LIVE WIRE

PHoEnix Association's Annual Magazine, BITS Pilani Hyderabad Campus

COVER STORY:

CRACKING THE CORONA

UNLOCKING THE SECRETS OF THE SUN

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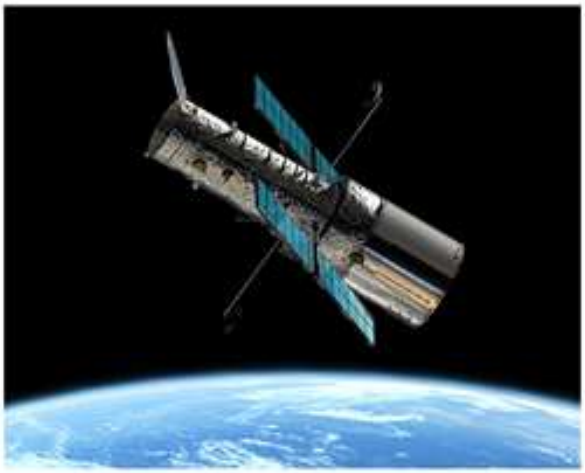

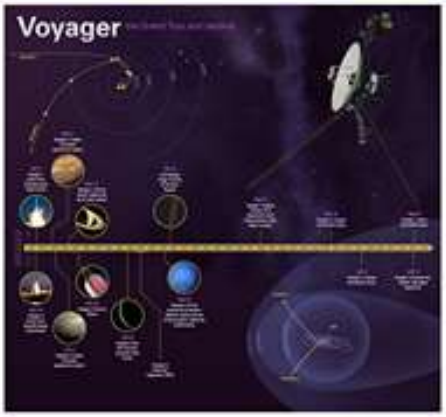

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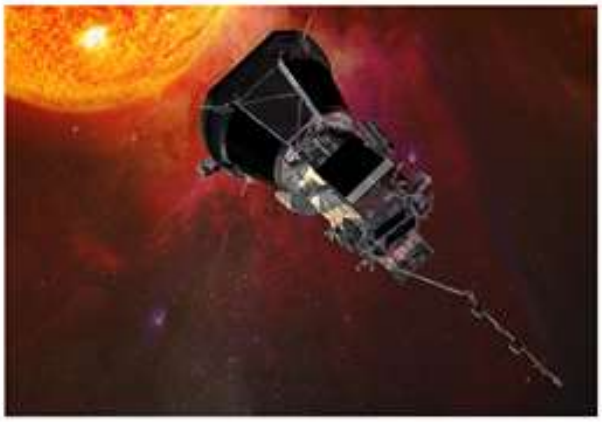


Interview with HOD

Dr. Sanket Goyal

Are you amazed at how far the EEE department has come since its inception?

->We have really done quite well. We started humbly with very few students and fewer faculty members. In ten years, we have 27 faculty members and close to 1500 students. We have more than >30000 square feet of lab area, which is really good. We also not only have good name and reputation in form of teaching output, but have good research output, which is a remarkable progress. We are the biggest department in the campus with > 60 PhD students, so we outperform many other departments that way.

Is there anything students can do to aid the Department?

->Yes, I think one thing students can do very easily is to be in touch with the department, like faculty members and PhD students. I think there is a lot of work going on in a variety of domains where students can keep themselves abreast. We offer many project courses, and I am delighted that so many students are taking those up. But I wish they'd do it more sincerely and efficiently. Whenever students they apply for Higher Education or recruitment, the project mentioned in their CVs are given higher precedence in comparison to their courses. So, they need to keep in touch with their faculty members for that. One other thing is, the students should feel themselves as a part of the PHoeniX / EEE family, one thing which I feel is missing upto some extent.

What do you think about the core placements on campus, and the students do to improve their chances?

->First of all, I'm not in full agreement with the definition itself of core courses (for placements). In my opinion, core jobs are those that make the taker happy NOT what the student has defined that he or she should be doing, and isn't. If you are an electronics student, and are happy with an IT job after four years, then good for you! If you are not happy working for a powerplant (just an example), then you're not in a core job. I feel that a student should always be satisfied with what he or she is aiming to work for. That being said, I've observed that, in general, the satisfaction level is very high from both the sides, students and recruiters. I've also interacted with many students desirous to pursue higher education after working in industry for a couple of years. This way, many students do get very good offers from many top-league institutes, which proves that academic rigor imbibed with other skills and industry experience have worked quite well for them.

What advice would you give to students aspiring for off campus thesis and internships?

->I don't have 'tips' as such, but I do have some feedback. For off-campus thesis students, I think they should do whatever they're doing more effectively, specially by being a linkage between the off-campus and on-campus supervisors. I would like to emphasize that the off-campus thesis is not just the collaboration with the student and the off-campus supervisor, but a collaboration between two supervisors and more so between two organisations. I've seen many success stories about those students who maintain a healthy communication between their supervisors, and end up publishing papers in reputed journals as a result. Therefore, such students must keep their both supervisors abreast of developments, and be more sincere and serious about it.

Any advice on how students should be utilizing their academic flexibility as well as the infrastructure here?

->I think they are doing quite well. As the main goal is to become happy, if they feel happy, I think they are utilizing it well. I feel like I've addressed this issue three times in your questions already, but they should definitely interact more. They must attend classes, talk to people and do hand-on live projects. Beyond academics, I suggest students to pick up at least two hobbies, one physical like sports, and other other one intelectual like music. Such hobbies will work like catalysts to outperform in your core work throughout your life.

Do you notice and positive or negative trends among the students? In other words, what qualities of us do we need to abolish and what do we polish?

->I don't know how to preach this to students, but I think nowadays students are much more aware, mature and mindful of themselves than before. Students should always be aware of their environment, and by that I mean the social, political and technological surroundings, which will extract many challenges requiring engineering interventions. Being the technologically intellectual outcome driven age, our eventual goal must be aligned with this only keeping in mind how we can contribute for Nation Building.

Any final thoughts?

->I've already covered most of the points, but to summarise, talk to the faculty, do hands on projects, and utilise our infrastructure. We have some limited mechanisms to fund projects as well, and interesting ideas. As many of our faculty members have overseas experience, we have strong ties with many institutes across the globe. We also have sustained collaboration with many public funded institutes in India too, so harness our time and efforts for your benefits. We're just one call away like the family members.

HOW TO BE A 9 Pointer

VIREN K RAMCHANDANI

2nd Year, EEE

The only mantra for becoming a 9 pointer is **willingness to work hard** and to **have faith** in yourself. Attending all the lectures, being in touch with professors and dedicating at least an hour a day for self-study are the most important of all. Always get your conceptual doubts cleared on spot. Consider textbook as your best friend. Start studying at least a week prior to exams and one important thing to do before every exam is, to solve previous year papers. Push your capacity to work to its maximum, but at the same time **don't miss upon recreational activities**. Try and avoid procrastination as much as possible. Last but not the least, stay connected with your family, teachers and true friends, they are the best motivators you will ever find in your life! The effort you put into all of the above points, will surely reflect as a 9+ in your CG card.

OMKAR MUKUL GOWAIKAR

2nd Year, ENI

First and foremost: **Be sincere** enough in your first year. Try attending lectures & more importantly the tutorials. For Phoenix students, this is where you can get a really high SG with minimal efforts and hence compensate for your future CGPA

ANURAG BEHERA

2nd Year, ENI

I believe **consistent self-study** while being up to date with what is being taught in the class by attending lectures, tutorials and not being too complacent or getting disheartened during exams are the key cogs to achieve a good grade.

BHARATHWAJ SURESH

3rd year, ECE

There are many general attributes for academic success, but I guess it boils down to how badly you want it. The easy way is to attend lectures and tutorials, study regularly and give your examinations in the right frame of mind. However, even if things start slipping out of your hands (which is something bound to happen to most Phoenix students in their 3rd year), it is important **not to give up**. Never approach an exam thinking about the grade you are going to get in that course. Sometimes, doing exceedingly well even in one component can boost your grades immensely (Due to the low-scoring nature of Phoenix courses). So just keep working hard till your compres even if results haven't gone your way in the past.

Some other general tips – **Solve all the tutorial questions**, try to attend lectures (Impartus works too), solve "relevant" questions from the textbook and attempt all the questions in the exam.

You need to **start from the very beginning**. Also, attend classes. Classes help in learning things quicker and lessens the time it will take a person to revise portion before a quiz or midsems/compre. **Keep revising** as frequently as possible and if possible make notes to help you in the open book component as well as revising for closed book components. Do not depend completely on slides. Textbook might be better in some cases but slides are usually faster but might not give you as much conceptual knowledge as you would sometimes need.

SHREYAM KUMAR

2nd Year, ECE

I would suggest everyone to **read their textbooks**. Most of the prescribed books are very good and interesting. Solve many problems from the exercises.

PRIYASH BARYA

3rd year, ECE

You must remember that your current academic standing is not in any way an indicator of what you are capable of. People often judge themselves based on their previous performance,and this becomes a major hurdle. I know people who were 7 pointers in their first year, who managed to score 9+ in their second and third year.

SHREYAS RAVISHANKAR
3rd year, ECE

To me, it all boils down to three things:

1. **Attend classes**. They definitely help and keep you up to date with what's going on.
2. Classes alone though, will not do. You are going to have to work if you want results.
3. **Enjoy** what you are doing.

MYTHILI K

3rd year, ECE

The first thing is to **snap out of the feeling that Phoenix is tough**. We have been hearing it ever since we joined here and there is this constant fear that Phoenix is going to be a lot of slogging. Once you get out of that, the subjects are really interesting provided you have a good base in EEE course of the first year. Everything that we learn is practically applicable and it's always better to put in your efforts for the subjects that you like. It's not possible to work equally hard on all the subjects. Work on the subjects that interest you and which you would like to pursue further. Grades will follow. Don't bother about the subjects that you can't do. It's better to be an **expert in one** rather than worrying about all.

RAAHUL JAGANNATHAN

3rd year, EEE

Our eyes determine what we see, our sight determines what we understand and that is how we gain knowledge. But curiosity never left man.

Man has been developing new instruments and new methods to know what was unknown, to see what was unseen.

One such advancement is the telescope which enabled man to see beyond his naked eyes.

The year 1608 saw the first telescope. Enhancements were made by Galileo and later on by Newton. Now four satellites of Jupiter and nebular patches of stars were known. The visibility was however limited to this one galaxy. It was believed that the universe was made up of only our Milky Way Galaxy, an oasis of stars, dust, and gas in the boundless space.

Until in 1924 when astronomer Edwin Hubble used the 100-inch Hooker Telescope, on Mount Wilson near Los Angeles, to observe billions of other galaxies all moving away from each other.

The universe is expanding! Now there were new questions and there were new possibilities.

A year before, Hermann Oberth, a German scientist, had established the fact that a telescope could be propelled into Earth orbit by a rocket.

The advantages of a telescope in the space are firstly, the angular resolution would be only limited by diffraction and not by the turbulence in the atmosphere, and secondly, a space-based telescope could observe infrared and ultraviolet light, which are strongly absorbed by the atmosphere.

Two missions- Orbiting Solar Observatory (OSO) to obtain UV, X-ray, and gamma-ray spectra and Orbiting Astronomical Observatory (OAO) to carry out ultraviolet observations of stars and galaxies were launched by NASA in 1946 and 1968 respectively, were the initial stepping stones towards space astronomy and signified the role space-based observations could play in astronomy.

The making of the provisionally known Large Orbiting Telescope or Large Space Telescope (LST) was in process by 1968 headed by Lyman Spitzer. But there was a new problem- the need for manned maintenance missions to the telescope. NASA and its “contractors” brought up the idea of developing a vehicle that could achieve orbit and return to earth intact and be reused repeatedly; the vehicle which was now called the Space Shuttle. Its construction had to ensure its withstand against frequent passages from direct sunlight into the darkness of Earth's shadow, eventually major changes in temperature, while being stable enough to allow extremely accurate pointing of the telescope.

Now different parts of telescope were made in different parts.

The Marshall Space Flight Center, chosen as the lead NASA field center for the design, development, and construction of the renamed Space Telescope (ST) delegated Perkin-Elmer Corporation the task of developing the Optical Telescope Assembly and the Fine Guidance Sensors, Lockheed Missiles and Space Company to build the cylindrical casing and the internal support systems and assembling the telescope together and Goddard Space Flight Center to be the lead in scientific instrument design and ground control for the space observatory.

Scientists were grouped into "Instrument Definition Teams" to translate scientific aims. Five devices were selected as the initial instruments that would be aboard the Space Telescope: the Faint Object Camera, the Wide Field/Planetary Camera, the Faint Object Spectrograph, the High Resolution Spectrograph, and the High Speed Photometer.

The HST is a Cassegrain reflector of Ritchey–Chrétien design with

HUBBLE TELESCOPE

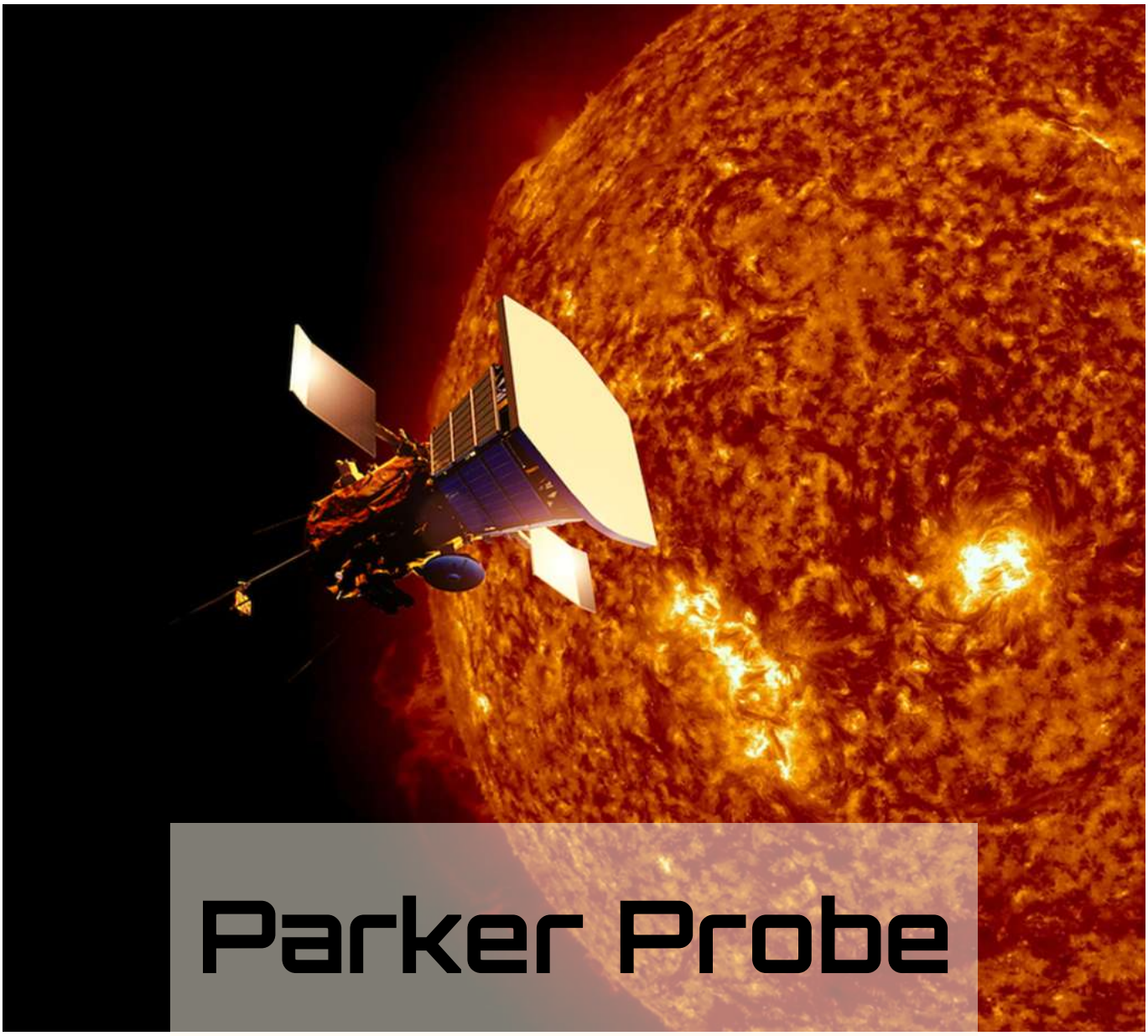
You can also check out hubblesite.org to watch “tonight’s sky” or “space telescope live” and explore and glimpse upon distant, exotic cosmic shores yet to be explained.

two hyperbolic mirrors for good imaging performance over a wide field of view its mirror polished to an accuracy of 10 nanometers, or about 1/65 of the wavelength of red light.

The two initial, primary computers on the HST were the 1.25 MHz DF-224 system, built by Rockwell Autonetics, which contained three redundant CPUs, and two redundant NSSC-1 (NASA Standard Spacecraft Computer, Model 1) systems, developed using diode–transistor logic (DTL). A co-processor for the DF-224 was added during Servicing Mission 1 in 1993. The DF-224 and its 386 co-processor were replaced by a 25 MHz Intel-based 80486 processor system during Servicing Mission 3A in 1999. Some of the science instruments and components had their own embedded microprocessor-based control systems- the MATs (Multiple Access Transponder) components and the Wide Field and Planetary Camera (WFPC).

The Space Telescope Science Institute (STScI) was designated the responsibility for the scientific operation of the telescope and the delivery of data products to astronomers on Earth.

The launching of this telescope wasn't smooth. There were doubts, there was a budget crisis, there was technical delay and the Challenger disaster. Finally, on April 24, 1990, the Space Shuttle Discovery lifted off from earth with the Hubble Space Telescope nestled securely in its bay.



Parker Probe

Avinash Bhat

During the August of 2018, as young BITSians were finding their footing in a new phase of their lives, NASA was busy breaking new ground of their own. At 7:31 A.M. GMT, NASA launched the Parker Space Probe, the first ever probe designed to approach within 4 million miles of the sun, facing heat and radiation unlike any other spacecraft in history. It was In 2017, the mission (up until then called the Solar Probe Plus) was named after Eugene Parker, a professor emeritus at the University of Chicago and the first to propose the concept of a 'solar wind'. This theory arose from his explanation as to how the corona of the Sun, a region of plasma that extends for kilometres above the solar surface, avoids being collapsed by the Sun's gravity. While the occurrence of particles being ejected from the Sun had been proposed and observed nearly a century before, Parker was the first to propose that these particles were due to the outer corona escaping from the gravitational pull of the Sun and into interstellar space. However, even though we were aware of the existence of the solar wind, we still did not know much about it, since we could only measure it once we reached the Earth. This is where the Parker Solar Probe comes into the picture. The goals that the mission hopes to accomplish during its near 7 year lifespan are:

> To trace the flow of energy that heats up the corona and accelerates the solar wind.
> To determine the structure and dynamics of the magnetic fields at the sources of the solar wind.
> To determine what mechanisms accelerate and transport energetic particles.

The Parker Probe is equipped with specialized instruments, developed by research institutions across the U.S., to work under extreme conditions while gathering data on the sun's corona, at the same time sweeping closer to our home star than any other spacecraft before. Its four instruments were designed to withstand exposure to the harsh temperatures and radiation as they characterize the electromagnetic fields in the dynamic region of solar atmosphere.

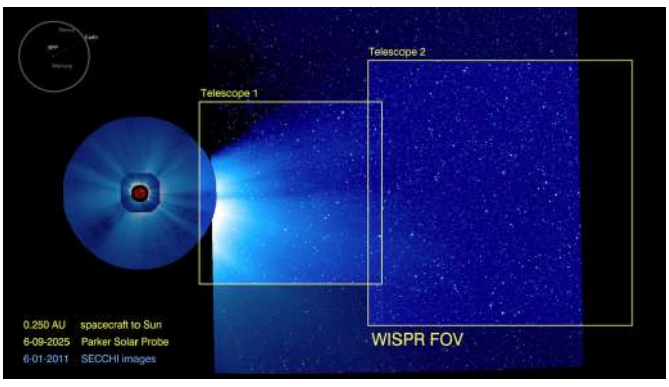
SWEAP

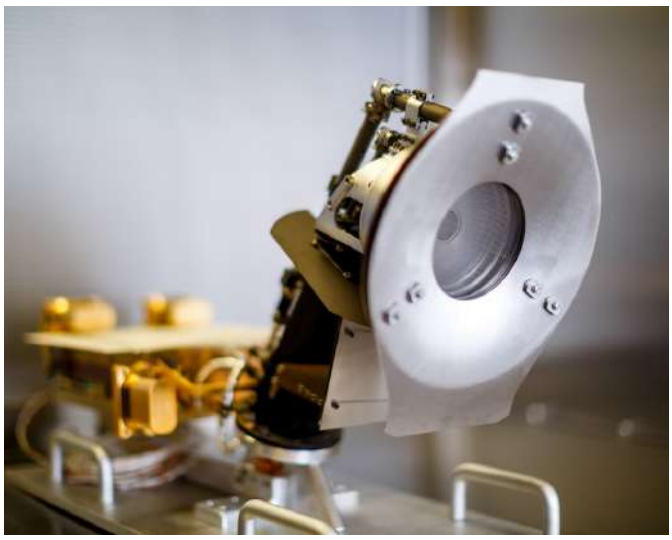
The Solar Wind Electrons Alphas and Protons Investigation was built mainly at the Smithsonian Astrophysical Observatory in Cambridge, Massachusetts, and at the Space Sciences Laboratory at UC, Berkeley.

The purpose of SWEAP is to help us better understand the constituent particles of the solar wind as well as the properties of the solar wind itself. It accomplishes this by using two complimentary devices: the Solar Probe Cup (SPC) and the Solar Probe Analysers (SPAN).

The SPC is a Faraday cup, a cup made of a conductive substance designed to capture charged particles in a vacuum. The cup is made of a series of highly transparent grids above several collector plates. The instrument separates incoming particles and measures their properties. An advantage of using a variable voltage grid is that it can avoid biased readings caused by interference resulting from cosmic rays. Components of the cup are isolated from one another by using sapphire. The obtained data can be used to gauge properties of the solar wind like velocity, temperature, etc.

SPAN is composed of two instruments – SPAN-A and SPAN-B. SPAN's purpose is to help the SPC by covering the space that the SPC cannot. SPAN-A is capable of taking readings for both ions and electrons, while SPAN-B is limited to taking readings only for electrons. SPAN segregates the different particles on the basis of mass and charge (by the use of deflectors and voltages) before taking measurements.





WISPR

The Wide-Field Imager for Parker Solar Probe was designed and developed by the Solar and Heliophysics Physics Branch at the Naval Research Laboratory in Washington D.C.

WISPR is essentially a camera that captures images of the Sun's corona from afar. WISPR does this by blocking out most of the incident sunlight which would otherwise prevent the corona from being visible (incidentally, this process of blocking most of the host star's light to view a much dimmer surrounding object is employed in many probes and space telescopes). WISPR makes use of two cameras with radiation-resistant Active Pixel Sensor CMOS detectors. These detectors are preferred over traditional Charged Coupled Device detectors due to them being lightweight and requiring lesser power for operation. They are also less susceptible to damage and interference from cosmic rays and energetic particles, which become more prominent closer to the Sun.

WISPR take images of the corona and the ejected mass from afar, before they encounter the probe. Once the solar wind is in close proximity, the onboard instruments are able to take detailed readings. This instrument is important since it helps scientists to link the acquired data with events going on in the Sun's corona and on the Sun's surface.

FIELDS

FIELDS was designed and built by the Space Sciences Laboratory at UC, Berkeley.

The instrument was designed to measure the electromagnetic fields in the Sun's atmosphere. The instrument is capable of measuring the waves and turbulence in the inner heliosphere, taking readings in intervals of less than a second. The extracted data can be used to understand phenomena associated with the dynamic nature of the fields.

FIELDS makes these measurements by using five antennas, each 2 metres long and made of niobium alloy. Niobium alloy is able to withstand high temperatures, making it an ideal candidate for building the antennas. Four of the five antennas stick out of the probe's heat shield, experiencing temperatures well in excess of 1300 degrees Celsius. The instrument can measure a broad frequency range.

The four exposed antennas measure the properties of the particles ejected from the Sun's corona, i.e., it measures the matter that constitutes the solar wind. The fifth antenna is not exposed to the Sun and is instead present in the shade of the probe's heat shield, its orientation orthogonal to the other four. It helps image the fields in three-dimensional space.

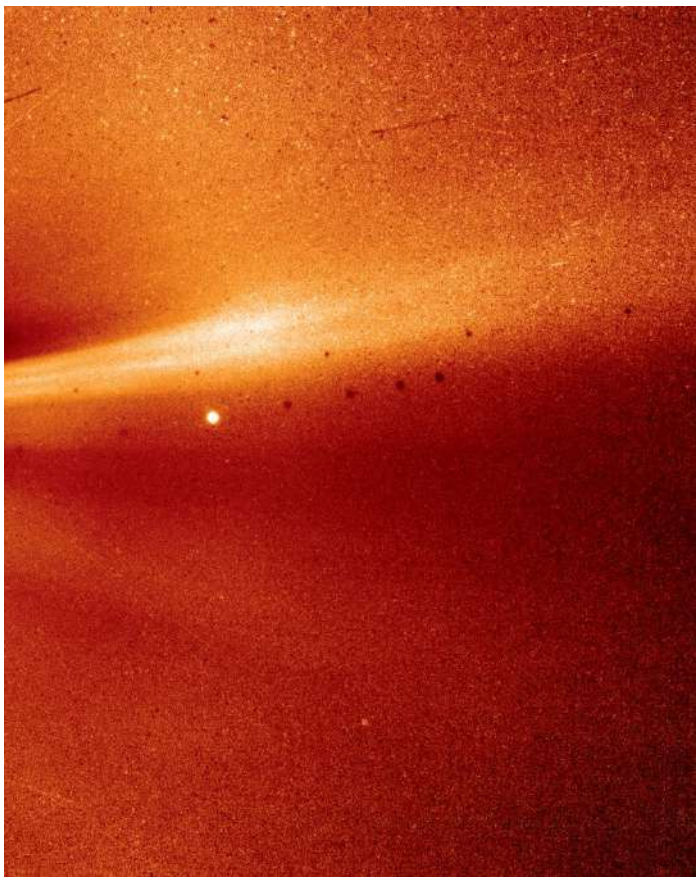
When a coronal mass ejection occurs, there is an accompanying variation in the magnetic field. This variation gives rise to a voltage, which can be detected with the right instruments. FIELDS accomplishes this with the help of three onboard magnetometers. Two fluxgate magnetometers measure the magnetic field further away from the corona, where the rate of variation is relatively less. Closer to the Sun, there is a rapid change in the magnetic fields. In this scenario, a Search Coil Magnetometer (SCM), with a sample rate of two million times per second, is employed.

ISʘIS

The Integrated Science Investigation of the Sun (pronounced "ee-sis" and including the symbol for the Sun in its acronym) was built at Johns Hopkins Applied Physics Laboratory in Laurel, Maryland, and Caltech, in Pasadena, California, with contributions from Southwest Research Institute in San Antonio, Texas and NASA's Goddard Space Flight Center in Greenbelt, Maryland.

The instrument measures encountered particles and based on the extracted data, scientists can determine their origin, what caused their acceleration and how such particles move outward from the Sun into interstellar space. ISʘIS uses two instruments, EPI-Hi and EPI-Lo (EPI standing for Energetic Particle Instrument), to extract the required data from a wide range of energetic particles.

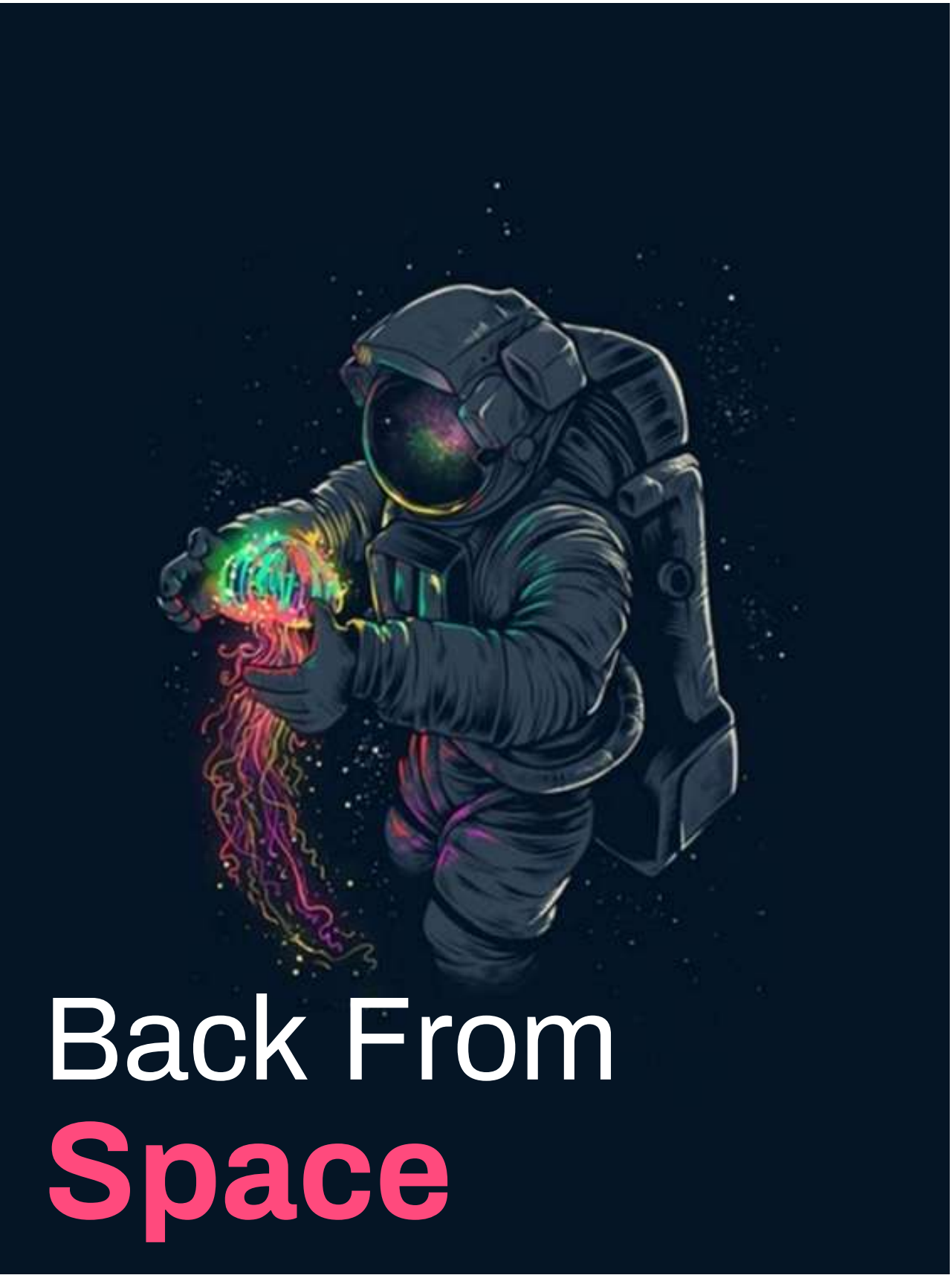
EPI-Hi searches for high-energy particles by using three stacked detectors, the front few layers of which are made from ultra-thin silicon. The instrument is able to identify the particle based on the depth it is able to penetrate the detector as well as how many electrons it is able to knock off the constituent atoms. The layers are made in geometrical patterns, which helps identify the particle's direction of motion. AT closest approach, the instrument is capable of measuring 100,000 particles per second.



EPI-Lo, on the other hand, measure the spectra of charged particles and is capable of identifying elements like carbon, oxygen, iron, helium-3 and helium-4. The ability to distinguish between the two isotopes is important since the data can help determine which of the proposed theories is actually responsible for the particles' acceleration. The instrument is capable of searching for a large number of low-energy particles simultaneously. An ion that enters the instrument initially passes through a pair of carbon-polyimide-aluminium foils and subsequently encounters a solid-state detector. When hit, the foils release electrons, which can be measured by a microchannel plate. The ion can be based on the impact on the detector and the time it took to move through the instrument.

With these instruments, humanity has become capable of looking at the Sun more closely than ever before. Despite the fact that it is our parent star and is responsible for driving a lot of reactions on the face of the planet, there is still a lot that we don't know about it. The Parker Solar Probe will help us answer a few questions we have, though doubtless it will be a long time before we can learn everything there is to know about our host star.

Recently, the Parker probe sent back the closest image of the Sun that has ever been taken. While there is still a long way to go until the goals of the mission reach fruition, this is a good sign, not just for the mission, but for humanity itself as it hopes to explore and understand the cosmos.



Back From Space

We have been hearing about Elon Musk's SpaceX (Falcon 9 and Falcon 9 Heavy) and Jeff Bezos' Blue Origins (New Glenn) getting their rocket back to Earth after successful takeoffs. But why take the extra effort when you can just discard the booster rockets in the sea?

According to Business Insider, each rocket deployed costs nearly $60 Million, a major cost of which is in the booster rockets. Jeff Bezos has a very nice way of conveying this fact, “it’s like flying a Boeing 747 across a country and then throwing it away”.

So these entrepreneurs have decided to step up and develop the reusable rocket technology for typically all launches, consequently bringing down the cost of space transport (and tourism) drastically. However, till now only SpaceX has seem to achieve completely operational reusable rockets, The Falcon 9 and The Falcon 9 Heavy.

So now is the right time we should know how these rockets actually work.

SpaceX’s Falcon 9 is to date the most successful rocket in the category with a landing and also a successful re-flight. Falcon 9 is a 2-stage, orbital class rocket with a reusable first stage that can land on a drone ship in the sea. According to SpaceX website, the rocket is capable of delivering 22,800 kg of payload to the lower Earth orbit.

Falcon 9’s first stage incorporates nine Merlin engines and aluminum-lithium alloy tanks containing liquid oxygen and rocket-grade kerosene (RP-1) propellant. These engines are arranged in an Octa-web layout with a central engine and 8 others surrounding it. SpaceX claims that it can successfully complete a mission even with two engine failures due to this arrangement.

The landing procedure of the first stage is where things start to get interesting. So read on...

After the Stage Separation, the first stage rocket is flipped so that the engines now face the other side. This is achieved by several Cold Gas Thrusters near the ‘nose’ of the first stage. These thrusters flip the rocket using Nitrogen to create thrust in appropriate directions.

There are four Grid Fins attached to the head of the 1st Stage Rocket. They are deployed only after the rocket is stabilized from the flip. They make minute movements to help steer the rocket towards the landing pad.

With the rocket facing the right direction, the next major obstacle is getting it back into the atmosphere. The 3 out of 9 engines in the Octa-web are fired to slow the rocket’s re-entry velocity. The arrangement of engines also helps control the position of descent of the rocket. One or multiple engines are run to properly align the rocket in the vertical position.

After the rocket enters the atmosphere, it now starts receiving signals from the drone boat called “Just Follow the Instructions” which is the final stage of landing.

This way the rocket is ready for Reuse.

But that’s not the end for this technology, it’s just the beginning. SpaceX achieved another milestone with Falcon Heavy where they were able to land two booster rockets along with the first stage rocket. Jeff Bezos’ Blue Origins landed their 1st stage on land, another major feat.

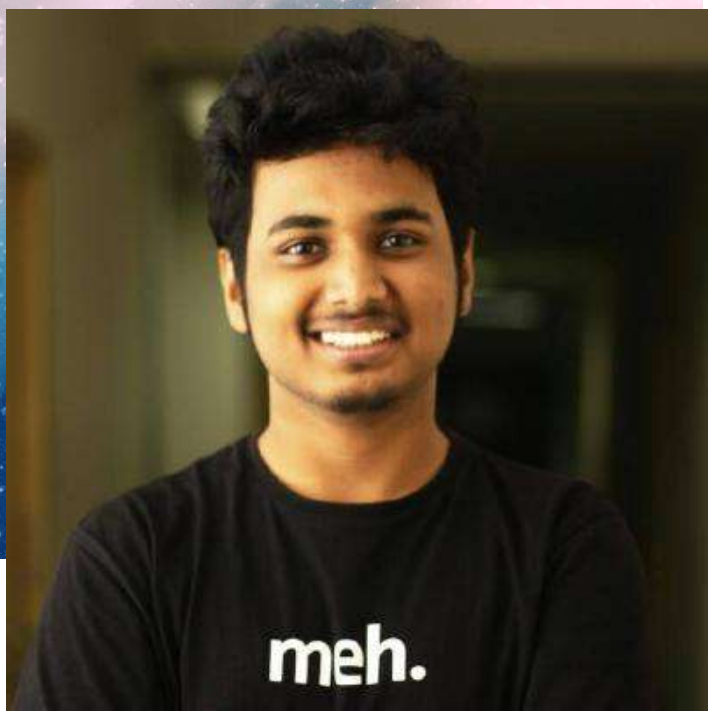
how to FAIL successfully

- Anjali Goyal

Elon Musk, technology entrepreneur, investor, engineer and now worth almost $12 billion was once a common man with big dreams and a small world. He is the co-founder and CEO of Neuralink; founder, CEO, and lead designer of SpaceX; co-founder, CEO, and product architect of Tesla; and co-founder of PayPal. He has not simply started these businesses, moreover revolutionized every aspect he touched. For instance, electrical cars through Tesla, E-cash through PayPal, rocket technology through SpaceX, and energy services through SolarCity. Musk has also envisaged Hyperloop, a high-speed transportation system. He has also envisioned a vertical take-off and landing supersonic jet electric aircraft with fan propulsion, referred to as the Musk electric jet. Musk is very explicit in stating that his vision is to change the world and mankind. He also aims at reducing global warming. The most talked about aim of his is to establish a human colony on Mars so that the human race never gets extinct.

Now, skipping the introduction which would never end, let us talk about his latest breakthroughs in technology. Musk believes that another danger of human extinction arises from the fact that humans are bereft of Artificial Intelligence. The goal, he explained, is to build a hard drive to be inserted in the brain. His planning is to wire this chip inside the skull which would give us digital intelligence. So, once this mission is accomplished, human race would not be merely about biological intelligence but artificial intelligence as well. Mark argues that without Artificial Intelligence our species is doomed. Musk claims that Neuralink would save mankind. But scientists argue that with the body incorporated with Artificial Intelligence, we will lose our biological flaws and eventually our essentiality of identity. Neuralink also proposed that “electrode-to-neuron interface at a micro level” will cure ailments like dementia and paralysis. But there may be a big gap among, say, repairing spinal twine accidents by means of implanting electrodes within the brain and implanting an intelligence-enhancing AI chip, as Neuralink pursuits to do. First restores an injured human to complete mobility; the other alters the very nature of the human. Musk looks like a cross-to-guy to discover ways to fail efficiently. Failure is probably the least of his worries, instead a necessity. In his personal phrases:
Failure is a choice. If things are not failing, you aren't innovating sufficient. Musk correctly manages his three agencies, five children, and even makes time to think about the future. With a passionate and revolutionary billionaire like musk, best time will tell what he has in shop for us.

AKHIL RAJ BARANWAL



Jack of all trades Akhil Raj is no less than a prodigy. Although, he calls himself an introvert who knows the power of speech, he was equally welcoming and descriptive about anything that was asked to him.

How has your journey in BPHC been so far?

Initially the seniors I met, partly by chance, were not friendly. I believe, any new comer joining this college should not go through what I did. But for introverts, like me, opening up takes time. The beginning was very traumatising for me. I was rudely refused for any help even though they promised help. I didn't like the college.

But on the brighter side, I also had fair share of seniors who guided and helped me throughout, some of them are, Suraj bhaiyya and Parakh bhaiyya.

What is your daily life like?

My daily life is partly what is on my to-do list and partly what should have been on my to-do list 😅. I don't follow time-tables, I find them rigid and inflexible. Everyday is different and I'm not comfortable putting a jail defining exactly how much time I spend with something.

I like to think that I start my day by sleeping. So my day begins at about 2-3 AM every morning.😅

The main aim is to finish whatever I have planned for the day before I start the next day (sleep :P).

On becoming an all rounder.

I realised that CG was not that big of a deal. While I was in standard 11th, I always felt there was not enough content in me. The only thing I was good in was academics. So I believed academics should not be the only thing on my priority list.

How and when did you start script writing?

I started writing short stories back in 7th / 8th. I got two publications in local magazines by the time I was in 10th, so I never diverted away from writing. I got interested in movies because you can show much more with a subtle easter-egg in a scene than you can ever with words. Books have a totally different magic to them, though.

The movie 'Imagine' which was played in Atmos inauguration 2019 was written by him. Here's the link to it https://youtu.be/PNcLJ-C4uQ0. Interestingly, the background score of the movie was also made by him and it was found out that Akhil also produces music. (Amused, eh?)

How do you think people can work on improving their creative thinking and imagination?

Indians romanticise the idea of schooling. I think schooling is now seeping its way into trying to discipline how a student thinks. Most people share similar thoughts, I guess.

I feel that pedagogy is constantly moving to being solution-based instead of being problem-based.

More care is given to the solution than to the thought process behind designing it, and I believe that it renders education incomplete.

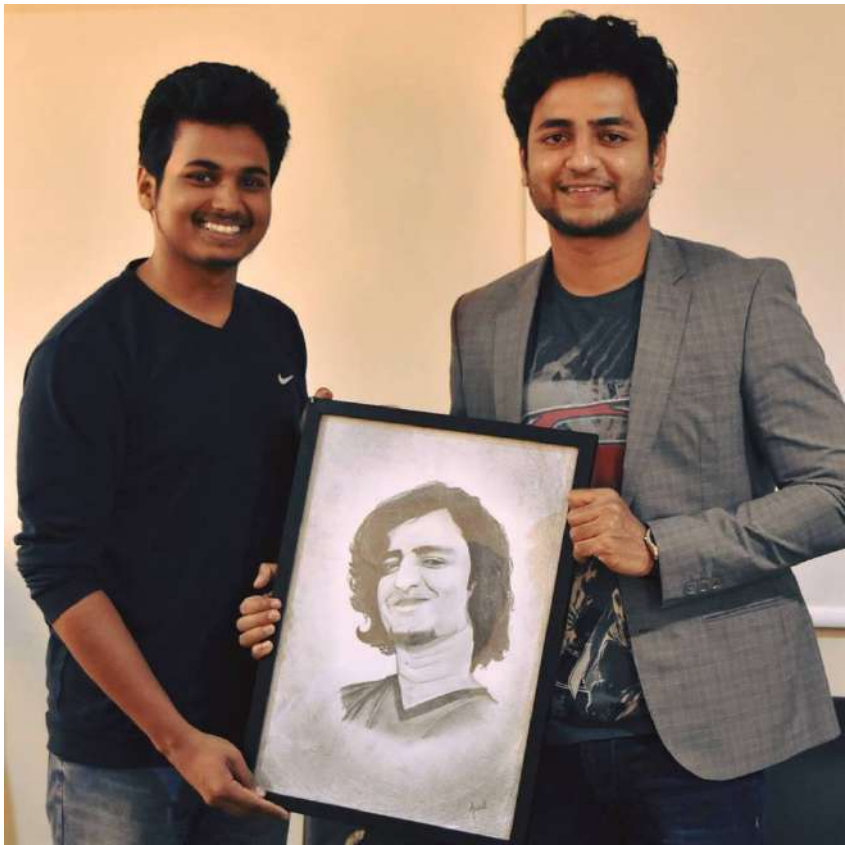
In a competitive environment where students are judged on scores that measure how brilliantly they can memorize solutions, most tend to deviate from conjuring new solutions to practising existing ones.

So that's not something that the student has control over entirely, but finding some time everyday for something that brings true joy, not temporary fun, to you, will be enough to rekindle imagination and creativity.

Also good at sketching, and having presented a portrait of Kenny Sebastian to him, Akhil describes how the experience felt like.

I started sketching since standard 2/3. I was never comfortable with colors. I used to love my fine arts classes in my 11-12th. Gradually I picked on it.

Meeting Kenny Sebastian was really a big moment for me. I was a huge fan of his back then. I had everything planned and prepared inside my head on how would I meet him and say a couple of things. But I ended up being starstruck!



Necessity is the mother of all inventions. But you know what else is – curiosity.
Stumbling upon questions and finding solutions on his own, this is how he has been 'passing' his time.

How did your technical knowledge expand?

So, Jayesh Sanwal was one of the most helpful seniors I met on campus. In my first year after he 'interacted' with me, he gave me his Arduino kit for free to just try out things. I spent my nights tinkering around it. The first project I created was a very simple strobe, which I called magnito. It was a big moment for me. I was very fascinated with the depth of electronics.

I was introduced to Suman Mam, under whom I did a lot of projects. The first one was to predict urinary tract infections in people in around four hours.

The other project I have been doing under her was to predict arthritis by monitoring the gait in a person. It is observed that a person who is inflicted with arthritis shows a different walking style. They tend to fiddle around. The aim is to create a wearable that can compare the gait of the person to that of an athlete and an already inflicted person.

More of his projects can be found on : https://github.com/akhilrb.

Been conducting the Student Mentor Programme (SMP) this semester, Akhil also expresses how he loves to interact in a manner like this and how he loves to share what he knows.

On his future plans and a word to all

My future would include pedagogy at some point in life. I also want to learn more so will consider masters'.

My word for juniors would be- Try out many things, become an average at most of them but get perfect at one thing. Choose one thing that makes you stand out, be it playing PUBG, cooking or anything.

Interview with PARIKSHIT SIR

When did you come to Bits Pilani Hyd Campus? How would you describe the transition from some other institute to BITS? Tell us a little more about your professional experiences.

-> I joined BITS Pilani Hyderabad Campus on 20th December 2018. Prior to that, I was working as a Research Scientist at Redpine Signals, Hyderabad for a brief period of 6 months. I have pursed my PhD at Indian Institute of Technology (IIT) Hyderabad in the field of flexible nanoelectronic devices for applications in healthcare. I was also a visiting faculty at Central University of Karnataka at a same time holding a position of Research Associate at IIT Hyderabad. Post Bachelors, I worked as an Automotive Embedded Engineer at KPIT Cummins, Pune.

The transition from other institutions to BITS has been very rewarding not only in terms of my career but also in terms of my dream of teaching one of the best of the minds in the country.

What is your commenton the teacher-student relationship in BITS?Also, what do you think are the key issues on which the students of this college lack when they get to stand on a common platform with their counterparts from other universities?

-> The student-teacher relationship in BITS is excellent. The students are friendly at the same time respectful towards the teacher. They key issue, according to me, on which the students of BITS lack when they get to stand on a common platform would be research oriented projects. I suggest students to take up more research oriented projects which would increase the level of creativity and also the knowledge in the subject.

If you had 0% attendance policy in your college, what would you do?

-> There are somethings which can never be learnt from Internet/Google and hence I always encourage students to attend the class to learn from the experience of the teacher (this is from the teacher's perspective). As a student, the thinking is different and I would use the 0% attendance policy to my advantage wherein I don't attend the lecture (for various reasons), but use the same time for some innovative research driven projects. This would not only utilize the time in a proper way but would also enhance the CV of the student.

What can be done by the students to increase the undergraduate research and technical culture on campus?
-> Like I said before, right from the first semester, they should get engage in research oriented projects so that they learn the ethics of research in the initial days itself. This would enable them to realize the field in which they want to pursue their research in their later semesters.

If your greatest supporter was in the room with us today, what five words would he or she use to describe you as a person, a teacher, or a colleague?
-> Sincere, Inspirational, Honest, Experimentalist, Hardworking etc.

After pursuing four long years of engineering in the field of electronics, most of the students still look for jobs in IT, finance and other non-electronic sectors. What is your view on this?
-> I would not say that is the complete fault of the students. I would rather say that the system is in fault here, as they are not able to provide more jobs in the core sector. As you know, survival is important and hence most of the students end up doing job in IT, finance etc. However, some do it by choice, which needs to be appreciated.

Can you recall any incident during your time interacting with the students that you found amusing? -> It has been 3 months since I joined BITS and what amuses me is that some EEE undergraduate students are interested in pursuing research in fabrication of nanodevices and also the nanomaterials synthesis (which I did not find in my previous institutes).

What is your comment on the kind of curriculum that is followed in all the renowned universities? Do you think the practical knowledge of the student is brought to light in the evaluation process?
-> I guess in every good/renowned institutes in India and abroad follow the curriculum wherein student get to decides its courses and accordingly structure his/her degree. Surely, the practical knowledge of the student is brought to light in the evaluation process which are in the form of projects, quizzes, assignments and examinations etc.

What is the trend of students here that you have been observing since your inception into BITS? What do you think makes this University significant?
-> I found the students at BITS very much talented, hardworking and also passionate about what they want to pursue (in due course of time, I shall learn more about students). For me, it's the Students that makes BITS Pilani – THE BITS PILANI thereby making the university significant.

Given the opportunity, what career would you have chosen other than teaching/research?
-> I have left other opportunities to be in this profession. So, I guess, this does not apply to me.

Is there any new technology or latest breakthrough that amuses you?
-> For me it's the Internet of Things (IoT) in healthcare. I am sure it is going to play a significant role in all our lives in the near future.

Is there any advice that you would want to give the students?
-> The same as what Winston Churchill said "Success consist of going from failure to failure without the loss of enthusiasm". I find some of the student fear failure and hence always follow an easy path. The day you fear failure is the day you chose not to succeed. Lastly, my best wishes to all the wonderful BITSIANs.

BON VOYAGE!

An insight on the Voyager missions

BY Tejus Vidyadhar Kusur

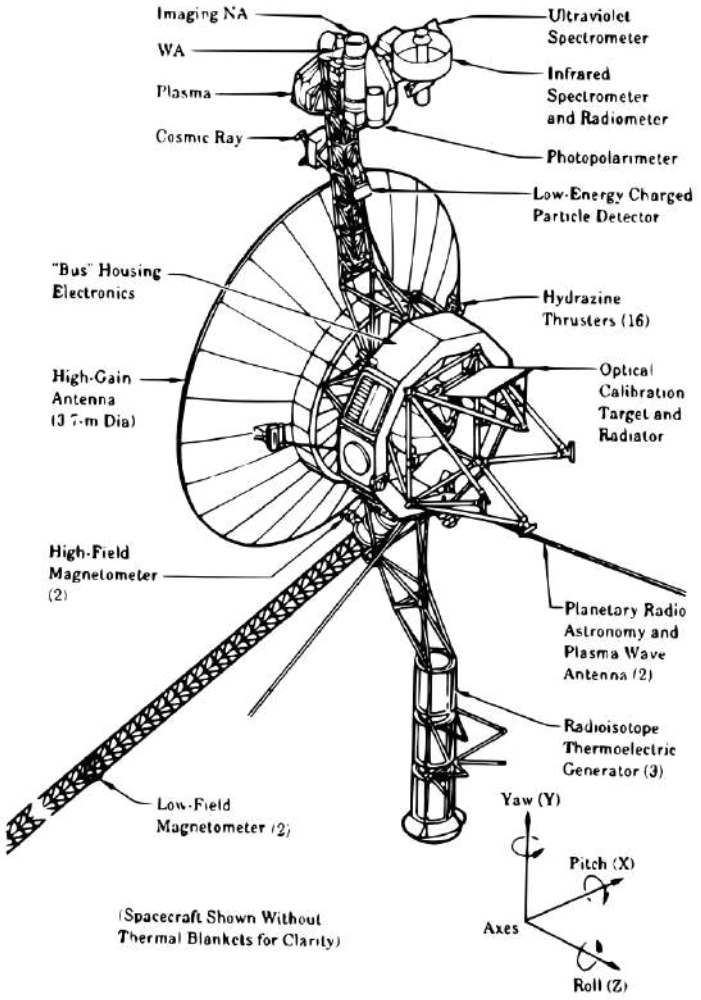
What is like to travel beyond all known boundaries? A region never explored before, dark, uncharted, mysterious with countless secrets to be revealed? This is interstellar space, regions well beyond the reaches of the solar system, 11346 million kilometres away, unaffected by solar wind, filled with the material from the dying stars and no power from the sun or any form of help. This is where the Voyagers currently trend, the twin probes with the distinction of being the farthest human satellite till date.

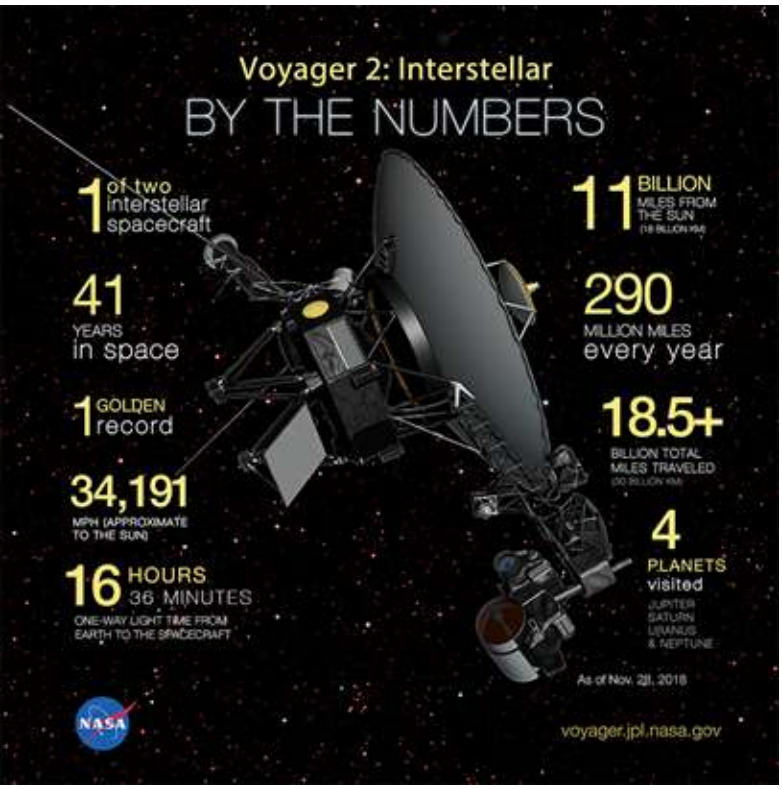
Conceived as a part of the Mariner program, Voyager 1 and 2 were launched in 1977 from Cape Canaveral, Florida upon a Titan IIIE-Centaur launch vehicle. Originally designed to explore Jupiter and Saturn (thereby the initial name of Mariner 11 and 12), the Voyager Program held similarities to the Planetary Grand Tour of the late 60s and 70s, taking advantage of rare alignment of the outer planets, discovered by Gary Flandro. This alignment occurs only once every 175 years, in which gravitational assists can be harnessed to explore Jupiter, Saturn, Uranus, Neptune and Pluto. Though the Planetary Grand Tour, which comprised of many small probes flying past the outer planets, ended due to shortage of funds, the Voyager mission incorporated several aspects of the Grand Tour, except the visit to Pluto (later achieved by the New Horizon Probe).

The Voyager 2, despite its numeric value, was first to launch, with a trajectory allowing flybys of Jupiter, Saturn, Uranus, and Neptune. Voyager 1 was launcher after Voyager 2, but the shorter and faster trajectory designed to reach Saturn's moon, Titan. This high velocity trajectory meant that Voyager 1 overtook the slower deep-space probes Pioneer 1 and 2 as well as the Voyager 2 to become the most distant human made object, a record it will keep for the foreseeable future.

Spacecraft design

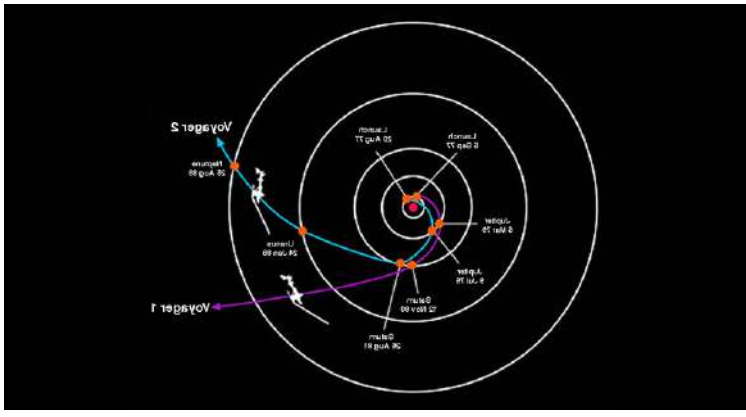
Weighing 773 kilograms, each spacecraft carries 105 kilograms of scientific equipment. Stabilised by three-axis guidance systems comprising of gyroscopic and accelerometer inputs to their altitude control computers, the satellites always point their high gain antennae to the Earth while the instruments point towards their targets. The satellites carry a spherical tank of hydrazine monopropellant as fuel and a Radioisotope Thermoelectric Generator to power its electronics.
The list of scientific instruments includes:
Imaging Science System (ISS)
Radio Science System (RSS)
Infrared Interferometer Spectrometer (IRIS)
Ultraviolet Spectrometer (UVS)
Triaxial Fluxgate Magnetometer (MAG)
Plasma Spectrometer (PLS)
Low Energy Charged Particle Instrument (LECP)
Cosmic Ray System (CRS)
Planetary Radio Astronomy Investigation (PRA)
Photopolarimeter System (PPS)
Plasma Wave System (PWS)





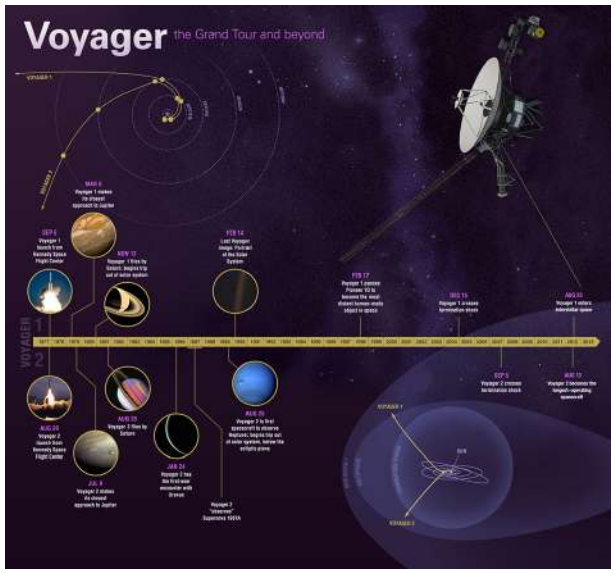
Voyager Planetary Tour

Voyager 1 and 2 explored all the gas giants of the outer solar system, Jupiter, Saturn, Uranus and Neptune, with Voyager 2 holding the title of being the only spacecraft to explore Uranus and Neptune. In addition to the gas giants, the two probes explored 48 of their different moons as well as the unique and characteristic system of rings and magnetic fields possessed by these planets.



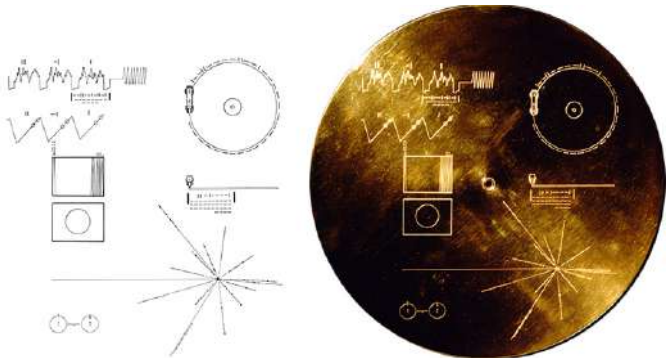
Voyager Interstellar Mission

The Voyager primary mission completed on 1989, with the close flyby of Neptune by Voyager 2. The Voyager Interstellar Mission (VIM) is in fact a mission extension to the already 12-year long flight of the crafts. The main objective of VIM was to test the possibility of exploration beyond the solar system to the outer limits. Voyager 1 crossed the termination shock (region where SolarWinds turn subsonic) in December 2004 while the Voyager 2 achieved it on August 2007 at 94 AU and 84 AU respectively. This proved that the solar system is not symmetric. Voyager 1 entered interstellar space on August 25, 2012 while Voyager 2 reached on November 5, 2018. Currently, only 5 instruments onboard the Voyagers are operational with the UVS being operational on Voyager 1 only.



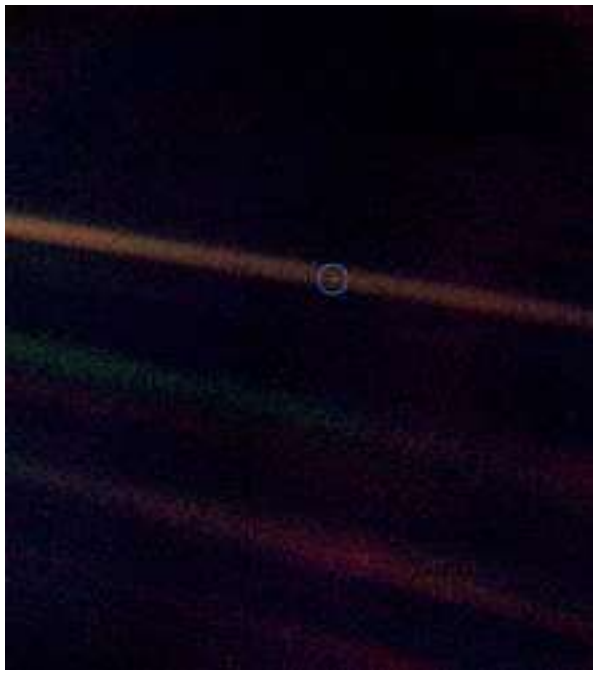
The Golden Record

The Voyagers carry a unique greeting to any form of extra-terrestrial life forms it might encounter in the form of message carried in a phonograph record. The 12-inch gold-plated copper disk contains sounds and images selected to portray the diversity of life and culture in on Earth. This comprise of 115 images, a variety of natural sounds, music selections of different cultures and eras as well as greetings from humans in 55 different languages.



P ale Blue Dot

One of the most iconic photographs ever taken, the pale blue dot is a photograph taken by Voyager 1 at the request of astronomer Carl Sagan at a distance of 6 billion kilometres, in which the Earth's size is less than a pixel against the vastness of space. As pointed out by Carl Sagan in his lecture at Cornell University in 1994, 'on that dot, "every human being who ever lived, lived out their lives"'.



Facts About the Voyagers:

•Voyager 1 and 2 are traveling at 3.6 AU and 3.3 AU per year respectively, which is 17 066.0582 m / s and 15 643.8867 m / s respectively.
•The Voyager 1 is at 21,711,163,000 km away from the earth while Voyager 2 is at 18,032,108 km from the earth.
•The Voyagers will outlive Earth. Long after humans have gone extinct and the sun expands into a red giant to swallow the earth, the Voyagers will continue to silent continue their mission of charting alien regions.
•Voyager 1 and 2 are currently running on Plutonium, with the expected life to be over 2020s.
•The Voyagers each have a total memory of 69.63 kilobytes of memory, equivalent of an internet jpeg and can execute tasks at about 81000 instructions per second, with the average smartphone being 7500 times faster than it.
•NASA uses its largest antenna – a 70-meter dish or a combination of two 34-meter antennas to hear the voyager. This is due to the fact that that Voyagers have a 22.4W transmitter but with the signal arriving at earth is 0.1 billion-billionth of a Watt.
•The software used for the Voyagers was originally written on Fortran 5, later ported to Fortran 77 and finally being ported to C.
•The Voyagers had their own share of troubles. Robotic 'vertigo' at the launch of Voyager 2, the early separation from the final stage booster rocket, disturbing telemetry due to false alarms from a troublesome sensor to the hydrazine manoeuvring thrusters pointing in the wrong direction, the Voyager team fought to keep the two probes alive to make it one of the most successive mission ever carried out by man.
•The original program cost around $865 million, while the extended Voyager Interstellar Mission costed an extra $30 million.

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INTERNSHIP AT MITACS

INSIGHTS BY PRIYASH BARYA

1)How did you plan to land this internship?

-> I actually did not 'prepare' for it. I never had any 'aim' for landing this. I am more of an academic person. I was not academically inclined however, from my first year. I started taking interest in course work from second year. I contacted Kanan Sir from Physics Department for a bit of exposure in what research is. He forwarded some papers for me to study. Then i went to CSIR CEERI. There, I did very good research, since the professors I was working under were very encouraging. His LOR also worked out. I took a minor in Physics also, so my profile is very research oriented. On top of that, I applied to many internships, and finally all these factors landed this one.

2)What did you do except for academic courses that you registered for in the institute?

->I would recommend people to get into projects early on, in 2-1 or 2-2. Try to interact with faculty, understand their work. Try to develop a good interest in the subject.

3)How important in CG>?

->Very important, especially in foreign internships. In MITACS, if you have a very good research profile and a decent CGPA above 8, people can do it, and people have. One of my friends in EEE had CG around 8, but had a publication and a great research profile, so he got through. But in DAAD, you need CGPA above 9.4. In SN Bose, you need to be among top 2 of your Department to just apply. In MITACS, the cutoff is 8.

4)How do people build a 'good research profile'? Suppose, if someone did not get a research savvyy PS Station, what should he or she do?

-> Then, on campus professors would matter a lot. MITACS applications are in September of your third year. So, you just have to have some good work in your second year. There is another option which is quite risky. You can drop your PS 1 and make your PS 2 thesis. In the meantime, you can do on or off campus research or whatever in the period freed up. People who are very interested and inclined in research have done it in the past. In India, there are many scholarships that take second years. If you do not have a good CG, and cannot get a good PS Station, I would recommend him or her to drop PS, and take a research internship instead.

)Selections in MITACS?

->It looks at CGPA as well as research inclination. They have a matching process in which they match your inclination and set of skills with the projects you applied for. Many people get rejected in the first round because their projects and skill sets do not match. After this match only, they forward you applications. You have to give a set of seven projects. Select them according to your skill sets and interests.

6)How do informal projects help in applications, since they are 'informal'?

->That is why you need LORs. Also, informal projects give you experience. Often, the professors take an interview of the candidates, and if you did not do the project you mentioned, then rest assured, they will know, and if they do, it will reflect very badly on you, and will affect your prospects in the future also. So, even if you did not do that much work, never lie about it, and be honest. Never write wrong things in your application. Letter Of Recommendations(LOR) will be enough for proofs of projects done. Actually, LOR from a project guide prof is stronger than LOR from a professor who is just a teacher.

7) Anything else you want to tell us?

->I would really recommend people to try out different internship prospects and don't get disheartened about foreign ones. There are some really good and prestigious Indian internships also. IISC has some, IIT Bombay, other IITs, NTU Singapore, and many others are there. These scholarships do look at GPA, but they are comparatively easier to get. Try to build yourself in a specific skill set. There are thousands of projects in MITACS, and you will find some that fit your skill sets and interests.
Also, its generally difficult to get pass the screening processes of these internships. To get around that, you can mail foreign professors directly, asking them to take you in for working under them. If you can convince them of their interest, they will surely agree to take you in, and some even give monetary grants. So, if MITACS does not work, and you want to do research, there are still many ways to do some real work.

INTERNSHIP AT

DAAD
Deutscher Akademischer Austausch Dienst
German Academic Exchange Service

INSIGHTS BY BHARATHWAJ SURESH

1)What should we prepare beforehand to get a research internship?
->There is nothing to prepare to get an internship at this level, actually. For this, you need a profile. You need to have a good CGPA, and you need to have projects. If you ask me, I took a project in my third year, and my CGPA was quite high.

2)So, you did a formal one, how important are informal projects in 2-1 or 2-2?
-> You know, here its hard to get a project under any professor you want to work with. So, the best way to go about it is, to take a project informally under a professor of your choice in your second year. I did not do that in my second year, and got a project directly, but its always safe to go down the path of informal projects to make sure you get what you want.

3)Is it necessary to learn something that is not taught in college to get an extra edge?
-> You might profit by doing online courses. Edx, coursera, etc. It helps with your coding skills, like, if you wanted to do something combining electronics and machine learning. Apart from that, its better to stick to your curriculum, since in electronics, you cannot do much.

4) Can you describe your project?
-> I am going to Germany, and my project is based on neuro morphic computing, basically implementing neural networks using electronics. In BITS, I am working under Professor Shouvik Kundu, who is working with memristor circuit design, which are basic circuit elements used for Neural networks. I have a publication under review as well from that work. The work I will have there is quite similar.

5)What are the screening criterias DAAD uses to select students?
-> Mainly, you need a good CGPA. From this college, a CGPA of 9.4 might give you a decent chance of getting an internship with DAAD. Next, you will need a good LOR from a professor. Many professors are particular about attending classes, so, if you attend their classes, get to know professors well, you will not have a problem doing that. Here, if you have a formal or informal project as well, it helps out a lot too. You will have to send a cover letter to the professor you are applying to, and at that time, you need to be acquainted with their work as well to show that you are interested.

6)A big part of scientific research is undoubtedly, reading publications of others. How would you suggest students go about that if they want to increase their knowledge?

-> If you want to read research papers, I suggest you find a topic that you find interesting, and read any long papers on it. The long papers are the ones that usually have detailed information on the subject. Also, after reading a particular paper, you must read its references as well. Reading a paper on one particular subject, including its references is better than reading papers on ten different topics.

7) Any other advice you want to give?

-> I have got DAAD, I will talk about DAAD. First of all, a cover letter. You need to send the professor you are applying to. It needs to show that you are dedicated. Mention your CGPA if it is good, otherwise don't. Foreign professors are lenient with grades, and will consider you even if you do not have good grades. Cover letter should be very personalised. Read the Professor's work, and write referencing them. Never follow a template. Mention that you will be applying for DAAD, sop they know that you don't need funding from them. Even if you fail to get DAAD, you can still ask the professor for funding, which they will provide if they think you are good enough. A friend of mine got funded by the professor. This is an advantage of DAAD, that you have a way out even if you don't qualify for the scholarship. In MITACS, there is only one scheme for both scholarship and internship, so it does not have this advantage.

In DAAD, you need to get a letter from the professor declaring that he will be taking you in as an intern, and then you apply for scholarship. All this should be done in August,because DAAD deadline will be in October.

NEWS UPDATES

1)Tesla unveils the Model Y

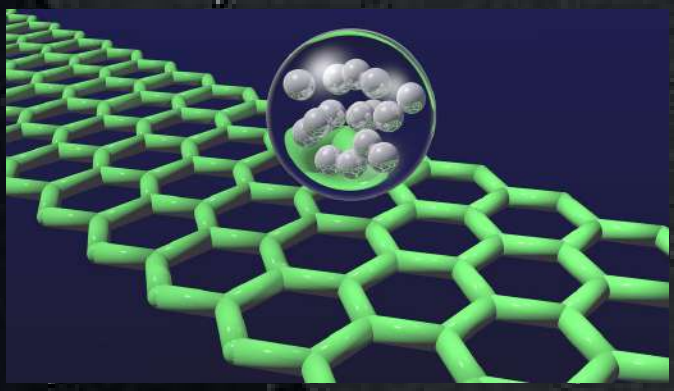
On March 14, Tesla unveiled the latest addition to its lineup, the Model Y. With prices ranging from $39,000 for the base model to $60,000 for the performance model, the Model Y will sit above the Model 3 in terms of the prove bracket. The slightly pricier models are expected to become available from 2020, whole the base model won't be available to 2021. With the Model Y, Tesla hopes to expand its consumer base and firmly plant itself as a mainstream car manufacturer. Also, with the Model Y, Tesla has finally managed to complete its S3XY lineup.

2)Matrix unveils watch powered by body heat

This year, Matrix unveiled the PowerWatch 2, a successor to last year's PowerWatch. Matrix made improvements from it's previous product, with the monochrome display being replaced by a 1.2 inch color display. The watch comes enabled with a fitness tracker and GPS. Of course, the main selling point is that it never had to be charged. The PowerWatch runs entirely on a mixture of solar power and the wearer's body heat. However, it is not meant to compete with other smart watches like the the Apple watch, with it being unable to support third-party apps and place calls. The target audience are, according to the company, people for whom carrying a charger is more of a nuisance than a convenience. The watch is meant for the outdoors type, with its aluminum case and rubber strap along with 200m water resistance making it the ideal companion for your next hike.

4)Qualcomm designs new chips to make smart speakers smarter
While smart speakers have become more prevalent today, they are far from perfect. Sometimes they don't hear your request, sometimes they mishear it and sometimes they take a while to respond. In order to tackle this Qualcomm came out with a new dedicated system-on-a-chip this year called the QCS400. Each missile has a quad-core power processor, the Hexagon DSP for audio interfaces, an Adreno GPU, 802.11ac WiFi, Bluetooth 5.0 and on-device security to protect sensitive information. One key aspect of improvement is improved voice response time. Devices with the QCS400 respond to used requests faster and keyword recognition is stronger. It also has improved connectivity options, supports Dolby, DTS X, and aptX Adaptive for sound processing and improved stand-by battery life by a factor of 25 with active voice listening enabled.

3)Breakthrough in graphene based electronics
Graphene is a carbon-based material which is believed to be the key to making nanoscale electronics. Due to its properties, it is possible to alter its quantum properties by etching tiny patterns to make it perform different tasks like photonics or sensors. However it seemed near impossible to achieve this since even minute defects could completely destroy it's quantum properties. However, recently two postdocs from DTU physics, Bjarke Jessen and Lene Gammelgaard, seemed to have found a solution. First they encapsulated graphene in hexagonal boron nitride, and then used a technique called electron beam lithography to make a dense array of holes of diameter approx. 20 nanometers with about 12 nanometers between them. They dining that some quantum properties survived the procedure, which shows great promised for the future of graphene based electronics

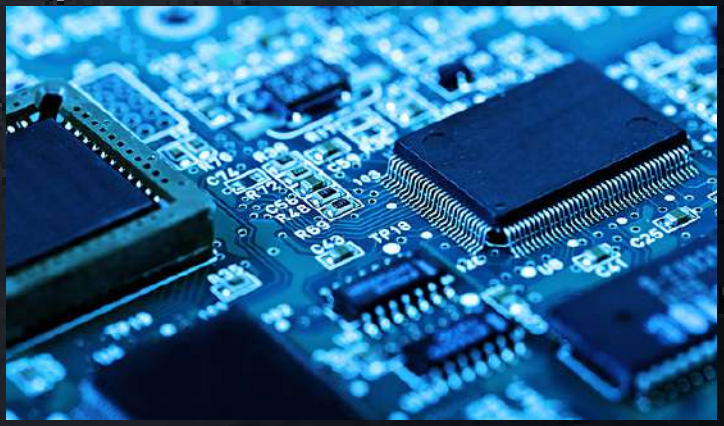


DID YOU KNOW!

Walking across a carpet can produce up to 35,000 V of static electricity.

Printed circuit boards are almost always green because they are made from a glass-epoxy, which is naturally green.

Electronics comprised 40% of car component costs in 2015 and is projected to comprise 50% of car component costs by 2030.

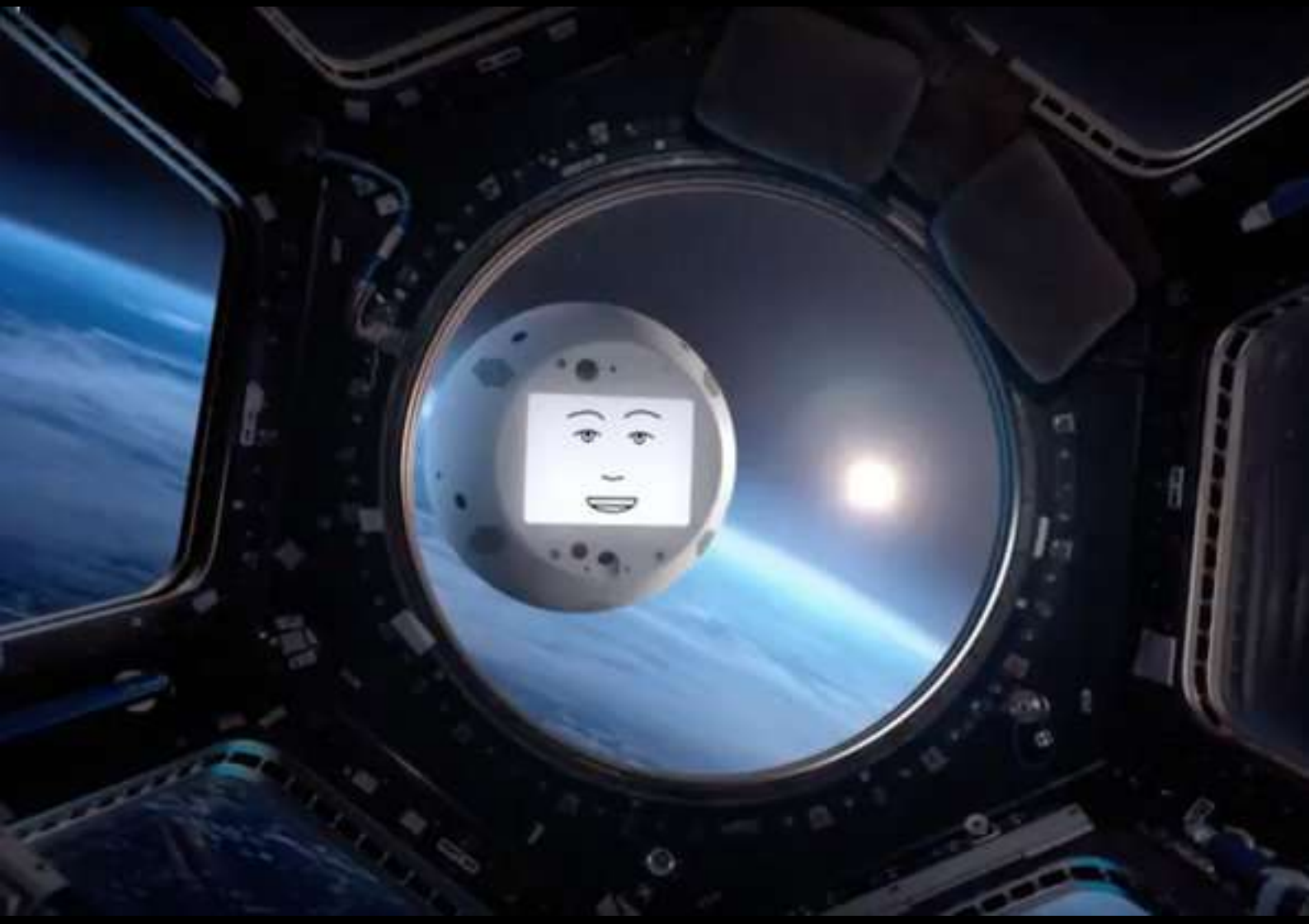


According to Moore's law, microchips double in power every 18 to 24 months.

According to Moore's law, microchips double in power every 18 to 24 months.

SPACE ROBOT

Abhishek Roy



Ever since the inception of Science fiction in entertainment media, the appearance of AI assistants with or without a Frankenstein complex, either in a Dystopian or Utopian world have been consistent.

Almost everyone is familiar with TARS, the prominent assistant crew member of the Endurance in the 2014 film, Interstellar. It could do tasks like piloting the ship, collecting data about various experiments, and performing procedures related to exploration and discovery. It also was programmed to have a quote humorous, witty personality which made it entertaining to follow and observe. Among other more famous AI assistants, we have HAL 9000((Heuristically programmed ALgorithmic computer) which was the main antagonist of Arthur C Clarke's Space Odyssey series. It's abilities were just about anything related to the ship's functions; piloting, maintaining, reading emotions and a host of others. He was shown to be sentient.

Having such an AI assistant in real life seems to be a far fetched dream, but one such robot is already on board the International Space Station right now. It's abilities seem surprisingly similar to those of TARS, but less extravagant. It might well be on its way to become the first full fledged independent non human crew member in space exploration missions to aid it's human counterparts. It's name is CIMON(the Crew Interactive Mobile CompanioN).

The idea to create CIMON was conceived because presently, whenever astronauts want to conduct an experiment, and need to look up the procedure for the same, they have to float their laptop besides them and look it up, or have to skim the manuals. All of this is time consuming, and hence, inefficient. Having a smart assistant with the ability to interact with speech, and to look up complicated information will be of immense help in such a scenario because then, the astronauts can just speak about what they want to know and it will be shown to them, with no extra effort, and no time wasted.

It was created by German Company DLR, Airbus and IBM jointly. It is a small 5 lb. 3D printed head without a body, with a screen which even shows a cute cartoon face. Now, unlike it's fictional counterparts like TARS, it can't process commands by itself. Any data or instructions related to it through speech is converted to text and sent to IBM's natural language processing computer, Watson, and there, the data is analyzed, answered, converted back to audio and sent back to space so that CIMON can actually say it. Watson can understand speech in context in which it has been spoken, and also the intention behind it, so, the conversation between CIMON and crew members need'nt be all experiment related. Relevant information in the form of video or audio or pictures can be shown too, when asked. It also has the ability to position itself in any place requested, using Ultrasonic Sensors. Presently, it's in active duty, helping resident astronauts with information on scientific experiments.

With developments like this, it's refreshing to observe how diverse the culture of space research has been. AI assistants like this have countless applications outside space too, and once CIMON gets abilities like, being able to move things with autonomous limbs, and conduct experiments autonomously, both the cost of function and danger to human life in space can be reduced dramatically.

TEAM PIXXEL

In today's age of start-ups and entrepreneurial spirit, we have seen many youngsters form companies and teams to tackle various problems of the present, both big and small. One homegrown example is Team Pixxel. They are a student team based in Bengaluru, comprising of students from the Pilani, Goa and Hyderabad campuses of BITS Pilani, as well as students from other colleges like NITK and RV College of Engineering. Their goal, as stated on their website, is, "building a constellation of nanosatellites to provide global, real-time and affordable satellite imagery and A.I. models to extract valuable information and trends from the data beamed down from those satellites". They plan to use the obtained images and weather data to make models that can beneficially impact the economy, national security and the climate. One such example they have provided is agriculture. By processing the data from their satellites, they can send farmers alerts on their phones regarding the ideal time for sowing seeds, spraying insecticides and harvesting.

While the team has a clear goal in mind, building satellites is no easy task. One must have the required tools and space for assembly. To this end, the members have been working with Workbench Projects, a fabrication lab and co-working space in the city. The team also has the support of the Peenya Industrial Association, with the body granting the members access to all their tools, as well as industry experts for designing support. The team has also in been in contact with ISRO and Shell. But considering the resources needed to assemble satellites, it does beg the question, why use satellites at all? Why not use something like drones or Internet of Things? The reason, according to Project Lead Awais Ahmed, is that satellites are easier and quicker to scale when it comes to expanding the project globally, when compared to drones or IoT.

In addition to their current project, the team also plans to participate in the IBM Watson A.I. XPRIZE, where competitors are presented with the challenge of creating A.I. technology that can be applied to real world scenarios. The team hopes that they can use their participation in such high profile events to bring about a change in how space data is used in the country. They also hope to inspire other ventures in the country to bring about new innovations in the field of space technology.

With their nanosatellite project, named 'FireFly', being slated for launch near the end of this year, Team Pixxel seems to be steadily advancing towards their goal of re-energizing the space data sector. With a little luck, they may inspire thousands across the nation to try out their own ideas as they reach for the stars.

(Bhatkhande, 2019)

PLACEMENT TALK 2019

The placement talk conducted on 16th of November witnessed many enthusiastic students from all the years, with majority being first yearites. The speakers included seven fourth yearites along with Chetan Kumar sir and Alivelu mam and was hosted by Anjali Goyal. The first speaker of the day, Ritika Ramchandani who got placed in Intel, answered some questions she was often posed by students which included when to start preparing, is coding really important and others as such. Following her was Aditya Dubey who also got placed in Qualcomm. He clarified what the difference between core and IT placements is and how one should choose specific stream basing upon their interests in a very humorous and captivating manner. Shreede Pattnaik, placed in Microsoft, spoke primarily about the procedure and preparation strategies for IT placements.Shikhar Sharma, placed in PayPal, spoke about the subjects to concentrate on such as DSA, OOPS, DM. The fifth speaker of the day, Yash Gupta who's placed in Flipkart addressed some common misconceptions asked by students regarding to POR. He focused primarily on the importance of summer internships, formal and informal projects, advantages of coding in groups and how to be a smart worker rather than a hard worker. Snigdha, placed in JPMC, spoke about how too smartly build a strong resume with great projects and internships. Lastly, Mohit Hirpana, placed in Qualcomm, who also is the coordinator of placements division spoke about what went wrong and what students need to concentrate on to improve their chances for placements. Alivelu mam spoke about the feedback given by different companies that came for placements, thus giving an idea on what aspects to concentrate on and skills to acquire. Motivating us simultaneously, she put forth all the flaws observed by the industries, thus guiding us in the right direction. The importance of CG, the need to be calm and composed on the day of interview, the advantages of exercising or regular yoga and meditation is something spoken about by every single speaker.

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