



# EMANATION

MECHANICAL DEPARTMENT NEWSLETTER



I am very sure, the newsletter "EMANATION" will definitely convey the message to all the readers, the activities being organized to exhibit the talents and achievements of the staff and students. Globalization is the order of the day, which needs competitiveness, creativeness and hard work to enter in to the international market. One should develop attitude towards exploration and experimentation as important parameters for their presentation. Training of human resources is one of the principal factors in achieving sustainable economic and social development. This kind of form gives opportunities to the young minds to accelerate their thinking to exhibit their talents.



worthwhile. I hope our readers will continue to support us in this endeavour and continue reading!

In this edition of emanation articles on Trapping fast moving cars, Nano Tubes and New wonder materials lies in the store for you. Apart from this, you will have updates from many exiting events conducted by mechanical dept. which will include reports on pencil sketching by SAE, Emanation Quiz, Aero Modelling workshop and Kabaddi, Volleyball tournament organised by VTU. An informative write up on the Merchant Navy has also been included in the CAREER OPPORTUNITIES section of this edition. It features a career flowchart, requirements for Graduate Mechanical Engineer entry, Career as an Engineer officer and the top colleges in India to build a career in MERCHANT NAVY.

On this optimistic note, we wish you make the best use of this edition. Also TEAM EMANATION wishes you Best for your upcoming examinations.

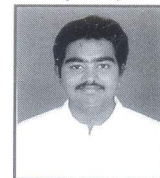
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Every successful project starts with an idea or a culmination of ideas by a group of likeminded people. Emanation is one such project. We have come up with a periodical that gives our readers the latest, bizarre and very useful information in mechanical engineering. The emanation project was launched on March 17th, to mark the beginning of our endeavour. The launch was made successful by the presence of our principal and the principal of K.S polytechnic, our HOD and the heads of all the other departments and our teachers. The opinions provided by the guests were considered and we hope this edition is proof of that. We couldn't have done anything without the immense support from our teachers B.V. Srinvasmurthy sir and Umashankar.M sir .This project has also had support from the management committee of K.S.I.T. This project has shown us how much work is involved in bringing together thoughts into action. It has also shown us how many sleepless nights we had to spend to make this project a reality. But there is a sense of enjoyment and satisfaction in seeing the hard copy of the periodical that makes it all



**TEAM EMANATION**

Congratulates

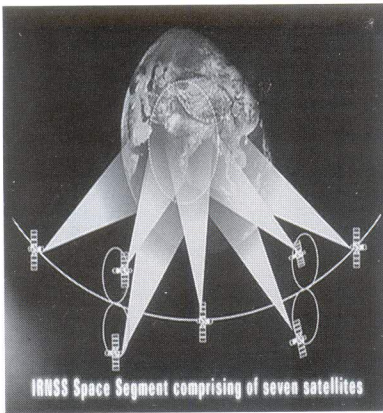
Mr. Karthik N

For Securing

Fourth Rank in BE (Mech. Engg)  
in University Examination – 2012-13



## Desi GPS!



India has a well-established space programme which is a source of strong national pride. IRNSS weighing 1,425 kilograms is an independent regional navigation satellite system, a result of one such programme by ISRO. It is designed to provide accurate position information service to users in India as well as the region extending up to

1500 km from its boundary. IRNSS will provide two types of services, namely, Standard Positioning Service (SPS) which is provided to all the users and Restricted Service (RS), which is an encrypted service provided only to the authorised users. The IRNSS System is expected to provide a position accuracy of better than 20 m in the primary service area.

IRNSS comprises of a space segment and a ground segment. The IRNSS space segment consists of seven satellites, with three satellites in geostationary orbit and four satellites in inclined geosynchronous orbit. IRNSS-1A, the first satellite of the IRNSS constellation, has already started functioning from its designated orbital slot after extensive orbit test and evaluation to confirm its satisfactory performance. IRNSS ground segment is responsible for navigation parameter generation and transmission, satellite control, ranging and integrity monitoring and time keeping.

The IRNSS is expected to be fully functional by 2015.

### Applications of IRNSS

- Terrestrial, Aerial and Marine Navigation
- Disaster Management
- Vehicle tracking and fleet management
- Integration with mobile phones
- Precise Timing
- Mapping and Geodetic data capture
- Terrestrial navigation aid for hikers and travellers

Visual and voice navigation for drivers The IRNSS is vitally necessary in times of war since most modern precision bombs and missiles depend on accurate positioning. Till now most of us have relied on the American GPS, very popular on smart phones but not good enough for military applications as it can't be relied upon for seamless coverage in times of war and the in-built error makes it unsuitable for precision strikes. India's satellite system is designed to cover a region of about 1500 km on either side of the border, essentially covering the geographical region from where India has a perception of threat, and both Pakistan and China are within the footprint. Why rely on the Americans when we could do just fine the Desi way!

## Sixth Sense in Mechanical Engineering - : Sensor Screw Measures Forces inside Machines

The sensor screw has its origin in special research area SFB 805, "Control of uncertainty in load-carrying mechanical systems" at the TU Darmstadt. If you are investigating uncertainties and ultimately want to overcome them, you need precise

measurements that are provided by sensors. "Until now, there really were no particularly good methods for attaching sensors," explains Matthias Brenneis who invented and developed the screw, based on a previous project at the Institute for Production Engineering and Forming Machines. "Adhesive compounds dissolve easily, especially in a harsh real-world production environment." In addition, externally mounted sensors provided readings from "outside"; however, these could differ from the forces actually acting in the interior of a machine or a component. "So why not combine a sensor and a machine component such as a screw using metal-forming?" wondered Matthias Brenneis. The advantages are obvious: screws are available practically everywhere and could be replaced by their "sensing" counterparts in entire production chains. Their operation is very simple and the little "measuring device" is hardly prone to faults. The sensor is located exactly where the forces are acting and therefore works very precisely, so that designing and dimensioning can be carried out more efficiently. The sensor screw can provide measurement data at certain points in time, but also continuously. Among other things, this makes precise quality controls possible. For example, if a work piece that is deformed or whose thickness varies is being transported through a roll train, the sensor screws that hold the rollers would register it immediately. Until now, quality-reducing deviations often become apparent only during the final inspection after the entire production process, resulting in expensive rejects. In order to be able to read and interpret the measurement data of the sensor screw, the TU researchers are developing suitable analysis software. "The goal is to obtain a lot of information from a few reliable data" summarizes Manuel Ludwig, who is in charge of this part of the project. The screw



## SIXTH SENSE

has passed through several stages, was made smaller, is approaching marketability and has been patented. The German Federal Ministry of

Economics and Technology is convinced by the new technology and has incorporated the project in its "Exist-Forschungstransfer" (Exist Research Transfer) program. For 18 months, the development of the sensor screw will now be supported with funding, ideally until it goes into production. The first clients are already using the technology in pioneering projects. The development of the sensor screw has now culminated in the spin-off of Consensus, a good example of the innovation and impetus coming from TU Darmstadt, the "University of Originators." But things will not end there, however, explains Jörg Stahlmann, who is in charge of Marketing and Sales at Consensus. "Our goal for the future is always to cooperate with the TU in order to open up new application fields." The Consensus founders would also like to benefit from the interdisciplinary knowledge that converges at the TU.

"This pool of expertise cannot be found in industry in this form" says Stahlmann. The TU development turns an everyday object into a smart high tech product and provides future users with a "sixth sense," as it were, when dealing with buildings and systems. A convincingly simple concept that Matthias Brenneis summarizes with a simple common denominator: "Good ideas are always easy to use."





# AURA...

## THE GIANT WHO TOUCHED TOMORROW



THE term "great" is often so loosely richly to him. His father's firm as applied to the lives of men one of those cosmopolitan houses so that we should ask our self's characteristic of Bombay, for associated what are the standards which justify it. With it was Premchand Roychand, one Two may be suggested. Gauged of all times-the hectic flow of money by these standards, none can question which poured into Bombay for the right of Jamsetji Nusserwanji Tata purchase of cotton during the American Civil War to be included in the Indian Valhalla. No value, and from that bitter experi- Hardened in the school of adversity, free once learnt a lesson he never forgot-the from any caste restriction and therefore importance of sound finance.

From Bombay they threw their financed with prodigal extravagance, tentacles East and West-to the rich Fortified with this rich experience and China market in opium and cotton, to adequate funds, none could be better Britain for the importation of Manu- equipped to play a great part in the factored goods which India could not industrial renaissance of India, make herself. Jaksetic Tata entered this But-and this is the distinguishing field at a great formative period. The feature of his life-Jaksetic Tata was liberalizing influence of education in never content with the conventional part. English poured new and heady wine into the beginnings of the cotton textile receptive minds, and he received his industry were laid before. he entered the instruction in that great school, the field. Experience fell in his day, industrial progress in India tended to be imitative rather than creative. If one pioneer erected a mill, then a score followed in his wake; if cement or a sugar factory was established then others sprang up like mushrooms until the market was saturated or even glutted. Jaksetic Tata was always creative. When his contem-poraries were satisfied with producing low-grade yarn for export to the China market and rough cloths for home consumption, he looked farther afield, and selecting Nagpur, in the Central Provinces, put down his mill in the center of the cotton-growing lands and catered for the proximate market. The prosperity of the Empress Mills he established there against the advice of all his friends reads like a dream. His ambition was that the mills should pay a hundred per cent. In 1920 original holders of the scrip were receiving 360 per cent. At a time when most industrial-ists gave little thought to their work-people after they left the mill at the close of the day's toil, he bent his mind to all the social activities which we call to-day

by the generic title of welfare work. Later, he was to learn in the hard school of experience that it is far easier to establish a new factory than to resuscitate an old one, and the struggle to recreate the derelict mills he acquired at Coorla and in Ahmadabad took heavy toll of his energies; but he succeeded here as in everything else. The strain was so great that it possibly shortened his life.

Many men know how to acquire a fortune; it is given to fewer to under-stand how to use it. Money was never to Jamsetji Tata an end in itself. Not that he was indifferent to many things that wealth can bring. He looked upon the decaying silk industries of Mysore and brought Japanese experts to put them on modern lines. He fought successfully for cheaper freights to the Far East-with the result of stimulating Japanese competition in directions not altogether favorable. When new sites were available from the reclamations of the Port Trust and the land thrown upon the market by the creation of the Improvement Trust, many investors held aloof, afraid of the terms of the new leases. Not so Jamsetji Tata; he acquired and built in every part of the Island. Yet, embracing and beneficial as these activities were, they seem to me to be no more than the prelude to his great constructive work. Secure in possession of an ample fortune, with a big income from the Empress and other cotton mills, he bent his mind to three major schemes. Though they came to fruition after his death, his was the inspiration, is the pioneer work.

Then when his fortunes were estab-lished he looked abroad to see how best they could be utilised for the advantage of his country. It was said of a great writer that he took the whole world of learning for his province. Of Jamsetji Tata it might equally be said that the whole field of industry came within his ambit. Those associated activities- the Indian Institute of Science to train the higher personnel; the iron and steel works to start the true economic cycle; and the hydro-electric stations to furnish cheap power and conserve the coal resources-left an enduring mark on his own generation. He did not live to see the coping stone placed on this work; but so well were the foundations laid, so determined the enthusiasm inspired in his sons and colleagues, that they pressed it to completion. Of him truly can the epitaph be writ-he wrought the people lasting good.

## WORLDS' MOST EXPENSIVE MISTAKE



The world's greatest organization NASA, USA, launched a satellite named "ORBITER" (in the late 1998) was supposed to revolve round the planet Mars for about 26months and gather all the information that it could regarding the climatic behavior of the Earth's sister planet.

Unfortunately, the whole project was a huge failure cause of a component used, which was according to British specifications while the rest of the parts were of metric standards. NASA lost about \$125million just cause of a minute mistake in recognizing the fundamental dimensions of the component.

"Our inability to recognize and correct this simple error has had major implications," said JPL Director Edward Stone.

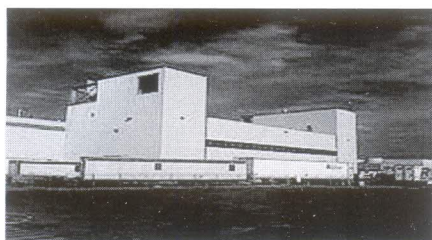
However, the Orbiter did manage to reach the destination but cause of this miscalculation it couldn't send any data (not even of 1Mb) to the station. After this simple logical mistake, which did prove expensive, NASA immediately setup a panel just to ensure that there is a proper check on every products they use in & out of the unit.

**Do not wait to strike till the iron is hot; but make it hot by striking.**

K.S.I.T MECHANICAL DEPT.



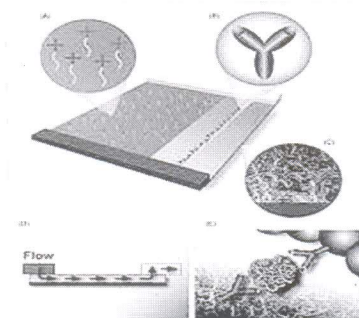
## THE NEW WONDER MATERIAL



Punching your way out of a paper bag could become a lot harder, thanks to the development of a new kind of paper that is stronger than cast iron.

The hottest new material in town is light, strong and conducts electricity. What's more, it's been around a long, long time. **Nanocrystalline cellulose (NCC)**, which is produced by processing wood pulp, is being hailed as the latest wonder material. Well, not only is NCC transparent but it is made from a tightly packed array of needle-like crystals which have a strength-to-weight ratio that is eight times better than stainless steel. Even better, it's incredibly cheap. Despite its great strength, "**nanopaper**" is produced from a biological material found in conventional **paper cellulose**. This long sugar molecule is a principal component of plant cell walls and is the most common organic compound on Earth.

### AVAILABILITY AND PRODUCTION



Cellulose is the most abundant biological polymer on the planet and it is found in the cell walls of plant and bacterial cells... Perhaps the most practical approach will simply be to paint or otherwise coat CNC composite materials in some material that keeps water away. For such a price - inexpensive strong and rigid

materials - we can be sure that innovations will follow to make the theoretical into practical. The beauty of this material is that it is so abundant we don't have to make it. We don't even have to use entire trees; nanocellulose is only 200 nanometres long. If we wanted we could use twigs and branches or even sawdust. We are turning waste into gold. The larger CelluForce facility opened in Montreal, Canada, in November 2011 and is now producing a tonne of NCC a day. It will be sold at just several dollars a kilogram within a couple of years.

### The production plant at Canada( CelluForce)

#### PROPERTIES

Mechanical testing shows it has a tensile strength of 214 mega Pascal, making it stronger than cast iron (130 MPa) and almost as strong as Structural steel (250 MPa). Normal paper has a tensile strength less than 1 MPa. The tests used strips 40 millimetres long by 5mm wide and about 50 micrometres thick. These are hard, dense and tough, and can be forced into different shapes and sizes. When freeze-dried, the material is lightweight, absorbent and good at insulating. In addition, the human body can deal with cellulose safely so NCC is less dangerous to process than inorganic composites. The secret to the nano paper's performance is not only the strength of the undamaged cellulose fibres, but also the way they are arranged into networks. Although strongly bound together, they are still able to slip and slide over each other to dissipate strains and stresses.

## ADVANTAGES AND APPLICATIONS

As it is cheaper than the carbon fibres, it can replace it in many applications. The field Medical Electronics is keen on *developing surgical equipment* using NCC .IBM is using it to create *components for computers*.

Even the US army is getting in on the act, using it to *make lightweight body armour and ballistic glass..The new La Ferrari ( Parts may be replaced by NCC)NCC will replace metal and plastic car parts* and could make *nonorganic plastics* obsolete in the not-too-distant future.

### DISADVANTAGES

As with most things, cellulose nanocrystals are not a perfect material. Their **greatest enemy is water**. Cellulose is not soluble in water, nor does it depolymerize. This could be overcome by using it in the places which are less affected by water.

Material &	Elastic Modulus
NCC 7.5 GPa	150 GPa
Kevlar 49 3.5 GPa	125 GPa
Carbon fibre 3.5 GPa	150 GPa
Carbon nanotubes 20 GPa	300 GPa
Stainless steel 0.5 GPa	200 GPa
Oak 0.1 GPa.	10 GPa

## NANOTUBES FOR DAMPENING VIBRATIONS

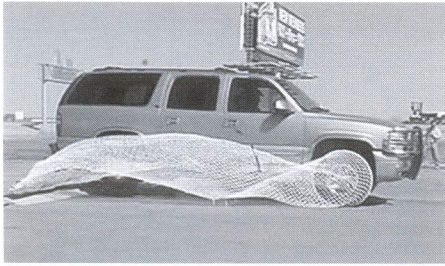
Research on a new class of nanostructured materials used to reduce vibrations in mechanical equipment and electronic devices, being developed by a team of scientists at Rensselaer Polytechnic Institute, will be featured in Nature Materials.

"The nanoscale building blocks we have developed have both micro and macro applications," said Nikhil Koratkar, assistant professor of mechanical, aerospace, and nuclear engineering at Rensselaer. "The new systems reduce and control vibrations within structures and will benefit the performance, safety, and reliability of future manufacturing equipment, sensitive laboratory equipment, and everyday electronic devices."

The Rensselaer research team, led by Koratkar, added carbon nanotube fillers to traditional vibration reduction materials to enhance their energy dissipation capability. Adding large quantities of nanoscale fillers increases the amount of surface area, and thereby increases frictional sliding that occurs at the filler-to-filler interface. The result is a decrease in vibrations. In 2004, Koratkar received a National Science Foundation (NSF) Faculty Early Career Development Award (CAREER) to fund the development of these new materials. Additional Rensselaer researchers on the project include Pulickel Ajayan, professor of materials science and Engg Pawel Koblinski, associate professor of materials science and engineering; and Jonghwan Suhr, a doctoral student in mechanical, aerospace, and nuclear engineering. The research is available in the Nature Materials journal online, and will be published in an upcoming print edition of the journal.



## FISHING OUT CARS!



You've driven over speed bumps before, but never over one like this. Meant to stop vehicles that slam through checkpoints without slowing, a net

flies from this innocuous looking speed bump to surround and capture a car, like something out of a Spiderman comic book. The U.S. Army asked the folks at **Pacific Scientific Energetic Materials Co.** in Chandler, to develop a device for use at checkpoints at Army bases mainly in the Middle East, said Bryan Stacey, senior business development manager at the company. Design engineer Mynor Castro invented the Pit-Ballistic Undercarriage Lanyard or the Pit-Bul, which masquerades as an innocuous speed bump. "It can stop vehicles going up to 45 miles per hour", Castro said.

With the Pit-Bul, the car can be returned to drivable condition in no more than ten minutes by simply removing the mesh net from the wheels. "The Army has guns at checkpoints but sometimes people don't speak the language so they don't know they're supposed to stop," Castro said. "They wanted something to give them a little more time to tell a good guy from a bad guy. This will slow the vehicle down to give them a few seconds to consider what to do next." The system stops vehicles within 80 feet and also in a nonlethal manner, Stacey hastened to add. Most systems include a sensor placed ten feet in front of the speed bump; should a vehicle cross the checkpoint without stopping, the system releases spikes that puncture the tires and also pull the net from a small pit within the middle of the bump. The system can also be manually deployed by a person standing up to 300 feet beyond the checkpoint, Castro said, "When someone is traveling at 40 miles per hour, you don't have time to react," he said. The system reacts in 170 milliseconds. "If you put all your effort into blinking as fast as you can, that's 250 milliseconds," Castro added.



**This portable vehicle arrestor can be set up for reuse in less than thirty minutes.**

within 15 minutes, he added.

Pacific Scientific owns the intellectual property for the security system, which runs on rechargeable lithium ion batteries, and this year has begun selling it for installation at airports, casinos, power plants, and other secure locations, Stacey said. The portable speed bump can be up and running

## HUMANS IN ANTS' SHADES

Can you believe that human beings being the most intelligent of all species in the world relays on a mere and tiny pest like an ant????ANTS are some of the most annoying creatures in the

world, but they are also the most fabulous "architect" "on which the modern human world is balancing on. The ants are comfort desires just like human beings. Some might think that it is a joke but it is a fact which the Arup Associates, a leading constructional company in Zimbabwe, under the leadership of Mick Pearce [a design engineer & an architect] took up the task to study, analyze and build a complex which is totally inspired on the way an "ant hill" is built. According to Mick Pearce, there are several factors on which the ant colony will look upon to before building the hill. The main factors are: the amount and the direction in which the sunlight would be incident on the hill at a particular time of the day, suitable sand required and its availability in the neighborhood, the very ground on which the hill is to be built, last but not the least, the predators location are also considered.

Mick Pearce, with all the information that he acquired from the research, started planning to build a complex, which is a DREAM PROJECT for many of the masonry companies. His dream was to create a building which won't require any sort of artificial or electronic interference for the "perfect human living". Mick Pearce got the opportunity to fulfill his dream and create the largest complex The Eastgate Centre in Harare, Zimbabwe.

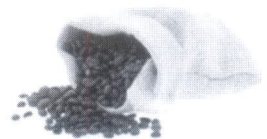
The Eastgate Centre is a huge complex made in order to store the food grains produced in Zimbabwe. It is largely made of concrete, has a ventilation system which operates in a similar way to that of an ant-hill. i.e., outside air that is drawn in, is either warmed or cooled by the building mass depending on which is hotter [the building concrete or the air]. It is then vented into the building's floors and offices before exiting via chimneys at the top. The complex also consists of two buildings side by side that are separated by an open space that is covered by glass and open to the local breezes. With the help of these actions the food grains are maintained at exactly 87 ° F, while the temperatures outside range from 35 ° F at night to 104 ° F during the day.

The EASTGATE Centre has natural air-conditioning system and it is also equipped with a complete electric proof package, i.e., during day time, no corner of the building needs any light at any instance of time because, the indigenous architectural design by the ants are very much sophisticated and are much accurate than the technologies developed by humans. This design of the building saves almost 87 to 90% of the electric charges that a regular building of its size would cost. On viewing the entire thing, we can say that the **ANTS HAVE A BETTER WAY OF COMFORT LIVING THAN ANY OF THE HUMAN BEING.**

## DID YOU KNOW?

**Spill the Beans**

**Meaning:** To reveal a secret



**History:** In Ancient Greece, beans were used to vote for candidates entering various organizations. One container for each candidate was set out before the group members, who would place a white bean in the container if they approved of the candidate and a black bean if they did not. Sometimes a clumsy voter would accidentally knock over the jar, revealing all of the beans and allowing everyone to see the otherwise confidential votes.



**Waking Up on the Wrong Side of the Bed**

**Meaning:** Waking up in a bad mood

**History:** The left side of the body or anything having to do with the left was often associated considered sinister. To ward off evil, innkeepers made sure the left side of the bed was pushed against a wall, so guests had no other option but to get up on the right side of the bed.



## Believe Yourself

—AN INTERVIEW WITH THE ALUMNUS



Being brought up in Bangalore, **Dilip** – whose parents are from north Karnataka, started his early education in Sri Aurobindo memorial school in banshankari. He then did his pre-university course in vijaya composite, Jayanagar. In 2003 he joined KSIT to pursue mechanical engineering, at that time T.G.S Murthy was the principal and Gopal krishna was the HOD. He passed out of the college at the year 2007, joined NTT data. After few years he completed MBA from Mysore. Soon he joined Telcon as a sales executive engaged in the sales of off road vehicles (JCBs). He currently works in INFOSYS as HR.

### 1) Why did you choose to do BE at KSIT?

My choice was initially between BIT and KSIT. I chose KSIT because it was the first choice for me, as the mechanical branch at KSIT was very well known and had highly reputed lecturers.

### 2) Describe your life at KSIT

It was a fantastic 4 years. I was good with academics and I also participated in street plays. Our team also took part in the Inter-state skit competition held at UVCE for which we also won the price for the play "bramhe". We also had dedicated professors like Ramanarasimha, Gopalkrishna, Uma Shankar and Nagabhushan.

### 3) How do you describe the corporate culture?

It is challenging in terms of work. You gain respect as you are sincere with your work. Sales job especially is a big deal and you have to have good bonding with your team mates. Being honest is an added plus point.

### 4) What qualities or qualifications do you see in the new recruits?

Academic percentage is an important aspect. We as HRs are mainly driven by academics. It reflects the sincerity in a candidate and shows how confident he is. Good communicating skills is an added plus point. If he has the qualities in him which is worth the job, he will be selected. One basis thing that both job seekers and HRs must understand is that it is the only company to offer job, there may be other better companies which may well suit the candidate. Being nervous is fine, if you would want it, you would automatically be in the mind state to try and grab the opportunity, it is a natural process.

### 5) Describe the transition from student to a professional.

In professional life you become responsible for your action, more-

over when you get paid at the end of the month, you should feel the gratitude behind that. Once you understand your responsibility there will be no pressure.

### 6) What tips do you want to give for students on interviews and placements?

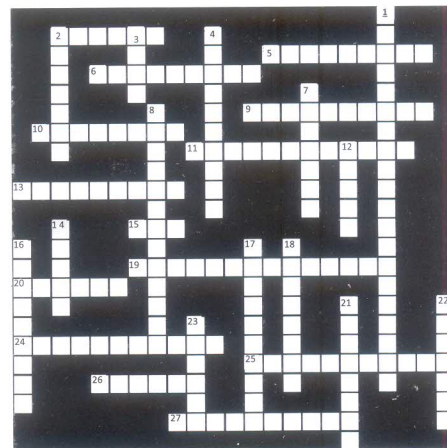
Apply for all companies, don't go only for money. We were offered lot less than what the next lot had offered us. And mainly no more about the company which you are attending an interview for.

### 7) What attracted you to this job?

I went into sales in mechanical firm at first. From sales I moved to recruitment because both are target based jobs. In sales you have to sell many things per month and in HR we have to recruit specified number of candidates per month. I tried my hand at the cost centre rather than profit center. HR is not about a machine, not about software testing, it is about someone who is doing that and is not happy about it and you are there to help it. It is basically a support function. It more of an interactive job, so I like that.

### 8) Success mantra

Believe yourself. Be confident and make sure right things are done at the right place. Do not lose confidence. Being dedicated and honest to your work and focused on what needs to be achieved makes one successful.



Ans at page 10

Across

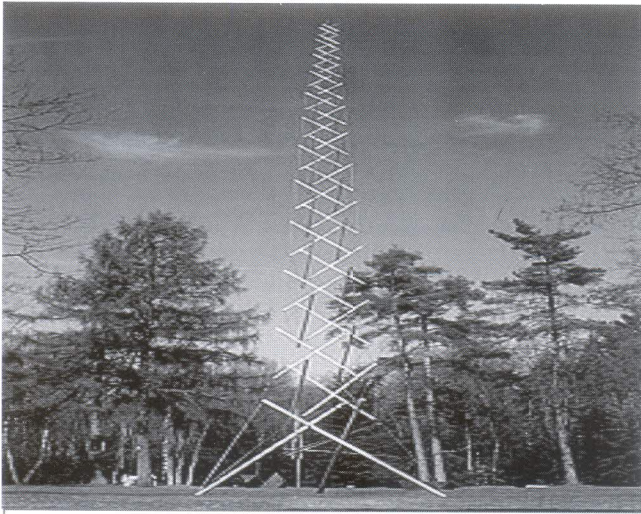
2. Lubricant that is mixture of oil and thickening agents
5. Designed to reduce friction, dissipate heat, and prevent wear and corrosion.
6. A device used to check shaft alignment (2 words)
9. Microscopic peaks and valleys
10. A system used to transport material from one location to another
11. Silicone, graphite and molybdenum, disulphide are examples of these (2 words)
13. A joint that consists of two yokes and a spider
15. Lubricant classified into groups A through F
19. Rolling elements of an anti-friction bearing (3 words)
20. This type of bearing does not require lubrication
24. A drive system without slippage
25. A device that is used to determine proper belt tension
26. A load applied perpendicular to a rotating shaft
27. Routine maintenance to prevent equipment failure

Down

1. FHP (2 words)
2. A sealed container that has an input shaft, output shaft and at least one set of mating gears.
3. Extends bearing life by containing lubricant inside housing
4. An excessive amount indicates belt tension is too low
7. A machine used to reduce friction and maintain clearance between moving and stationary parts
8. Main cause of mechanical system failure
12. A series of interconnected links that form a loop
14. A load applied parallel to a rotating shaft
16. Measure of resistance to flow
17. Machine used to determine frequency of maintenance and when equipment may fail
18. A device used to connect mechanical device to a prime mover
21. A wheel with evenly spaced teeth
22. The period when most wear occurs
23. A tool used to remove gears, pulleys, sprockets, bearings and couplers



## Tensigrity



If we observe the picture, what can we infer?

The bars floating in the air, without any contact with a 'solid' support are truly very impressive. People, in general, really like to contemplate such a 'magic' phenomenon that they do not understand.

Yes it is magic, "magic of science"!! If we observe closely, we see bars aren't actually floating, they are attached by strings.

Can this type of structures really exist? Are there any explanations for the structures like these?

The answer is yes, and this system of arrangement is called Tensigrity

## Introduction

**Tensigrity** is a portmanteau of **tensional integrity**. It refers to the integrity of structures as being based in a synergy between balanced tension and compression components. Tensigrity structures are built of struts and cables. The struts can resist compressive force and the cables cannot. Most cable-strut configurations which one might conceive are not in equilibrium, and if actually constructed will collapse to a different shape. Only cable-strut configurations in a stable equilibrium will be called **tensigrity structures**. The artist Kenneth Snelson built the first tensigrity structure and his artwork was the inspiration for the first author's interest in tensigrity. Buckminster Fuller coined the word "tensigrity" from two words: "tension" and "integrity."

Tensigrity structures are very special cases of trusses, where members are assigned special functions. Some members are always in tension and others are always in compression. A tensigrity structure's struts cannot be attached to each other through joints that impart torques. The end of a strut can be attached to cables or ball jointed to other struts.

## Principle of Tensigrity

'Tensigrity' is a pattern that results when 'push' and 'pull' have a win-win relationship with each other. Pull is continuous whereas push is discontinuous. The continuous pull is balanced by the discontinuous push, producing the integrity of tension and compression. These fundamental phenomena do not oppose, but rather complement each other.

## Understanding the principle of tensigrity

A more common example of a tensigrity is in a child's balloon. When examined as a system, the rubber skin of the balloon can be seen as continuously pulling (against the air inside) while the individual molecules of air are discontinuously pushing against the

inside of the balloon keeping it inflated. All external forces striking the external surface are immediately and continuously distributed over the entire system, hence the balloon is quite strong despite its thin material. The automobile tire works the same way. It is the tensional integrity in the tire that yields a low failure rate despite the wear of high speeds and long miles. Thus a tensigrity is any balanced system composed of two elements, a continuous pull balanced by discontinuous push. When these two forces are in balance, it results in a stabilized system that is maximally strong. Two tensigrity are easily recognizable in the systems of the human body. The muscular-skeletal system is a tensigrity of muscles and bones, the muscles provide continuous pull, the bones discontinuous push. This forms the basis for all human physical mobility. The central nervous system can also be seen as using the analogy of tensigrity where motor neurons and sensor neurons, complement the other in a balance.

## How does this works then?

A compressive member loses stiffness as it is loaded, whereas tensile member gains stiffness as it is loaded. Stiffness is lost in two ways in a compressive member. In the absence of any bending moments in the axially loaded members, the forces act exactly through the mass centre, the material spreads, increasing the diameter of the centre cross section; whereas the tensile member reduces its cross-section under load. In the presence of bending moments due to offsets in the line of force application and the centre of mass, the bar becomes softer due to the bending motion. For most materials, the tensile strength of a longitudinal member is larger than its buckling (compressive) strength. (Obviously, sand, masonry, and unreinforced concrete are exceptions to this rule.) Hence, a large stiffness-to-mass ratio can be achieved by increasing the use of tensile members.

## Application of Tensigrity Structures

- In space applications.
- Complex roofing for stadiums by assembly of modules.
- Building of Arches, complex structures and light weight tent like structures.

## What is stopping it?

Tensigrity structures present a remarkable blend of geometry and mechanics. Out of various available combinations of geometrical parameters, only a small subset exists that guarantees the existence of the tensigrity. The choice of these parameters dictates the mechanical properties of the structure. The choice of the geometrical parameters has a great influence on the stiffness. Pretension serves the important role of maintaining stiffness until a string goes slack. The geometrical parameters not only affect the magnitude of the stiffness either with or without slack strings, but also affect the onset of slack strings.

## A Challenge for the Future

In the future, the grand challenge with tensigrity structures is to find ways to choose material and geometry so that the thermal, electrical, and mechanical properties are specified. The tensigrity structure paradigm is very promising for the integration of these disciplines with control, where either strings or bars can be controlled.



## MERCHANT NAVY OVERVIEW

Over 95% of the world's trade goes by sea and, in the 21st century, the seas of the world carry more good than ever before. The volume of goods traveling by sea has increased nine fold since 1950. The global shipping industry is increasingly relying on India as a favored source of its current and future seafarer demand, because it acknowledges the India has the means to satisfy the number shortage and the Indian academic system provides the strongest foundation for building high standards of skills, initiatives, professionalism and leadership required of the modern seafarers. There are over 85,000 merchant ships in the world with more than 100 types of cargo ships. Ships do not move cargoes; people do we require ambitions individuals to join our competent and committed team officers operating our modern fleet of vessels.

### CAREER FLOW CHART

- B.E. Mechanical Engineering
- Application-interview-selection-medical / eyesight.
- 12 months pre-sea training
- (Exempted from class IV part 'a' certificate of competency) (Essential to work as engineer of the ship)  
Obtain class iv part "b" certificate of competency
- Complete 12 months sea time as 4th engineer (Salary between USD 2500 to USD 3500 per month) .
- Obtain class ii ( part "a" & "b" ) certificate of competency
- Complete 18 months sea time as 2nd / 3rd engineer (Salary between USD 3500 per month to USD 8000 month) .Obtain class i certificate of competency
- Sail as 2nd engineer / chief engineer (Salary between USD 8000 month to USD 12000 month)

## GRADUATE MECHANICAL ENGINEER ENTRY

A pre-sea training programme for Graduate Mechanical Engineers approved by the Director General of Shipping Government of India. This Programme trains Candidates in the theory and practice of marine Engineering and completes workshop training as per the IMO module courses. It provides Ship owners with a ready Marine Engineer. These 12 months Pre-Sea courses at the Academy imparts comprehensive training in Marine Engineering and Shipboard Practice. It Comprises of academics and ship familiarization along with Marine Workshop training (as per IMO modules) done at academy. After completion of the courses at the Academy the candidate undergoes the four basic STCW course. The candidate is exempted from Class IV Part A COC & obtains it on the basis of Academy passing out certificate. The candidates then join the shipping company's vessels as Junior Engineers for sea time of 8 months where they undergo further practical training and maintain their TARB to ensure that the entire syllabus is covered and they get to do all tasks as prescribed. After this he goes for this Class IV part B, written & oral examination.

**ELIGIBILITY:** B.E. (Mech.) with 50% aggregate marks from AICTE approved Universities / Colleges.

Minimum 50% marks in English at 10+2 or 10th level is a must.

Fluency in written and spoken English

**AGE LIMIT:** Not exceeding 28 years on the date of

commencement of training

**MEDICAL FITNESS:** Medically fit with eyesight 6/6, with or without external aids.

Maximum power permitted ( $\pm$ ) 2.5 No. color blindness.

All candidates have to pass complete medical examination and

Mandatory tests prior to joining at the Academy.

We have panel of qualified doctors and requirements as per

ILO Convention 147 Seafarer's Medical Examination.

## CAREER AS AN ENGINEER OFFICER:

A career at sea is very demanding as well as rewarding. It offers a level of job satisfaction, a wide experience and challenging work environment. Experienced Marine Engineers are in great demand in all industries because of their ability to handle very large power plants, their resourcefulness, sense of responsibility and ability to work with their own hand with almost no external assistance. A Marine Engineer is a very valuable and responsible member of a shipping crew. He has to operate and control all engineering system onboard his ship, and maintain them in good working condition. This gives him tremendous experience and confidence. However, it must be understood that the life of a Marine Engineer is tough, and not suited for the weak hearted. But there is compensation as well. Class IV Certificate of Competency holder starts as a Fourth Engineer (approx. Salary US\$ 3500) with prospectus of becoming a Chief Engineer in about 8 year (approx. Salary US\$ 9500 - 13500) plus leave and allowances.

### Top Colleges in India

- Tolani Maritime Institute (TMI) 1st InfiniteCourses Rank : 1 Website: [tolani.edu/tmi](http://tolani.edu/tmi) City: Pune
- Samundra Institute of Maritime Studies InfiniteCourses Rank : 2 Website: [www.samundra.com](http://www.samundra.com) City: Mumbai
- International Maritime Institute (IMI) InfiniteCourses Rank : 3 Website: [imi.edu.in](http://imi.edu.in) City: Delhi
- Vels Academy of Maritime Studies InfiniteCourses Rank : 4 Website : [velsmaritime.com](http://velsmaritime.com) City: Chennai
- Maharashtra Academy of 5th Naval Education and Training InfiniteCourses Rank : 5 Website : [manetpune.com](http://manetpune.com) City: Pune
- Institute of Technology & Marine Engineering InfiniteCourses Rank : 6 Website : - City: Kolkata
- B.P. Marine Academy InfiniteCourses Rank : 7 Website : [bpmarineacademy.in](http://bpmarineacademy.in) City: Mumbai
- Indian Maritime University (IMU) InfiniteCourses Rank : 9 Website: [imu.tn.nic.in](http://imu.tn.nic.in) City: Chennai



## **Guest lecture on Development of Magnetic bearings: An ingenious effort**

**Dr Soumendu Jana**  
**Sr. Principal Scientist, Propulsion Division**  
**National Aerospace Laboratories, Bangalore**

On April 5th, a guest lecture on "Development Of Magnetic Bearings" was conducted by Dr Soumendu Jana, a senior scientist in National Aerospace Laboratories. Dr Soumendu Jana is involved in design, development and analysis of external dampers (elastomeric dampers, squeeze film dampers) for rotating systems, CFRP composite tail drive shaft for helicopter, active magnetic bearings for rotating system, active vibration control using layer damping and shape memory alloy, etc.. He has won awards like the National Design Award in 2013 by National Design Research forum of the institute of engineers and outstanding performance award for design, development and project execution in 2005 and 2010. He has also published 39 technical papers and 20 internal reports. Dr Soumendu Jana also has patents i.e. "A process for providing effective layered damping for the control of structural vibrations" and "Improved magnetic actuator".

A bearing is a machine element that constrains relative motion and reduces friction between moving parts to only the desired motion. Many bearings also *facilitate* the desired motion as much as possible, such as by minimizing friction. Bearings are classified broadly according to the type of operation, the motions allowed, or to the directions of the loads (forces) applied to the parts. A magnetic bearing is a bearing that supports a load using magnetic levitation. Magnetic bearings support moving parts without physical contact. For instance, they are able to levitate a rotating shaft and permit relative motion with very low friction and no mechanical wear. Magnetic bearings support the highest speeds of all kinds of bearing and have no maximum relative speed. Magnetic bearings are of two types : active and passive magnetic bearings. An active magnetic bearing (AMB) system supports a rotating shaft, without any physical contact by suspending the rotor in the air, with an electrically controlled (or/ and permanent magnet) magnetic force. It is a mechatronic product which involves different fields of engineering such as Mechanical, Electrical, Control Systems, and Computer Science etc.

Magnetic Bearings are free of contact and can be utilized in vacuum techniques. Highest speeds are possible even till the ultimate strength of the rotor. Absence of lubrication seals allows the larger and stiffer rotor shafts. Absence of mechanical wear results in lower maintenance costs and longer life of the system. Adaptable stiffness can be used in vibration isolation, passing critical speeds, robust to external disturbances. On the whole the designing of magnetic bearings is an ingenious effort!!

## **Career Guidance and Opportunities:**

Career guidance and opportunities in Mechanical Engineering was the theme of the seminar that was held on 22nd March. Mr. Ravi PS from QuEST Global was the speaker of the successful event. Mr. Ravi PS is an alumnus of KSIT who is currently working as a Technical Manager at QuEST Global Pvt. Ltd. The technical talk was organized for the 3rd year students aiming to provide a brief exposure on the Industrial trends and analytical thinking required to strengthen the fundamentals of the subject. Quest Global Engineering, is a diversified Product Development Solutions company, employing over 4200 professionals across the

world with delivery centers in US, Singapore, UK, Germany, Italy, Spain, France, Japan, Australia and India. They cater to multiple high technology verticals such as Aero Engines, Aerospace and Defense, Industrial Products, Fast Moving Consumer Goods, Power Generation and Oil & Gas. Our portfolio of services and solutions covers all aspects of the product development and engineering process such as Product Design, Product Development, Prototyping, Testing, Certification, Manufacturing Support, Product Support (sustenance, repair, documentation etc.), Product re-engineering as well Consulting Services. Their service offerings cover mechanical engineering, electrical as well as electronics



and embedded systems engineering of the product development process. With their diversified portfolio and geographic spread they have been able to conceptualize, design & develop, test, manufacture, certify and support different kinds of products worldwide. QuEST Global Engineering has a Global Product Development framework that is anchored on a local-global approach to Product Engineering to ensure close co-operation between the customer teams and Quest's Global teams. We have successfully implemented a network of collaboration across teams in nine geographically dispersed engineering centers. Mr. Ravi PS stressed on the importance of practical learning by exposing students to the realistic situations which involved high understanding of the subjects like Mechanics of Materials, Fluid Mechanics, Turbo Machines etc. The talk was very much interactive, he motivated students to come up with their own ideas and stressed on the field of Research and Development. The presentation was very much apt for the students to know the right path in which they need to progress. He even insisted on software courses like CATIA, PRO E, and UNIGRAPHICS etc. that the students can pursue in order to excel in the field of design. The session went for about an hour and a half and concludes at around 12:30. The response of the students who participated was very much positive and are looking forward to attend much more in the near future. All the students were very thankful to the Mechanical Department for organizing such an event.

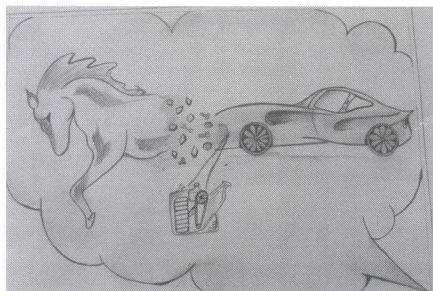


## SAE COLLEGIATE CLUB

We are happy to inform that SAE Club has taken off to a good start with 80 students from Mechanical Department and 3 faculty members, i.e., Dr.P.M.Suresh, HOD, Dept of Mechanical Engineering, Mr.Nagprasad sir (incharge) and Mrs.Shree Sudha Madam (incharge) being registered as members of the club.

The following events were organized under the club.

### PENCIL SKETCHING COMPETITION

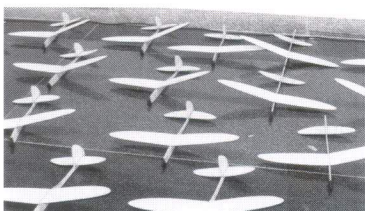


It was held on 4<sup>th</sup> of April, and the topics given were –

- ♦ What does an automobile mean to you?
- ♦ Futuristic model of cars

The event was open to students from all branches. 43 participants took part in the competition. About 15 volunteers worked actively to make the event a grand success. All the faculty members supported the event. Dr.H.K.Srinivas, Prof and Head, Dept of Mechanical Engineering, YDIT, and Mr.Kumar.V, Design Engineer, QuEST Global Pvt. Ltd. took keen interest in carefully judging and selecting the best sketches. They took special interest in collecting the idea behind the sketches from each participant personally. The event went on for about 2 hrs, and thanks to all the people who made it a grand success.

### WOKSHOP ON AEROMODELLING



A one day workshop on aeromodeling was held on Sunday, the 13<sup>th</sup> of April in the college for SAE members. Mr.Kumar.V, Design Engineer, QuEST Global Pvt. Ltd and Mr.Jitendra Bhatt, Design engineer, QuEST Global Pvt. Ltd. educated the students regarding the basics of aeromodeling, and guided all the participants in making gliders. Dr.P.M.Suresh sir took keen interest in ensuring the smooth functioning of the event. Mr.Nagaprasad sir worked with the team of 50 students and ensured that everyone was happy at the end of the day. About 2 hrs. of briefing was done regarding the basics of aeromodeling in the beginning of the workshop. Then, groups of 3 were made, and each team was guided to make chuk gliders from balsa wood. After a lot of effort, all the teams were successful in flying the gliders for a few meters. Though the journey of gliders was only a few meters, the joy experienced by all had no bounds and limits at the end of the day!

### SUICIDE

According to World Health Organisation (WHO) estimates, in the year 2000, approximately one million people died from suicide, and 10 to 20 times more people attempted suicide worldwide. This represents one death every 40 seconds and one attempt every 3 seconds, on average. This also indicates that more people are dying from suicide than in all of the several armed conflicts around the world and, in many places, about the same or more than those dying from traffic accidents.

In all countries, suicide is now one of

the three leading causes of death among people aged 15-34 years; until recently, suicide was predominating among the elderly, but now suicide predominates in younger people in both absolute and relative terms, in a third of all countries.

Although suicide is a deeply personal and an individual act, suicidal behaviour is determined by a number of individual and social factors. Ever since Esquirol wrote that "All those who committed suicide are insane" and Durkheim proposed that suicide was an outcome of social / societal situations, the debate of individual vulnerability vs social stressors in the causation of suicide has divided our thoughts on suicide. Suicide is best understood as a multidimensional, multifactorial malaise. Suicide is perceived as a social problem in our country and hence, mental disorder is given equal conceptual status with family conflicts, social maladjustment etc. According to the official data, the reason for suicide is not known for about 43% of suicides while illness and family problems contribute to about 44% of suicides.

Suicidal ideation is a feeling people may have when they are no longer able to cope with an overwhelming situation, which could be financial, the death of somebody they love, remorse, rejection, relationship breakup and unemployment., or a devastating/debilitating illness. There may be a feeling of bleakness and an erroneous assumption that taking their own life might be the answer. If the individual's mental state is heightened enough, suicide may seem to be the only exit.

A three pronged attack to combat suicide suggested in a 2003 monograph are:-

- (1) Reducing social isolation, (2) preventing social disintegration, and (3) treating mental disorders.

People who consider themselves a burden often find easy reasons to end their lives, here's a few reasons one should know why, not to take the extreme step.

Killing oneself will NOT be a relief to the suffering. When one is dead, they're nothing. They no longer exist. If they want relief from their suffering, they have to choose to live. They have to reach out and find the courage to make tomorrow better than today.

What if that person ends up being the one who finds the cure for cancer? Or the one who discovers life on Mars? What about all the special people one might meet, lives one might touch and the souls one might inspire? How will one ever know his/her true potential if they're not there to experience it? The future is a mystery; don't we all want to know it?

#### Crossword answers

##### Across

2. Grease 5.Lubricant 6.Dial Gauge 9.Asperities 10.Conveyor 11.Dry Lubricant 13.Universal 15.Oil 19.Ballsor Rollers 20.Sealed 24.Synchronous 25.Tensiometer 26.Radial 27.Preventive

##### Down

1. Fractional Horsepower 2.Gearbox 3.Seal 4.Fluttering 7.Bearing 8.Contamination 12.Chain 14.Axial 16.Viscosity 17.Predictive 18.Coupling 21.Sprocket 22.Startup 23.Puller

Everything has beauty, but not everyone can see.



## INDUSTRIAL VISIT

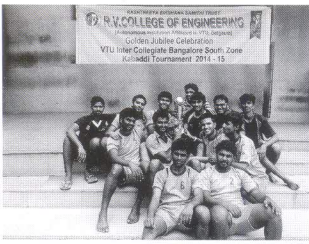


Government Tool Room & Training Centre

Students of 4th semester had been on an industrial visit to "Government tools room and training centre" located on west of chord road in Rajajinagar industrial estate. It is a government run organization providing efficient solutions and training for production machinery. They manufacture various components for a wide range of clients including BESCOM. We were shown around their training and production unit. Various machinery like CNC vertical milling machine, CNC EDM machine, CNC turn mill and internal and external cylindrical grinding machine. It was a good experience to learn the various codes and programs used to produce a specific component. The training division offer short term & long term courses in the field of CNC programming and machining, CATIA, PRO-E, Unigraphics. It was a scintillating experience.



## ACHIEVEMENTS



KSIT MEN's Kabaddi team won the Runners Up trophy in VTU Zonal level competition held at RVCE on 11.04.2014. KSIT Women's Volleyball team won the runners up in KREEDOTSAV 2013-14 held at BMSCE.



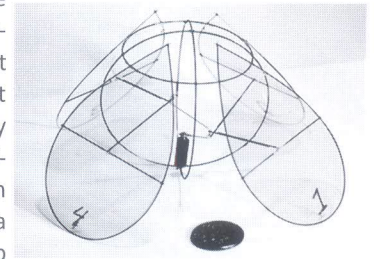
## ENOUGH WITH THE BIRDS AND THE BEES

Enough with the birds and the bees for that matter. Aerospace engineers have turned to the winged beasts time and again for instruction and inspiration. But the winged are not the only creatures to successfully ascend through a fluid. Jellyfish manages it too—and without much in the way of brains. It's time we modeled aircraft after those translucent creatures, and that's just what a handful of researchers at New York University's Courant Institute have done. They started out with something even simpler than jellyfish. "We were putting bugs—what we call bugs—in this device we invented, called a flapping flight wind tunnel," says Leif Ristroph, a professor of mathematics at the institute, of the origins of the jellyfish craft. The wind tunnel he speaks of contains a woofer that oscillates the air. In essence, for whatever object that's in the tunnel, the air comes pre-flapped. The "bugs" that Ristroph and crew were tossing in that flap were simple three-dimensional shapes that they hoped would hover in the up and down flow.

One was a hollow pyramid. "Because it's a pyramid shape it has a different drag coefficient when the air is coming up versus when

the air is going down," says Ristroph. "Over one cycle the asymmetric shape leads to a new upward force, a lift that can balance the body weight so the pyramid can hover in the air."

Unattached to any tether, the pyramidal bug bobbed and hovered with an occasional tilt but always returned to an upright orientation, where the stability of an airplane comes from a delicate balancing act between forces and is dependent on a carefully tailored relationship between tail and wing, the pyramid's stability was as simple as that of a Weeble. "Here we used simple shapes and we got hovering and stability coming out of it for free," says Ristroph.



The movements of a swimming jellyfish are used to configure how a drone design flaps its wings.

### Modeling the Flow

Being that Courant is NYU's mathematics institute, the team managed to make a model that explained the stability. But in the flapping wind tunnel their bugs were harvesting energy from the imposed flow to generate lift. There was nothing in the model that told them whether or not an active model—one that did the flapping rather than having its air flapped for it—would work just as well. "We weren't at all sure that anything would carry over," says Ristroph. "At that point we said let's just plow ahead with putting this flyer together and cross our fingers to some degree and hope for the best. We were going into uncharted territory."

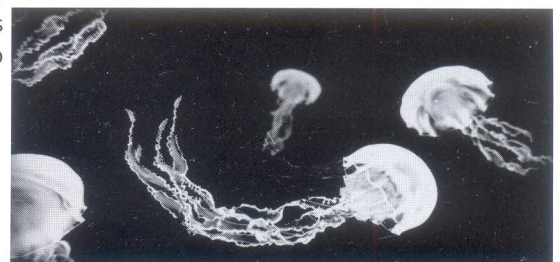
To keep things as light as possible the team turned to those two pillars of small/light innovation: cell phones and remote control enthusiasts. Ristroph and his colleagues took the vibrating motor form the former and carbon fiber from the latter. For wings they used Mylar sheets just a few microns thick. Working together, more or less in phase with each other, four wings push air out the bottom of the now active pyramid, much as a jellyfish pushes water down with a convulsive contraction of its coronal muscles. And indeed, when released, the jellyfish bug flew and stayed upright.

"Now the flow is generated by the wings, so it tilts with the aircraft. It's fundamentally different," says Ristroph. "It is a jet propulsion that doesn't mean it is a jet engine, it means a concentrated squirt, if you will."

Of course, jet propulsion is not limited to jellyfish. Squid, scallops, and cuttlefish, among others, squirt to move as well. But you won't find them in the air. "It's entirely aquatic," says Ristroph. "No one has ever seen an animal that flies using the basic idea of squirting air downward. That's one of the most fascinating things to think about: Why not? Is there something bad about it? The fact that we got this machine to work, it deepens that mystery."

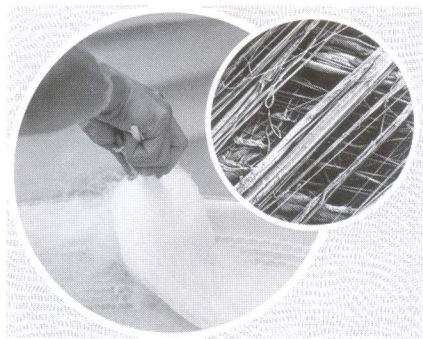
The fact that they got the machine to work for about \$15 dollars is also mysterious. The low cost and the simplicity of assembly suggest that further advancement could come from hobbyists and tinkerers. "In next 50 years that's where the real innovation will come from," says Ristroph. "From people that aren't contaminated by what

the textbooks force us to think."





## Cotton Candy Inspires New NANOFIBER Process



Most nanofibers are manufactured using a process called electro spinning, where a high-voltage charge of electricity blasts into a droplet of polymer liquid, resulting in the formation of long polymer strands. Although this process works fairly well,

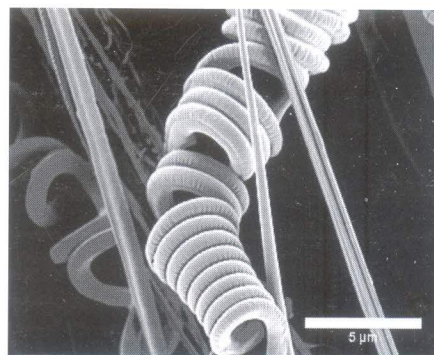
drawbacks include low production rates, the need to use high-voltage electricity, and limited control over fiber orientation, which makes it hard to produce consistent, three-dimensional structures. **Kit Parker**, a mechanical engineer and biomedical engineer at Harvard University's School of Engineering and Applied Science, wanted to find a better way to produce nanofibers for one of his fields of interest—constructing miniaturized scaffolds for tissue growth. His review of manufacturing methods led him to rotary jet spinning—a simpler and more effective solution than electro spinning. Rotary jet spinning uses a rotating drum and nozzle—just like a cotton candy machine. Parker discovered that by feeding polymer material into a reservoir attached to a motor and then spinning it, the material is stretched out into 100nm diameter nanofibers. The fibers are extruded through the nozzle by a combination of hydrostatic and centrifugal pressure. "This is the first step," says Parker. "Our initial testing suggests that this technique is quite versatile for both research and everyday applications. Because rotary jet spinning does not require high voltage, it really makes nanofiber fabrication available to everyone." Parker theorized that these fibers could be produced using a high-speed rotating nozzle to create a polymer jet that undergoes extensive stretching, before it solidifies. The Rotary Jet Spinning (RJS) system consisted of a reservoir with two sidewall openings that was attached to the shaft of a motor with controllable rotation speed. To facilitate fiber collection, a flexible air foil was placed on the shaft above the reservoir.

The fiber production process consisted of three steps:

- ◆ Jet initiation to induce flow of the polymer solution through the opening.
- ◆ Jet extension to increase surface area of the propelled polymer stream.
- ◆ Solvent evaporation to solidify and shrink the polymer jet.

Parker's team fed both naturally occurring and synthetic polymers (in solvents) into the reservoir at a rate that maintained a constant hydrostatic pressure and continuous flow. The fibers were collected on a cylindrical collector or on cover slips that were held against the collector wall. Data showed that fiber morphology, diameter, and web porosity could be controlled by varying nozzle geometry, rotation speed, and polymer solution properties. These fibers were also used to successfully form tissue engineering scaffolds—artificial structures designed to support living tissue. In fact, heart tissue from rats was integrated with these nanofiber structures and formed into heart beating muscle. Some of the Nano fibers produced included polylactic acid in chloroform, polyethylene oxide in water, polyacrylic acid in water at different conductivities, and gelatin in mild acetic acid.

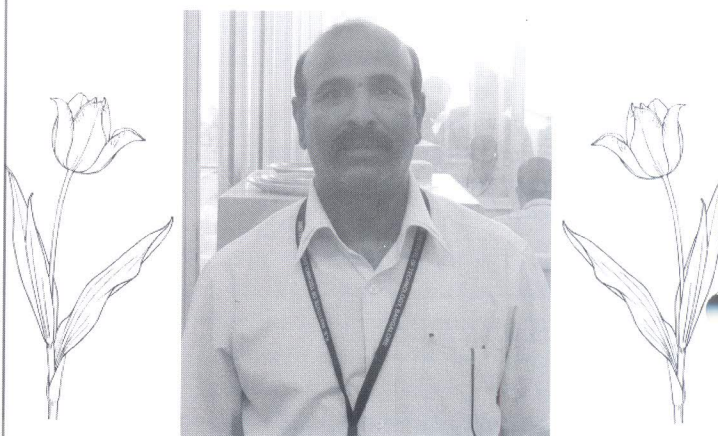
## Moving Forward



Compared to other methods, rotary jet spinning provides more flexibility in making nanofibers. Characteristics of the polymer nanofibers can be controlled by web porosity, hierarchical and spatial organization of fibrous scaffold, and three-dimensional

assemblies—all of which expand product design possibilities. Potential industrial applications include artificial organs, tissue regeneration, filter systems, and textiles. "This is a vastly superior method for making nanofibers as compared to typical methods, with production output many times greater," says Parker. "Our technique will be highly desirable to industry because these simple machines can easily bring nanofiber production into any laboratory. This will, in effect, mainstream nanotextiles. We are already making wound dressings, heart valves, and high-performance athletic clothing. I think we'll also be able to make the softest bed sheets and lingerie known to man."

## SAD DEMISE



A person that departs from this earth never truly leaves, for they are still alive in our hearts and minds, through us, they live on. Words seem inadequate to express the sadness we feel about our beloved faculty P.G. MOHAN KUMAR sir.

"The Man who's work followed his deeds". He was known for his simplicity, modesty and passion for teaching. He had worked in various institutions as Principal, Asst Prof and had always been a motivating factor for students in both academics and extra curricular activities. He was one of the standing pillars of our college who strived day in and day out for the development of the college. He was the man who was liked by everyone.

**He who hesitates is lost.**