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Applied Science and Humanities Department

VISION

The Department of Applied Science and Humanities is committed to dynamically integrate the components of Science, Humanities and Engineering to groom students to transform them as globally acknowledged professionals.

MISSION

The department is carrying a mission to create and disseminate the knowledge and techniques in intellectual areas of Engineering and other core areas of Applied Science and Humanities for betterment of Eco system.

To inculcate the importance of Applied Science and develop a natural flair for Engineering and Technology which in turn shall mold students into a competent professional.

To be recognized for practicing the best teaching-learning processes to create highly competent, resourceful, and self-motivated young Engineers for the benefit of the society.

*New Year's Day.
A fresh start.
A new chapter waiting to
be written.*

Mars Helicopter Just Keeps on Going

The original mission of the Mars Helicopter (named Ingenuity) was to successfully complete a single 30-second long flight on Mars. That happened back in April. After several more successful flights, Ingenuity's 30-day mission came to an end, but the helicopter was doing so well that NASA decided to keep it flying. Several months later, JPL promised that Ingenuity would "complete flight operations no later than the end of August," but as of late



November, the little helicopter has completed 17 flights with no sign of slowing down.

NASA has kept the helicopter operational, in part, because it's transitioned from a pure technology demonstration to an operations demonstration. In fact, Ingenuity has turned out to be quite useful to both the science team as well as the roboticists who operate the

Perseverance rover. While NASA never planned to have Ingenuity make occasional scouting flights, its having that capability seems to have paid off. To understand just how much of a difference the helicopter is making to Perseverance's mission, we talked to one of the Mars rover drivers at JPL, Olivier Toupet.

IEEE Spectrum: How much of a difference has it made for you to have Ingenuity scouting for Perseverance on Mars?

Olivier Toupet: My team designs the routes for the rover to drive, and typically we have orbital imagery [from Hi-RISE], which is as you can imagine very low resolution, and then we have imagery from the rover on the surface, but it can only see a few hundred meters. With the orbital imagery, we can't see rocks that are smaller than typically about a meter. But a rock that is taller than 35 centimeters is an obstacle for the rover—it can't put its wheel over a rock that size. So it's been really helpful to have that helicopter imagery to refine our strategic route and plan to avoid challenging terrain well before the rover can see it."

IEEE Spectrum: What about for Perseverance? Are there any examples of specific ways in which detailed imagery from Ingenuity caused you to change your mind about a route?

Olivier Toupet: We landed right next to an area called Séítah, which is actually very hard to drive through because it's full of large sand dunes. And getting stuck in sand is the nightmare of every rover planner, because it could be mission-ending. Right after landing, the scientists were saying, "let's cross over Séítah and get to the delta!" I said, that's not going to happen, we have to drive around it.

While we were driving around, the helicopter just flew right over to the west side of Séítah on Flight 9. That was really interesting, because it gave us excellent images and we realized that while there were some places we wouldn't want to drive in, there were other places that actually looked traversable.



And so it was really helpful to have that helicopter imagery over Séítah to refine our strategic route. In the end, we decided to drive around it.

IEEE Spectrum: You and your team must be highly skilled at understanding Martian terrain from the relatively low-resolution orbital images, since JPL has been planning for rovers on Mars based entirely on orbital images for decades now. With that in mind, how actually useful is high-resolution imagery like the helicopter provides?

Olivier Toupet: I was actually a rover planner on Opportunity, Curiosity, and now Perseverance, so I've been doing this for a long time! But it's a fair question. You are correct that we're very experienced with interpreting orbital imagery, but there are still some cases where higher resolution imagery can be very important. With Curiosity, there's a place called Logan Pass, where of course we had relied on orbital imagery for our strategic route planning.

Overall, it's true that typically orbital imagery is good enough, especially on terrain that's pretty benign. But there are times where having higher resolution imagery ahead of time is very valuable for route planning.

IEEE Spectrum: What has the reaction been to having the Mars Helicopter stick around as a scout?

Olivier Toupet: The whole team, we all love it! We didn't know we were going to love it—it's really interesting, I think initially there was a lot of pushback, even from the science team, because they thought it was going to be a distraction. But in the end, we're all very happy with the helicopter, including the science team. The more information we have the better—for the science team, for example, the helicopter can save us a lot of time by quickly investigating potentially interesting areas.

IEEE Spectrum: As someone who's been working on several generations of Mars rovers, what would you like to see from the next-generation Mars helicopter?

Olivier Toupet: The big advantage of a helicopter is of course that it can fly, and the Mars Science Helicopter will be able to fly tens of kilometers in a single day. To give you a sense of perspective, we're hoping that Perseverance will be able to drive a few hundred meters in a day. So the helicopter would have several orders of magnitude more range, which is amazing—you could imagine going not just to one site on Mars, but to multiple sites.

But the big disadvantage of the helicopter, unfortunately, is the payload. A rover can carry a lot of science instruments, while the helicopter, because the air density is so low on Mars, has a much lower maximum payload, which restricts how much science you can do. That being said, you could imagine being able to swap instruments—what if you could carry just the instrument that was necessary for the specific site you're visiting that day? Of course there are technical challenges with that, but yeah, personally I do think that the next mission should be a helicopter just by itself. It would be great to see that in the future.

IEEE Spectrum: And when we send another rover to Mars, should it have its own helicopter scout?

Olivier Toupet: That's a great question, and a controversial one, because the next mission to Mars is about sample return, and the European Space Agency is making the rover, not NASA. And so, I don't know who gets to make such decisions, but I personally do think that a helicopter would be extremely valuable—not just as a scout, but potentially also as a backup, that could retrieve the samples if the rover had some issues. That would be great to have for sure.

By Evan Ackerman

Contributed by: Neha Shah

Source: <https://spectrum.ieee.org/mars-perseverance>

The New Normal: Are the Engineering Institutes becoming future-ready?

Higher education in the engineering space needs to focus on industry-standard curriculums. Namrata Hazarika from the Elets News Network (ENN) writes on how engineering institutions are making students ready for the future job market.

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The COVID 19 pandemic brought in a new set of challenges in front of the higher education system. Remaining resilient and focusing on mitigating the challenges has been the top priority for the education fraternity. The new normal scenario in the engineering sector is pushing educational institutions to revamp themselves and strive hard to build excellence in education, especially in the technical fields.

Current Challenges in Engineering institutions

DrReebaKorah, Professor & Dean, Alliance College of Engineering and Design, said, “Sailing through the pandemic for almost 18 months, some educational institutions such as private universities, institutions of national reputation, and standalone institutions have strived hard to be digitally compatible with the situations that arose due to the new normal. However, many public universities with an enormous number of affiliated institutions are still struggling to cope with the situation.”

The need to build digital connectivity is a significant challenge. For instance, the implementation of digital learning in higher education is picking up gradually. “Most of the tier-1 and quality focussed institutions moved to online platforms of their convenience to ensure adequate student engagement without affecting the pre-scheduled sessions,” Korah said.

Digital learning has created learning gaps in students. Hundreds of engineers who graduated are not able to find jobs as they don’t possess the required skills, which the industry needs now. The question is how can we prepare our graduating engineers for future jobs? Engineers lag in digital skills related to artificial intelligence, machine learning,

data science and wireless technologies among others. In this context, Shekhar Sanyal, Country Head and Director of Institution of Engineering and Technology (IET) India, said, “We are passing through a pandemic which has changed the market scenario. 2020 and 2021 were tough years, however, we anticipate a rebound in the economy and thereby jobs in the next two years. Job applicants need to understand that additional qualifications and broader understanding of the market and non-technical skills will play a major role in their ability to get a job.”

Most of the engineering institutes or colleges need to be equipped with modern facilities and invest in infrastructure development. There should be updated curriculums and course structures. Training the faculty is a must so that they can motivate students to build confidence and focus. Apart from IITs and NITs, most engineering institutions are providing average teachings. A competitive mindset should be developed among engineers to be able to cope up with current industry requirements. Focusing on practical skills should be the priority of the engineering institutions rather than imparting fundamental theories to the students.

“The significant change we observe is the substantive requirement of new-age technical skills, coding skills, and soft skills irrespective of their core specializations.” Korah also added and said there is a need to focus on outcome-based education, which evaluates the skills acquired during the study and creates new knowledge.

Role of National Education Policy

In this case, the National Education Policy (NEP) will play a critical role. The government is focusing, by and large, to implement NEP throughout the country. It will be done in a phased manner and hopefully, the NEP will bring potential results in the next 4-5 years. “The new National Education Policy likely will create awareness in society about the importance of outcome-based education. Future generations will benefit from the changes. At Alliance College of Engineering and



Design, we practice outcome-based education which prompts us to upgrade our curriculum and syllabi based on the current industry needs and deliver the same in a project-

based/problem-solving learning mode. The core problem-solving strategy we follow is ‘Design Thinking’,” Korah added.

Campus Placement

The COVID pandemic has hit the world adversely. As a result, there have been disruptions in the hiring process for engineers. Many companies deferred the hiring process of freshers due to the uncertain business environment. The trends are changing fast in 2021, the experts think that it is difficult to on board several thousand people at a time remotely. Covid 19 pandemic has a long-lasting impact on the hiring process.

According to data available with the All India Council for Technical Education (AICTE), the campus placement in engineering colleges dropped significantly in the academic year 2020-21. Around 59,494 students were able to bag jobs. It



was the lowest since 2012-13 with around 63,483 found jobs during the period. Nikhil Jain, CEO & Co founder Foreign Admits also said, “The syllabus should be shorter and crisp. As per the notifications by the All India Council for Technical Education (AICTE), and to give the students a shot at placements, the syllabus was significantly reduced and the credits available for project and fieldwork were fulfilled digitally. This didn’t affect the IT industry as much but the core branches like Mechanical Engineering and Civil Engineering took a big hit. Since a lot of practical coursework was completed through the online module, the students weren’t industry-ready. This seriously affected their employability.”

“A recent report by Naukri.com for the 2020-21 placement season highlighted how about 66 percent of students who got jobs did not receive their offer letters, while 44 percent faced deferred joining dates after being hired. The report also highlighted how another 33 percent of students did not hear back from the employer about the status of their employment,” Jain added.

In addition, these things will change once the job market opens up. The students should focus on subjects that have lucrative opportunities in the 21st century. Areas like automation and robotics, data science and data analytics, artificial intelligence, machine

learning, renewable energy engineering, civil and mechanical engineering as well as biomedical engineering will be high on demand. The students should focus on the skills that are currently on demand to become future-ready.

By Digital Learning Network Page | 8

Contributed by: Aniket Patil

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