IIT Delhi Central Library

OCTOBER 1-31, 2022 NEWS CLIPS

A theory can be proved by experiment; but no path leads from experiment to the birth of a theory.

Albert Einstein

IITs two-day mega Research and Development fair, InvenTiv begins

Recent Arrivals

The Secret of Our Success

The Secret of Our Success
In the rankings, released in London recently, IIT Bombay was evaluated as India’s top higher education institution for its excellence in employability, social concern, and environment.

Apart from this, IIT Bombay was also included in the world’s top 100 institutes based on the employability of its graduates.

IIT Delhi was ranked for its employability and environment while Jawaharlal Nehru University (JNU) was ranked for gender equality and removing other inequalities.

In terms of competition and academic freedom, Delhi University ranked fourth in India.

Globally, the University of California was declared the top university, followed by the University of Toronto and the University of British Columbia in second and third ranks respectively.

The US dominates the rankings with 135 ranked universities (19.2 per cent of the total). Of these, 30 universities are included in the top 100. Similarly, the UK was ranked second with 67 British universities being included in the rankings.

After the US and the UK, Australia and Germany are at the forefront of this ranking. The students and teachers of JNU are excited by the university’s performance in the rankings. JNU Vice Chancellor Professor Santishree D. Pandit said that she congratulates the students and teachers of JNU “for fulfilling the dream of Dr. Bhim Rao Ambedkar and Prime Minister Narendra Modi”.

IIT Kharagpur has secured the highest in continuous and regular research efforts. IIT Kharagpur has taken many special initiatives to improve lifestyle and health which are being appreciated globally.
23 IIT Came Together To Showcase Their Innovations; IIT Bhubaneswar Team Made Portable Ventilator For Infants: PM Modi


Prime Minister Narendra Modi addressed the nation on his monthly radio programme ‘Mann Ki Baat’. This is the 94th edition of the show.

“This month, 23 IITs came together to showcase their research projects, IIT Bhubaneswar team has made a portable ventilator for infants. This ventilator can be used on battery and can be used in remote areas to save lives of pre-mature infants,” PM Modi. Prime Minister gave the example of a team from IIT Bhubaneswar who developed a portable ventilator for newborn babies. It runs on battery and can be used easily in remote areas. He said this can prove to be very helpful in saving the lives of babies who are born prematurely. Mr Modi also mentioned that several IITs are working together on a multilingual project that makes learning local languages easier. This project will help the new National Education Policy in achieving those goals as well. IIT Madras and IIT Kanpur have played a leading role in preparing India’s indigenous 5G testbed. Prime Minister hoped that taking inspiration from IITs, other institutions will also step up their R&D activities.

In a first-of-its-kind collaboration, all 23 Indian Institutes of Technology (IITs) across the country came together for a mega Research & Development (R&D) Fair at IIT Delhi on 14th & 15th October 2022.

A total of 75 projects were showcased in the event along with 6 showcase projects handpicked from all 23 IITs. IIT Kanpur led a presentation on ongoing R&D covering fundamental areas in design/development of Drones, and its applications including logistics, swarm, surveillance, delivery systems, and crop monitoring.

On the 5G technology front, a presentation was delivered by IIT Madras covering 5G Core and allied technologies licensed to industry, and follow-up research in several IITs. IIT Kharagpur will bring forth the numerous affordable healthcare devices developed and technologies transferred to the industry.
IIT Bhubaneswar has developed a portable and low cost ventilator for the use of patients during Covid-19 pandemic situation. The institution had started product development for this project three weeks back after realising the shortage of ventilators in India to help Covid-19 patients. This portable ventilator costs around Rs 8,000 per piece. The institute has created prototype of the ventilator and tested it successfully. It will apply for approval from the Indian Council of Medical Research (ICMR) before going for production, said IIT Bhubaneswar director RV Rajakumar.

Mohapatra said the ventilator will be connected with oxygen supply. According to the requirement, pumping rate can be adjusted in the ventilator. This pumping is carried out by using programmable stepper motor drive. The speed and stroke length of the stepper motor can be both controlled manually and programmable, he added.

**IIT Bombay, Delhi, JNU most sustainable institutes in India: QS World University Rankings (Sustainability)**


In total, 15 Indian universities ranked in the list with the top rank being bagged by IIT Bombay. Globally, the University of California, Berkeley (from the US) has taken the lead in the sustainability.

Out of 1300 institutions, 700 institutions appeared on the final ranking list. (Representative image. File)

IIT-Bombay is the best educational institutions in India in the inaugural QS World University Rankings: Sustainability released today. A total of 15 Indian universities ranked in the list with the Indian Institute of
Technology, Bombay (IIT-B) featuring in the 281-300 rank range, followed by IIT-Delhi (321-340 rank) and Jawaharlal Nehru University at the third rank (361-380).

**QS World University Rankings:** Sustainability ranking is a new framework to evaluate how universities are taking action to tackle the world’s most pressing environmental and social issues.

This year, experts evaluated over 1300 higher education institutions meeting specific eligibility requirements, out of which 700 institutions appeared on the final ranking list.

Fourth rank has been saved for the University of Delhi which features in the 381-400 rank range and the Indian Institute of Technology Kanpur (IITK) is on the fifth spot (451-500).

Other Indian universities that feature in the list are the Indian Institute of Technology Roorkee (IITR), Aligarh Muslim University, Jadavpur University, Indian Institute of Science, Indian Institute of Technology Kharagpur (IIT-
Globally, the University of California, Berkeley (from the US) has taken the lead in the sustainability as it has achieved top scores in both the Environmental Impact and Social Impact categories, each contributing 50 per cent of the overall score. It is followed by two Canadian institutions, the University of Toronto (second) and the University of British Columbia (third).

Other universities to appear in the top 10 are the University of Edinburgh, University of New South Wales (UNSW Sydney) and University of Sydney at fifth rank, University of Tokyo, University of Pennsylvania, Yale University and the University of Auckland.

The US dominates the rankings with 135 ranked universities (19.2 per cent of the total), while the United Kingdom is the second-most represented country, with 67 universities ranked (9.5 per cent). Germany is the third-best for overall representation, with 39 universities, followed by China with 37 and Australia with 33.

**IIT-Delhi, AIIMS researchers devise a robotic hand for paralytics**


Researchers from IIT-Delhi, in collaboration with AIIMS, have developed the first robotic hand exoskeleton device for rehabilitation of wrist and finger joints for stroke survivors. The product secured a US patent for its design and innovation in August this year.

The device is based on a four-bar mechanical link, which can be controlled by patients through muscle activity. It’s customisable through a simple user interface. “The exoskeleton can be used by patients according to their clinical symptoms. Active participation of the patient is ensured through muscle activity (electromyogram) and visual feedback,” said a researcher.

Professor MV Padma Srivastava, head of the neurology department at AIIMS, told TOI that the product would be launched in November by ICMR and the main aim was to make it accessible to patients at a low cost.

Dr Neha Singh said the robotic exoskeleton training showed improvement not only in the wrists and finger joints of stroke patients, but even in brain signals. The study demonstrated greater improvement in both clinical scales and neuroplasticity in response to robotic exoskeleton therapy compared with conventional rehabilitation.

Prof Amit Mehndiratta from IIT-Delhi said once the affected hand was mounted on the exoskeleton, the patient could voluntarily make an effort for wrist movement, which was measured by a controller.

“Once the patient’s effort is sufficient, as decided by the copyrighted algorithm, the device assists the patient’s hand for wrist and fingers movement. The controller continuously measures the effort of the patient and automatically increases or decreases the muscle activity threshold to keep the patient engaged and encouraged...
throughout the therapy. Each patient is enrolled for a month and undergoes 20 robotic therapy sessions of 45 minutes daily for five days each week,” said Mehndiratta.

The clinical testing of phase-III was funded by ICMR under the centre of advanced research and excellence in disability and assistive technology. The device would be more compact, lightweight and aesthetic compared with the one used during the phase-II trial. Phase-III of the trial was started in 2020 and “rigidity removal” worked 100%.

“In phase-I, the product design was frozen. Case control trial was conducted in phase-II, which showed good improvement while using the robot compared with home-based exercise therapy on 12 patients in each category,” Mehndiratta said.

**New labs and research spaces to come up soon at IIT Delhi: Kejriwal**


*The Indian Institute of Technology, Delhi has proposed the construction of a new Engineer Block and a new Mini Academic Block within its campus.*

New laboratories and research spaces will come up soon at IIT Delhi as the Delhi Chief Minister Arvind Kejriwal has granted his approval for the removal and transplantation of 157 trees for the construction of a new Mini Academic Block and a new Engineer Block at IIT Delhi.

The IIT had sent a proposal to remove and transplant 157 trees to clear its construction site. “Kejriwal has approved the project against the condition of IIT taking up the plantation of 1,570 trees inside its campus,” stated delhi government in a press statement.

The Indian Institute of Technology, Delhi has proposed the construction of a new Engineer Block and a new Mini Academic Block within its campus.

The institution intends to develop several research spaces and laboratories in these blocks that will help it impart a better quality of education upon its students and researchers.

“However, certain patches of trees are obstructing the construction of the new blocks. Thus, the IIT through its Director wrote a letter to the Delhi Government seeking approval for removal and transplantation of 157 trees to clear the site,” said the Delhi government spokesperson.

Approving the proposal, the Delhi Government has noted that out of the 157 trees, IIT will transplant 82 trees, while it will take up felling of 75 trees. The transplantation will take place within the identified project site.
Meanwhile, as per Delhi government, if any tree apart from the 157 approved ones is damaged, it shall constitute an offence under Delhi Preservation of Trees Act 1994.

The Delhi Government has further made it mandatory for IIT to plant ten times the trees, in lieu of the removal and transplantation.

The IIT will be planting the new 1,570 trees within its campus to maintain ecological balance.

These include Neem, Amaltas, Pipal, Pilkhan, Gular, Bargad, Mango and Sheesham among other species. These trees will be planted as saplings of 6-8 feet height on non-forest lands.

The IIT will further submit a report on the same to the Tree Officer for supervision.

**IIT Delhi and Bombay revamp curriculum to address changing industry landscape**


**IIT Madras has been providing a flexible curriculum to the students without compromising on the core degree**

With an aim to create more employable graduates and meet their changing aspirations, two of the country’s IITs are revamping their curriculum. While IIT Bombay will start the newly developed curriculum for the first-year freshers, IIT Delhi is finalising the concept. IIT Madras, on the other hand, has kept the curriculum more agile, to help students discover their innate strengths.

“It is important to keep pace with time and provide the best opportunities to our students who are the cream of the lot,” says IIT Bombay director Subhasis Chaudhuri, adding that the curriculum revamps are at first experimental, and not every change is successful. “As students go through the process, we may have to make amendments since nothing is frozen in stone. The aim is to ensure that our students do not become obsolete by the time they graduate, with minimum lag time while adapting to global and technological trends,” he adds.

Talking at length, Kishore Chatterjee, convenor of the UG Curriculum Review Committee at IIT Bombay and professor in the Department of Electrical Engineering, says, "The curriculum gets revised from time to time to remain in sync with the aspirations of all the stake holders, with the last major revamp being conducted in 2007. This time round the institute has brought in some innovative concepts. All first-year engineering students will have to engage in a departmental introductory course over two semesters that will cover the history and the future perspective of their chosen stream."

These students would be organised into groups under what the institute calls 'Makers Space' to provide hands-
on experience in building new products and services. "Makers Space will complement the earlier workshop practice and engineering drawing classes to inculcate the penchant for ‘synthesis’ among the students," Chatterjee says, adding that the institute has introduced two new basket of courses – HASMED (Humanities, Arts, Social Science, Management, Entrepreneurship, Design) and STEM (Science, Technology, Engineering, Mathematics) that will be taught along with the compulsory core engineering and departmental elective courses. Right from ‘Philosophy of Mind’, ‘Marketing and Finance for Entrepreneurs’, and ‘Innovation by Design’ (under HASMED) to ‘Embedded Systems’, and ‘Motion Planning of Autonomous Vehicles’ (under STEM electives), the courses are based on students’ appetite and interest, Chatterjee explains.

The curriculum changes at IIT Delhi have a similar aim. “It should make students future ready and excite them in academics,” IIT Delhi director Rangan Banerjee says. He also emphasises the need for “multidisciplinarity in education to meet societal challenges, which is why relooking at the curriculum has become an increasing need,” he adds.

IIT Delhi dean, (Academics) Narayanan Kurur, calls the revamp at the institute more of a “curriculum review” which is still at the conceptualisation stage. The earliest implementation of the changes would be from the 2023 academic year. “There would be extensive discussions between the various stakeholders (some of which has already happened). This feedback would then be incorporated into the concepts. Once the overall concept is accepted by the senate, the implementation phase would start. This involves the departments designing a curriculum in keeping with the educational objectives laid out in the concept note,” he says.

Kurur explains that inclusion of new programmes is not an indication of a curriculum change. “Including programmes happens quite regularly. For example, in the past two years we have introduced various programmes including a BTech in Materials Science and another in Engineering and Computational Mechanics. This year we are introducing a Bachelor of Design. A curriculum review is of existing programmes where the effort is towards producing the IITD graduate of the next decade who would be equipped to effectively absorb current knowledge while figuring out how to extend it in developing new solutions, among other traits.

IIT Madras that undertook its major curriculum revamp about 8 years ago, has a different approach towards curriculum change. “It has been focusing on providing flexibility to students, while still doing justice to the degree they would be earning,” says Shanthi Pavan, dean (Academic Research), IIT Madras, adding, “Many students are in a certain branch not by choice, but by virtue of their rank in the JEE. If there is enough flexibility in the curriculum, a student can take core courses in the branch(es) of his/her liking as electives. At IIT Madras we are enabling students to earn credits through research activities and NPTEL courses. We have also introduced interdisciplinary dual-degree programmes (BTech+MTech), which any student can choose to upgrade to. Many of these programmes (on Data Science, Robotics, Electric Vehicles etc) are popular among them.”

Researchers at IIT-Delhi develop Covid virus-like particles to further develop vaccine treatment

Virus-like particles or VLPs are molecular mimics that look and act like a certain virus without being infectious.

Researchers at IIT-Delhi have developed Covid ‘virus-like particles’ (VLPs), which they say are a possible vaccine candidate against the virus.

“Vaccines offer a great deal of protection against the virus, but some people who have received the shots still catch Covid-19. To develop even better vaccines and treatments, ideally, experiments need to be conducted with the real virus, which can only be handled in very specialised laboratories. Working with live viruses can put personnel at risk, and the requirement for specially designed settings can limit the scope of research that some teams can perform. Instead, a safer and easier strategy is to use virus-like particles,” reads a statement from the institute.

These VLPs have been developed by IIT-Delhi researchers in collaboration with the Translational Health Science and Technology Institute (THSTI), Faridabad.

VLPs are molecular mimics that look and act like a certain virus without being infectious.

“The majority of the VLPs developed worldwide have utilised only the spike protein of SARS-CoV-2 as the primary antigen. However, our VLPs are as ‘native virus-like’ as possible, which means they contain all four structural proteins from SARS-CoV-2 (S-Spike, N-Nucleocapsid, M-Membrane, E-Envelope). This could be an advantage in case there are several mutations in spike in any variant, which preclude the binding of neutralising antibodies,” said Dr Manidipa Banerjee, lead researcher and professor at IIT Delhi’s Kusuma School of Biological Sciences.

“Animal experiments carried out at THSTI indicate that our VLPs trigger a strong adaptive immune response against multiple antigens. Vaccines based on inactivated virus naturally have this advantage, however, VLPs are safer as they are non-infectious due to lack of genome,” Banerjee added.

IIT Delhi team to visit Abu Dhabi to discuss plan for 1st IIT campus in UAE


The Indian Institute of Technology (IIT) Delhi’s high-level team of faculty members is all set to visit Abu Dhabi this month to discuss plan for first IIT campus in United Arab Emirates (UAE).

According to the Emirates News Agency (WAM), the team’s visit was finalised on the sidelines of a two-day event of all 23 IITs in India to commemorate the 75th year of India’s Independence.

India’s Minister for Education and Skill Development, Dharmendra Pradhan, spoke about future plans for IITs at the event. “Technology will drive the next phase of growth and development with information technology and communications technology among the front-runners. Our IITs should seize this opportunity,” he said.

On February 18, 2022, as part of the India-UAE trade deal signed, India has announced to set up the first Indian Institute of Technology (IIT) in the UAE.
Since then, the two sides have been in contact to come up with measures to follow up on the proposal. IIT Delhi has a small team stationed in the Abu Dhabi map to implement the proposal.

This will be the first time an IIT would be established outside of the country.

As per media reports, teams from the United Arab Emirates (UAE) were in New Delhi this month to study the model followed by IIT-D while also holding talks with teachers and students.

Professor V Kamakoti, Director of IIT Madras, told local media that overseas expansion of IITs has been put on the “fast track” and hopes to open the Abu Dhabi campus along with the ones in Malaysia and Tanzania within one year.

About IIT

IITs are the national institute of India and presently there are 23 IITs in the country. These 23 IITs are located in various regions of the country offering undergraduate (UG), postgraduate (PG) and doctorate (PhD) level programmes. The top IITs in India are IIT Delhi, IIT Bombay, IIT Kharagpur, and IIT Madras. Predominantly, IITs are known for offering B Tech and M Tech degree programmes.

Admission to IIT is through the Advanced Joint Entrance Examination (JEE). The highest-ranking eligible students in JEE Mains are eligible to appear on the JEE Advanced. Indian expatriate students usually visit India to write these exams.

Among the most famous “IITians” are Google CEO, Sundar Pichai; the face of the Indian IT industry N. R. Narayana Murthy; bestselling novelist and writer Chetan Bhagat; and former Governor and Economist of the Reserve Bank of India Raghuram Rajan.

Dharmendra Pradhan Urges All IITs To Run Skill Development Centres In Research And Development Fair IIInventiv


The first-ever mega Research and Development fair of all 23 Indian Institutes of Technology (IITs) started today, October 14, at IIT Delhi.
The first-ever mega Research and Development fair of all 23 Indian Institutes of Technology (IITs) started today, October 14, at IIT Delhi. The event named InvenTiv was inaugurated by the Union Education Minister Dharmendra Pradhan. The objective of organising Research and Development fair is to create holistic awareness about the research and innovation work being done by IITs and to explore collaborative avenues between state universities and institutions, industry and IITs for better development.

Addressing the event, Education Minister Dharmendra Pradhan said: "In the present era, IITs are the best temple of our country in terms of education and all other activities. IITs have proved themselves to all the criteria for all the standards of effort. I feel proud when many developing and developed nations approach the Indian government to set up IITs in their countries at their own cost. It is not just the three letters of IIT but the India's collective wisdom in experimenting with IITs is earning global recognition. I congratulate the IIT council for all the activities and for coming up with events regularly." The minister urges higher education institutions (HEIs) and IITs to run 'Skill Development Centre' to enhance skills of their students to get familiar to present technologies and to meet the industry requirements.

The theme of InvenTiv includes Defence and Aerospace, Healthcare (including devices and digital health), Environment and Sustainability (including air, water and rivers), Clean Energy and Renewables (including Hydrogen and EV), Manufacturing (including smart, advanced and industry 4.0), and AI/ ML/ Blockchain technologies (including quantum computing), among others.

The two-day mega Research and Development fair is being organised to showcase projects in diverse areas covering climate change, sustainability, smart city architecture, rural agriculture, affordable healthcare, drone
technology, and more. The event will also host institute administrators and students from Tier 2 and Tier 3 cities. About 75 projects brought out by 23 Indian Institutes of Technology across the country are selected for the event, along with six showcase projects. These projects will be presented before the audience in designated booths during the two-day mega event.

**IIT-Delhi set for curriculum revamp after over a decade**


*Banerjee, who was earlier a professor at IIT-Bombay, said both knowledge and technology landscape are rapidly changing and the curriculum has to match up the pace.*

The Indian Institute of Technology (IIT)-Delhi is set for a complete curriculum revamp for all courses after more than a decade, according to the top institute’s new director Rangan Banerjee. In an interview, Banerjee told PTI knowledge and technology landscape is rapidly changing and the curriculum has to match up the pace, and therefore IIT-Delhi has formed a panel for the curriculum review for all courses.

From being engineering institutions to becoming full-fledged universities, IITs have evolved over the years, he said. “We are going through a complete review of our curriculum so that we can enhance the student experience. The exercise is being conducted after over a decade. Over the last several years, IITs have moved from being predominantly undergraduate and engineering institutions to full-fledged universities offering a wide range of courses,” the IIT director said.

“We are trying to provide in our curriculum, challenges and opportunities for students to engage with the real world and hence a complete revamp was needed. So hopefully next year we should be able to see many changes. Right now we are doing extensive consultation with faculty, students and alumni,” he added. Banerjee, who was earlier a professor at IIT-Bombay, said both knowledge and technology landscape are rapidly changing and the curriculum has to match up the pace.

“The curriculum has to constantly evolve for it to be relevant and our classroom teaching and practical modules have to reflect the same,” he said. Since its inception, around 54,000 students have graduated from IIT-Delhi in various disciplines, including Engineering, Physical Sciences, Management, and Humanities and Social Sciences. “The committee for curriculum review is working on a concept note following which each academic entity at the institute will look at its courses in the light of this.
“We are hoping that after the curriculum review we will have much more flexibility in our curriculum. We have started many new academic programmes, including in new areas like Artificial Intelligence, Data Science, Cyber Security and Electric Mobility,” he said. “The challenge today is that we are dealing with a generation of students that has a smaller attention span. Classroom teaching alone cannot be the focus. We have to make them work on real-life projects, so they can learn actual problem-solving,” he added.

Banerjee said the institute is focussing on ways to increase the impact of its research. “Since space is a big constraint for us and we cannot physically increase the number of students on the campus, we are looking to increase the impact of our research,” said the IIT director.

**IIT Delhi’s rural technologies going intercontinental**


The Rural Technology Action Group (RuTAG) at the Indian Institute of Technology (IIT) Delhi has transferred two rural technologies to four African countries, including Ghana, Namibia, Sudan, and Zambia. The technologies include a ground water level measuring device and an ergonomically designed treadle pump, which are improved versions of the practices followed by the rural people in Rajasthan and Uttar Pradesh, respectively.

The groundwater level measurement device developed by RuTAG, IIT Delhi, is used to measure the groundwater table in monitoring wells. The device consists of a robust rust-resistant stainless-steel probe connected to a high-tension coaxial cable. The cable is then connected to an electronic circuit containing a battery, an LED lamp, and a buzzer. The probe is an assemblage of plumb bob, perforated tubular body, high-pressure cord holding gland, and copper electrodes. The probe is lowered into the well, and as it comes in contact with water, the circuit is completed, the buzzer beeps, and the LED glows. The operator can then get the depth using the markings on the cord. The salient features of the device include portability, high operational stability, and accurate measurements.

A treadle pump is a mechanical device which uses human power to draw water from the ground. It is a twin-cylinder reciprocating water pump presently being used by poor/marginal farmers in various places for irrigation.
purposes. These are particularly popular in areas where the water level is not too low (around 10 m or less). RuTAG IIT Delhi treadle pump is made using handpump and plumbing parts, making it easier for farmers in rural areas to obtain spare parts. The pump consists of two piston-cylinder assemblies, a delivery channel, inlet pipes, treadles, a handle, and an adjustable seat. The foot pedals on the treadles can be adjusted to meet the needs of individual user. An average person can draw water at a rate of 3500 to 4000 litres per hour. The treadle pump parts are made of mild steel, and the estimated life of the pump is around 10 to 15 years.

The Rural Technology Action Group (RuTAG) at the Indian Institute of Technology (IIT) Delhi has transferred two rural technologies to four African countries, including Ghana, Namibia, Sudan, and Zambia. The technologies include a ground water level measuring device and an ergonomically designed treadle pump, which are improved versions of the practices followed by the rural people in Rajasthan and Uttar Pradesh, respectively.

While speaking about the transfer of the technologies to the African nations, Prof S.K. Saha, Coordinator, RuTAG, IIT Delhi, said, "It is a proud moment for RuTAG IIT Delhi to go global. More importantly, such knowledge sharing that would benefit the major percentage of the World population is a great satisfaction as a technologist. IIT Delhi is committed to expand and support such knowledge sharing in the days to come".

Along with IIT Delhi, there are RuTAG centers at IIT Bombay, IIT Guwahati, IIT Kanpur, IIT Kharagpur, IIT Madras, and IIT Roorkee also. Together they published a compendium of 50+ technologies, which are ready to go to the field. They conducted three international conferences on Rural Technology Development and Delivery (RTDD) at IIT Delhi, Madras, and Jodhpur in the years 2018, 2020, and 2022, respectively.

RuTAG at IIT Delhi was set up in 2009 and has been working on several demand-driven technologies to reduce the toils of the villagers and improve their performances. Through RTDD, RuTAGs propagate the philosophy of "Researchizing Rural Problems," while the projects in the centers connect the young engineering minds with society.