Research Facility (CRF) that are fully functional. That apart, a High Capacity Computing (HPC) facility for Artificial Intelligence (AI) with a data centre is being set up with the help of the National Supercomputing Mission (NSM), the minister said.
In addition to this, to strengthen and augment the existing research-relevant infrastructure, a new building under ‘Sophisticated Analytical & Technical Help Institutes (SATHI)’ scheme is being built adjacent to the CRF building, he added.

“The project is being implemented in phases keeping in view availability of faculty, sponsorship of research projects, etc,” Sarkar said.

Rangan Banerjee, director, IIT Delhi, had announced in August that the institute is opening two new campuses in Jhajjar and Sonipat in Haryana. The Sonipat project has a total cost of Rs 59.73 crore. The Jhajjar campus will be the country’s first-of-its kind institute for Patient-Specific Drug Development for cancer treatment, Banerjee had said.

IIT Delhi is also making its overseas foray, setting up a campus in Abu Dhabi, which is expected to start programmes in January 2024.

**IIT Delhi team wins Accenture challenge**


The Accenture Innovation Challenge 2023 saw the participation of over 182,000 students from over 6,600 colleges in India. 37% of these participants were women.

Each member of the grand prize-winning teams was awarded prizes worth Rs 1 lakh. The members of the first runner-up and second runner-up teams received prizes worth Rs 75,000 and Rs 50,000 each, respectively.

All eligible participants were also given the opportunity to participate in a fast-track recruitment process for Accenture’s Advanced Technology Centres in India (ATCI). Here are the winners from the engineering schools track.
**GRAND PRIZE WINNER**

Team Svar from IIT Delhi developed an AI and machine learning-based mobile app that automates and personalises speech therapy for children with speech impairments. Currently available in English and Hindi, the app plans to add more regional languages, and offers a 24×7 virtual speech therapist. It gives reward points to children who pronounce words correctly, thereby motivating them to continue their therapy.

- Ujwal Mathur
- Tejas Kumar
- Ekansh Agarwal

**FIRST RUNNER-UP**

Team ToKyO from IIIT, Naya Raipur, built BreaTHE, an AI and deep learning-based diagnostic system, meant to empower healthcare workers to diagnose pulmonary disorders by listening to the audio of patients' breathing. The affordable solution can diagnose and categorise the audio into respiratory conditions like chronic obstructive pulmonary disease (COPD), pneumonia, bronchiectasis, bronchiolitis, upper respiratory tract infections, and healthy lungs.

- Subhanshu Arya
- Harsh Pandey
- Aryaman

**SECOND RUNNER-UP**

Team Learnhattan, from BMS College of Engineering, Bengaluru, presented a blockchain and web3 platform called ‘Learn, earn, thrive’, which aims to transform the way people learn coding. While learners typically pay to learn, this solution allows learners to earn blockchain-based tokens for learning engagements. It aspires to promote a collaborative community of learners and course creators where everyone earns.
IIT develops sensor to monitor water quality in real time


By measuring their extracellular current continuously, the approach facilitates real-time monitoring of water quality.

The electro-microbiology faculty at the Department of Biochemical Engineering and Biotechnology at IIT Delhi has developed a sensor for real-time water quality monitoring using electricity-generating microorganisms. Known as “electroactive microorganisms”, these microbes generate electric current and are widely researched for power generation but can also be used for bio-sensing.

Specifically, the bio-electrochemical sensor developed uses “weak electricigens”, a category of electroactive microbes that are known for generating low electric charges. When they encounter a pollutant, their output decreases.

By measuring their extracellular current continuously, the approach facilitates real-time monitoring of water quality. Such technology could act as an early-warning system to be used in tandem with conventional monitoring methods that can be expensive or not amenable to 24/7 operation.

The sensor responded to a number of pesticides and could be used repeatedly for longterm monitoring, a crucial feature for areas frequently exposed to water contamination. In future, such technology may also be useful for detecting emerging contaminants that are not typically covered in routine tests.

Many natural environments appear to host weak electricigens, raising the possibility of future on-site sensors as well as easy incorporation into existing monitoring stations. The findings have relevance to the widespread adoption of water quality monitoring that will be required to meet the UN’s Sustainable Development Goal of sufficient water and sanitation by 2030.

The findings were authored by Dr. KartikAiyer (former postdoctoral fellow), Ms. Debasa Mukherjee (Ph.D. scholar) and Prof. Lucinda Elizabeth Doyle (Assistant Professor) from the Department of Biochemical Engineering and Biotechnology, IIT Delhi, in a research paper entitled “A Weak Electricigen-Based Bioelectrochemical Sensor for Real-Time Monitoring of Chemical Pollutants in Water”, published in ACS Applied Bio Materials published by the American Chemical Society.
**Useful in identifying emerging contaminants**
Such technology could act as an early-warning system to be used in tandem with conventional monitoring methods that can be expensive or not amenable to 24/7 operation. In future, such technology may be useful for detecting emerging contaminants, not usually identifiable.

**Creatara, an IIT Delhi Innovator, launches e-bike**
*December 12, 2023* [https://garhwalpost.in/creatara-an-iit-delhi-innovator-launches-e-bike/](https://garhwalpost.in/creatara-an-iit-delhi-innovator-launches-e-bike/)

Creatara, an urban mobility EV, the brainchild of innovators Vikas Gupta and Ringlarei Pamei from IIT Delhi, was officially launched on Saturday at the IIT Delhi’s Research & Innovation Park. The e-bike promises to redefine the way people navigate their cities, offering a blend of safety, customisation, and cutting-edge technology.
Creatara enters the Indian e-bike market at an opportune moment. The industry is experiencing explosive growth, with market size exceeding USD 1.18 billion in 2023 and a projected CAGR of 10.6%, reaching a staggering USD 2.92 billion by 2032 (IMARC Group). This surge stems from a growing desire for eco-friendly commuting solutions, spurred by factors like rising fuel prices, increasing awareness of environmental concerns, and government initiatives like the FAME scheme, the company said in a press release.

In a market often challenged by concerns about safety, Creatara says that they stand out with their unique features like the safe-start technology. This innovative feature ensures a minimum pre-defined rider weight, to prevent unauthorised or unintentional acceleration, offering peace of mind to parents and users alike.

There are many crucial elements and features like these on the vehicle that enable prioritizing safety without compromising on performance, the company added.

Creatara said that they go beyond mere transportation. Their advanced technology integrates seamlessly with the riding experience. State-of-the-art sensors monitor road conditions in real-time, providing riders with invaluable information about the path ahead. Additionally, speed monitoring and GPS tracking empower users with control and enhance their situational awareness.

One of the main underpinning concepts of Creatara is their proprietary modular vehicle platform. It can be adapted to different use case scenarios and user preferences. Case in point is their ‘moto-cross’ variant revealed at the launch. Its hill-friendly design tackles inclines with ease, preventing rollback and capable suspension set-up ensuring a smooth ride even on challenging terrains. This feature opens doors for exploring new environments and conquering hills with confidence.

Creatara understands that every rider is unique. That’s why it offers unmatched customisation options. Users can adjust the maximum speed to their comfort level and terrain, adapting the e-bike’s performance to their individual needs. This flexibility allows riders to personalise their experience and embrace the freedom of the open road, the company stated.

With a claimed charging time of 4-5 hours and a claimed 100km/hr top speed and range of 100 kms on a single charge, the Creatara E-bike epitomises sustainability and efficiency. The Creatara launch signifies a new chapter in urban transportation. With its unwavering commitment to safety, cutting-edge technology, and user-centric design, Creatara empowers individuals to redefine their commutes and explore their cities in a sustainable and personalized way, the company said.
Memes, drama & songs to present technical papers: How this IIT-Delhi professor made learning fun


Narayan, however, decided to do away with both the report and presentation, and instead, asked students to design either a drama, opera, video, meme-story, Instagram reel, short movie, dance performance, songs or poems to explain or express the content of the paper.

As part of the exercise, the batch was divided into six teams of six members each; (right) Professor R Lakshmi Narayan (Express File Photo)

While talking about academics at the IITs, one often imagines tough and complicated lectures, projects, and assignments. But last year, a teacher at the Indian Institute of Technology, Delhi (IIT-D), thought of a unique and trendy way to make sure students memorise their technical papers well. And what could be a better way to grab the attention of Gen Z than memes and reels?
Meet Professor R Lakshmi Narayan, from the Department of Materials Science and Engineering (DMSE), who came up with the idea of marrying technical papers with art forms to come up with something offbeat.

After successfully conducting the experiment with his third-year undergraduate students in 2022, Narayan repeated the exercise with the current batch.

As part of the exercise, the batch was divided into six teams of six members each. Each team was required to read a technical paper from the journal, Acta Materialia, and explain it using art forms such as plays, music, interpretative dance and memes.

“I was an instructor for the course, Mechanical Behavior of Materials, which deals with the physics of how structures and solids deform and fail when subjected to loads. This subject involves a lot of Mathematics and Physics, and often involves key concepts that can be utilised to identify what microscopic-level changes in the material are required so its mechanical properties like strength and toughness can be improved,” he said.

The exercise was a part of the students’ term paper under which they are asked to identify a recent technical paper and summarise the results and findings of the work using a powerpoint presentation along with a report critically examining the content for its impact in the field.

Narayan, however, decided to do away with both the report and presentation, and instead, asked students to design either a drama, opera, video, meme-story, Instagram reel, short movie, dance performance, songs or poems to explain or express the content of the paper.

By making it all about creativity, Narayan also managed to ensure students take no shortcuts. “Students often use ChatGPT to get a summary and analysis of the technical paper. This experiment completely changed this mentality and pushed us to actually read and understand the paper,” said Himalaya Bhonsle, a third-year student of DMSE who participated in one of the performances.

“People who were able to read the technical paper carefully and critically were able to visualise the material characteristics and develop a beautiful art form to describe it. Such a visualisation is not possible via AI tools like ChatGPT,” said Narayan.

For many students, the exercise helped them remember concepts which are usually difficult, and sometimes boring. It also helped them identify different talents that their classmates possess, which may have gone unnoticed in the traditional methods of classroom evaluation. “There were a few actors in our class whom we didn’t know about. It was only after they acted in this experiment that we got to know of their talent,” said Lovish Raj, a fourth-year student of DMSE, who took part in the exercise last year and was a judge this year.
Kaspersky, IIT Delhi Partner to Foster Local Cybersecurity Talent Development in India  

Kaspersky, a global cybersecurity company, and Indian Institute of Technology (IIT) Delhi, a leader in the field of engineering education and research, have signed a Memorandum of Understanding (MoU) to work together to support and encourage the growth of cybersecurity-related research and educational initiatives at the Institute.

Under the agreement, Kaspersky and IIT Delhi will work together to promote cybersecurity education and research to build a more robust cybersecurity workforce in India. The agreement demonstrates both parties’ efforts to foster closer cooperation to enhance the security of the computing environment in the nation and beyond.

The MoU includes exchanging knowledge and expertise, developing educational materials, organising and promoting events to raise cybersecurity awareness, and sponsoring merit (academic) awards or prizes to
encourage IIT Delhi students to pursue careers in ICT and Cybersecurity. This partnership will enhance the IIT Delhi graduates’ desirability on the job market by adding IIT Delhi’s educational and scientific activities of new training courses and programs that provide the graduates with relevant competencies that are in demand.

“The demand for cybersecurity professionals is expected to grow exponentially as India cements its position as the world’s technology and innovation hub. Our collaboration with IIT Delhi proves our enduring commitment to the country to help further develop its programs to create more skilled and expert local cybersecurity professionals. We must collaborate to develop the expertise and skills required to protect against cyber threats, which are increasing in both volume and sophistication. This collaboration will help to produce higher calibre cybersecurity experts in India and contribute to a more secure digital world,” commented Adrian Hia, Managing Director for Asia Pacific at Kaspersky.

Highlighting the significance of this collaboration, Professor Preeti Ranjan Panda, Dean, Corporate Relations, IIT Delhi, emphasised the imperative role educational institutions play in preparing the younger generation to counteract evolving cyber threats.

“As cyber threats continue to surge in complexity alongside technological advancements and automation, it is of paramount importance to equip our youth with the knowledge and skills necessary to defend against these challenges,” stated Professor Panda.

“This collaboration aims to empower students and researchers with cutting-edge insights and practical skills required to navigate the dynamic landscape of cybersecurity with the help of Kaspersky, which is recognized as a leading and trusted cybersecurity entity,” added Professor Naresh Bhatnagar, Dean of Research & Development at IIT Delhi.

Last September, Kaspersky launched its newest cooperation program for universities, Academy Alliance, to integrate the company’s expertise and latest technologies into teaching to enhance students’ academic outcomes. Through this MoU, IIT Delhi is the first to participate in this educational partnership program in the region Ms. Evgeniya Russkikh, Head of Academic Affairs, said, “Kaspersky Academy Alliance is part of the company’s mission to drive the best cybersecurity education to build a safer world. It is an all-inclusive solution dedicated to strengthening our partner universities’ information security programmes through skills development of students and specialist training for the teaching staff.”
This collaboration is part of Kaspersky’s global commitment to developing cybersecurity capabilities and expertise. The company has previously signed similar agreements with other universities and academic institutions around the world.

**Why IIT Delhi is focused on Energy Transition and Sustainability at its Abu Dhabi campus**


With UAE's push towards sustainability and climate change goals, IIT Delhi’s new MTech programme will empower graduates with a thorough understanding of advanced technology and progressive policy frameworks to address the intricate challenges of energy transition.

The Indian Institute of Technology, Delhi (IIT Delhi) has ended days of speculation as it has closed the application window for its newly launched MTech programme on Energy Transition and Sustainability at its Abu Dhabi campus. Evidently, the stage is all set for classes to commence in January 2024, and the institute is trying to go that extra mile, to equip professionals and scholars in the energy industry with what it claims to be a comprehensive understanding of technology, public policy, and environmental sustainability.

Two key areas will be in focus: 'Technologies for Decarbonisation' and 'Economics, Policy, and Planning for Energy Transition.' The two-year in-person programme at IIT-Delhi Abu Dhabi’s temporary campus will subject candidates to a rigorous selection process which would be aligned to the institute’s stringent academic benchmarks. Candidates would need to have a four-year bachelor’s degree in engineering or certain science disciplines, though a master’s degree in relevant science disciplines is also welcome.

**Starting from scratch**

Talking to Education Times, Rangan Banerjee, director IIT Delhi says, “The campus is both a challenge and an opportunity for us to break new grounds overseas. It is like as though we are nurturing a startup from ground up to ensure everything goes right. Sustainability being a key area of concern for both Abu Dhabi with interests in oil and the Indian government, along with the CoP (United Nations Climate Change conference) 28 that is emphasising on climate change goals, this is perhaps the most opportune moment to commence the Energy Transition and Sustainability programme. We are making every effort to engage in outreach activities and reaching out to schools to understand the country's ecosystem. With our offshore campus, we hope to impart education that is both holistic and relevant globally.”
Need of the hour

Discussing about the programme, Shantanu Roy, professor, Department of Chemical Engineering, IIT Delhi and coordinator, IIT Delhi-Abu Dhabi campus says, “Energy transition (the movement from a primarily fossil fuel-based economy to one based on renewables) is a challenge confronting the whole world, and indeed both the UAE as well as India. Given the rise in global temperatures owing to fossil fuel emissions, the transition to fossil-free energy is the need of the hour, and one of the important ingredients of realising this transition is the training of graduates in this evolving field.”

Prof Roy further explains that this master’s programme is specifically designed for IIT Delhi-Abu Dhabi as the UAE hosts COP28 this year; it also coincides with the country’s ‘Year of Sustainability’ in 2023. “Aligned with the UAE National Energy Strategy 2050, the programme, aims to empower graduates with a thorough understanding of advanced technology and progressive policy frameworks, fostering, a new generation of leaders capable of navigating the intricate challenges of energy transition,” he says, elaborating that extensive research and stakeholder consultation, as well as many hours spent by IIT Delhi professors went into developing the curriculum for the programme.

Green jobs

“In terms of employability, the graduates will be ready for the job market in the evolving energy sector as well as industries focused on sustainable development, in addition to policy making bodies, governments, NGOs, thinktanks, etc. They will also be prepared to take on projects and consultancy in the growing fields of green energy, contributing significantly to the sustainable development landscape.

Increasing interest

Highlighting that IIT Delhi will be rolling out several other programmes in 2024 and beyond, Roy informs that the application portal for the current programme was opened around end of October 2023 and closed on November 30. “Even though there is a significant increase in interest from students wanting careers in sustainability, no data can be shared as of now as the admission process is yet to commence,” he says. The applications for the programme was open to students of all nationalities, including Indian students, both within the UAE and internationally.

Key features

The programme will be covering four semesters over a 2-year duration to offer specialisations in ‘Technologies for Decarbonization’ and ‘Economics, Policy, and Planning for Energy Transition’. During the first semester, students will study core subjects like Energy and Sustainability, Energy Transition, Energy Systems Modelling and Analysis, and Economics and Financing of Energy Transition, in addition to foundation
courses in Engineering Mathematics, Thermal Engineering, Electrical Engineering, and Process Engineering. Later, the students will follow elective tracks of their choice, which will culminate in a thesis project.

In the second year, students will undertake a supervised industry internship, followed by individual projects aligned with their chosen specialisations. Besides, it will encourage an exchange of experts and policymakers from UAE, India and globally, to make the programme an enriching experience for students. The joint venture between India and Abu Dhabi will demand support from the governmental bodies in the two countries. With classes scheduled to start in the second half of January 2024, the programme will be launched with faculty from the Delhi campus teaching the courses and supervising research, Roy says. In due course, IIT Delhi will be hiring faculty who will be stationed in the Abu Dhabi campus. “The diverse mix will create a dynamic learning environment for the students. As of now, all students are full-time. Working professionals are strongly encouraged to apply, but they have to undertake the full-time programme. In later years, we plan to open this up for part-time enrolment, to ensure professionals could study while they continue working, he adds.

Elaborating that many of the specialised courses to be taught in the new MTech programme is already part of the curriculum at IIT Delhi, with similar content being taught across various departments, Roy further mentions that in order to specifically tune the programme to energy transition and sustainability, many of these courses have been curated to suit the underlying theme of the programme. “This existing structure has shown positive employability prospects for graduates as they are equipped with skills and knowledge aligned with industry demands,” he adds.

**Current status**

The programme will be offered first at a temporary campus of IIT Delhi - Abu Dhabi, located at Zayed University. “The campus will serve as the operational base until the permanent campus is ready. The temporary campus is being refurbished and developed to provide all the required advanced infrastructure for running the programmes that will be offered out of this campus. It will include specialised research centres focusing on areas including sustainable energy, climate studies, computing, and data sciences. It will also have well-equipped laboratories and halls, all within its strategically advantageous location,” Roy concludes.

**Diverse curriculum**

If IIT Delhi has incorporated lessons in Economics, Policy, and Planning for Energy Transition in the programme, it is because the institute considers itself as a diversified institution with a significant focus on liberal arts, management and policy studies, Roy says. “Specifically, courses in areas like Energy Economics.
are being offered here in the department of energy science and engineering, and for a long time,” Roy adds, pointing to the fact that in the new programme, the Abu Dhabi National Oil Company (ADNOC) is offering up to 15 scholarship places while 10 more scholars with distinguished backgrounds will be selected for more scholarship opportunities.

IIT Delhi's Placement Season 2023-24 Sees 480 Job Offers on Day 1

IIT Delhi Placement 2023-24: The hiring process saw registrations from over 360 national and international firms, presenting more than 660 job profiles spanning various sectors.

Students at the Indian Institute of Technology (IIT), Delhi, received 480 job offers on the first day of the placement season for the academic year 2023-24. The placement period, which commenced on December 1, 2023, will span up to May 2024 for the full-time hiring of undergraduate and postgraduate students. The hiring is being conducted in hybrid mode - both physical and virtual.

According to the institute, the hiring process has seen registrations from over 360 national and international firms, presenting more than 660 job profiles spanning various sectors.
By December 1, IIT Delhi students had secured approximately 480 full-time job offers, including pre-placement offers, resulting in approximately 450 unique selections. Several students have also successfully obtained multiple job offers.

Professor R Ayothiraman, who oversees the Office of Career Services at IIT Delhi, expressed a commitment to maximising student placements through a diverse array of companies representing various sectors.

"The Office of Career Services at IIT Delhi is working to maximize the placement of students who avail of our services. We have a healthy mix and lineup of companies across sectors to cater to the varied needs and aspirations of our student body," said Professor R Ayothiraman, in charge of the Office of Career Services.

Microsoft, Goldman Sachs, and Texas Instruments were among the leading recruiters on the first day, offering positions to a significant number of students on the campus. About 25 students have received job offers from overseas locations, including Hong Kong, Japan, the Netherlands, Singapore, South Korea, the United Kingdom, and the United States.

Dr Anishya O Madan, Industrial Liaison Officer, Office of Career Services, IIT Delhi, said, "The talent pool is eager to contribute to the growth of the organisations they join. We look forward to welcoming all recruiters who believe in the potential of our talent pool."

**IIT Delhi’s Certificate Programme in Data Science & Machine Learning will equip you with a skillset for this growing field**

The technology landscape continues to expand, and reliance on high-performance tech is also increasing. This surge also brings with it diverse career prospects in this dynamic industry. As per a study, the Indian job market anticipates a 22% churn over the next five years, with roles emerging from fields like AI, machine learning and data segments.

With promising career prospects in machine learning, narrowing down on an education programme that can empower professionals is vital. They should be able to learn cutting-edge technologies that can help them upskill and propel their career ahead.

IIT Delhi, one of India’s leading engineering colleges, offers a 6-month live online Certificate Programme in Data Science & Machine Learning, where lectures will be held on Sundays to suit working professionals. This programme is apt for early and mid-level participants who want a new-age perspective on data science and machine learning. And for the ones who want to deploy a data-forward decision-making approach to grow their business or who are supervising software development and machine learning assignments.
A rigorous curriculum is at the heart of this programme.

The programme will equip participants with an in-depth understanding of data science and machine learning tools and techniques with Python, along with real-world case study discussions.

The industry-aligned curriculum of this programme lays a strong emphasis on vital concepts from ground up so that participants have a strong foundation to absorb all the learnings. Students will get to dabble with statistics for data science, optimisation formulations with ML, deep learning, and storytelling with data. The programme is divided into the following modules:

1. Data Science Essentials
2. Communicating Effectively with Data
3. Optimisation for Machine Learning
4. Machine Learning
5. Deep Learning

The approach towards this programme
The rich learning pedagogy of this programme is a rich blend of peer-to-peer learning, gaining industry insights from the esteemed IIT faculty backed by real-world case studies and a capstone project. On programme completion, students will also receive an industry-recognised Data Science & Machine Learning certificate from IIT Delhi, which is a substantial value-add.
From the learnings of this programme, professionals will be able to:

- Create predictive models through neural networks and time series data forecasting models.
- Understand machine learning with an in-depth experience in machine learning algorithms, its applications and statistical models.
- Diving deep into methods like regression clustering, decision trees and deep learning.
- Minimising errors and building accurate models by learning optimisation formulations.

Guidance for the road ahead
What’s better is that while participants get to learn the ropes of artificial intelligence and machine learning, they also get to understand their career trajectory through Emeritus Career Services. To enable them to make inroads into this bustling field of technology, participants will be helped with 15 recorded sessions and resources in the following categories:

- Resume and cover letter
- Navigating job search
- Interview preparation
- LinkedIn profile optimisation
- Job placement assistance

Virtual hiring drives will be conducted for the participants. On a dedicated online portal, participants will be able to apply for jobs and keep a tab on their older applications.

To be part of the programme, here is the eligibility criterion:
Graduates (10+2+3)/ Diploma Holders (only 10+2+3) from a recognised university in any discipline as on Dec 30, 2023.

So, if you have been contemplating to dip your toes into this career realm, check out how IIT Delhi’s Certificate Programme in Data Science & Machine Learning can prepare and enrich your journey as a tech professional.

To know more about the programme, click [here](#).
About IIT Delhi

The Indian Institute of Technology Delhi (IIT Delhi) is one of the 5 initial IITs established for training, research and development in science, engineering and technology in India. Established as College of Engineering in 1961, the Institute was later declared an Institution of National Importance under the “Institutes of Technology (Amendment) Act, 1963” and was renamed as “Indian Institute of Technology, Delhi”. Since its inception, over 48,000 students have graduated from IIT Delhi in various disciplines, including Engineering, Physical Sciences, Management and Humanities & Social Sciences. Of these, nearly 5070 received PhD degrees. The rest obtained Bachelor’s and Master’s Degrees in Engineering, Sciences and Business Administration. These alumni today work as scientists, technologists, business managers and entrepreneurs. There are several alumni who have moved away from their original disciplines and have taken to administrative services, active politics or are with NGOs. In doing so, they have contributed significantly to the building of this nation and to industrialisation around the world.

WISHING ALL A HAPPY & PROSPEROUS NEW YEAR 2024

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