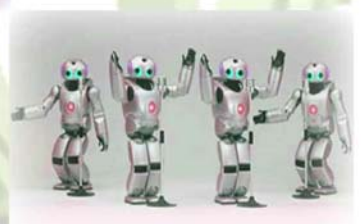
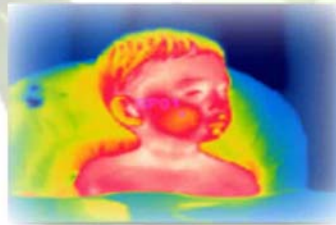
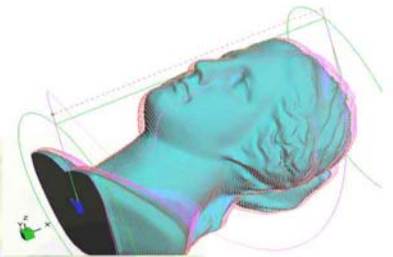


# MECHZINE

VOLUME 2, 2005-06





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## Interview with Dr. Eswaran

There seems to be a divide between the faculty and students here and many of us feel that things have taken a new shape over the years right from the student faculty interactions to the student community and many other things. Let us have Dr. Eswaran take us 25 years back into history to the time when he was a student at this very campus. Let us hear from Dr. Eswaran the practices prevalent at his time and his experiences at IIT Kanpur – that brought him back here as a professor in the department and whom we adore now.

1. **Student faculty relations:** IIT started out with a very few students probably one fifth of the current strength or even less....then it was easy for the faculty to identify with the students because of limited strength. The tea arranged by our TA101 instructor at the end of the course for the entire class still lingers on in our mind. Other such informal occasions always strengthened our relations with the faculty. True such things are not feasible now but then we and you must think of more options to bring the two communities closer.
2. **Research and Teaching:** Research and Teaching go hand in hand and in fact definitely complement each other. As a researcher it is absolutely necessary to have one's basics right and imparting knowledge offers a medium to do so because once you go to the class in order to teach something you will make sure that you are giving absolutely right things. Again with enthusiastic students teaching doesn't remain just a duty but also a learning and enjoyable experience.
3. **Unique experience:** One memory that stands out from the old times is an incident when the Gymkhana President scrapped the "Culfest"(now more popularly known as Antaragni) on the pretext that it was actually only instrumental in degrading the present culture. This aroused the entire student community and we literally went on to SAC rooftops to turn down the president. Well apart from that I also enjoyed my term as a Senator during my final year.
4. **Placement:** The placement scenario is definitely on a down in our institute. Actually it's very difficult for just one professor to look after an issue that's so vast and demands a lot of time because after all they must not lose touch with their research. Placement is something that needs to be managed professionally with a well formed committee. We also need to project ourselves in a better and sophisticated manner.
5. **His job:** Many people feel being a professor is a boring occupation. But I quite disagree with people on this view because as a professor one is not commanded by anything. It is what he likes that he does. For example I have already had two publications in the field of Anthropology – something entirely different from Fluid mechanics. But then this is the sort of freedom that you have being a professor say



*The future ain't what it used to be. – Yogi Berra*

you can start off with things that fancy you and this way may be you don't mind money but then you definitely live life in a zealous way enjoying every bit of your work.

6. **Difference from 1980 to 2005:** The increased strength, the JEE pattern and the ever changing school education trends have made things completely different. The present JEE pattern has given encouragement to so many coaching centers that have absolutely destroyed the essence of engineering because such centers TRAIN and don't TEACH. This has changed the very outlook of students who enter their first year because they completely forget what its like to be in an academic institution and the values they are supposed to abide by.
7. **His message:** Well the culture in the hostel is deteriorating nowadays as the tendency is to glorify those who tend to get away with things putting in minimum amount of effort. To make a mark in this world it is necessary and inevitable to work for it as evading hard work will not lead us very far.

**Interviewed by  
Dhruv Singh and  
Siddhartha Srivastava**



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*It takes twenty years of hard work to become an overnight success. – Diana Rankin*



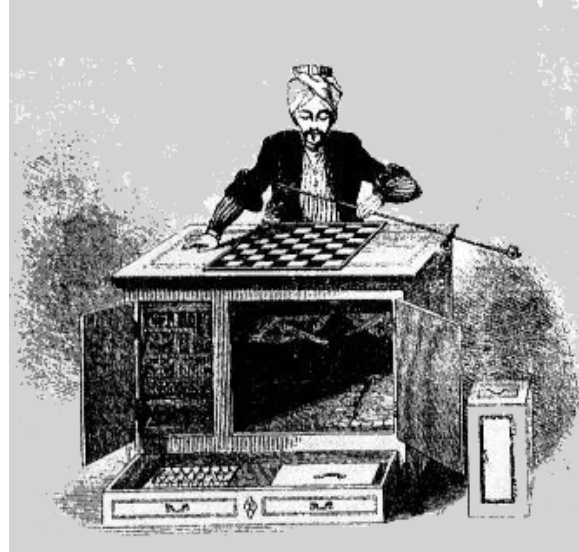
# What is an Automaton?

Although records are scant, it is known that automata date back to thousands of years. Chinese craftsmen built a mechanical orchestra during the Han Dynasty (300 B.C.) Such automata were widespread in China by the time of the Sui Dynasty (6th Century A.D.), when the Shai Shih t'u Ching was written (Book of Hydraulic Excellencies). During the T'ang Dynasty, the Chinese built birds with moving parts, mechanical otters that swallowed fish, and monks begging girls to sing. The skill of the Chinese craftsmen waned after 1386.

The Ancient Greeks created some remarkably advanced automata and mechanical special effects - many of which were used in their temples. Archytas of Tarentum (400 B.C.) a friend of Plato, built a wooden pigeon moved by steam. Heron describes the workings of several bird automata in his "Spiritalia" (150 B.C.)

Following the decline of Greece and Rome, interest in automata was re-kindled in Mesopotamia. In the 13th Century A.D., al-Jazari provided a diagram of a peacock automaton in his treatises. In Europe, Roger Bacon built a talking android head (an ANDROID is a figure in human form), and Albertus Magnus constructed an iron man.

Master clockmakers built a number of mechanical figures during the Middle Ages. One of the oldest and best known examples is the seven hundred year old Astronomical Clock in Prague. When the clock tower chimes the hour, a skeleton holding an hourglass rings a bell and a Turk draws his sword. A door in the clock tower opens to reveal a series of animated figures that move across the top of the clock.



The astronomical clock was so amazing that people thought it was a magical device. After it was built, the burghers decided to reward the clockmaker by putting-out his eyes. The townspeople were so proud of their magic clock that they made sure that the clockmaker would never build another one like it. When the clock broke down a few years later, no one knew how to fix it. The Astronomical clock remained silent for next 300 years.

Later, clockmakers in Germany constructed many similar clocks - although none were as impressive as the one in Prague. Precision clockwork was also used to construct machines and mechanical toys.

In the 16th Century, European trade with the Far East, and translations of Hero of Alexandria's writings from the 1st Century, spurred new interest in constructing automata. Automata became quite fashionable among the wealthy.

Magician Boxes were a popular toy for wealthy adults. A disc with a question written on it was inserted into the device, and the figure of a magician pointed his wand at the answer.



*Though no one can go back and make a brand new start, anyone can start from now and make a brand new end. — Unknown*

In 1578, in a Latin treatise of mechanical instruments, Jacques Besson described the workings of a device which dispersed water, wine and oil through a single spigot.

In 1606, Henry Winstanley designed a similar device called "The Wonderful Barrel" which served hot and cold drinks "without mixture". Winstanley exhibited the Wonderful Barrel at his water theater on Piccadilly, along with perpetual fountains and other devices.

A rival engineer named Charles Butchered installed a New Mechanical Fountain at the Black Horse Inn in 1708 "which at command runs at one cock hot and cold liquor." The fountain also served tea, coffee, chocolate, sherry, white wine, cherry brandy and punch.

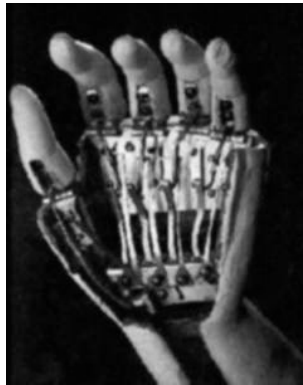
In the 18<sup>th</sup> Century, mechanical pictures (tableaux mecaniques) were quite popular. A framed painted landscape would spring-to-life by clockwork.

Mechanical theatres soon sprang-up. The biggest was the one at the gardens of Hellbrunn near Salzburg, Austria. It contained over 113 hydraulically operated figures.

In 1722, Isaac Fawkes, a stage magician, displayed a musical clock as part of his act. The clock "played a variety of tunes on the organ, flute and flangolet with birds whistling and singing." At the Bartholomew Fair, Fawkes gave top billing to a device called the "Temple of the Arts." Mechanical musicians played while mechanized ships and ducks crossed a painted bay that was supposed to represent Gibraltar. The ships were later replaced with

a mechanical version of King George's coronation. And in honor of the Algerian Ambassador, a "moving picture" depicted an Algerian scene in which an apple tree blossomed and bore fruit.

Many supposedly mechanical devices were actually operated by live assistants using strings and pulleys. These included Balducci's automated drugstore, and "Blackmoore" - which chimed the number of pips on a playing card.



The most famous automaton of all - the automatic Turkish chess player, or "Psycho" - was actually a clever fraud. In 1769, the Baron Wolfgang Von Kempelen (who served as counselor on mechanics to the Empress Maria Theresa) was watching a performance at a party which made use of magnetic toys. The Baron bragged that he could build a much more thought-provoking diversion. The Empress told him he should go ahead and build one. The Baron worked on his invention for the next six months before presenting it in court. It was an automaton chess player dressed in traditional Turkish costume.

This incredible "thinking machine" fooled all the greatest minds of Europe. Learned men and courtiers came from far-and-wide to see it.



The Turk was seated behind a cabinet full of mechanical gears. The front of the cabinet opened-up to reveal the inner workings. When the machine was wound-up, the android came to life. It would turn its head from side-to-side, pick up chess pieces with slow, jerking movements, and move them to



*You don't get paid for the hour. You get paid for the value you bring to the hour. — Jim Rohn*

another position on the board. In this way, the android was able to play a game of chess against a real human opponent.

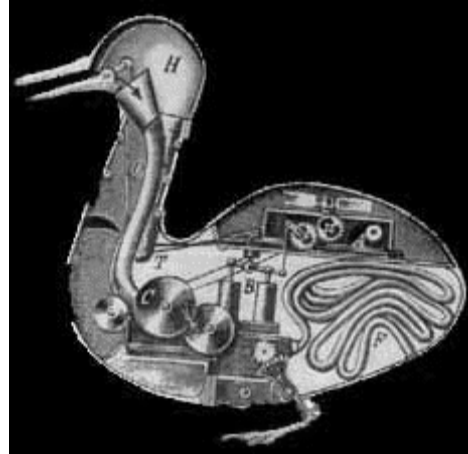
The courtiers were delighted, and the Baron von Kempelen became famous.

In reality, the chess player's gears were all fake; they were merely meant for show. A small person or child hid within the cabinet beneath the Turk. The cabinet was divided into four or five separate compartments. As the Baron opened the doors on the front of the machine to "prove" to the audience that there wasn't a person inside, the child would twist and contort to hide himself in a different part of the box (one of which was actually a drawer underneath the main compartment!) When the chessplayer was wound-up, the person inside the box would crawl up into the body of the Turk, and move the head and arms just like a puppet. The "machine" would magically spring-to-life, and begin to play a game of chess.

The Turk may have been a fake, but Jacques de Vaucanson's creations were purely mechanical. In 1738, he designed an automaton flute player "that many learned men thought was human."

De Vaucanson's masterpiece was a mechanical duck which performed convincingly enough to fool a live duck. "It quacked, seemed to breathe, ate and drank."

An American professor named George Moore built a walking steam man in the mid-19'th century. The steam engine in the man's metal belly powered the legs, while the body was connected to a horizontal bar which in turn was fastened to a vertical post...The steam man walked around the post in circles just like a merry-



go-round.

In Eisenstein's classic film *October*, there is some great footage of antique Russian automatons. More familiar to Americans are the animated cowboys and musicians at Wall Drug in South Dakota. Hundreds of shopping malls display animated automatons every year.

- Siddhartha Shrivastava

*Neither a lofty degree of intelligence nor imagination  
nor both together go to the making of a genius. Love,  
love, love, that is the soul of genius.*

*- Wolfgang Amadeus Mozart*





## Women in Engineering

In Peru, there's a legend that says for every woman who goes down into the mines, a man comes back up dead. There's another legend that says when women go into the mine, it stops producing. *It's a man's world down in the mines.* These words, as anybody can feel, are certainly discouraging.

The biggest challenge that women face in planning a career is not being taken seriously. Often they have to work harder and accomplish more in order to be recognized.

In fact one of the biggest sources of potential engineers is women. But still their percentage in engineering is very low. And the low number of women engineers is really a *big problem*.

Let us see why we want women in engineering:

a) There is a shortage of skilled workers. Polls of business leaders indicate that the skill shortage is the prime barrier towards growth.

b) Women add other perspectives to problem solving and different approaches to teamwork that enable project teams to generate more creative solutions and better address society's needs.

c) Women are 50% of the population and a major consumer group. By attracting women engineers companies can gain better understanding of their customers needs, improve product designs and

compete more effectively in the marketplace.

One of the main reasons why there are so few women in engineering is often subtle but sometimes direct discouragement that girls and young women get from adults, peers and the media.

Many girls opt out of mathematics and science courses in middle school and close the doors to many socially important and personally rewarding jobs in future.

Myths that often discourage girls from pursuing engineering courses:

a) Boys are better in mathematics and science than girls.

The reality is that there is no difference in the ability of boys and girls to understand the subject.

b) Girl's don't like technology.

The fact is girls are interested in technology, but cultural differences in the way boys and girls are raised typically limit the experiences girls have with different technologies.

c) Women engineers can't be feminine.

The fact is that women engineers are the same kinds of sisters, daughters and mothers found in other profession.

Scarcity of women in science and engineering can lead to isolation, lack of mentoring, stereotypes about women's performance and difficulty gaining credibility among peers and administrators.



*It is wise to keep in mind that neither success nor failure is ever final. — Roger Babson*

Therefore we see that the society needs a change. Such discriminations have to be removed. Institutions need to establish policies and priorities for women in different disciplines of engineering. Active recruitment of women into areas that have few females can have positive consequences. Institutions need to establish policies against sexual harassment and gender discrimination. Recognition of such policy issues is only a first step towards overcoming the institutional barrier that keeps women from participating fully in science and technology.

In the recent times, a lot of change has been observed in the attitude of women. There are women engineers who work everyday to solve problems and make the world a better, cleaner and safer place. These women are actively involved in their communities, raising families and enjoying all kinds of sports and hobbies.

Certainly in the years to come, the myth that engineering is only associated with working under a car and is more masculine will nowhere be heard.

Ajay Murmu and H.Sripath  
(B.Tech First Year)

### GRADUATION AT IIT KANPUR

A boy after JEE win  
Entered IITk with ME stream  
With a great enthusiasm  
Stepped into his all time dream  
Soon got disappointed due to seniors' screams  
Used to remember his home in dreams.

After a months swing  
With new friends started enjoying  
But soon came mid-semester examining  
Forcing every student for mugging  
The results were still disappointing  
And now the system started, him, biting.

He got used to within a year  
And soon forgot every fear  
Tough courses he had to bear  
But faced them with top gear  
And scored good marks to cheer  
Staying now since years  
Became active part of IITK sphere.

It was now the fourth year  
Bringing nearer his departure  
The agony of again leaving the home was there  
But a long way ahead he has to steer  
And soon he has to leave  
As his graduation was complete  
But IITK memories were always deep  
But IITK memories were always deep.

ABHINAV AGARWAL

*Courage isn't having the strength to go on – it is going on when you don't have the strength. – Napoleon Bonaparte*



## हथौड़े की महिमा

एक साधारण सा हथियार  
जिसके बिना सब कुछ निराकार  
जो व्याप्त है पूरे जगत में  
और सब कुछ उसके वश में  
वह और कुछ नहीं दोस्तों  
वह है हमारा प्यारा साथी हथौड़ा ।

आता है कभी वह काम ठोकने के  
तो कभी मोड़ने के  
कभी तोड़ने के तो कभी जोड़ने के  
इसकी माया तो है अपरमपार  
जो हर किसी के बस के है पार ।

आते हैं हथौड़े बहुत सी शक्लों सूरत के  
कुछ मोटे छोटे तो कुछ बड़े शरीर के  
पाठ पढ़ाते हैं यह भिन्न भिन्न हथौड़े  
विभिन्नता में एकता का  
तभी तो सारा संसार करता है गुणगान  
इनकी महिमा का ।

हम भी नहीं हैं अछूते इन सर्वशक्तिमान  
सर्वव्यापी संपूर्ण हथौड़ों से  
आखिर अधूरा है हमारा सपना बिना इनके  
सहयोग से  
चाहे वह टी.ए. हो या कुछ और  
मिलती है हमें ग्रेड्स इन्हीं की कृपा से  
तो बोलो हथौड़े की जय ।

मयूर दीक्षित



*In order to keep a true perspective of one's importance,  
everyone should have a dog that will worship him and a  
cat that will ignore him. – Derek Bruce*

## CHAPOO MECHINEERS

Mechanical Engineering is a branch of engineering which is not a branch at all. It is basically a part of engineering in which almost everything is done. Mechanical Engineers touch almost every aspect of technology. They create machines, products and technological systems that benefit society. Mechanical engineers work in industry, business, government organizations and universities. Some work for large companies, others are part of small firms or even work for themselves.

The mechanical engineering field is so diverse that each mechanical engineer does things somewhat differently from his or her colleagues. Still, most mechanical engineers focus on one of three broad areas of technology:

**ENERGY:** Mechanical engineers are concerned about the mechanics of energy - how it is generated, stored and moved. Many mechanical engineers are employed in industries that produce and deliver electrical power, natural gas and oil. Mechanical engineers are also developing solar energy, wind energy and geothermal systems to supplement and eventually replace conventional fuels. They are also concerned with energy use, including developing more fuel-efficient cars, motors and appliances. Other mechanical engineers focus on the effects of heat energy on systems and machines.

**MANUFACTURING:** Mechanical engineers develop the machines that process materials into products. In business these engineers are concerned with designing and building machines and systems of machines that improve operating efficiency. Automation, air pollution control, materials handling and plant engineering are all areas of interest for mechanical engineers in manufacturing.

**DESIGN MECHANICS:** Mechanical engineers are concerned with designing devices used by consumers and industry. Household appliances, automobiles, computer hardware, plant equipments, spacecrafts, airplanes - anything that uses mechanical motion - are all designed by mechanical engineers and often in cooperation with other types of engineers and specialists. One area attracting increasing attention by mechanical engineers who specialize in design mechanics is medical biotechnology. In this field, mechanical engineers are the "motion specialists" on design teams that include doctors and biologists. The design, fabrication and installation of artificial body parts - particularly artificial limbs - demand the knowledge of how things move, how they can be designed to withstand stress, and what materials will provide adequate strength and still be compatible with the human body. So we can see that Mechanical Engineers form the crux of the engineering society of the world. Kudos to them.

**Shekhar**



*Where you end up isn't the most important thing. It's the road you take to get there. The road you take is what you will look back on and call your life. — Tim Wileg*

## THE DUEL

The sun had itself behind the horizon. Everywhere the atmosphere was quiet all gloominess spread all about. Subodh was struggling with himself to decide whether or not to take drugs. He had become a drug addict only two years ago, when he had taken one on his friends' recommendation.

Subodh once a genius had now turned to be a dull student. Previously he was proud of his self control & his self determination but now all had melted into the thin air. Previously he was an optimist but now a pessimist. He did not go to his house during these years in order to escape his parents' eyes. He had told them about fake results but now it was his last year in the campus & any day his parents will come to know about the deception he has given to them.

He was just turning mad staring here & there but seeking no way to get rid out of his lust for injection. He tried hard, harder then ever to get rid of his lust but it seemed to be invincible. Many times before also he had tried to overcome his desire of having drugs, many times he had slapped himself in order to give vent to his frustration, many times he had made promises to himself for not taking drugs & later on he had broken them.

Whenever he took drugs he got a momentary pleasure, but later on he cursed himself without bounds but he was not able to understand why his ego cursed him after taking the drugs & why that only turned in favor of taking them

when he tried to overpower the desire.

Subodh could easily feel all his determination melting away in thin air. But he wanted to stop himself after all it was not a fair thing. Subodh tried hard, he went out of his room running here & there trying to divert his mind but all his efforts seemed to turn futile. Why? He couldn't find answer to this question. At last he kneeled down, took the injection, cursed himself & put it in his veins giving himself a malicious satisfaction.

This was almost the daily routine of his life. Days passed, months passed and slowly his time in the campus also came to the threshold of finishing. His CPI was too low & he could not get any job. This set him in depression. After all when he had crossed the threshold of this campus for the first time he had promised himself to be the best student.

He couldn't do any work on that day. He bolted his room from inside switched off the light and sat down in the dark. He could feel himself to be the guilty of everything, he felt that he was a person who shattered his parent's dream who had toiled hard to educate him and have cared for him, he was not able to face himself, he had become a burden, a real burden on this earth.

He could easily visualize the shock that his parents would be getting when the truth will unveil itself before them and they will come to know that their son was a drug addict, the poor fellows still did not knew the fact. He



*To handle yourself, use your head; to handle others, use your heart. — Donald Laird*

felt disgust & shame from everywhere. He always tried to change himself but could never do so, he could very easily remember his promises of changing the whole world but he could not change himself only. He cursed himself again and with a loud thud brought down his fist on the ground with all his might to hurt him, he had started hating himself, he could easily see darkness everywhere, no path, only darkness. He felt that he had deceived everybody, his parents, his teachers, his relatives and even the Almighty. He could not understand the purpose of being alive. His friends had deserted him, he was alone, completely alone, nobody to share his feelings, he felt that after one day his parents will come to and then all shame. Shame and hatred will pour down on him from every side. He could hear voices yelling out to him *"You are a deceiver, you deceived your parents who are comparable to GOD, you betrayed yourself, your own soul, you are a complete loser, a burden on earth"*.

The voices echoed in his brain he felt to end his life. Yes, he wanted to commit suicide to escape the

consequences which were inevitable. He stared through out his room in faint moonlight; he saw injections & other drugs lying in an absurd manner throughout his room, his books that have deserted him. He could see a rope in front of him and he took the decision, the hardest decision, *he will hang himself*. He felt that it will be easier to face death than shame from his parents. He fetched the rope made the knot & hanged himself to the fan.

And then again there was a complete silence, complete peace; *the duel in Subodh's brain had ended* along with his life. The moon got covered by dark clouds. There was no sound of birds, gloominess prevailed everywhere. After all drugs had managed to swallow one more victim & this time a genius and his parents loving.

VISHVA DEEPAK TEWARI

**DO YOU KNOW?** In 2002 the U.S. Congress officially recognized that the Italian inventor *Antonio Meucci* is to be credited for the invention of the telephone and not *Alexander Graham Bell*.

Ankur Sanghai



*You cannot prevent the birds of sadness from flying over your head but you can prevent them from nesting in your hair. – Swedish*



## जिंदगी खूबसूरत है

पूरब में फैली हवा की लाली से  
खेतों में लहराती गेहूँ की वाली से  
अलसाई माटी की खुशबू से जाना  
जिंदगी खूबसूरत है ।

बादल से छनकर आती किरणों से  
किरणों को थामे खड़े पेड़ों से  
पेड़ों से झरते पत्तों से जाना  
जिंदगी खूबसूरत है ।

जाड़ों की ऊनी सुनहली धूपों से ,  
गरमी की ठंडी ठंडी छाया से ,  
बारिश की पहली बूंद से जाना ,  
जिंदगी खूबसूरत है ।

कोयल के मीठे मीठे गीतों से,  
कलख करते अंबर के मीतों से  
गुंजन करते भौरों से जाना  
जिंदगी खूबसूरत है ।

शबनम के आशियां घास — दुकूलों से  
बागों को महकाते खुशदिल फूलों से  
फूलों पर मंडराती तितली से जाना ,  
जिंदगी खूबसूरत है ।

तारों से निखरी प्यारी रातों से,  
रातों को रोशन करते चंदा से,  
चंदा को ताकती चकोरी से जाना,  
जिन्दगी खूबसूरत है ।

बागों बहारों से पर्वत पहाड़ों से  
कलियों से फूलों से घास दुकूलों से  
नदियों से झरनों से जंगल के हिरनों से  
सागर से साहिल से अंबर के राहिल से  
चांद सितारों से हसीन नजारों से  
सजी इस खूबसूरत जिन्दगी से जाना  
जिन्दगी खूबसूरत है ।

- अरविन्द कोठारी

### *Stray Dogs*

Searching, digging, spying things  
Can a dog someday really sing?  
It sees the shops full of treats,  
Poor thing! Seeing a man it always  
retreats.

Nothing to eat, nowhere to go,  
Not many friends and not many foes,  
Starving, without food going to bed,  
They have to sleep without being  
fed.

City is their birthplace,  
City is their grave,  
Poor things, these stray dogs,  
They can never be safe.

Sumeet Kale



*Change is inevitable, except from sending machines.*

- Unknown

## Y3 INDUSTRIAL TRIP







## WHAT DO MECHANICAL ENGINEERS DO?

Mechanical engineers work on today's and tomorrow's technical problems. For example:

Mechanical engineering is a diverse field and mechanical engineers are found working on almost all technologies. Mechanical engineers work to make our lives more comfortable by designing components and systems for product delivery for use in manufacturing. They create machines, products, and new technologies. Mechanical engineers work on cryogenic, vacuum and mechanisms by applying analytical techniques such as testing and mathematics. They may design automation and robotics, heating and ventilation or refrigeration. They also redesign existing components, assemblies and manufacturing systems and processes with special machinery for improved efficiency.

Emerging technologies in biotechnology, materials science, and nanotechnology will create new technological opportunities for mechanical engineers.

Additional opportunities for mechanical engineers will arise because a degree in mechanical engineering often can be applied in other engineering specialties. Some of the largest industries employing mechanical engineers are: Aerospace, automotive, architecture and government. More than half of mechanical engineers are employed in manufacturing—mostly in

machinery, transportation equipment, computer and electronic products, and fabricated metal products manufacturing industries.

Till the date Mechanical Engineers have shown their efficiency in most of the field of engineering. And they will continue to do so...

- Prashant Saxena

### झेलम की सहनशक्ति

जहां मजहब शांती का फरमान था  
जहां इंसान हिंसा से अनजान था  
आज निरदोश जनता जुलूम क्यों सह रही है  
अरे निष्ठुर झेलम फिर भी तू बह रही है

जहां हौसले गगन को चूमते हैं  
जहां चमन हवा को दूँढते हैं  
खौफ से भरी जनता बात यह कह रही है  
अरे निष्ठुर झेलम फिर भी तू बह रही है

वे हाथ जिन्होंने घुसपैठियों को ललकारा था  
वे आंग्रें जिन्होंने कातिलों को धिक्कारा था  
आज मजबूरन आतंक सह रही हैं  
अरे निष्ठुर झेलम फिर भी तू बह रही है  
अरे निष्ठुर झेलम फिर भी तू बह रही है

स्वजील भास्कर



*The great thing is not so much where we stand as in what direction we are moving. — Oliver Wendell Holmes*

## UNREAD COMPREHENSION

### **Comprehending Engineers -Take One**

Two engineering students were walking across campus when one said, "Where did you get such a great bike?" The second engineer replied, "Well, I was walking along yesterday minding my own business when a Beautiful woman rode up on this bike. She threw the bike to the ground, took off all her clothes and said, "Take what you want." The second engineer nodded approvingly, "Good choice; the clothes wouldn't have fit anyway."

**Lesson:** Don't bother to drop even the most obvious hint, they can't catch anyway. (This is a reality! If you don't believe, test them!)

### **Comprehending Engineers -Take Two**

To the optimist, the glass is half full. To the pessimist, the glass half empty. To the engineer, the glass is twice as big as it needs to be.

**Lesson:** There is no philosophy to talk abt but calculations and calculations...

### **Comprehending Engineers -Take Three**

A pastor, a doctor, and an engineer were waiting one morning for a particularly slow group of golfers. The engineer fumed, "What's with these guys? We must have been waiting for 15 minutes!" The doctor chimed in, "I don't know, but I've never seen such ineptitude".

The pastor said, "Hey, here comes the greens keeper. Let's have a word with him." "Hi John. Say, what's with that group ahead of us? They're rather slow, aren't they?"

The greens keeper replied, "Oh, yes, that's a group of blind firefighters. They lost their sight saving our clubhouse from a fire last year, so we always let them play for free anytime." The group was silent for a moment. Then the pastor said, "That's so sad I think I will say a special prayer for them tonight." The doctor said, "Good idea. And I'm going to contact my ophthalmologist buddy and see if there's anything he can do for them." The engineer, after much thought said, "Why can't these guys play at night?"

**Lesson:** No emotions please, only practicality works here.

### **Comprehending Engineers -Take Four**

What is the difference between Mechanical Engineers and Civil Engineers? Mechanical Engineers build weapons; Civil Engineers build targets.

**Lesson:** They build and build and build and build and... to compliment one another.

### **Comprehending Engineers -Take Five**

Three engineering students were gathered together discussing the possible designers of the human body.



One said, "It was a mechanical engineer. Just look at all the joints." Another said, "No, it was an electrical engineer. The nervous system has many thousands of electrical connections." The last said, "Actually it was a civil engineer. Who else would run a toxic waste pipeline through a recreational area?"

**Lesson:** All of them have their own theories. None for believing!

#### **Comprehending Engineers -Take Six"**

Normal people believe that if it ain't broke, don't fix it. Engineers believe that if it ain't broke, it doesn't have enough features yet."

**Lesson:** They are complicated and twisted.

#### **Comprehending Engineers -Take Seven**

An architect, an artist, and an engineer were discussing whether it was better to spend time with a wife or a mistress. The architect said he enjoyed time with his wife, building a solid foundation for an enduring relationship. The artist said he enjoyed time with his mistress, because of the passion and mystery he found there. The engineer said, "I like both." "Both?" "Yeah," replied the engineer. "If you have a wife and a mistress, they will each assume you are spending time with the other woman, and you can go to the lab and get some work done."

**Lesson:** Gals, NEVER fall for an engineer!

#### **Comprehending Engineers -Take Eight**

An engineer was crossing a road one day when a frog called out to him and said, "If you kiss me, I'll turn into a beautiful princess." He bent over, picked up the frog and put it in his pocket. The frog spoke up again and said, "If you kiss me and turn me back into a beautiful princess, I will stay with you for one week." The engineer took the frog out of his pocket, smiled at it and returned it to the pocket. The frog then cried out, "If you kiss me and turn me back into a beautiful princess I'll stay with you and do ANYTHING you want." Again the engineer took the frog out, smiled at it and put it back into his pocket. Finally, the frog asked, "What is the matter? I've told you I'm a beautiful princess, that I'll stay with you for a week and do anything you want. Why won't you kiss me?" The engineer said, "Look I'm an engineer. I don't have time for a girlfriend, but a TALKING frog, now that's cool!"

**Lesson:** Once again, gals, NEVER fall for an engineer!

Now we know why so many engineers are single.





## कहानी एक “मेकैनिकल” इंजीनियर की

-चन्द्रमोहन

“लोहे का स्वाद लोहार से मत पूछो  
पूछो उस घोड़े से, जिसके मुँह में लगाम है”

आप ऐसा सोच सकते हैं कि एक लोहार का जात-भाई (मेरा मतलब मृच्छान्तिक एनर्निएर) होते हुए भी मैं ऐसी पंक्तियों से अपनी बात क्यों शुरू कर रहा हूँ जो लोहार के खिलाफ किसी हड़ताली नारे से प्रतीत हो रहे हैं। लेकिन इससे पहले कि आप किसी ऐसे सोच में पड़कर परेशान हों मैं यह स्पष्ट कर दूँ कि एक यांत्रिक अभियंता (मृच्छान्तिक एनर्निएर) भले ही हाथ में हथौड़ा और पाना ह्यस्पान्एरह लिए हुए लोहार का भाई लगे पर वास्तविक रूप से वह एक लगाम में डले घोड़े की तरह निःसहाय व निरीह प्राणी ही है।

जब अपने इंजीनियरी सफर के पहले पायदान पर उसे एक पेचकस ह्यश्चएल्ल डरविएरह पकड़ा कर कहा जाता है कि “बेटा! लग जा काम पर” तो मस्तिष्क में कई तरह के खयाल कबड्डी खेलने लगते हैं मसलन

- क्या मैं ये पेचकस ह्यश्चएल्ल डरविएरह घुमाकर पूरा इंजीनियर बन जाऊँगा?
- क्या पेचकस के अलावा और भी हथियार (औज़ार) मेरे शस्त्रागार में होंगे?
- क्या मैं उन सारे हथियारों का कुशल मालिक बन सकूँगा?
- क्या मेरे हाथों एक सृजनकर्ता की ताकत आ जाएगी?
- क्या मैं कभी अपनी साईकिल खुद ठीक कर सकूँगा?

ऐसे ही कुछ सवाल पनपे चन्दू के मन में जब उसे ड० की प्रयोगशाला में साईकिल के सामने बिठाकर हाथ में कुछ औज़ार पकड़ा कर किसी ने कहा “खेलो चन्दू, खेलो”। और फिर ये खेल अगले चार वर्षों के लिए चालू हो गया। कभी चन्दू का सामना एक ढातहए से होता तो कभी डरल्लिन् च्हन्नि से। चन्दू ने ठान ली कि हो न हो, इन्हीं मशीनों के बीच वह अपने जीवन के तमाम साल बिता देगा। कुछ गैर-ज़रूरी (पढ़ें तहएएरएतचिल) विषयों का अध्ययन करते-करते चन्दू अपने 2<sup>वें</sup> ग्रेड के अन्त तक पहुँच गया। उसने निश्चय किया कि वह अपनी गर्मी की छुट्टियाँ बर्बाद नहीं होने देगा। एक ऐसे प्रोफेसर की तलाश में वह निकल पड़ा जो उसे कोई काम दे सके — मतलब वाला काम। और उसकी खुशी का ठिकाना न रहा जब उसे ऐसा मौका बड़ी आसानी से मिल गया। मिलता क्यों नहीं, आखिर उसने अपनी रुचि का इज़हार कितनी निपुणता से किया था। गर्मियाँ आ गई। घर का मोह छोड़कर चन्दू अपने काम ह्यप्रेज्जएतह के लिए रुक गया। उत्साही चन्दू के सारे अरमान साबुन के बुलबुले की तरह हवा में उड़ गए जब प्रोफेसर ने उसे इस बात का अहसास कराया कि दो बरस में उसने इतना नहीं सीखा कि उसे कोई भारी भरकम काम दिया जा सके। सो उसे एक लिग्नी-पट्टी कहानी ह्यछेम्पुतएर छेदएह दे दी और उसे समझ कर 2<sup>ड</sup> से 3<sup>ड</sup> में बदलने को कहा। चन्दू की समझ में नहीं आया कि क्या करे। अब मैदान छोड़कर भागना भी तो उसकी शान के खिलाफ था। उसने तैराकी में नाम दर्ज कराया, किराये पर एक कूलर ले आया और चंद घंटों के काम को दो महीने तक धीरे-धीरे करता रहा। इसी बीच उसने ये भी महसूस किया कि एक साल बाद जब वह और समझदार हो जाएगा तब उसे अपने मतलब का काम ज़रूर मिल जाएगा।

तीसरा साल भी हौले-हौले गुज़रने लगा। चन्दू को कुछ बकवास विषयों के साथ-साथ कुछ प्रयोगशाला-कार्य ह्यप्राचतचिल ह्येरकह भी मिला। उसने पूरी लगन से लैब में काम किया और उसे भरोसा होता गया कि वह और



*We can easily forgive a child who is afraid of the dark.  
The real tragedy of life is when men are afraid of the  
light. — Plato*

काबिल हो रहा था। इस चक्कर में उसका ध्यान अपनी छपि से ज़रा हट-सा गया। खैर, चिन्ता करने की कोई ज़रूरत नहीं थी। आखिर मतलब की चीज़ें तो उसकी समझ में आ ही रही थीं। अब वक्त आ क्यों यूरोप की किसी कंपनी ने उसे जवाब नहीं दिया। वैसे कुछ विश्वविद्यालयों की तरफ से जवाब ज़रूर आया। आखिरकार जर्मनी के एक प्रोफेसर ने उसे अपने यहाँ काम ह्युम्पेर्न्तएरन्हपिह दे ही दिया।

घर से ढेर सारे अचार और प्यार लिए चन्दू अपने काम के बारे में सोचता हुआ जर्मनी पहुँच गया। “इतनी तेज़ी से प्रगति करते देश में तो बहुत उम्दा काम होता होगा”, चन्दू ने सोचा। उसके प्रोफेसर ने उसका उत्साह देखते हुए उसे एक बेहद रोमांचक काम दिया। एक ऐसी मशीन के निर्माण का काम जो इतनी छोटी होगी कि उसे अपने नन्हे आकार के कारण नैनो कहा जाएगा। चन्दू को मानों ज़िन्दगी का मकसद मिल गया हो। उसने प्रोफेसर से काम शुरू करने की आज्ञा मांगी तो उन्होंने कहा कि इस काम को करने से पहले एक लिखी-पढ़ी कहानी ह्येम्पुतएर छेदएह लिखनी होगी। “नहीं.....”, चन्दू के मन से एक चीख निकली पर उसके बाद वह दो महीने तक यूरोप की खूबसूरती का मज़ा लेते हुए उस कोड को पूरा करने की कोशिश करता रहा। कोड तो पूरा हो गया लेकिन छुट्टियाँ खत्म हो गईं। चन्दू को अफसोस था कि असल काम तो उसने किया ही नहीं लेकिन उसके प्रोफेसर उससे बहुत

गया था अपने-आप को एक फैला आकाश देने का। चन्दू ने एक बार फिर मतलब के काम की तलाश शुरू की। इस बार उसका लक्ष्य यूरोप की कंपनियाँ थी। पर न जाने खुश थे। उन्होंने उससे कहा, “तुम प्रोग्रामिंग की दुनिया में बहुत नाम कमाओगे।” प्रोग्रामिंग?? चन्दू को अपने कानों पर विश्वास नहीं हो रहा था। वो एक यांत्रिक अभियंता है और इसी रूप में उसे मशहूर भी होना है।

लेकिन प्रोफेसर का आशीर्वाद तो आकाशवाणी की तरह सच हुआ। कोमल काम करने वाली एक कंपनी ह्यशेफतद्वारए छेम्पान्द ने उसे अन्य 50 लोगों के साथ नौकरी दे दी। चन्दू के पास कोई चारा भी तो नहीं था। एक तो छपि भी इतनी अच्छी नहीं थी और ऊपर से कंपनी पैसे भी तो बहुत दे रही थी। चन्दू मन मसोस कर रह गया।

आज वो एक बड़ी सी कंपनी में शेफतद्वारए श्रन्गिएर है। उसके माँ-बाप उससे बहुत खुश हैं। एक सुंदर सी पत्नी भी है उसके पास जो न सिर्फ शादी के वक्त ढेर सारा दहेज लेकर आई थी बल्कि एक प्यारे से बेटे को जन्म देकर चन्दू की दुनिया में चार चाँद भी लगाए थे। चन्दू बहुत खुश है। वस कभी-कभी अपने बेटे की साई किल की मरम्मत करते वक्त हाथ में पेचकस उठाता है तो.....

*The worst sinner has a future, even as the greatest saint has had a past. No one is so bad or so good as he imagines. — Sarvapalli Radhakrishnan*



## AME WINTER TOUR

Kanpur has nothing much to offer once the end sems are over and the winters start setting in. That is why people start rushing to their homes as soon as the last three exhausting hours are over.

But we third yearites were much more excited about something else, the winter industrial tour organized by AME. Incidentally this year too the trip was chosen to cover Mumbai, Pune and Goa. We left no stones unturned to gather as much information as we can about the industries we were supposed to visit and of course the more interesting places as well.

With so much exciting stuff in our hands and a lot of *enthu* finally the most awaited evening arrived when we started our journey with 43 students along with Dr. Sameer Khandaker on the 3<sup>rd</sup> of December by the PUSPAK express. We reached Dadar station (Mumbai) from where we moved to the IIT Bombay campus by bus in the following evening. The subsequent day was supposed to be a *rest* day so we took full advantage of this fact by enjoying the day as much as we can. Some of us went to the Gateway of India while some preferred to visit the ESSEL world.

Our Industrial tour started on Monday with our visit to Bhabha Atomic Research Centre (BARC), Trombay, where the security arrangements there were highly impressive.

Before being introduced to the Nuclear Reactor we went to the Reactor Control Division, the Radiation Photography Division and the advanced Robotic Systems Division. After this we visited the DHRUVA reactor which is primarily used for the production of neutrons to carry out the various Neutron Beam Radiation experiments. Lastly we covered the Liquid Material Mercury Division.

The very next day we went to L&T which is the chief manufacturer of equipments for boilers and layered vessels. We got a chance to go through the various manufacturing processes involved. The most fascinating was the huge Lathe Machine which could handle 80 tonn capacity jobs.

The next day we left IITB campus with taking the memory of beautiful places like NARIMAN point, MARINE drive, Hazi Ali, Water Kingdom & Essel World in the morning and headed for TATA Motors, Pune via the Western Express Highway. We were fortunate enough to be hosted by our ex IIT K seniors Mr. Anurag Tripathi along with Mr. Subhashish Dash which made our trip to TATA Motors even more memorable and enjoyable. The plant was mainly based on the assembling of light and heavy commercial vechiles. After this we were all set to move to the beach city Goa where we stayed in a Youth Hostel located near the railway station.

In spite of this full night journey we had to

*Heights of great men reached and kept, were not  
attained by sudden flights; but they while their  
companions slept, were toiling upwards in the night.*

*- Unknown*



visit Juhari Agro. The factory was consisting of Ammonia Plant. The very big heat exchangers showed us the real picture of the industry. Ammonia was produced in the plant and was stored in Hot and very large spherical vessel. NPK and DPK plants were also there to produce large amount of urea. The whole visit was the recap of Heat and Mass Transfer.

In the next day onwards we visited Western Shipyard Limited, a private sector company. Even the company is famous for the repairing the ships, we also enjoyed the Floating dry dock (submerged) and got the opportunity to see huge aircraft propeller in that workshop arena. The most interesting thing was that the most of the things about the ship was beautifully explained by our Dr. Sameer Khandekar, because they have the experience of working in Marine Engine.

The last and our final industrial trip was National Institute of Oceanography (NIO). The National Institute of Oceanography (NIO) is one of the constituent laboratories of the Council of Scientific & Industrial Research (CSIR) - a R&D organization in India with a network of 38 laboratories in different fields of science and technology. NIO has grown today into a large oceanographic laboratory with focus on oceanography of the waters around India.

The visit at NIO was not so much interesting in a way that they didn't show us any practical work going on. They just explain their projects and the

trip was ended with series of movies shown by NIO about oceanography and research projects.

The last day of our trip was full of fun and excitement at GOA. We went to temples and famous Church of Goa. Then we went ANJUNA beach before going to CALANGUTE beach. The real fun was at CALANGUTE beach. Many of us enjoyed the Rafting also. Everybody took the enjoyment of hilarious waves of the beach and got the opportunity to see the Sunset. The very interesting thing about the trip was that our Dr. Sameer Khandekar and Mr. Goswami ji were also included in our fun part. They gave so much freedom which make our trip more interesting.

And time just flew. Before anyone of us could realize, It was the departure day. The memories are 'etched' in each one of us, those jolly days when (even without our knowing of it) we accumulated so much of practical knowledge. Finally on behalf of the entire team I would like to thank to entire AME council, AME faculty advisor Dr. Ashish Dutta, our ex-HOD : Dr. N.N.Kishore and obviously Dr. Sameer Khandekar and our Mr. Goswamiji (who make our trip more interesting) for organizing such a wonderful trip. How I wish we could be learning the same way all through our four/ five years.



*There is a time for work. And a time for love. That leaves no other time. – Coco Chanel!*

## यादें

जीवन की आपाधापी बढ़ती जाती है  
ज़िंदगी बीतती है यादें यादें हो जाती हैं

वक्त में पीछे मुड़े इसका वक्त नहीं  
पलछिन जो छिन गए फिर जीने का वक्त नहीं  
फिर भी वक्त वे वक्त यादें याद आ जाती हैं  
ज़िंदगी बीतती है यादें यादें हो जाती हैं

आओ यारों वक्त से हम वक्त चुरा लें  
यादों की सदा दिल को सुना लें  
दिल के संगीत की सरगम बन जाती है  
ज़िंदगी बीतती है यादें यादें हो जाती हैं

जीवन की आपाधापी बढ़ती जाती है  
ज़िंदगी बीतती है यादें यादें हो जाती हैं

तन्हा बैठे गुज़रे पल जब याद आते हैं  
यादों की महफिल खुद को भूल जाते हैं  
भूली विसरी यादें याद आ जाती हैं  
ज़िंदगी बीतती है यादें यादें हो जाती हैं

जीवन की आपाधापी बढ़ती जाती है  
ज़िंदगी बीतती है यादें यादें हो जाती हैं

जीवन में कभी कभी ऐसे पल आते हैं  
साया धडकन सांसे सब बेगाने हो जाते हैं

उस आन सारी यादें जो ए राह बन जाती हैं  
ज़िंदगी बीतती है यादें यादें हो जाती हैं

जीवन की आपाधापी बढ़ती जाती है  
ज़िंदगी बीतती है यादें यादें हो जाती हैं

जीवन के अधूरे को पूरा कर देती है  
याद आ कर यादें दिलों को अधूरा कर देती हैं  
खारे दिल बन बन कर यादें तड़पती हैं  
ज़िंदगी बीतती है यादें यादें हो जाती हैं

जीवन की आपाधापी बढ़ती जाती है  
ज़िंदगी बीतती है यादें यादें हो जाती हैं

पल पल गुज़रे पल यादें ताजा कर जाती हैं  
याद आ कर कभी कभी मुसकान दे जाती है  
कभी कभी पलकों को नम कर जाती हैं  
ज़िंदगी बीतती है यादें यादें हो जाती हैं

बाकी बातें मिट मिट कर मिट्टी हो जाती हैं  
जीवन की लौ कभी न कभी मद्धम हो जाती है  
यादें ही हैं कि जो बाकी बाकी रह जाती हैं  
ज़िंदगी बीतती है यादें यादें हो जाती हैं

जीवन की आपाधापी बढ़ती जाती है  
ज़िंदगी बीतती है यादें यादें हो जाती हैं

- अरविन्द कोठारी



*I love Mickey Mouse more than any woman I've  
ever known. - Walt Disney*

## FREE ELECTRICITY WILL SOON BE A REALITY

**“Making Free Electricity and pumping water for farmers at no operating cost can be done using low temperature phase change to extract energy right from the environment (even tapping into the gravitational and magnetic forces of the earth to enhance or also accomplish the process)...”**

Engines do other things besides powering vehicles. Some functions for engines or motors are stationary. Pumps, electric generators, and compressors are just a few of the devices powered by stationary engines. The nicest thing about our engines is that we have developed environment and consumer friendly engines and motors. Through the combination of all our technologies, we plan to bring total energy independence to the public. All the engines we discussed earlier can drive generators to make electricity or pumps to pump water, but the idea (at least at first) is to get the energy to run these engines from either a Low Temperature Phase Change (refrigeration process), magnetic energy or gravity. People can have their own electric generators that make ALL of their power at no operating cost from energy harmlessly extracted from the environment outside their

homes (even in a snow blizzard at night). Farmers can pump water, or make electricity, absolutely free. The heat pump is so efficient that it can run even a Rankine cycle as long as the COP is above 5 to 1. That process is called the LTPC GENERATOR (OR FARM PUMP). Of course, the real winner is when we combine the efficiencies of the Super heat pump with the Fischer cycle engine that needs no condenser at all but can use any liquid as the working fluid. This combination can extract energy from the air outside at any temperature anywhere on the earth (day or night) to power the Fischer engine that drives a generator, car, pump or any mechanical device at absolutely no operating cost at all! Of course, when you can get free electricity, there is no limit to what can be done... you can do it all!

Siddhartha Srivastava



*It takes twenty years of hard work to become an overnight success. - Diana Rarkin*



## DEFINITION OF MECHANICAL ENGINEERING

- Ankur Gupta

Mechanical engineering is the application of physical principles to the creation of useful devices, objects and machines. Mechanical engineers use principles such as heat, force, and the conservation of mass and energy to analyze static and dynamic physical systems, in contributing to the design of things such as automobiles, aircraft, and other vehicles, heating and cooling systems, household appliances, industrial equipment and machinery, weapons systems, etc.

Mechanical engineers often create simulations of the operation of objects, as well as the manufacturing processes to be used, in order to optimize performance, cost effectiveness, and energy efficiencies, before settling on a particular design.

Engineering drawings of the objects to be fabricated are the end product for a design engineer. They serve a dual purpose; to contain all information required for fabrication, and as a control mechanism for revision levels. Prior to the late 20th Century most engineering drawings were drawn by hand with the aid of mechanical drafting boards. The advent of the digital computer with graphical user interface made the creation of models and drawings using computer-aided design (CAD) programs possible.

Most CAD programs now permit creation of three-dimensional models which may be viewed from any angle. State-of-the-art solid modeling CAD programs are a virtual reality for machine design. Such solid models may be used as the basis for finite element analysis (FEA) and / or computational fluid dynamics (CFD) of the design. Through the application of computer-aided manufacturing (CAM), the models may also be used directly by software to create "instructions" for the manufacture of objects represented by the models, through computer numerically-controlled (CNC) machining or other automated processes, without the need for intermediate drawings.

Fundamental subjects of mechanical engineering include: dynamics, statics, strength of materials, heat transfer, fluid dynamics, solid mechanics, control theory, pneumatics, hydraulics, mechatronics, kinematics, and applied thermodynamics. Mechanical engineers are also expected to understand and be able to apply concepts from the chemistry and electrical engineering fields. At the smallest scales, mechanical engineering becomes molecular engineering - one speculative goal of which is to create a molecular assembler to build molecules and materials via mechanosynthesis. For now this goal remains within exploratory engineering, and some consider it science fiction.



*We are what we repeatedly do. Excellence then, is not an act, but a habit. - Aristotle*

## *Speed of Gravity*

Gravity is the mutual attraction between all masses in the universe. Most scientists assume that gravity travels at the speed of light which is the speed of propagation of electromagnetic waves in vacuum ( $=3 \times 10^8$  m/sec approx.). Einstein's general theory of relativity recognizes the universal character of the propagation of speed of light and the consequent dependence of space, time and other mechanical measurements on the motion of the observer performing the measurements, still this had never been tested.

The assumed speed of gravity remained untested and unchallenged for so long because most physicists thought that gravity shows its speed only in the propagation of gravitational waves through space, and since no one has even detected gravitational waves, measuring how fast they travel was not possible. SIR NEWTON believed that the speed of gravity was instantaneous while SIR EINSTEIN believed that gravity traveled at the speed of light.

However on September 8, 2002, an international group of scientists did it, using an experiment conceived by Sergei Kopeikin, professor of physics and astronomy at the university of Missouri-Columbia.

We hope more such attempts will be made in the future solving many of the unanswered questions. ----- Ankur Sanghai

## *School and beyond*

As I stand today at life's threshold,  
Broke, shattered, and no hand to hold,  
As thoughts creep up and bring on tears,  
Entering a new world brings on fears.

How can I leave this secure hand?  
Without it, my life would be bland,  
No more spice and no more fun.  
No more discipline under the sun.

The hand that led me to my goal,  
Helped me enrich and strengthen my soul;  
Helped me through life's twists and turns,  
Made me competent and helped me learn.

It made me realize all my dreams  
And taught me  
Life was not full of creams,  
Made me as I am today  
Now I stand alone in this wide world  
Weary, confused, my vision blurred  
But the hand that has led me all along  
Has made me equipped to survive long

Believe, I trust that eternal hand,  
It has always been my magic wand,  
How can I repay, I do not know;  
But through my deeds,  
I shall help it glow.

**Sumeet kale**



*Change is inevitable, except from vending machines.*

- Unknown

## ASSEMBLY LINE PRODUCTION : AN OVERVIEW

- Amber Maheshwari

Ever wondered how thousands of cars, two wheelers and other automobiles are rolled out in a day even when a single automobile is itself made of thousands of parts? What today seems simple was a Herculean task before the installation of assembly lines. But how did this innovation that transformed industrial production and flooded the markets with cheap commodities come about?

Henry Ford installed the World's first moving assembly line on December 1, 1913, as one of several innovations intended to cut costs and permitting mass production. The idea was an adaptation of the system used in the meat processing factories of Chicago, and the conveyor belts used in grain mills. By bringing the parts to the workers considerable time was saved. The idea was first developed in Venice several hundred years earlier, where ships were produced using pre-manufactured parts, assembly lines, and mass production; the Venice Arsenal apparently produced nearly one ship every day, in what was effectively the world's first factory.

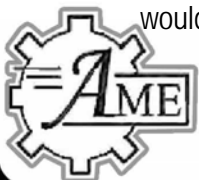
Ford's engineers took the first step towards this goal by designing the Model T, a simple, sturdy car, offering no factory options -- not even a choice of color. The Model T, first produced in 1908, kept the same design until the last one -- number 15,000,000 -- rolled off the line in 1927. From the start, the Model T was less expensive than most other cars, but it was still not attainable for the "multitude." Ford realized he'd need a more efficient way to produce the car in order to lower the price. He and his team looked at other industries and found four principles that would further their goal: **interchangeable**

**parts, continuous flow, division of labor, and reducing wasted effort.**

Using interchangeable parts meant making the individual pieces of the car the same every time. That way any valve would fit any engine, any steering wheel would fit any chassis. This meant improving the machinery and cutting tools used to make the parts. To improve the flow of the work, it needed to be arranged so that as one task was finished, another began, with minimum time spent in set-up. If he brought the work to the workers, they spent less time moving about. Then he divided the labor by breaking the assembly of the Model T into 84 distinct steps.

The innovation sequence leading to the moving assembly line went like this:

1. The tool room at the 60-acre Highland Park plant of Ford opened in 1910 was a major center for innovation in machining and tooling. They built the specialized single purpose machines that made the plant go. These new machines for producing parts were positioned strategically according to 'what' they produced in order to produce parts as close to the assembly area as possible. By 1914, the tool room had built and installed 15,000 of its special purpose machines. Workers on the production machines dropped their parts into bins lined up between their own work area and the assembly area. The parts runners carried parts and sub-assemblies from the centrally located parts bins to the assembly areas, but they had trouble keeping up with the pace set by either the parts producers or the assemblers unless they were just swarming all over the place. When there were too



*I couldn't wait for success so I went ahead without it.*

— Jonathon Winters

many runners, the parts really didn't seem to get delivered any faster -- there was just more confusion.

2. In 1912, conveyor belts were installed to take parts from the production areas to the assembly areas more quickly. Next (by early 1913) the bottleneck showed up in key sub assemblies, particularly the fly-wheel magneto, and also with engines and transmissions. All the other parts could be produced faster and delivered to the assembly areas more quickly than these key components.

3. By mid 1913, the production people set up moving assembly lines for the magnetos, the engines, and the transmissions. The assembly time for the magnetos dropped from 20 minutes to 5 minutes as a result. This was then split into 29 individual jobs. This cut down the assembly line time to 13 minutes. A year later it took 7 minutes to build a magneto. These results made Ford more apply these techniques to framework assembly. The fastest workers were able to produce a frame of car was in about 12 hours.

4. By December 1913, the plant people had set up the experiment with winches and ropes pulling the chassis down a line where the assemblers stood in one place with their parts piles. They put on their wheels, or fenders, or whatever, as each chassis moved past them. In other words, the innovation reversed the old process in which the workers moved in teams down the line receiving their parts at each chassis as they arrived. One of the primary features of the new process was that all work--or as much as possible--was arranged so workers used their tools at waist height.

It proved so successful that in January 1914 the Ford production engineers installed the continuous chain to keep the chassis line moving. The production time dropped rapidly to 6 hrs using the winches--a

dramatic drop from the 17 hr. labor input in the old moving team system.

Ford's manufacturing principles were adopted by countless other industries. Henry Ford went beyond his 1907 goal of making cars affordable for all; he changed the habits of a nation, and shaped its very character.

Today's assembly lines are very much like the one installed in 1913 by Ford. Apart from conveyor belts, monorail systems, pulleys, chain drives, tooling rails, robots today play an important role in assembly lines reducing production time significantly.

There are 3 basic types of Assemblers:

LINE ASSEMBLERS work on items that automatically move past their stations on conveyors. They generally perform 1 or 2 steps in the assembly operation.

BENCH ASSEMBLERS perform precise assembly work, putting together sub-assemblies or whole products, such as calculators, radios, rifles, or automobile steering columns.

FLOOR ASSEMBLERS put together large machinery or heavy equipment on shop floors. Examples of the type of equipment assembled include school buses, cranes, and tanks.

A continuously moving assembly line slowly moves products from one assembly team to the next. This technique keeps production moving at a steady pace, allowing employees to gauge production status at a glance and reduce the amount of work-in-process inventory. Not only has the assembly line production revolutionized manufacturing, it has transformed our lifestyle.



*Courage isn't having the strength to go on -- it is going on when you don't have the strength. -- Napoleon Bonaparte*

## High Adventure

Adventure Sports Club at IITK tries its level best to give students the greatest adrenalin rush possible. Visiting Indian Himalayas is the best & quickest way to get a shot of adrenaline owing to their height & mystic beauty.

21 adventure enthusiasts went for a trek in garhwal across the source of Ganges – Gaumukh to Tapovan during dussehra vacations (Oct 2004). This trek starts from the holy town of gangotri which can be reached by covering 269 kms. on a bus starting from haridwar. The long route doesn't seem long due to the scenic beauty one faces on the way – road goes along bhagirathi river & one can see snow covered peaks all the way to gangotri. The famous town of Tehri (where 2 rivers meet – bhagirathi & bhillangana) could be seen on the way where a dam is under construction (it has already submerged most of the town). It took us a whole day to reach the holy town which doesn't even have electricity (kerosene generators are used for this purpose). The night was quite cold as it had snowed there 2 days ago. The next morning we could see snow all around & for most of us it was the first encounter with snow. The group started a little late as an economical arrangement of porters took some time. These porters pick up heavy stuff such as tents (each weighing around 10 kgs.) and this time they demanded a little more money due to difficult trail owing to the snow all along the way, but we knew it was just an excuse. Many started with a fast pace (this showed their enthusiasm) but walking uphill at a height of 3140 mts. (above sea level) with 18 kg. on your back is not an easy job! So their pace

went down to 4 km/hr. in a few minutes. Air at this height is quite thin (lesser air molecules per unit volume) so human body takes few days to acclimatize to such pressure conditions & a slight overexertion feels like the end of a 400 mt. sprint. The tree line ended soon after Chirbhasa & now the trail was a narrow path covered with boulders & stones along Bhagirathi River. The gorge of this river was getting less deep as we were getting near its origin. After 1600 hrs. the sun went behind a peak and suddenly the wind began to blow. I could feel the temperature falling down at a fast pace (it would have fallen by 10 deg. in 10 minutes) & the destination was 5 kms. ahead. This meant another hour and a half walk. But the majestic view of Himalayan peaks makes you forget the biggest troubles of life and this was just a little physical stress. 6 tents were pitched at Bhojwasa somehow using our torches in the bitter cold climate.

Next morning we started for Tapovan with the slow members in the front & the faster ones came at a gap of one hour after packing all the stuff. But we soon met our group ahead waiting for us at Gaumukh (4000 mts.). Someone among us misused the SOS signal which created a little panic but it was soon resolved. 'Gaumukh' means mouth of cow – as the Ganga appears to come out of a large glacial formation which appears as *gau mukh*. Pious Hindus come to this place walking all the way to have a *darshan* of this place. But it is still not clear whether the Ganges originates at Gaumukh or some distance beyond at Nandanvan where it can be seen flowing again. The trail beyond this was all glacial &




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*We are what we repeatedly do. Excellence then, is not an act, but a habit. - Aristotle*

extreme care had to be taken while walking on it. Gangotri glacier is 29 km. long, and 2 to 6 km. wide being the largest glacier of Central Himalayas. A glacier is basically a mass of rocks & ice moving slowly cutting U-shaped valleys. Its surface is covered with rocks & mud & one can slip easily misjudging the loose stones below feet. It had snowed heavily 2 days ago so all path was covered with 2 feet deep snow & we couldn't see the surface, this was even more dangerous. But we moved one behind other to be safe. Our guide was cutting steps in the way to check for any "crevices". A Crevice is a fissure in glacier formed when it breaks due to landslide, avalanche, etc. and these fissures can be as deep as few 100 metres (it's the same crevice in which Annie Garner fell in Vertical Limits). Walking in the snow was a great experience for all of us. Three Bhagirathi peaks could be seen from there appearing as they were watching all people who have been to this route for ages. Sun reflects quite strongly on snow & ice and we had to use our sun goggles to watch around. Soon we encountered our vertical climb out from the glacier towards tapovan. It had got quite cold due to sun being lost behind peaks & the water on rocks began to get converted into ice. I was the last person in the group (it's the duty of the deputy leader to leave no one behind) & had to use my Ice Axe twice to arrest my fall owing to the slippery rocks. I can never forget my first view of tapovan (4450 mts.). We were standing at the base of peak Shivling (6540 mts.) with plain land covered with snow all around. It was simply hypnotic. Snow was cleared to pitch the tents & all went to sleep after having the dinner made on kerosene stoves. That night there was

precipitation & one of the tents, that was wrongly pitched, was all full of ice in it. 4 of the members had to run out to other tents in order to survive. The next morning we could see ice on our head & near our nose due to the freezing of water vapors, temperature had fallen 15 degrees below 0 on the last night. The stream along our place had frozen & we had to wait for the sun to melt it again. That day we had few walks & a long sun bath lying in the snow. Next day we started further for a day hike to Nandanvan. Gangotri glacier is to be crossed again to reach Nandanvan which is on the other side. We could not see the surface due to 3 feet deep snow. The path down into the glacier was very steep & was declared unsuitable for the whole group by our leader (Ravindra Vishnoi) who went down into it to judge it. 3 other members had got down & we had to use our climbing ropes to bring them up. All took chances going down roped up & coming up to have an experience of climbing. Next day 3 of us got geared up with ice axe & ropes to go to Nandanvan. The route was very beautiful. We were in the inner reaches of the glacier. Crevices, rock falls & small glacial lakes could be seen in the way. It was my life's first full fledged glacier walk & can never forget the moraines & landslides through which we moved. After 5 hrs. we could see & hear the waterfall of Nandanvan (thought of as the original source of Ganges by some) above us. But our guide declared the route dangerous ahead as the path was all deep snow & there were many crevices around. So we halted near a crevice to take photographs, had water & chocolate & moved back taking a different route. This time we didn't use ropes but just the ice axes to climb up to tapovan. Next day we started back



*Better to do something imperfectly than to do nothing  
flawlessly. — Robert Schuller*



towards gangotri & covered 24 kms. to reach there by the night. After coming back down we realized that all had severe sun burns on their faces as we had forgotten to use sunscreen lotion this

time. So 21 successful trekkers came back to IIT Kanpur to attend Antaragni 2004 with a different look.

Gaurav Bhutani

## बीते दिनों की यादें

कालेज के वो दिन छूटे  
मस्ती के प्यारे पल रूटे  
आज तुमसे बाटता हूँ मैं अपनी तनहाइ  
जब हर प्यारे यार की मुझको याद आई  
कुछ ना बचा जीवन में मस्ती के बिन  
फिर याद वो प्यारे दिन।

सोचा था किस्मत के नभ में सूरज अपनी  
किरणें बिखरेगा  
मेरे भाग्य से अमावस की रात हटाने को  
एक सुंदर चॉंद उकरेगा  
पर जब हुआ सूर्योदय तो पाया था सूरज  
बहुत दूर  
जीवन में मेरे हो ना पाया प्रकाश भरपूर  
इस जलते चॉंद से गया मेरा सुख चैन छिन  
फिर याद वो प्यारे दिन।

जब न था ये 8 से 5 का बंधन  
जीवन में था हमारे सुख चैन को पूरा  
आमंत्रण  
एक जलती भट्टी में हम झोंक दिये गये

और बस यादें उन बिछड़े दिनों के साथ रह  
गये  
मैंने किया था एन्जॉय वो एक-एक दिन  
फिर याद वो प्यारे दिन।

जीवन में मेरे ना रह गया था कोई रस  
मेरे मन को कुण्ठित कर गया यह जीवन  
नीरस  
सब्र की सीमाएँ लांघ गया मन सारी  
उठने लगी हैं इस उर में अब विद्रोह की  
चिंगारी  
जब जब हुआ मैं अपने इस जीवन से खिन्न  
फिर याद वो प्यारे दिन।

काश कर सकता मैं भी समय यात्रा विचित्र  
और जीता वो जीवन फिर से जो अब है  
मात्र कुछ चित्र  
अगर हो जाता मेरा यह सपना सच  
तो बदल डालता मैं अपना जीवन चक्र  
कर देता मैं स्थिर वो सुनहरे पल  
जिन पलों के साक्षी हैं वो प्यारे दिन।

अभीषेक आनन्द  
(Y3008)

Rendezvous with Chetan Bhagat

*Where you end up isn't the most important thing. It's the road you take to get there. The road you take is what you will look back on and call your life. — Tim Wileg*



By Siddhartha Srivastava

An alumnus of IIT-D and writer of famous novel “Five Point Someone”, Chetan Bhagat (B.Tech. M.E.) visited our campus on 28<sup>th</sup> Sep. He gave a lecture about his book. The lecture was organized in L2. It enjoyed an overwhelming response. The lecture hall was over crowded and people were standing all around. In his two chilly hot lectures he talked about some deleted scenes of his novel and some interesting mails he received. He spoke blatantly and mesmerized the young crowd.

The lecture was followed by an interactive session. Most of the people were curious to verify existence of characters, facts and incidences mentioned in the novel. During the session he revealed that his C.P.I. was actually seven point something and he has used exaggerations to make the novel more interesting. He said that he wrote the novel to share the genre of a movie, that is, a continuous story which made it the best seller.

After that he gave autograph on the copies of his novel. From L.H.C. he moved to hall-1 where he took dinner with some students. Chetan showed curiosity to visit G.H. while he was talking to girls after his lecture. So we went to G.H. where he had another interesting chat in G.H. mess in his same bold and frank style.

There he gave an interview to Mechzone;

Q) How did you come up with the idea of writing a novel?

A) For a few years I was feeling gloomy and lonely and really missed my friends and college days. So I started penning down the memories of my stay at IITD which later turned out to be “Five Point Someone”.

Q) What kind of feedback are you getting from different class of readers?

### TRUE WINNER

In this world of speed and flow,  
Winners might be among steady and slow.

But fast and consistent are more successful,  
For they are cool and more skillful.

Priorities are not just the strengths,  
They focus on growth and advancements.

Working in a team they help each other,  
And row the boat in storms with innovative steer.

They change strategy and act smart,  
Giving their way to success a cutting edge start.

Failure is not permanent, just an event,  
They fight against situation, not opponent.

For people who don't care,  
To think to be a true winner is just a dare.

Kamlesh Singh Rana

*If you have love, you don't need anything else. And if you don't have it, it doesn't matter much what else you have. — Sir James M. Barrie*



A) Well, different factions see it in different ways.

IITians see the book from Ryan's (a boy who did not like the academic set up of IIT and wants it to be more creative) point of view.

Elderly people and parents read the book from Sameer's (son of an IIT professor, Sameer committed suicide because he could not stand up to the expectations of his father) point of view.

And non IIT girls having an IITian boy friend are very curious about the book, in order to know what their boy thinks.

Q) How did you come up with the caption "what not to do at IIT"?

A) I saw an advertisement on a site "what not to wear".

Q) Why did you have only one female character in your novel?

A) Well, it is very difficult to describe and justify a female character. But I would really like to have more female characters in my novel you can expect at least two or three of them in my next novel.

Q) When should we expect your next novel?

A) By 2006

Q) Would you write a sequel to "Five point someone"?

A) Actually it is very difficult to create the same effect again with same characters because this time the story was from bottom of my heart.

Q) How did you think this book affected the profile of IITs?

A) Exploring the darker side of IIT life actually lifted the profile.

Q) Do you wish to become a full time writer?

A) I am not yet sure about that, let me wait and watch the performance of my coming novels.

Q) What were the good things about your IIT life?

A) Friends were the best part of my IIT life and the course on design architecture in the first year was good as well.

Q) What is your view about sex education?

A) Sex is an important part of our life and we should not be hesitant or indifferent about it.

Q) What is your stand about ragging?

A) It is ok up to some extent but sexual or violent ragging is really very bad.

During his talks he was very bold about sex and emphasized and accepted its importance in somebody's life. He accepted premarital sex as well.

After G.H. he moved to V.H. from where he left for Delhi. He promised to come back sometime later with his wife and spend some more time with us.



*Strive for excellence in whatever you do. Seek it not in competition with others but as a thing to be achieved in itself. - Unknown*

## BACKTALK – FLIGHT RULES

### Rules of the air

1. Every takeoff is optional. Every landing is mandatory.
2. If you push the stick forward, the houses get bigger. If you pull the stick back, they get smaller. That is, unless you keep pulling the stick all the way back, then they get bigger again.
3. Flying isn't dangerous. Crashing is what's dangerous.
4. It's always better to be down here and wishing you were up there than up there wishing you were down here.
5. The only time you have too much fuel is when you are on fire.
6. The propeller is just a big fan in front of the plane used to keep the pilot cool. When it stops, you can actually watch the pilot start sweating.
7. When in doubt, hold on to your altitude. No one has ever collided with the sky.
8. A "good" landing is one from which you can walk away. A "great" landing is one after which you can use the plane again.
9. Learn from the mistakes of others. You won't live long enough to make all of them yourself.
10. You know you have landed with the wheels up if it takes full power to taxi to the ramp.
11. The probability of survival is inversely proportional to the angle of arrival. Large angle of arrival, small probability of survival and vice versa.
12. Never let an aircraft take you somewhere your brain didn't get to 5 min earlier.
13. Stay out of the clouds. The silver lining everyone keeps talking about might be another airplane going in the apposite direction. Reliable sources also report that mountains have been known to hide out in the clouds.
14. Always try to keep the number of landings you make equal to the number of takeoffs you've made.
15. There are three simple rules for making a smooth landing. Unfortunately no one knows what they are.
16. You start with a bag full of luck and an empty bag of experience. The trick is to fill the bag of experience before you empty the bag of luck.
17. Helicopters can't fly; they're just so ugly the earth repels them.
18. If all you can see out of the window is ground that's going round and round and all you can hear is commotion coming from the passenger compartment, things are not at all as they should be.
19. In the ongoing battle between the objects made of aluminum going hundreds of miles per hour and the ground going zero miles per hour, the ground has yet to lose.
20. Good judgment comes from experience. Unfortunately the experience usually comes from bad judgment.
21. It's always a good idea to keep the pointy end going forward as much as possible.
22. Keep looking around. There's always something you've missed.
23. Remember, gravity is not just a good idea. It's the law. And it's not subject to repeal.
24. The three most useless things to a pilot are the altitude above you, runway behind you and a tenth of a second ago.



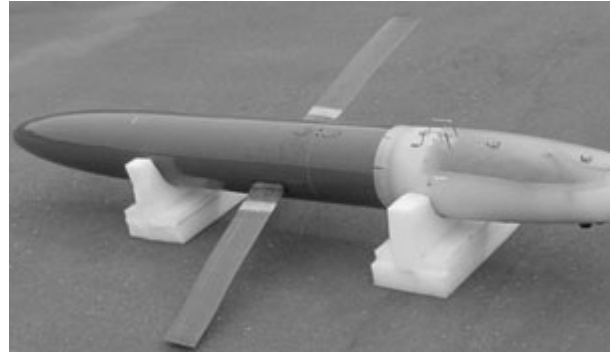
*Behind every successful man there is a lot of unsuccessful years. -Bob Brown*

## *Loneliness and the long distance glider*

A small ocean glider named *Spray* has become the first autonomous underwater vehicle to cross the Gulf Stream underwater.

Launched on Sept. 11, 2004, about 100 miles south of Nantucket Island, Mass., the 6-foot-long orange glider with a 4-foot wingspan looks like a model airplane with no visible moving parts. It made its way slowly toward Bermuda at about one-half knot, roughly half a mile an hour or 12 miles per day, measuring various properties of the ocean as it glided up to the surface and then back down to 1,000-meters depth three times a day. Scientists recovered the vehicle in early November north of Bermuda.

"It has been exciting, to say the least," said Breck Owens, one of the developers of the robot for Woods Hole Oceanographic Institution. "This trip proved we can use gliders to monitor circulation patterns and major current." Other collaborators on the project include the Scripps Institution of Oceanography at the University of California, San Diego, and the Office of Naval Research.



*The Spray autonomous underwater vehicle measures roughly 6.5 feet long and 8 inches in diameter.*

*Spray* was developed to provide a small, long-range autonomous platform for long-term ocean measurements. The underwater glider uses lithium batteries and a hydraulic pump to periodically change its volume to alternately glide upward and downward.

*Spray* has a range of about 3,500 miles, which means it could potentially cross the Atlantic Ocean. Its mission is to provide a relatively low-cost way for scientists to observe large-scale changes under the ocean surface that might otherwise go unobserved, according to Owens.

The glider follows a preprogrammed course, and surfaces every seven hours to relay its position and information about ocean conditions via satellite back to the team in Woods Hole, Mass., and San Diego. On this mission, it was equipped with an instrument for measuring the temperature, salinity, and pressure of the ocean, and with an optical sensor for measuring the turbidity in the water. Its next mission is slated for early 2005.

Ravi Bhaduria Y3277



*"No person knows what delights of the eye are kept hidden for them – as a reward for their good deeds."*

*– Quran*



*A*ssociation of

**Mechanical Engineers**