

MECHAZINE



DEPARTMENT OF MECHANICAL ENGINEERING

2017-18



GALGOTIAS COLLEGE OF ENGINEERING & TECHNOLOGY

Mechazine



HoD's Message:

Nurturing creativity and inspiring innovation are two of the key elements of a successful education, and a department magazine is the perfect amalgamation of both. It harnesses the creative energies of the academic community, and distils the essence of their inspired imagination in the most brilliant way possible.

True to its name, this magazine gives an insight into the range and scope of the imagination and creativity of our students and faculty members. Hence, I am quite pleased to learn about the forthcoming issue of the magazine which is ready for publication.

May all our students soar high in uncharted skies and bring glory to the world and their profession with the wings of education.

Prof. Mohd. Asim Qadri
(HoD-ME)



Editor's Message:

This magazine was a dream for me and my team. It gives me so much more than just plain and simple pleasure to present forth the reader its 2017th edition. It contains many things that we think will interest not just a broad spectrum of students but also the nerds as we engineers tends to be in all our glory. It reflects the hard work my team has put into this and the dedication that they have shown for the course of making this thing consumable.

We all here at the editorial board hopes that you will find this interesting to read and that at the end of the day, you will get something worth knowing out of this.

Because that is the whole idea behind this publication, to provide knowledge to the ones seeking it the most, because my fellow engineers as a great man once said to me "**Knowledge is power**".

Prof. M K Lohumi

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The Material of Tomorrow, Graphene2!

New materials have always been a bearer of new technologies and Subsequent societal development and advances. The simplest examples,

We go back in history and think about the Stone Age which developed into The Bronze Age and then it went on into the Iron Age. And each Age is labelled by the material that was bearing the new technology or the new Society as a whole.

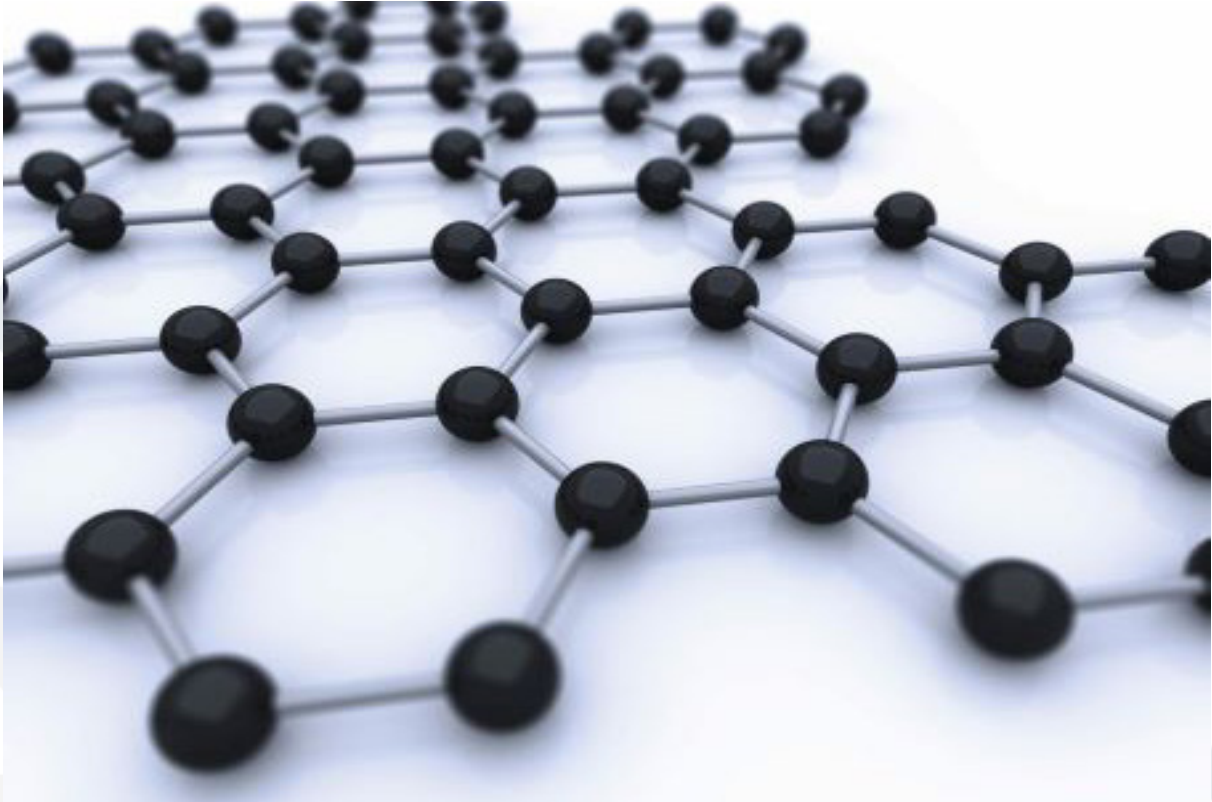
And every new material was better than its predecessor and it also made life simpler for the people of that age. I think in the beginning it made life Bearable just to exist and that's it. And this is the way it has gone on in our Society and still today we always have new technologies that come with the introduction of new materials or substances.

There's a new development that has come only in the latest decades or so and that is the ability of using basic sciences like physics, chemistry combined with material science and we are able now to atom-by-atom design new materials with designer functionalities.



Graphene is amazing; it's the material of superlatives; it's best in everything. Graphene be described as a one-atom thick layer of graphite. The first 2-Dimensional material ever discovered. It is the basic structural element of other allotropes, including graphite, charcoal, carbon nanotubes and fullerenes. Graphene is the strongest, thinnest material known to exist. Graphene is a 2-dimensional network of carbon atoms. These carbon atoms are bound within the plane by strong bonds into a honeycomb array comprised of Six-membered rings. By stacking of these layers on top of each other, the well Known 3-dimensional graphite crystal is formed. It is a basic building block for Graphitic materials of all other dimensionalities.

Fullerenes, rolled into 1D nanotubes or stacked into 3D graphite. Thus, Graphene is nothing else than a single graphite layer it is expected that graphene's mechanical properties will find applications into making a new generation of super strong composite materials and along Combined with its optical properties, making flexible displays. To calculate the strength of graphene, scientists used a technique called Atomic Force Microscopy. It was found that graphene is harder than diamond and About 300 times harder than steel. The tensile strength of graphene exceeds 1 Tera Pascal.



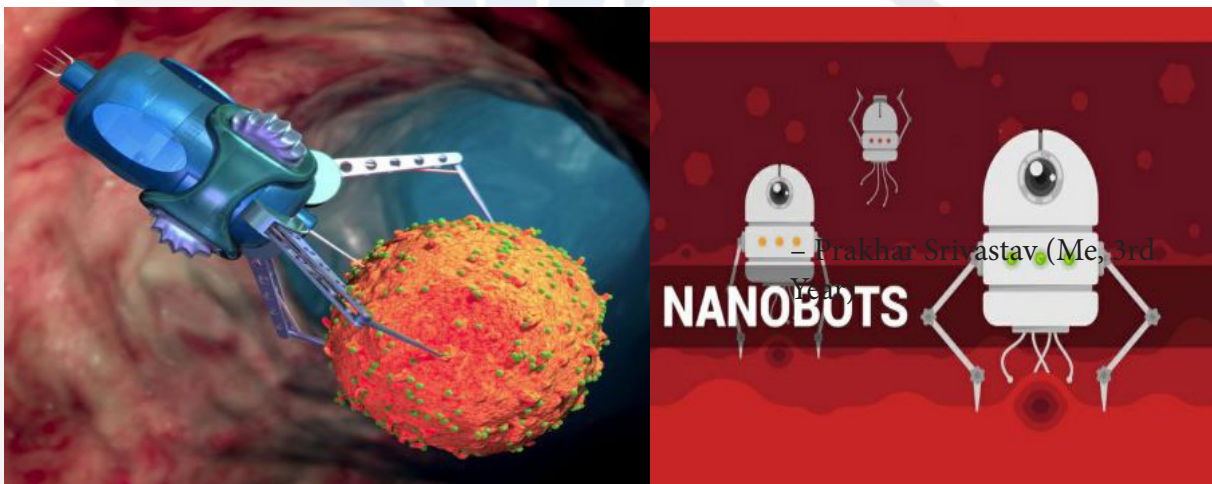
It is stretchable up to 20% of its initial length. Graphene is not used in commercial applications, many have been proposed and/or are under active development, in areas including electronics, biological Engineering, filtration, lightweight/strong composite materials, photovoltaics and energy storage. Graphene has a high carrier mobility, as well as low noise, allowing it to be used as the channel in a field-effect transistor. Graphene's high electrical Conductivity and high optical transparency make it a candidate for transparent conducting electrodes.

Graphene is a singular layer of graphite, has been discovered to have unique Properties. The high mobility and ability to travel short distances without Scattering makes it one of the best materials for electrical applications. Graphene's mechanical and optical properties also allow its use to go beyond Electrical applications.

- Jaysurya Jaiswal (ME)

Say Goodbye to pills, Nano Robots to the Rescue

Nano robots will be able to repair damaged or diseased tissues. The circulatory system is the natural path for these devices and the Nano robots will pass through the blood stream to the area of defect. They attach themselves to specific cells, such as cancer cells and report the position and structure of these tissues. A creative methodology in the use of these devices to fight cancer involves using silicon Nano machines with a thin coating of gold and light in the near infrared spectrum. Light in the 700-1000 nanometer range will pass through the tissue and reaches the defective cell. When this infrared light strikes the particular type of Nano robot, the device gets hot due to the oscillation of the metal's electrons in response to the light. Using an MRI, the Nano robot is specifically placed in the cancerous region, and then the light causes the devices to heat to 131 degrees Fahrenheit which destroys the cancerous cells but doesn't damage surrounding tissues. sciences like physics, chemistry combined with material science and we are able now to atom-by-atom design new materials with designer functionalities.



This is the new technology, without any drawbacks. These Nano robots can cure any disease without affecting any other cells or tissues. The future vision: Imagine going to the doctor to get treatment for a fever, instead of giving you a tablet the doctor implants a tiny robot into your bloodstream. The robot detects the cause of your fever, travels to the appropriate system and provides a dose of medicine directly to the infected area. This is going to happen in a few years of time from now. Each person is going to have a Nano robot in his body which is going to monitor human body system. So the time arrives to enjoy with the robot within our self.

– Prakhar Srivastav (ME)

How to Produce not Make Something in the Industry

In this world of competition, without proper production management, a company cannot survive. Using a manufacturing concept for competitive advantage is relatively a new concept. Lean manufacturing is a concept actually brought up by the Toyota Motor Company, Japan. But it was popularized to the world by the book “The Machine That Changed the World” by Womack, Jones and Roos of MIT in 1990. Adding value by eliminating waste, being responsive to changes, focusing on quality and enhancing effectiveness of workforce is achieved by lean manufacturing. It needs a systematic and continuing search for non-value added activities.

The term lean manufacturing is a more generic term and refers to the general principles and further developments of becoming lean. The term lean is very apt because in lean manufacturing the emphasis is on cutting out “Fat” or wastes in manufacturing process. Lean manufacturing, an approach that depends greatly on flexibility and workplace organization, is an excellent starting point for companies wanting to take a fresh look at their current manufacturing methods. Lean manufacturing has endeavored to rationalize production by 9 principles.

They are:

- Continuous Flow
- Lean machines/Simplicity
- Workplace organization
- Parts presentation
- Re-Configurability
- Product quality
- Maintainability
- Ease of access
- Ergonomics

$$\begin{array}{ccccc} \text{KAI} & & \text{ZEN} & & \\ \text{改} & + & \text{善} & = & \text{“good change”} \\ \text{“change”} & & \text{“good”} & & \text{aka} \\ & & & & \text{“continuous improvement”} \end{array}$$

Continuous Flow:

The preferred shape of the lean work cell is U-shaped. Each sub process is connected to the next in order of process. With the worker in the interior of the U, minimum movement is required to move the work piece or assembly from one workstation to the next. Ultimately, one of the goals of the lean work cell is to eliminate all non-value-added movement; hence it's U-shaped. When the worker has finished the process, he simply turns around and is back at step one. Lean Machines/Simplicity Since continuous-flow, one-at-a-time manufacturing is another goal of lean manufacturing, it is important that each workstation or machine be designed to fit within a minimal envelope. The minimal envelope ensures the elimination of excess flat space at the workstation or machine. This is done to avoid the possibility of storing parts or subassemblies at the machine. Storing parts increases work in process and results in “batch” processing, which subsequently defeats the purpose of lean manufacturing. In addition, smaller, minimal size workstations and machines eliminate unnecessary steps taken by the worker between sub processes.

Workplace Organization:

A smooth, uninterrupted flow of completed work pieces is the desired result of a properly designed lean work cell. Nothing can slow or stop this flow faster than the loss or misplacement of tools. Thus all tools used at a workstation should have their own holder. There should be exactly as many holders as there are tools so that the absence of a tool is quickly noticed. Using a modular tool holder system with a specific holder for each tool is ideal. If holders can easily be added to or taken away from a workstation, this simply adds to the flexibility of the workstation and increases its usefulness in a lean manufacturing process.

Parts Presentation:

Naturally, during the average work shift, additional parts will be required for the work cell. Traditional methods of resupplying workstations are not useful in a lean work cell. Each worker should go about his work with the minimum number of interruptions. Therefore, all parts should be supplied to each workstation from outside the work cell. The use of gravity feed conveyors or bins fit the simplified design of the lean work cell.



Re-Configurability:

A properly designed lean work cell must be easy to reconfigure. In fact, the ability to change the process and go from good part to good part as quickly as possible is a must. The faster the changeover, the less production time is lost.

Product Quality:

One of the results of one-at-a-time manufacturing is a decrease in quality problems. As each part is produced, visual inspection by the worker can verify that it is correctly assembled. If verification is required through gages, they should be mounted to the machine or workstation and be easily replaced. Quick release of fixtures using star knobs or locking levers is a necessity.

Maintainability:

Ease of service is another requirement of a lean cell. Long downtimes cannot be tolerated in a pull-through system. When customer demand exists, the product must be produced. A modular structural framing system provides the ultimate in maintainability. Components can be replaced or reconfigured in a matter of minutes.

Ease of Access:

Using an aluminum framing system as the foundation of a lean cell, all necessary work components can be mounted in easily accessible locations because each surface is a potential mounting surface. Parts bins, tools, shelves, and fixtures can all be positioned in the optimum location for efficient work. The T-slot on the framing system's surface also allows quick repositioning of pneumatic or hydraulic components if clearance space is critical.

Ergonomics:

It includes height, lifting, etc. Finally, the worker must be protected from ergonomic problems. Any properly designed lean work cell must, by definition, be ergonomically designed. Maintaining the work at the ergonomically correct height throughout the work cell is always important. Although it is frequently not taken into consideration, designing for the average worker height is also a necessity. Since average heights vary from country to country, the height of a machine or workstation must be easily changed if there is any chance that a workstation may be shipped from country to country. Thus lean manufacturing increases the production by completely eliminating waste in the production process, to build quality into the process, to reduce costs - productivity improvements, to develop its own unique approach toward corporate management, to create and develop integrated techniques that will contribute to corporate operation.

- Saksham Goyal (ME)



The Finest of all Inventions, The Large Hadron Collider

Yup you read it right, one of the finest inventions till now. We are talking about the PARTICLE ACCELERATOR. A Particle Accelerator also known as Atom Smasher sounds like it'd be something straight from a science-fiction novel, largely because most of us don't really quite understand how they work and also because they do have a place in works of fiction (fans of the television show The Flash will know the title character got his powers from a particle accelerator). A particle accelerator is a machine that uses electromagnetic fields to propel charged particles to nearly light speed and to contain them in well-defined beams. The goal of a particle accelerator is to energize a particle by, well, accelerating it, when a particle is given a kick by speeding it up, it gains more energy.

On a basic level, particle accelerators produce a beam of charged particles that can be used for a variety of research purposes. Most often, the beam of particles is comprised of protons or electrons, charged subatomic particles. Sometimes, whole atoms of elements like gold or uranium, which are much heavier, are used.

In a circular particle accelerator, the particles are repeatedly propelled through a circular pipe. With each pass, the strength of the electric fields increases, accelerating the beam of particles. When the particles have reached the desired energy level, a target is placed into their path, where a particle detector observes the collision.



The Large Hadron Collider (LHC) is the world's largest and most powerful particle accelerator. It was first started up on 10 September 2008, and remains the latest addition to CERN's accelerator complex. The LHC consists of a 27-kilometre ring of superconducting magnets with a number of accelerating structures to boost the energy of the particles along the way.

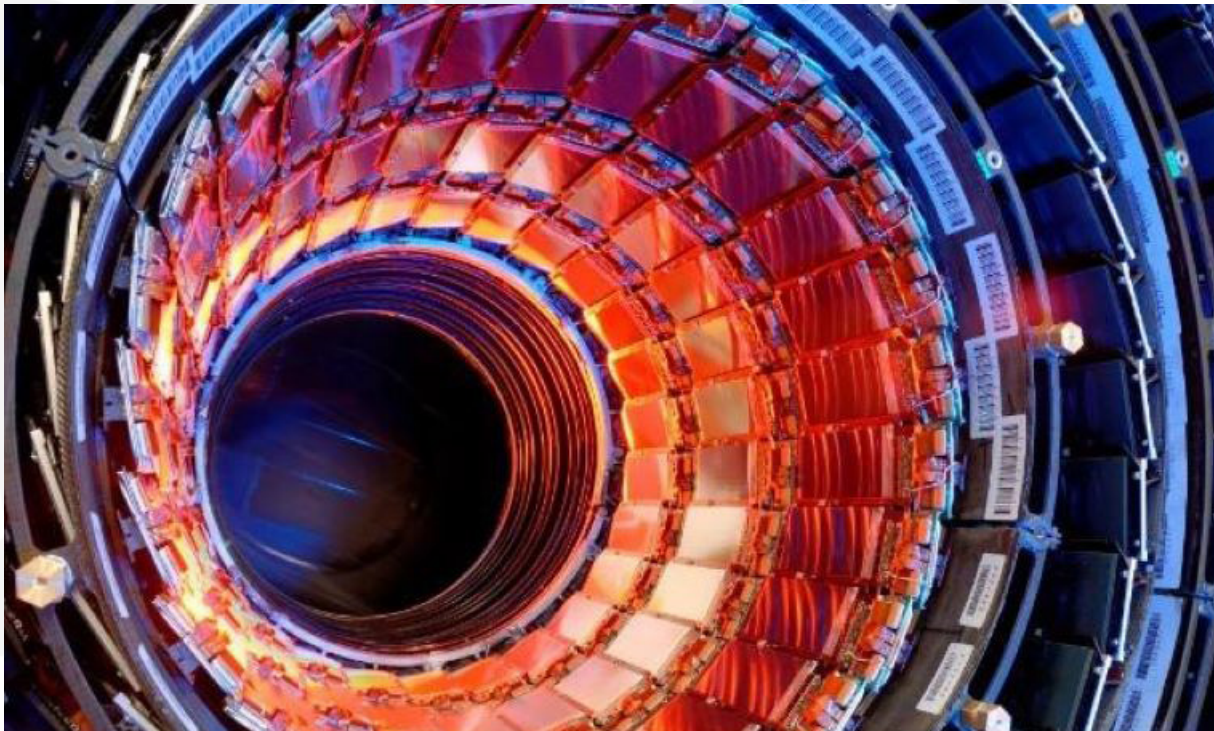
Inside the accelerator, two high-energy particle beams travel at a velocity close to the speed of light before they are made to collide. The beams travel in opposite directions in separate beam pipes (two tubes kept at ultrahigh vacuum).

They are guided around the accelerator ring by a strong magnetic field maintained by superconducting electromagnets. The electromagnets are built from coils of special electric cable that operates in a superconducting state, efficiently conducting electricity without resistance or loss of energy. This requires chilling the magnets to -271.3°C (a temperature colder than outer space). For this reason, much of the accelerator is connected to a distribution system of liquid helium, which cools the magnets, as well as to other supply services.

Thousands of magnets of different varieties and sizes are used to direct the beams around the accelerator. These include 1,232 dipole magnets 15 meters in length which bend the beams, and 392 quadrupole magnets, each 5 to 7 meters long, which focus the beams. Just prior to collision, another type of magnet is used to “squeeze” the particles closer together to increase the chances of collisions. The particles are so tiny that the task of making them collide is akin to firing two needles 10 kilometers apart with such precision that they meet halfway. All the controls for the accelerator, its services and technical infrastructure are housed under one roof at the CERN Control Centre. From here, the beams inside the LHC are made to collide at four locations around the accelerator ring.

You might be thinking what the LHC is looking for? Well, in an attempt to understand our universe, including how it works and its actual structure, scientists proposed a theory called the standard model. This theory tries to define and explain the fundamental particles that make the universe what it is. It combines elements from Einstein’s theory of relativity with quantum theory. It also deals with three of the four basic forces of the universe:

- 1) Strong nuclear force.
- 2) Weak nuclear force
- 3) Electromagnetic force.



The Standard Model makes several predictions about the universe, many of which seem to be true according to various experiments. But there are other aspects of the model that remain unproven. One of those is a theoretical particle called the Higgs boson particle (which in its own is a vast topic, just skip it for right now). Dark matter might also play an important role in LHC research. Our current understanding of the universe suggests that the matter we can observe only accounts for about 4 % of all the matter that must exist. When we look at the movement of galaxies and other celestial bodies, we see that their motions suggest there’s much more matter in the universe than we can detect. Scientists named this undetectable material dark matter. Together, observable matter and dark matter could account for about 25% of the universe. The other three-quarters would come from a force called dark energy, a hypothetical energy that contributes to the expansion of the universe. Scientists hope that their experiments will either provide further evidence for the existence of dark matter and dark energy or provide evidence that could support an alternate theory.

- Vaibhav Srivastava (ME)

Elon Musk-A name Behind Which is a Story Worth Sharing

Captain America- Tony, what are you without your suit?

Tony stark (confidently) - GENIUS, BILLIONAIRE, PLAYBOY AND PHILANTHROPIST.

Everyone has heard these lines, but did you know that there is a real tony stark in our midst. ...guess who?

Yes, he is no other than ELON MUSK.

Hello friends, Today's article describes ELON MUSK the man with great a many ambition.

I think everyone knows about elon musk, yes that spacex guy (actually the owner). Ranked 34th Richest in America and 38th most Powerful in the world. So we will discuss about elon musk's journey. About how he achieve the things he have and what were the major drawbacks in his life and how did he overcame them. So, without further due let's start from the beginning.

Elon Musk was born on June 28th, 1971 in Pretoria, South Africa. His father Errol Musk is an Electronics Engineer. Elon's mother Maye Musk, Canadian by nationality, is a professional dietitian and model who has appeared on boxes of Special K cereal and the cover of Time magazine.



Everything was going great in the life of elon, his parents and his younger brother kimbal. But, then their life took a darker turn in 1979, Errol and Maye Musk divorced. The nine-year-old Musk and his brother decided to live with his father. After the divorce, both children was shocked as anyone would guess, in those years of confusion elon needed a distraction and he got one from coding, elon has describes in many of his interviews that he starting making games as a hobby.

He further stated that in 1983, at the age of 12, he sold a simple game called Blaster to a computer magazine for \$500. Musk also said that "it was a trivial game...but better than Flappy Bird".

Still, Musk's school days weren't easy. As stated in the book "Elon Musk: Tesla, SpaceX, and the Quest for a Fantastic Future". He was once hospitalized when a group of bullies threw him down the stairs and beat him until he blacked out.

I would really love see their faces today.

Moving on with story, after graduating high school, Musk moved to Canada, along with his mother Maye, his sister Tosca, and his brother Kimbal. He spent two years studying at Queen's University in Kingston, Ontario.

But he finished his studies at the University of Pennsylvania, taking home one degree each in physics and economics.

While studying at the University of Pennsylvania, Musk and his fellow student Adeo Ressi rented out a 10-bedroom flat house and turned it into an official nightclub. It was an early entrepreneurial experiment though a really fun one.

After trying his hand at entrepreneurship, Musk traveled to Stanford University to study for his PhD. But he ended up deferring his admission after only two days in California, deciding to test his luck in the newly born dot-com boom. And spoiler alert he never did return to finish his PhD at Stanford.

Musk and his brother Kimbal took \$28,000 of their father's money started Zip2, a web startup that provided city travel guides to newspapers like the New York Times and Chicago Tribune.



When Elon and his brother started their first company, instead of getting an apartment they just rented a small office. He slept on the couch and showered at YMCA. Elon had only one computer at that time so, the website was up during the day and he was coding at night, seven days a week. After this the story moves towards more glory his startup was a hit and afterwards he also co-founded a company which later became PayPal. And PayPal was also a hit in the digital marketing, every piece was falling in their places, until

Elon Musk was kicked out from the company he created himself (Elon did the coding behind PayPal). Things got worse when in October, he started a huge fight among the PayPal cofounders by pushing for them to move their servers from the free UNIX operating system to Microsoft Windows. PayPal cofounder and then-CTO Max Levchin pushed back, hard.

Things worked out for Musk — he stayed the single biggest shareholder in PayPal, netting him \$165 million of the \$1.5 billion that eBay paid for PayPal in late 2002. PayPal's board fired him by submitting to mutual interest and made Thiel the new CEO. Being heart broken, he thought he had lost his life's purpose, but he still kept going on.

Later he decided to create rocket company SpaceX or space exploration technologies. Musk's goal was to build something that would make spaceflight cheaper by a factor of ten.

His first rocket launch tests was a complete failure, it never did leave the atmosphere instead it exploded while approaching the end. It was a big loss for his company but he tried hard and launch its 2nd rocket again the rocket failed just like his company, and the 3rd launch also didn't give any good news. In the meanwhile, Musk was kept busy here on Earth. In 2004, he made the first of what would be \$70 million of total investments in Tesla Motors, an electric car company cofounded by veteran startup exec Martin Eberhard. Which started with a big bang of excitement and enthusiasm. Then in 2006, Musk came up with the idea for Solar City, a solar energy company designed to combat global warming. He gave his cousins Peter and Lyndon Rive the working capital to get it off the ground.

But back at Tesla, all was not well. Under Eberhard, Tesla was burning way more cash than it was taking in. In 2007, Musk staged a boardroom coup and ousted Eberhard.

But between SpaceX, Tesla, and Solar City, Musk actually ended up going broke literally. He describes 2008 as "the worst year of his life," as Tesla kept losing money and SpaceX was having trouble launching its rockets. By 2009, Musk was living off personal loans just to survive. Around the same time, Musk was going through a divorce with Justine Musk, a Canadian author, with whom he had six sons, yes you read it write SIX of them.

Around that time during the launch of the 4th rocket THE HEAVY FALCON. One reporter asked "what would have happened if the 4th launch fails?"

He replied "if it didn't work that would be it we won't have the resources to mount the 5th launch"

After all the struggle the heavy falcon's launch was finally successful, making Mr. Musk a billionaire at age 37. It is crazy to even think about from literally broke to a freaking billionaire from a single launch such is the story of Elon Musk. Musk's extraordinary career was starting to get noticed in other circles, too. Robert Downey Jr.'s portrayal of Tony Stark in the "Iron Man" movies is at least partially based on Elon Musk, and the entrepreneur even has a cameo in "Iron Man 2". All the while, Musk's personal life has been in some kind of flux. In 2008, Musk started dating actress Talulah Riley. They got married in 2010 and divorced in 2012. In July 2013, they got remarried; in December 2014, Musk filed for a divorce but withdrew the paperwork; in March 2016, Riley filed for divorce.

All this seems to be a little messy for a well sorted billionaire, but Musk is so unpredictable that he even launched a Tesla car into the space with the heavy falcon and till now the car is floating in space and in it is a crash dummy who is just chilling and enjoying the beautiful canvas of our solar system and all in all the cosmos. That seems a little extreme for a guy who was broke a couple of nights before doesn't it, he even has to submit a fine of for his actions which really insane. But such is the thinking of our protagonist today, he never settles for less and never did he ever accepted his defeat. In an interview when Elon Musk was asked "after failure of the 3rd rocket don't you think that you need to pack this in?"

He said "never...I would never give up...I mean I would have to be dead or completely incapacitated". And then he goes on and on about it.

So moral of his story is believe in yourself, no matter how many hurdles came in your way, Risk it all.

- Vaibhav Diwakar(ME)

College Expectation v/s Reality

Starting College this year? Are you a fresher? Excited to start a new chapter in your life? For sure, you have certain expectations from your dream college like becoming Mr./Miss Fresher, etc. well guess what You're not the only one who does, everybody have in some moment of their life thought about it. But these all are myths.

1. Expectation: Getting ready to accept all those party invites you'll be getting, staying out partying for long hours, not having any care in the world, feeling that kiss of independent on your new college cheeks.

Reality: The only invite you'll be getting is from your books to open them up. Staying up all night, trying to complete assignments that are due the very next day because you've been busy wondering in your mind about party you won't be going to.

2. Expectation: Getting ready for college and looking no less than Alia Bhatt and Varun Dhawan from 'Student of the Year'.

Reality: The first few weeks will be a struggle to get up and get dressed for college but after that no one will really care, after that sweat pants and t-shirts will be the perfect outfit. Yes, it will be Gangnam style throughout the year.

3. Expectation: Every day a new movie, going to explore every corner of the city because who cares about classes, you're a free bird now! Living of the edge chasing the horizon, taking the route that the winds will offer you.

Reality: Running after teachers to give you attendance because if they don't, you're toast literally period.

4. Expectation: Winning all the college events and becoming college celebrity right? Everyone will know your name and will try to get in contact in with you. Senior will sit right alongside you in the cafeteria and no one will dare say anything to you.

Reality: Even your best "Johnny Depp" impression fails in front of the students and you will end up sitting in the crowd clapping like a dying walrus. Because no matter what you do won't be the first to do that college is a vast jungle where every prey has a predator and every predator already has a prey. Good luck finding your.

5. Expectation: Because now you're a grown-up and your parents will not question you when you're out late. (One of my personal favorite.)

Reality: And then they call. And I mean it's "the CALL".

6. Expectation: Parties every night, with good looking men and women everywhere and "Ethanol" (guess what I am nerd) flowing like water in immaculate pillared frat houses.

Reality: There are occasional "frat" parties on the weekends, where nobody goes and someone always ends up alone there just to be swamped with embarrassment, yes I feel sorry for that guy.

7. Expectation: Spending your days watching movies and taking naps.

Reality: Waking up before 8 a.m. every morning, attending class until 5 p.m., working, and doing homework until 12 a.m.

8. Expectation: You and your roommate will be total besties!

Reality: You'll eat together at the dining hall every day for the first week and may very well spend the rest of the year pretending that the other one doesn't exist.

9. Expectation: Doing your own laundry like the mature you've just become, and in a nutshell taking care of yourself and doing things the way they should be. Making your life a little bit systematic.

Reality: Waiting until you run out of clean clothes to wear and then try to go home for the weekend so that your mom can help with the laundry.

P.S: The motive of this article was not to say that college isn't that much fun that the movies and shows make us believe it is. Rather it was to break it to you as quickly as possible, because believe me the place we are in right now can be all these things and more, we just have to be reasonable about it. I mean what kind of teacher will just let you leave class without even noticing that you're walking out from the class in front of him.

Be reasonable about what you ask from the place you're in and it will surely not let you down. Everybody has some expectations and it is so natural to have them but always think from both sides of the bargain. So, let's conclude this article by saying-

Maybe college isn't everything that you expected, but you can agree that it's one of the best section of your journey, where you can be for the very first time of your life what you want to be. Don't miss this time over stupid movies and parties. Live it, take part in it, And BE IT. Because my friend this time surely will never come back and it will, in a tick BEGONE.

- Vaibhav Diwakar(ME)

Scary Conversion to Rationality

In the present days when the whole society is based on scientific methods and rational world view. It's a profound dilemma and big debate to choose one of them.

Less people are daring enough to convince themselves to disbelief the popular opinion. Most of the rationality is suppressed in the childhood. The problem is that it's done by the people who care the most and the brainwash is mostly unintentional and the motive is to make the kid a better human. Skepticism is a less accepted judgement method as most of the times it challenges the methods led by faith and belief systems. Confidence and majority are the only brittle pillars it's based upon and it's evident to say that they are very easy to dismantle.

It's not wrong to say that most of their beliefs can be debunked but sometimes things are not about the outcomes but to live with it and not making a difference is good a somewhat of a better alternative. A good proportion of humans believe what they want and the democratic system of society allows it and it should be the way it is. Even if there are irrationality in just a small portion of world view which influences some big and small decisions. Believers are everywhere and you can't change everyone in small amount of time. All you can do is hope that the irrationality doesn't create wrong deeds or wrong influences. If the person is irrational but he is doing well by it and his influence is positive and productive, I could care less of about his world view. Imposing that I would be different in long run.



I can share first person experience as I have been a strong believer without an evidence drawn approach. I was always defending myself without a clue of what reality is but that didn't mean I won't change. I always admired the scientific method and I used it frequently to rectify my wrongs. These things that I talked about are common experience in anyone's life. One thing on contrary is that you are most likely to go through these if you are a science student or drawn to science by any means.

When I think of rationality it's a broad topic but I'll take only one aspect and use it as an analogy and explain as a collective. In immature years (6-15) most of our mind set is formed by our parents and with little influence of society.

Most common thing associated with irrationality is religion and faith-based systems. Clearly, it's indeed an irrational way to look and make your working model of the present world. There is a huge difference in your world and experiences in either of the approach. Growing up we don't think too much, we make ourselves believe what our seniors say. Our parents use to scare us and try to make us a good human being on the fear of god. "He knows if you think bad about someone and punish you, he is watching you every single minute", This statement sounds very light and it seems like no one would get intimidated by it but experience tells that sometimes it makes immature people crazy thinking that god is in my mind every time.



The moment you think something bad, you have a tendency to apologize to god and repeat the same thing again and again without rationalizing it. The more you believe in that statement the more it messes you up. It's a stupid move even if it's done by parents or a prominent figure in someone's life.

Some famous people have quoted it very often not most people are open about it but it happens to everyone at a certain time in growing up, like I have a reference of an artist named J Cole. He quoted "I was dead scared to even have a negative thought and tried to get baptize and read the bible every time I thought something negative. It was ruining my life. ". This is a torture on small minds, sometimes things leave a bigger impact than you expect. It's a common thing in society but it doesn't comes as strong as its affecting us. You don't want to have a negative and unstable mind to be the future of your child. Using religion as your tool to make a good human renders the core reason obsolete. This is the scariest time in every person's journey to rationality. People find the answer but sometimes it captures you so hard that it makes you believe the most stupid things you can come up with. The internal mind war should be stopped by using right methods to raise a soft and easily mold-able brain.

It's the fallacy of human mind to suppose that an encyclopedic knowledge is desirable but the mind is made strong not through much learning, but by thorough possession of something

- Anonymous Post (ME)

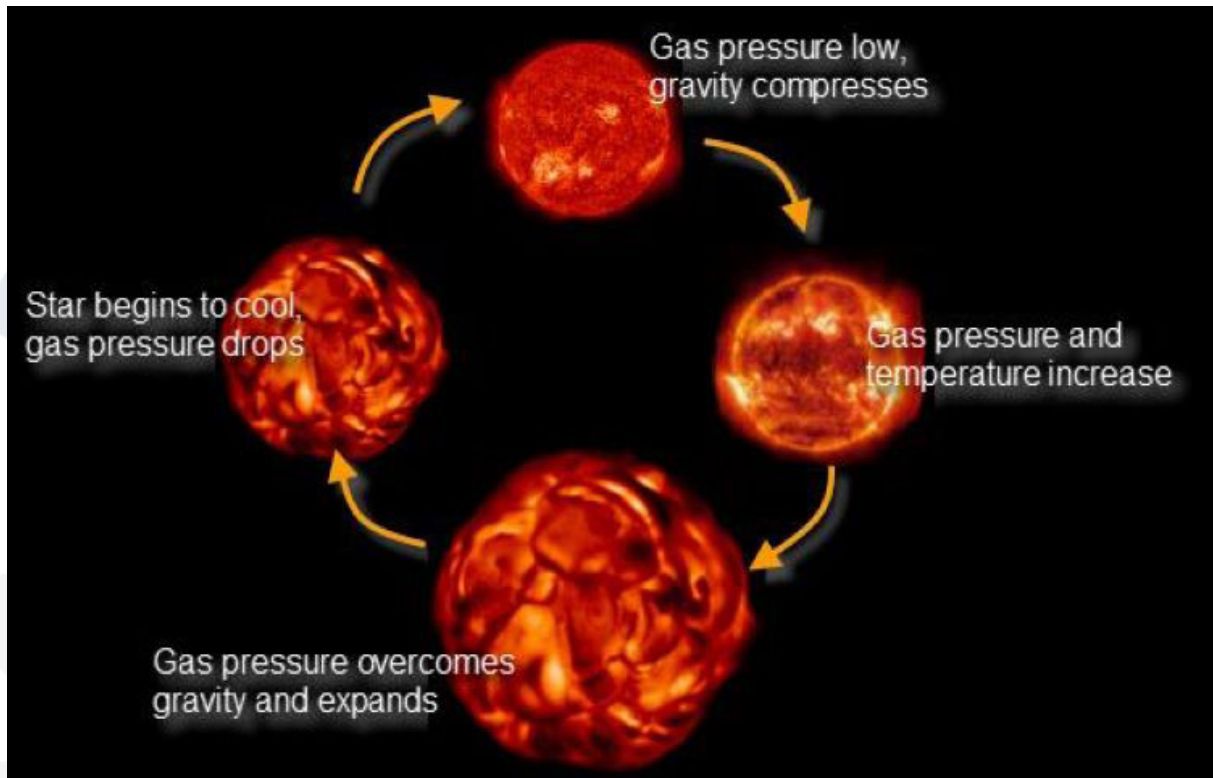
10 Reason why Betelgeuse is Loved by Every Science Geek

- It's very near to earth - the star is just 642 light years away and its 2nd brightest star in the Orion constellation. Which is the reason why the observation of such stars is easy and pretty satisfying as the more light a star emits the more we can observe the more we can understand about its nature and working and how it's going to be in future and what is predominant event in its history which led to a change resulting in present state.
- It's in a very exotic state (RED GIANT) – There are many states or stages in life of any star and it depends exquisitely on the mass and fuel burning speed of the star. It's in the red giant phase of a star which means it is growing in size and accelerating to burn its fuel which will finally end its life because the speed of fuel use predicts the life of a star.
- It's one of the closest supernova candidate – Now, here is the catch it's the closest supernova to earth and it means it will implode and explode at the same time and we will be observing it with the telescopes of all wavelengths and it will die 642 years earlier and we will be observing it later and it will be a major scientific event which will not only change our understanding of the universe but it will give us enormous scientific data which will open many other research fields.
- It will change the Orion constellation forever – As a kid in America we were born and raised with science we were taught about stars and constellation and we were eager to see it in the night skies and see it with our own eyes. As we know it will go supernova in matter of centuries it will change the constellation and it won't be the same again. One star will become non-existent.



- The star is now a subject for scientist – Betelgeuse is very un-predictable it changed from being 2nd brightest to brightest in the Orion constellation and may be because of our methodical knowledge its sounds like its predictable but there is so much happening in its core that it is creating strange chain transformation which ultimately makes it more interesting to study.
- It's insanely Huge - Betelgeuse is a huge star it is 1000 times bigger than our sun which explains why its life is so small and why it is so unpredictable and it's also intriguing that the radius of Betelgeuse is 820 million km but our sun's radius is 695,700 km and that's a huge size difference and that's what makes Betelgeuse unique.

- Although it's going to die it's still a baby – our sun is around 4.6 billion years old and still it has 5 billion years to live and give its precious sunlight to earth but Betelgeuse is only 10 million years old and it has only 1 million years left to live and its already an old man (a red giant).
- The meaning of the star's name – The name Betelgeuse is derived from the Arabic 'yad al-jawza' meaning 'hand of the central one' However, in medieval times the "y" was mistranslated as a "b" hence the star's unusual name. Interestingly, Arab astronomers initially saw the central one ('Jauza') as the nearby constellation of Gemini, but after studying Greek astronomy switched its name to refer to the constellation of Orion. It's almost spiritual to think about the name and how the star lived out its life by being a study subject for humans and how he was a teacher for humanity. He spewed wisdom of light his whole life and it's great that we let it teach us and tell us about his life.



- The surface of star is super bumpy which is observed very less – The star's surface is super bumpy and this anomaly makes it difficult to determine the shape of star as it keeps changing and it results in change of characteristic which is rarely observed character and also appearance and its already respectively tough to observe it as it is in a cloud of nebula. Some infrared telescope helps us to peer into the clouds and observe it with unprecedented detail.
- It's in pop-culture now – Many poets have written poems about Betelgeuse dying and many writers have written about this 640 light years away old dying star. You can read a poem by James ph. Kostybar and a beautiful poem written by a poet named Wednesday. When a scientific study subject becomes a pop culture icon you know that it's super important and we need to use that geek underbelly of every citizen and make it a landmark in education.

- Yash Chauhan (ME)

How Far we are from Interstellar Travel

Once a question erupted inside brain of 6 year old me, “What would happen if somebody jump out of Earth?” This question was inspired by the illustration of Solar System ascribed on my mind. In which, gravity always works downwards. That downward was defined by Earth’s geographical south. I supposed that someone would keep falling all the way down after jumping out of Earth(I know, this solution is full of logical fallacies). Interesting part is, this solution got my curiosity hooked up on another question, and how far will the person keep on falling? I proposed an experiment in my mind, to use a catapult to shoot a person upwards at the equator and see how far and where the person reaches (too much cartoon Network, I know). As far as I can remember, that was the moment I started to wonder about infinities of Universe.

In 1977, NASA did something already that I planned to do in childhood. Difference was, my guinea pig got replaced with a space probe and catapult with liquid hydrogen. They launched a space probe named Voyager 1. Its prime objectives included flybys of Jupiter, Saturn and its largest moon Titan. It studied the weather, magnetic field and rings of the two planets and gave humans first detailed images of their moons. Its primary mission completed with flyby of Saturn in 1980, it achieved escape velocity that will allow it to leave solar system. Now, it is on its extended mission to explore the outer heliosphere and in 2012, it entered the interstellar space and became the first space probe to do so. I will not go into details of what it recorded or what insight humans got because you can easily find it over Wikipedia.

I’m interested in discussing the exhilaration associated with humans successfully exploring Interstellar space. Success story of Voyager opens up the possibilities that someday, we might be able to travel outside our solar system. The biggest hindrance in achieving the feat of interstellar travel is speed. As Einstein has proved, no object can travel more than the speed of light i.e. 299,792,458 m/s (oh yeah! I love using the exact value!). Assuming that in future, humans succeeded in achieving this (ignore special theory of relativity for a while). It would still take about 15 years to reach the nearest solar system and about 2.2 million years to reach the nearest galaxy, Andromeda. Now, interstellar travel sounds impossible, right? Moreover, fastest velocity humans have ever achieved is 16.26 km/s, it is only 0.005% of the upper limit. Now the ‘impossible’ associated with interstellar travel might be getting darker.



But, there is a legendary saying by Dr. Sheldon Cooper, “When you understand the laws of physics, Penny, anything is possible” There might be some other ways to cover interstellar distance in humanely possible time. As we are familiar, $\text{time} = \text{distance}/\text{speed}$. So, if we wish to reduce the time, as the mathematics is indicating, we could do it either by increasing the speed or decreasing the distance. Now that seems ridiculous, how can we decrease the distance! I think, maybe there is a way to decrease the distance but capitalists air craft carriers have prevented mankind from this knowledge to protect their business (it was a joke, you have to laugh here). But yeah, there is a way for that and physicists call it wormhole.

Wormhole is a theoretical passage through space and time that could create a shortcut between two different dimensions. In layman's terms, it is like going through a straight path rather than going through the curvature of space and time. A wormhole could be a bridge connecting large distances, short distances, different Universe or different point of time. They might sound like a hypothetical concept from some Sci-fi movie, but they're theoretically valid. They are consistent with Einstein's theory of General relativity or sometimes referred as Einstein's theory of gravitation. It is not known till now that they exist or not or say we have not observed any of them. But they exist mathematically and provide strongest hopes for Interstellar travel.



Doesn't matter how impossible interstellar travel seems. But, there are a number of physicists in world who chose to believe, it is possible because every day new secrets of Universe are being revealed. Maybe, there will be a day when we will travel out of space. Keep yourself excited for the day and if you're not excited enough, go watch 'Interstellar'. Maybe you would be excited then. I think, this is the second time I'm citing Interstellar, well it is quite inevitable. It is the best space movie ever made. In the end I would quote someone fictional.

"When you understand the laws of physics, Penny, anything is possible"

-Dr. Sheldon Lee Cooper, B.S, M.S., M.A., Ph.D., Sc.D.

That Quote has somewhat changed the way I look at the observable universe now, knowing that there are thousands of places no-one has ever been to, things no-one has seen. You can find the word of astrophysics in poetry, theoretical physics and in our self because at the end of the day, we all are made of STAR STUFF.

- Yash Chauhan (ME)

A Poem, The Greatest Gift

That greatest gift is the
Joy of a gift shared;
That giving of ourselves,

Our time,
Our encouragement,
Our resourcefulness,

That greatest gift is the giving
Of ourselves to a worthy other,
So, That special one can enhance
The value and number of his or her
Gift to the world.

So, let us give and spread
Our love and joy be giving through
The gift of ourselves to another;

Let us be blessed by the satisfaction
Of giving so that we can receive
The greatest gift of renewed fortune
To give once more of ourselves.

- Shashank (ME)

A Poem, Class

Don't gloat in victory, or pout in failure;
Don't brag of your conquest and possession;
Be considerate to the less fortunate and
Graceful with the defeated;

Suffer you must, but without a murmur of complaint;
Choose well in your taste and avoid ostentation,
Showmanship, and buffoonery;

Let your action, achievement, and accompaniments
Speak for you at the expense of your mouth;
Do and acquire what you like and not things.

You value highly for their impressions on others;
And if they impress others, then let it be;
Stay in sync with your energy and mood,
While remaining polite, respectful, and responsible;

The moral dictates of your natural way;
Although not perfect, try to do as many of these
As often as you can and will;

If so, you will earn an air of distinction and class
That birth, money, power, and status alone
Cannot bestow.

- Shashank (ME)

A Message to Convey, The Professors Way

The Professor began his class by holding up a glass with some water in it. He held it up for all to see & asked the students “How much do you think this glass weighs?”

‘50 grams!’..... ‘100grams!’‘125 grams’ ...the students answered. “I really don’t know unless I weigh it,” said the professor, “but, my question is:

What would happen if I held it up like this for a few minutes?”.... ‘Nothing’the student said. Ok what would happen if I held it up like this for an hour?’ the professor asked.

‘Your arm would begin to ache’ said one of the students

“You’re right, now what would happen if I held it for a day?”

“Your arm could go numb; you might have severe muscle stress & paralysis & have to go to hospital for sure!”

..... Ventured another student & all the students laughed

“Very good.

But during all this, did the weight of the glass change?” Asked the professor.

‘No’.... Was the answer.

“Then what caused the arm ache & the muscle stress?”

The students were puzzled.

“What should I do now to come out of pain?” asked professor again.

“Put the glass down!” said one of the students

Small short story, the expression on the faces of students suddenly starts changing from a sweet and tender smile to an expression of uncertainty as the professor started explain the outrageous experiment he just conducted and the professor said.

“Life’s problems are something like this.

Hold it for a few minutes in your head & they seem OK.

Think of them for a long time & they begin to ache.

Hold it even longer & they begin to paralyze you. You will not be able to do anything.”

It’s important to think of the challenges or problems in your life, But EVEN MORE IMPORTANT is to ‘PUT THEM DOWN’ at the end of every day before you go to sleep...

That way, you are not stressed, you wake up every day fresh & strong. So, that you can handle any issue, any challenge that comes your way.

- Vaibhav Diwakar (ME)

SAE - Efficycle's astounding Results

2017, it's been a fantastic year for our department and for science over all. From the recent discovery of gravitational waves to Nano robots running through human veins, there was a lot to catch up to. Considering our departmental achievement, the students have put yet another feather in their hat as they claim victory over a highly prestigious and competitive event, known as SAE – Efficycle. In this the students faced a challenge to design, build and operate a tri-cycle hybrid that can be used by human drive power and by an electric drive. Students from different years collaborated and formed a team under the guidance of their seniors. And then, from scratch they started and vigorously worked stimulating both their studies and their passion. After a period of rapid designing and prototyping they finalized the design.



“The Designing phase is the most confusing and frustrating to go through, as you don’t have any idea where you want to go but you know you have to get there in time, it can be described as a series of unrelated events some of which you regret & change and some of them you like & keep, and that is how you make something that you and your team can both agree on. And voila you just finalized your design”

Team Zyklus's Captain, Sharmistha Srivastava (ME)



Now, there fabricating phase started and with all the glory associated with it, it is now the time to get their hands dirty. All the members started hustling on as they change the design to reality as they screw each bolt and welded each joint with utter concentration, all they wanted was to make something they can be proud of, but little did they know their accomplishments will be gathering so much more than just praise and approval.

As the fabrication phase was coming to an end the enthusiasm which was supposed to be diminishing was surprisingly at its highest. Something that kept the team going regardless of all the set back they faced.

The day came and all their hardwork was going to be tested in the battle arena. And Spoiler alerts IT PAID OFF.

“ The moment the race was over, We knew that it was our time, It was our time to shine.”

Team zyklus’s Vice captain, Rajnish Singh (ME)

The team Won the following title:

1. Endurance race, 1st position (35000 Rs)
2. Best girl participant (15000 Rs)



The team Won the following title:

1. Endurance race, 1st position (35000 Rs)
2. Best girl participant (15000 Rs)
3. Overall competition runner up, 2nd position (75000 Rs)

The team won a whopping total of 125000 rupees, which was entrusted to the club head to be later used for some other venture, do you know why. Because

“There are limitless adventures for those who seek them all”.

- Yash chauhan (ME)