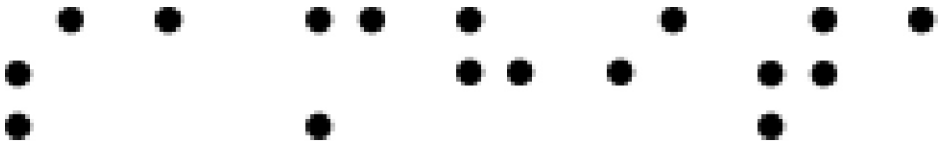
Association of Biomedical Engineers

Samhita



SSN College of Engineering
Old Mahabalipuram Road, SSN Nagar - 603110

Editorial Board

Samhita: The official magazine of Srishti 2k12

From the President's Desk

At the outset, I wish to convey my heartfelt congratulations and felicitations to the faculty and the students of the Biomedical Engineering discipline for bringing out the magazine "SAMHITA" on the day of "SRISHTI", the National Level Technical Symposium to be held under the aegis of the Biomedical Engineering Department on 29th August, 2012. I am happy that the symposium has rightly chosen to adopt a multi-dimensional approach to the concept of 'vision'- from highlighting eye related diagnosis and treatment to stressing on the importance of eye donation. The symposium will definitely provide the right environment for the exchange of ideas and experience between the members of the biomedical community. I am certain that this symposium will be a premier forum, presenting the technological advances in the field of biomedical engineering and generating thought-provoking and innovative ideas.

I wish Srishti2k12 all success.

Ms. Kala Vijayakumar
President, SSN Institutions

From the Principal's Desk

I am pleased that the Department of Biomedical Engineering is conducting SRISHTI 2k12, the National Level Technical Symposium and is releasing "SAMHITA", their magazine.

The college moulds the students to gain knowledge in the state-of-the-art techniques in their discipline which enables them to apply the same in various given situations. The mission of SSN is to make a positive difference to the society through education. I am overwhelmed with joy to see our students who are not only diligent, devoted, and dedicated in their efforts but are also innovative in their thinking. I wholeheartedly appreciate the Head of Department and the faculty members of the Biomedical Engineering for the guidance and the continuous support they extend to the students.

Dr. S. Salivahanan
Principal, SSNCE

A message from our Head of the Department

I am delighted to write a foreword for SAMHITA, the technical magazine of the BME department. I offer my heartiest congratulations to our student association for this initiative. Efforts like publication of the magazine are extremely valuable on academic campuses in enhancing, developing and honing the editorial skills amongst the literary-minded students, in addition to playing the role of a mirror to the past and the possible future.

The Department of BME has earned the reputation of being the most distinctive Department in this campus, offering a highly technology and healthcare oriented program deftly designed and delivered to the aspirants in serving mankind. The Department has the proud privilege of having exceptionally qualified, dedicated and scholastic faculty to impart knowledge in varied spheres, including the latest technologies. Endowed with enviable creative talents, unique use of highly innovative medical equipment technology and enduring relationship with various hospitals, our Department has developed exemplary methods of teaching that helps enhance students' knowledge and comprehend the significance of being team leaders in the area of their interest.

The theme of Srishti2k12 is 'vision' and it is heartening to see that the approach of the ABE towards this theme is not just from the technical perspective but from the social perspective as well. It has been wonderful to be a part of the event which sees the entire department working together in full force.

I also take this opportunity, on behalf of the entire department family, to extend my heartfelt congratulations to those who are involved in the making of this magazine. My special gratitude to members of the Editorial team for striving hard to bring out the best in this edition of the magazine.

I am confident of the success of this magazine & looking forward to better and more brilliant issues with every year in future.

My very best wishes!

Dr.A.Kavitha
Head of the Department
Biomedical Engineering

From the President of ABE

What you will be, is what you work to become- The truth about talent

"Hide not your talents, they for use were made, what's a sundial in the shade?"
-Benjamin Franklin

Beyond birth, beyond genes, and well beyond luck lies a secret to talent,
the will that directs you.
The human brain extends to horizons, the boundaries of which are not known.
Talent is not something restrained by birth; it is a belief that has to truly sink in.
The talent you seek is merely a few steps away, a few steps of focus and persistence
is all what it takes.
'Srishti' is our humble effort to create a platform that takes us closer to
this realization. Working with the entire group in organizing this event has taken
me one step closer in this quest and I am certain it has been the same for
everyone else. We have had our share of falls, but have always got up to
try things differently. It's simple; you never know what fits in, till you have tried
it all out.

So, keep trying,

Until then
Seshank
President
Association of Biomedical Engineers

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Editorial

It is in human nature to be comfortable with existing methods and to resist change. Change is almost always met with apprehension. In this regard, Srishti2k12 has been witness to not just a few but many changes.

This year, a lot of effort has gone into changing existing trends and pushing the boundaries of innovation. A refreshing approach has been adopted for almost everything – from the posters and websites to the events and publicity. Even the annual magazine has not been able to escape from this wave of change.

The official magazine of Srishti now has a new name – Samhita. Samhita is a powerful Sanskrit word with a multitude of meanings. The Sanskrit dimension makes sense, since Srishti is the only symposium at SSN with a Sanskrit name. The collected works of the Indian greats like Sushrutha and Charaka are also referred to as Samhitas. And here is an interesting piece of trivia - the pattern of dots on the cover page is actually Samhita written in Braille.

This magazine would not have been possible without the participation of everyone at the BME Department. As a note of gratitude, we would like to thank our HOD Dr.A.Kavitha for her suggestions regarding magazine content. Her timely intervention gave us a much needed direction.

A special thanks to Ashwin for lending us a hand in many aspects of the magazine. We also want to thank Lakshmi, Saranya, Moorthy and Fareesha for their immediate response and contributions.

We would also like to place on record our appreciation of our third year students. Their participation this time has us convinced that the future edition will definitely live up to the high standards and maybe achieve even more.

Anjana Vencatesan
Akshaya.H

The Department of Biomedical Engineering

The SSN College of Engineering started its Biomedical department in the year 2005 to provide quality under graduate programs in the upcoming field. The Biomedical Department of the college has cordial relations with various organizations such as L&T Medical Systems, BPL, Texas Instruments and educational institutions such as The Chettinad Hospital and Research Institute, Ramachandra Medical University and The Sai Biosciences Research Institute. The department also has tie-ups with institutes and industries alike, with Memorandum of Understanding being signed with Phoenix Medical System, Sai Bioscience Research Institute, Bharat scans, Florida International University, Trivitron and Sri Ramachandra Medical University and Research Institute to facilitate academic cooperation between the industry and the department.

IEEE-A flagship Organization which caters to the scientific community has various societies and chapters spread throughout the world. The department has started a student's chapter of IEEE Engineering in Medicine and Biology Society (IEEE EMBS). A few of other academic accolades include scholarships from the Government of Japan and a scholarship from the Department of Biotechnology (DBT) given by the Government of India, Ministry of Science and Technology.

The department is also an active contributor to the SSN I-Cell, an initiative by the students to develop and spread research interest throughout the college. Its main aim is to inculcate the research ideas in the first and second years, facilitating the students to do something exceptional by the time they are in their final year.

Students participated in the PSoC workshop held in the department in the month of December from 15th to 17th, 2011. Tutorials on the architecture of PSoC 5.0 were covered and there was a hands-on session for a few beginner level experiments.

Medical Imaging workshop was conducted in the department which handled various concepts related to CT, MRI image reconstruction techniques on February 3rd -4th, 2012.

A Cognitive Neuroscience workshop was organized in the department from January 5th to 7th, 2012 and lectures were handled by eminent scholars from NIMHANS, Bangalore.

Learning is Fun

Students from final year participated in the National Level Intellectual Property Rights workshop and the workshop also saw many participants from other colleges. Officers from the Indian Patent Office gave a detailed explanation on obtaining patents and other intellectual properties.

A Finite Element Analysis workshop was held on February 23rd, 2012 which had two sessions of which the first one was about simulation of finite element models using COMSOL Software. The latter half was handled by Dr.Jebaraj, FEM Department, Anna University, Chennai who explained the basics of Finite Element Theory.

A Medical Expo was organized by the department to serve as a platform for collaboration in improving health care and medical devices. It was presided over by Sivakumar, Siva Consultancies

Triumphs Galore

Plans into Prototypes

N.Gopalakrishnan and Aswin.S from the batch of 2008-12 secured the first place in the Schneider Innovate Challenge with a cash award of Rs. 3 Lakhs for their project titled “Effectuation of Bioprosthetic Limb using Electro-Occulography”.

Two teams were selected for the Sushrutha Innovation Award Challenge 2012. Lakshmi.A and Archana.J won the first prize for the project titled “Non-invasive blood glucose measurement”. Another team comprising of Akshaya.C, Akshaya.H, Anbarasi.R, Manoj.M and Praveen.C was selected among the top 20 teams at National level.

A team of four including Akshaya.C, Akshaya.H, Manoj.M and Praveen.C were selected among the top 20 teams to attend a National level Entrepreneurship workshop organized by the DBT(Department of Bio-technology) in association with the ABLE (Association of Biotechnology Led Enterprises) in Bangalore.

Two teams from the department, out of four from our college, have been shortlisted by Texas Instruments, India to take part in their Analog Design Contest 2012.

On a winning trail

Lakshmi.A and Archana.J bagged the first prize in Bioquest and second in Topcoderz in the Vision 2k12 conducted by the College of Engineering, Guindy.

Ashwin.V and Jeyaprakash.P.S secured first place in paper presentation at the National Level Conference organized by Udaya School of Engineering.

Versatility into picture

The final year batch also participated actively in the camps organized by the NSS and YRC which includes YRC-C, YRC Alert and YRC blood donation camp.

Sruthy.S from final year came second in the Adaptune dance contest conducted by the MNM Jain College of Engineering and in Adaptune, as a part of Kalakriti, Anna University.

Srishti 2k11 - a look back

The Department of Biomedical Engineering conducted its National level technical symposium SRISHTI-IV on 24th August 2011. The theme of Srishti2k11 was diabetes. The inauguration was presided over by Dr. Roopesh Jain, senior consultant, Diabetes and Ms. S. Padmapriya, Chief Diabetic Educator, Dr.A. Ramachandran's Hospital, Egmore, Chennai. The inauguration kicked off with addresses by Dr. N. Salivahanan, Principal, SSNCE and Dr. N. Sriraam, Head of the Department, BME. The Chief Guest, Dr.Roopesh Jain gave a guest lecture on Diabetes and Ms.S.Padmapriya presented an overview of causes, effects and awareness about diabetes. The symposium received an overwhelming response for both its technical and non-technical events.

The Association of Biomedical Engineers

Inauguration 2012

The inauguration of the Association of Biomedical Engineers (ABE) was held on 25th July 2012 in the Department Seminar Hall. The function was presided over by Mr.Balamurugan, Associate Vice President and Head, Medical Devices Operations, ERS HCL Technologies and he was accompanied by Mr.Srinivasan, HCL Technologies.

Dr.A.Kavitha, the Head of the Department, welcomed all the dignitaries, her colleagues and the students and this was followed by the felicitation of the Chief Guest. Mr.Balamurugan addressed the gathering and threw some light on the thrust areas of research which his department is currently undertaking. He explained the importance of Research and Development in medical devices and pointed out various applications of research in diverse fields.

Mrs.Dhanalakshmi, Association In charge, briefed about the Association and its activities in the previous year. S.Seshank, Student President addressed the gathering and briefed about the upcoming association activities and Srishti, the National Level Technical Symposium which is to be held on the 29th of August 2012. He then released the promotional video for Srishti2k12. Following the video release was the CD release of the placement brochure by Mr.Balamurugan, taking our department placement activities to the next level.

ABE Office Bearers for 2012 – 13

Association Co-coordinator	Mrs.Dhanalakshmi
President	S.Seshank
Vice President	R.C.Tharani
Secretary	M.Srikanth
Treasurer	R.Harshitha
Joint Secretary	T.Deepa Rohini
Association members	Shree Shyamalae V.R
	Sanjay Romero D'Sami

The Alumni Connect

I am currently pursuing my masters in Biomedical Engineering at Arizona State University. One year into my masters I've come to realize as to how much I've been able to learn. Working amidst professors and students and being able to contribute to their research is absolutely enlightening. It is amazing how the masters program has pushed me to learn, develop skills and manage my time so effectively. It has helped me appreciate the various disciplines and the scope of Biomedical Engineering. At this juncture, I'd like to wish Srishti 2K12 good luck and the very best to the forthcoming batches of SSN - BME!

Sandhya Santhanaraman

Sandhya was part of the 2007-2011 batch and was also the co-editor of Hoppslate 2010

Guest Article - Mr Kush Tripathi

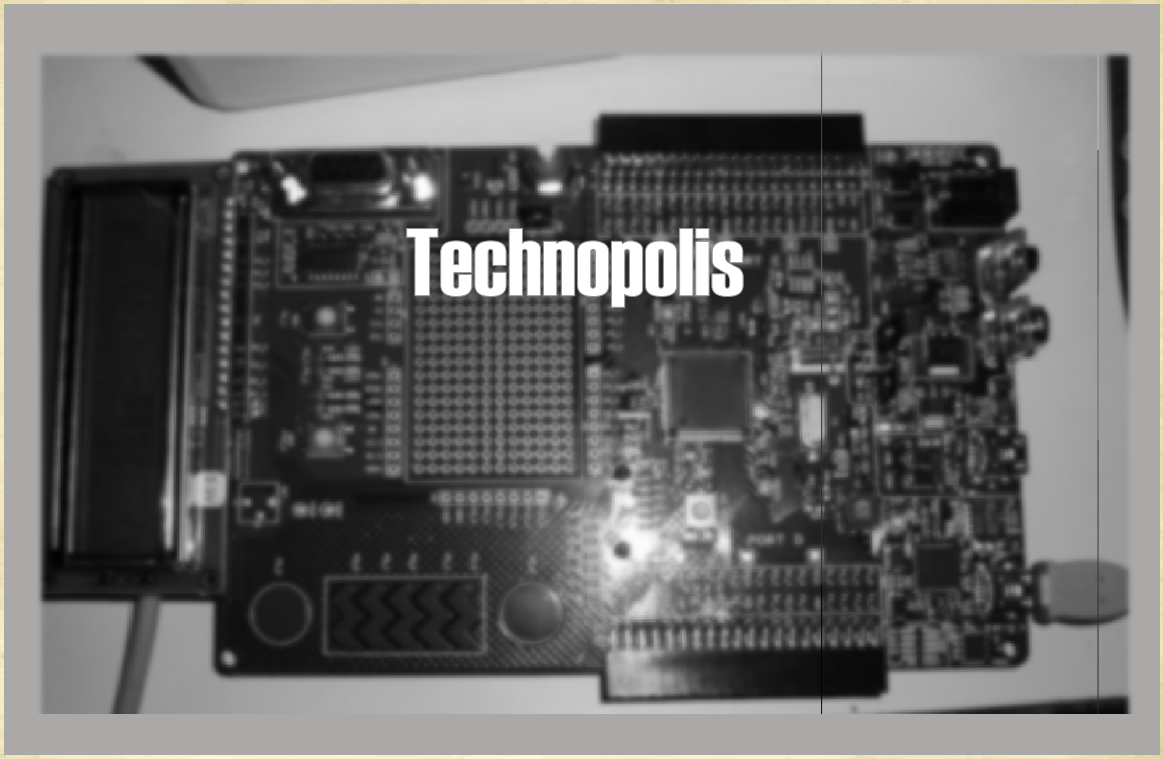
Biomedikal.in is a small effort to change the opinion and outlook about Biomedical Engineering in India. Biomedical Engineering, being a highly interdisciplinary field has never got its due respect in India; it is a common misconception that anyone can work on biomedical applications. Students in India do not take up “Biomedical Engineering” as a choice but as a last resort, this in fact led to the closure of this branch in the college where I completed my under graduation .The director of the college felt that the 50 seats in the biomedical department would fetch a lot more remuneration under the ECE tag. He felt the seats were wasted. Initially I was worried, what would I do after I graduate. A probable closure of the department in other colleges was evident. The fear of losing my identity as a biomedical engineer was the forces that led to the establishment of Biomedikal.in. It started off with this blog “Kushtripathi.wordpress.com”, I had not been an avid blogger until then, but felt it was a good way to spread the message. I decided to discuss the scope of Biomedical Engineering seriously. The Initial response was good as there were very few out there writing about Biomedical Engineering. There was only one other Blog on Blogspot by Mr Haza sheriff, but he was not very active. Within 3 months I started getting the clicks, the queries and the comments. Appreciation came not only in India, but from about 100 countries around the world. The success was overwhelming. I used this as a medium to share all sorts of Books on the subject. The books were pirated versions as the original ones were too costly. Someone chose to report this to “wordpress” and my blog was removed. It was a big setback for me; everything I had done over the past 6 months vanished. All the subscribers, friends and well-wishers were no longer there.

In April of 2010, I purchased my own domain name i.e Biomedikal.in (Biomedical with K or Biomedical with Kush Tripathi). I did this intentionally as I thought I had a different point of view towards Biomedical Engineering. Thereafter I continued writing, many bloggers came and went, but I continued my journey to enlighten the young Biomedical Engineers of the country. Ever since, I have guided many students in personal and professional issues. It has been a good journey so far, I feel happy talking to students and spreading the word about Biomedical Engineering as a discipline. As of now Biomedikal.in is received by 195 countries in the world and generates about 14 lakh hits per month. This is fairly satisfactory, considering the fact that Biomedical Engineers form a very small group. Biomedikal.in is a non-profit website, you won't be interrupted by any advertisements or popups, it's just an information directory open to everyone and I don't intend to commercialize it. My only wish is that Biomedical Engineering grows in India and its roots grow to become so strong that nobody can rip it apart. These words by Robert Frost are an inspiration;

"The woods are lovely, dark and deep,
But I have promises to keep,
And miles to go before I sleep,
And miles to go before I sleep."

And I have Miles to go before Biomedikal.in sleeps. The change has started and I am very happy that Biomedikal.in was a part of it.

Kush Tripathi is the founder and editor of the immensely popular Biomedical Resource Website - www.biomedikal.in. He is also a columnist with Color Doppler, India's first Ultrasound Magazine. He has worked as Project Associate at the Center for Nanoscience & Engineering (CeNSE), Indian Institute of Science, Bengaluru and is currently a PhD Scholar in Biomedical Devices and Technology at IIT Madras.



We, the people at BME, believe that our writing can well articulate our technical prowess. Our technical section opens with content related to our theme - vision. It then transitions into emerging areas of research and exciting new inventions.
The essence of BME is right here .....

Human Bats-the marvel of echoes

Echoes, Bats and humans- you may well think this is an article on the Dark Knight. I am sorry to disappoint the Dark Knight fans, although there is something in this article for comic lovers. Remember the Marvel comics superhero 'Daredevil'? He was blinded by exposure to radiation, but that same exposure ramped up his other senses so that he could, in essence, "see" with his hearing. Daredevil used a form of echolocation to fight villains and uphold justice.

While I liked the character, I always thought the idea was far-fetched. But perhaps the idea is not as 'sci-fi' as you might think. There are reported cases of blind humans who have developed a form of echolocation – they can see in the dark.

Echolocation is an art by itself, it's a form of imagery, the form of an object is perceived by the sound that bounces off it. This may seem impossible, but it is no more extraordinary than using light waves to form three-dimensional images of the world around us. It just takes a bit of brain processing. Bats are the most common creatures that come to mind when one thinks of echolocation, but others do it as well, such as dolphins.

Introducing the human bat –Mr. Daniel Kish. He lost his eyes to cancer at just 13 months of age, but you wouldn't be able to tell from watching him. The 44-year-old happily walks round cities, goes for hikes, rides mountain bikes, plays basketball, and teaches other blind youngsters to do the same. Brian Bushway helps him. Now 28 years old, Bushway lost his vision at 14, when his optic nerves wasted away. But, like Kish, he finds his way around with an ease that belies his disability.

Both Kish and Bushway have learned to use sonar. By making clicks with their tongue and listening to the rebounding echoes, they can "see" the world in sound, in the same way that dolphins and bats can. They are not alone. A small but growing number of people can also "echolocate". Some develop the skill late in life, like Bushway; others like Kish, come into it early. Some use props like canes to produce the echoes; others, just click with their tongues.

The echoes are loaded with information, not just about the position of objects, but about their distance, size, shape and texture. By working with these remarkable people, scientists have worked out a lot about the scope and limits of their abilities. But until now, no one had looked at how their brains deal with this super-sense.

A new study looks at these two human echolocation experts, one with early blindness and one with late blindness. It was found that when the subjects listened to ordinary sound their auditory cortex was recruited. But when they listened to clicks used for echolocation, part of their visual cortex was also recruited. The pattern of activation of the cortex also depended on the location and movement of the objects reflecting the echo.

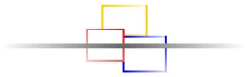
This suggests that human echolocation experts, to an extent, are actually "seeing" with echolocation – they are using the visual processing part of their brain to process sound. This makes sense on many levels. First, sound waves are already processed to a degree to detect direction, distance, and even size. Our ears are positioned so that

sound waves will hit them at slightly different times from different directions, and our brains can process that information – comparing the timing of the sounds in both ears, to give us a sense of where the sound is coming from. If you combine this type of processing with a bit of visual processing, it makes sense that you can make a crude image of the environment from sound information alone.

This also demonstrates the plasticity of the brain. It can change its function based upon use. Also, parts of the brain that no longer have a function – like the visual cortex of someone who becomes blind can be recruited to serve a new function.

Well, enough with the reading; you should probably just close your eyes, clap your hands and try figuring your way out - Bring out the superhero in you.

S.Seshank , Final year



Understanding the intricacies - Saccades

When was the last time you took a moment to appreciate the sheer magnitude of processes involved in vision and perception? Well here is one such phenomenon that will make you marvel the human eye.

Saccades are rapid, simultaneous movements of the eye from one fixation point to another. They are the fastest movements produced by the human body. The peak angular speed of the eye during a saccade reaches up to 900°/sec in humans. To understand the concept of saccades better, read a line of this article again. It is a fact that you do not actually scan every letter per se because your eye jumps from one point to another. We, however, cannot feel this happening as saccades are not only rapid but also involuntary. Saccades are not restricted to text alone, it has in fact been proven that saccades come into play during face detection and recognition too. Your eye uses saccades to note only certain landmarks of facial features for recognition.

Commonly used methods of measuring saccades include EOG (electro-oculogram), IR cameras and scleral eye coils. The method employed depends on the application and the accuracy that is desired.

Not surprisingly, saccadic measurements are used as a diagnostic tool. The three saccadic parameters most relevant to clinicians are peak velocity, latency, and accuracy. Based on velocity, saccades may be classified as slow or fast and both types are associated with various pathological conditions. Saccadic slowing may be caused by non-pathological factors like general fatigue or ingestion of sedatives. Pathological conditions that lead to saccadic slowing include basal ganglia syndromes, cerebellar syndromes, oculomotor weaknesses and conditions like ocular myasthenia. Abnormally fast saccades are observed in patients with opsoclonus syndrome or ocular flutter. In these cases, the patient makes large saccadic movements without any inter-saccadic interval. Another cause of fast saccades could be restriction syndromes, i.e. the brain plans for a large saccadic movement but the eye is forced to make several small saccadic movements due to muscular restrictions. Lesions and palsies may also cause the saccadic velocity to vary between the two eyes.

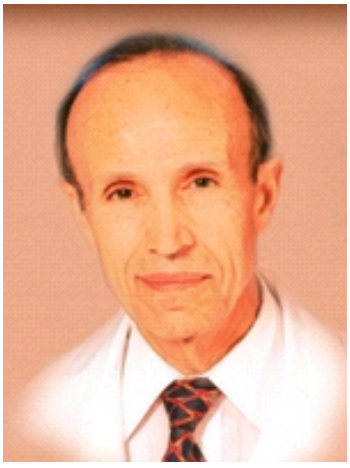
Latency is of comparatively lesser diagnostic importance since it is sensitive to the mental state of the subject. The main causes that affect saccadic accuracy are dysmetria (overshooting or undershooting the target), glissades (gliding towards target) and pulsions (vertical saccades that are pulled to left or right).

Studies measuring these three parameters have proven impaired saccadic functioning in neurological conditions like Alzheimer, Schizophrenia and Parkinson diseases. The role of saccades in diagnosis and studies of oculomotor properties is only expected to grow with the advancements in measurement techniques.

It is the appreciation of phenomena like these that make studying Biomedical Engineering absolutely worth it.

Anjana Vencatesan , Final year

Gholam A. Peyman



Gholam A. Peyman, MD is a retina surgeon and also a successful inventor. He has been granted 124 US Patents covering a broad range of surgical techniques, new methods of diagnosis and treatment. His most widely-known invention to date is the LASIK eye surgery. LASIK, commonly referred to as laser eye surgery, is a type of refractive surgery for the correction of myopia, hypermetropia and astigmatism. He is also a pioneer in vitreoretinal surgery, intraocular drug delivery, refractive surgery and the chorioretinal biopsy technique. He is presently the emeritus professor of ophthalmology and director of the Vitreoretinal Service, Department of Ophthalmology, University of Arizona School of Medicine in Tucson. He introduced vitrectomy to India in 1972 at the Madurai Eye Hospital and also introduced intravitreal injection of antibiotics for endophthalmitis in Eye Camps.

Gholam A. Peyman was born in Iran. He received his MD at the University of Freiburg, Germany in 1962. In 1969, he completed his residency in ophthalmology and retina fellowship at the University of Essen, West Germany. In 1971, he did an additional postdoctoral fellowship in retina at the Jules Stein eye institute, University of California.

From the year 1971 to 1987, Peyman served as Associate Professor and then Professor of Ophthalmology at the Abraham Lincoln School of Medicine, University of Illinois, Chicago.

He held a joint appointment at the School of Medicine and also at the Neuroscience Centre of Excellence at the Louisiana State University, New Orleans till the year 2000.

He has served as Professor of Ophthalmology at Tulane University School

Landmark:1872- Brown-Sequard proposed the revolutionary idea that one cerebral hemisphere can influence both sides of the body

of Medicine, New Orleans and at the University of Arizona, Tucson.

Peyman has many inventions to his credit. One of his most widely-known inventions is the LASIK eye surgery. In 1971, Dr. Peyman began estimating the injection of antibiotics into the vitreous for the treatment of endophthalmitis (inflammation of the internal coats of the eye) as a new approach to drug delivery. Peyman began evaluating the potential use of a CO_2 laser to modify corneal refraction in rabbits. In 1974, Peyman described the first pressure-controlled valve, known later as the Krupin valve, for glaucoma surgery. His other major inventions include the development of a vitrectomy instrument (1971–73), an operating microscope (1974) and stereoscopic assistance scope (1977), the first endolaser probe for retinal surgery (1981), the first 23- gauge vitrectomy instrument (1990), a pneumovitrector (1996), and triamcinolone-assisted vitrectomy (2000). Dr. Peyman was the first to perform retinochoroidal biopsy. Along with Dr. Jeff Koziol, he developed the first telescopic intraocular lens for patients with macular diseases.

Dr. Peyman was awarded the Fisher Prize of the Chicago Ophthalmological Society (1973), the Senior Honour Award of the American Academy of Ophthalmology (1989), the Gertrude Pyron Award (2001), the ASCRS Innovators Award (2001), the Macula Society's Paul Henkind Award (2004) and the ARVO/Pfizer Ophthalmics Translational Research Award (2005).

R.Narendran, Second Year

Aravind Eye Hospital was founded in 1976, by Dr. G. Venkataswamy, a man known to most of us simply as Dr. V. In an eleven bed hospital manned by 4 medical officers, he saw the potential for what is today, one of the largest facilities in the world for eye care. Over the years, this organization has evolved into a sophisticated system dedicated to compassionate service for sight. The Aravind Eye Care System now serves as a model, for India and the rest of the world.

Inaugurated in 1976, Aravind Eye Hospital, Madurai has grown to accommodate 330 paying patients and 920 free patients. It serves a population of 26.7 million covering the districts, Dharmapuri, Salem, Namakkal, Perambalur, Nagapattinam, Trichy, Karur, Dindigul, Virudunagar, Sivaganga and Ramnad.

Aravind Eye Hospital, Madurai, is the headquarters for the Madurai Eye Bank Association, which receives eyeball donations from various institutions in India and from the USA. Aravind-Madurai handled 946,138 outpatient visits and performed 142,404 surgeries from April 2011-March 2012.

Shadowy Details

Disclaimer: This article starts with the assumption that the reader is familiar with the concept of shadows thus enabling me to skip over dictionary definitions.

It is interesting to note that shadows were not featured on paintings in the pre-Renaissance era. This was mostly because it was difficult to capture their effect. Leonardo da Vinci was one of the first artists to analyze the effect of cast shadows in paintings and images. Cast shadows are crucial in helping us perceive the 3D world.

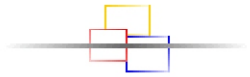
They give the viewer a clear idea about the geometry of the object and its relative size and position in space. Going a step further, moving cast shadows or dynamic shadows are essential in helping us understand the trajectory of dynamic objects. To illustrate with a simple example, we would be unable to perceive the orientation of creases in objects without cast shadows.

Perception of depth is an important characteristic of vision. Depth perception is attributed to monocular and binocular cues. Binocular cues are caused by the disparity in retinal display of the two eyes. Monocular cues include perspective, relative size, interposition and shading. Perception of depth increases when a shadow of one object is made to fall on another surface. Da Vinci in his writings also pointed out that, the closer an object is to the background surface, the closer the shadow will be to the casting object.

When the object casting the shadow is moving, more information can be gathered from the transformation of the shadow across time. This is particularly effective when the surface over which the object is moving is planar. In dynamic scenes, moving shadows provide an idea about the relative motion of objects in the scene. This property is commonly exploited in animations and graphics to add a touch of realism. Another interesting property is that of stationary light source constraint. Studies have proven that our perception of a scene is always based on the assumption that the light source is stationary. We correlate the moving shadow to the motion of the object and not to the light source.

Perhaps the most fascinating aspect is that it is still unknown how the brain processes shadows. How does it differentiate a dark patch from a shadow? How does it allow shadows to provide spatial information and not just treat them as background noise? I guess these are just few of the many questions, the answers to which continue to evade mankind.

Anjana Vencatesan, Final year



Colour Blindness

Colour blindness is the inability to distinguish between different colours which results due to the absence of colour-sensitive pigments in cone cells of the retina. Mostly it is inherited by way of a mutated X-chromosome. It is more prevalent among males, because men have only one X-chromosome and if they are handed a faulty X-chromosome by carrier mother, they will be colour blind.

A person with colour blindness has trouble seeing red, green, blue or mixtures of these colours. The most common is red-green colour blindness where both red and green appears same.

Causes can be congenital. It can also be caused due to UV rays or head trauma. Parkinson's disease is a neurological disorder in which light-sensitive nerve cells in retina, where the vision is actually processed may be damaged causing colour blindness. This can happen in babies (shaken baby syndrome) or even due to diabetes. Types of colour blindness include

Red-green colour blindness (most prevalent) - 95%

Blue-yellow colour blindness - 5%

Total colour blindness (least common)

Q: What is a Systems engineer's favourite dance? A: The unit step

The most common test is known as Isihara colour test where a series of 38 plates are used to identify red-green colour blindness. As of now, there is no treatment for colour blindness. Although colour blindness is not considered a very big disability, it can prevent a person from pursuing occupations like flying, marine navigation and art based careers. Colour identification is also very important for occupations using telephones or computer network cabling, as the individual components are colour coded. Countries like Romania don't issue a driving license to colour blind people.

In 2003, a cybernetic device called eyeborg, was developed to allow the wearers to hear sounds representing different colours. There are reports of researchers working on gene therapy to combat colour blindness in future.

R.Janani
Meenakshi Krishnakumar
Second year

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Sports biomechanics

A number of us (I would say about 85% of the total human population) follow some sport or the other. When we as sport fans look at one of our idols perform magic on the field of play we are completely astounded. For example, when Roberto Carlos of Brazil scored that absolute peach of a goal against France, the one we will always remember, we went, "WOW! How did he do that?" or when Sachin Tendulkar plays his famous straight drive we have no words to describe his genius. But, what we can do is analyse how these great players get their technique and maybe, just maybe, try to replicate it.

So what is Sports biomechanics? Sports biomechanics in a layperson's words is that field which can basically help us analyse any professional sportsperson's activity or his special skill which helps him be the best at what he does.

For all you technical freaks it can be defined as quantitative based study and analysis of professional athletes and sports' activities in general (courtesy Wikipedia).It is what you get when you combine sport and biomechanics(which is the study of biological systems by means of mechanics). Biomechanics is classified into a) statics (study of any system which is at rest or moves at a constant velocity) b) dynamics (study of systems which possess acceleration).

There are basically two ways in which biomechanical analysis is done. It can be either quantitative or qualitative. Quantitative analysis is the analysis of movement based on the numbers or statistics we get through several measuring instruments. Qualitative analysis is the method which is widely adopted during coaching some sort of skill and it is not based on numbers. Biomechanical analysis can be divided into 4 in this field:

a) Non-cinematographic analysis: The name itself suggests that this is analysis without

the use of any cameras and it is the most widely used method by all coaches and athletes. It is based on analyzing by observing. No mathematical calculations here.

b) Basic-cinematographic analysis: This is analysis of a particular event by observing what actually took place compared to what you think took place. You can observe events in slow motion and this reduces guess work. Again no mathematical calculations are required here.

c) Intermediate cinematographic analysis: Here there is minimal amount of mathematical calculations. Velocity and force along with other parameters are calculated and measured. This reduces estimation and can give close to accurate results.

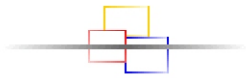
d) Biomechanics research: This is complex analysis and requires complicated equipment such as EMG, transducers, computers etc. This gives extremely accurate results and help an athlete enhance his performance.

The below example is just a very small taste as to how biomechanics can be used in a sport like football. Basically in order to "curl" the ball in the air like Beckham it is important to know how and where exactly to kick the ball. Making a ball swing through the air is a great spectacle and it is the aim of many young players. Making the ball swing is not such a hard skill, but making it swing and controlling it to go exactly where you want it to is much harder. To make it swing from right to left, a right-footed player approaches the ball at an angle to the direction they want to kick. Using the instep of the boot, the player strikes the bottom half of the right side of the ball. Conversely, if you want to swing the ball from to left to right, the right footed player uses the outside of the boot and strikes the ball in the bottom half of the left hand side.

The follow through is also very important. You need to follow through in the same direction as the player approached the ball and not in the direction of the ball. The ball moves sideways as it travels because of a phenomenon known as Magnus force, which is caused by imbalances in the different pressures on the ball.

So next time you're playing a game of football try to think about how you can "Bend it like Beckham".

Archit Ramprasad , Third year



Diaphragmatic Pacing

The diaphragm, the most important muscle of ventilation, develops negative intrathoracic pressure to initiate ventilation. Innervated by cervical motor neurons C3-C5 via the phrenic nerves, the cone-shaped muscle by means of contraction decreases intrapleural pressure during inspiration, expands the rib cage, and thereby facilitates movement of gases into the lungs.

A diaphragmatic pacemaker, in medicine, is a surgically-implanted device used to help patients breathe following complications from spinal cord injuries. It provides a means to improve ventilation and eliminate the need for continuous positive pressure ventilatory support. The standard approach has been phrenic nerve pacing; however, direct pacing of the diaphragm muscle may be helpful in some patients.

The basic principle of Direct Diaphragm Stimulation (DDS) entails the attachment of

4 electrodes to the underside of the diaphragm via a minimally invasive abdominal surgical procedure. The electrodes are each connected to a cable that passes out through the abdominal wall. The cables are connected to an electrical stimulator and the stimulator sends electrical impulses to the electrodes in the diaphragm, leading to contraction of the diaphragm. The stimulation system is activated at least 4 times a day for 30 minutes in order to produce contractions of the diaphragm and thus achieve conditioning of this muscle. If this is sufficiently tolerated, the stimulation time can be extended to several hours per day. If there is nocturnal respiratory dysfunction, continuous DDS during the night hours can be of benefit. In this case, DDS goes beyond conditioning and has the character of an attempt at interventional treatment.

***Investigations prior to implantation of the diaphragm pacemaker*:**

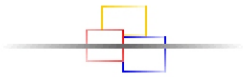
In preparation for the planned operation, several diagnostic investigations are required in order to guarantee the safety and effectiveness of the diaphragm stimulation. These investigations are required as part of inpatient treatment and involve hospital admission 2-3 days before the day of surgery.

The following investigations are planned in advance of the operation - Test of respiratory capacity (vital capacity), Electrocardiography (ECG), Chest X ray (X ray of the thorax in two planes), Fluoroscopy of the chest (thorax fluoroscopy) to establish diaphragm mobility, Laboratory tests, Cardiology opinion, Anaesthesiology opinion

Diaphragm pacing is an attractive treatment option for many reasons - In children who require ventilatory support only during sleep, there is the possibility of removing the tracheostomy. It permits children who require full-time ventilatory support to be ventilated while participating in normal activities and not be tethered to the short length of ventilator tubing. For many young patients, freedom from the ventilator is wonderful, and the increased mobility or the ability to remove the tracheostomy tube is a huge improvement to their quality of life. Notable improvement in the quality of life is for adolescents who are considerably more affected by perceptions about being or looking different than their peers. For those patients who use pacing as their sole mode of ventilatory support during sleep, pacing can improve the quality of life for family members who want to live more active lives and enjoy travelling or overnight stays away from their homes. Equipment for mechanical ventilation is typically large, cumbersome, and complicated. Packing up a ventilation system for a few nights away from home can be difficult. The diaphragm pacer system, on the other hand, is portable. If the child does not have a tracheostomy, then tracheostomy supplies, suction equipment, etc., need not be brought with the child after pacing has been successfully implemented. At present, diaphragmatic pacing systems are still cumbersome, though work is being done on more portable miniature systems. All currently available systems involve an external transmitter and an implanted receiver. Fully implantable diaphragmatic pacing systems are being developed. The improved pacing systems

now being used are more affordable and much easier to implant than the earlier systems were. Clinical trials will be required to determine whether diaphragm pacing is worth the expense and also in which patient populations is it most useful.

R.Vaishnavi, Third year



Accidental Discoveries & Inventions in Medicine

Scientists have made many historical breakthroughs in the field of medicine. Here are a few interesting inventions that were, for lack of a better word, accidental.

Pacemaker

Wilson Greatbatch expressed an insatiable interest in circuitry and held revolutionary thoughts about how to fix naturally occurring problems in the human body.

Greatbatch was on the hunt for a solution for "heart block," a condition in which a heart does not receive messages from surrounding nerves to pump blood correctly. In contrast to other scientists who used large and cumbersome gadgets to stimulate heart muscle, Greatbatch wanted to devise a smaller implant to get the job done.

Though Greatbatch intended to create a machine to mend a broken heart, his moment of discovery may surprise everyone. While building an oscillator to record heart beat sounds in animals at Cornell University in 1958, he accidentally grabbed the wrong transistor and installed it in his device. Realizing his mistake, Greatbatch was still curious to see what would happen. Not expecting the oscillator to work, he switched it on and heard a familiar, rhythmic pulsing sound -- a pattern remarkably similar to a heart. His invention, known as the **pacemaker**, was ideal for sending pulsating signals to the heart. He tested his new creation on animals and fine-tuned the device before implanting it into a human in 1960.

Anesthesia

Crawford Long, William Morton, Charles Jackson and Horace Wells all come to mind when talking about anesthesia. These men realized that in some cases, ether and nitrous oxide (laughing gas) inhibited pain in people under their influence. In 1844, Horace Wells attended an exhibit and witnessed a participant injure his leg while under the influence of laughing gas. The man, whose leg was bleeding, told Wells that he didn't feel any pain. After this accidental discovery, Wells used the compound as an anesthetic while he removed his tooth. From there, anesthesia's use during medical procedures and surgeries took off. Wells, Morton and Jackson began to collaborate and use anesthesia in dental practices, while Crawford Long used ether for minor surgeries.

Pap Smear

In 1923, Dr. George Nicholas Papanicolaou took on a study of his own with the hope of witnessing cellular changes over the course of a menstrual cycle. Much to his surprise, upon examining a slide made from a smear of a patient's vaginal fluid, he discovered much more: that abnormal cancer cells could actually be plainly observed under a simple microscope. This in turn resulted in the Pap Smear, a simple test which has now saved millions of women from cervical cancer.

LSD: Lysergic acid diethylamide commonly known as an acid is a semi-synthetic

Q: Which tenant of a world religion states that all beings will eventually tend towards normal? A: The Zen-tral limit theorem

psychedelic drug. LSD is non-addictive and non-toxic. It acts as a painkiller for chronic pain. The effects of the drug include visuals (closed and open eyed) and intense hallucinations. The psychological effects include altered thinking processes, closed and open eye visuals, an altered sense of time and spiritual experiences.

The actual discovery of LSD as a hallucinogen occurred when *Dr Hoffman* was busy in some extensive research in Switzerland to synthesize a drug that could ease the pain during child birth. He catalogued the untested substance and stored it, after observing that he has not found anything interesting in his work. And then on a Friday afternoon in April 1943, he discovered the true properties of the compound he synthesized, by accidentally taking a healthy dose of it while handling it without precautions. While riding on his bicycle back home he observed "an uninterrupted stream of fantastic pictures, extraordinary shapes with intense, kaleidoscopic play of colors". And that is when he found the actual effects of the drug he synthesized.

Criminalized throughout the USA in 1966 (and by other countries soon), further research into LSD was (and still is) constantly hampered by its illegal status. Dr. Richard Alpert claims that he had tested the drug on 200 test subjects and 85% of the students say that it has been the most educational experience of their life.

LSD and the Discovery of the Polymerase Chain Reaction

Dr. Kary Mullis is a Nobel-prize winning chemist with a wide variety of controversial views. He has had a profound effect on the world through his co-discovery of the polymerase chain reaction (PCR) which allows us to amplify specific DNA sequences and is a quintessential part of most biochemical laboratories today. Interestingly enough, Dr. Mullis describes a psychedelic experience with LSD which helped him discover what would become the polymerase chain reaction. During a symposium held for centenarian Albert Hoffman (who discovered LSD), Hofmann revealed that he was told by Nobel-prize-winning chemist Kary Mullis that LSD had helped him develop the PCR. Replying to Hoffman, Dr Mullis told in BBC's *Psychedelic Science* documentary, "What if I had not taken LSD ever; would I have still invented PCR? I don't know. I doubt it. I seriously doubt it."

Archana. J, Final year

Aoccdrnig to rscheearch at Cmabrigde Uinervtisy, it deosn't mttaer in waht oredr the ltteers in a wrod are, the olny iprmoetnt tihng is taht the frist and lsat ltteer be at the rghit pclae. The rset can be a toatl mses and you can sitll raed it wouthit porbelm. Tihs is bcusease the huamn mnid deos not raed ervey lteter by istelf, but the wrod as a wlohe

The Medical Mirror

I never did anything by accident, nor did any of my inventions come by accident; they came by work - Thomas Edison

All the inventions starting from a pin to the PET are useful to mankind and are the fruits of one's toil. It is the scientists' arduous work and determination which has fetched

Landmark:1846 - Henry Bigelow reported a breakthrough in surgical anesthetics with the first uses of inhaled ether.

us devices that prove to be of immense importance under many circumstances. One such invention is the Medical Mirror, which was awarded the Best Invention 2011.

Mirror Mirror on the wall! Who is the fairest of them all? – From The Snow White

But this is the age when the people tend to ask the mirror "Who is the healthiest of them all?" as lifestyle has changed and it has become so hard to find a person who is hale and healthy. An MIT student- Ming-Zher Poh has indeed found the right time to invent the Medical Mirror or the Magical Mirror, which gives the people everything about their health when they stand before it.

I am silver and exact. I have no preconceptions- Sylvia Plath

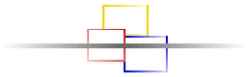
These lines written by Sylvia Plath, taking the role of a mirror, mean that the mirror is honest in portraying a person facing it. It does not hide anything. It looks like Sylvia Plath had foretold Poh's invention long back.

In the current scenario where all medical diagnoses are made using chest straps, sticky electrodes and bulky sensors, the medical mirror, without any physical contact, reports all the physiological parameters with least the possible error. When a user looks into the mirror, an image sensor detects and tracks the location of his or her face over time. By combining the techniques of computer vision and advanced signal processing, the user's heart rate is then computed from the optical signal reflected off the face. The user's heart rate is displayed on the mirror, allowing visualization of both the user's physical appearance and physiological state. This device illustrates an innovative approach to pervasive health monitoring based on state-of-the-art technology.

Poh says that the medical mirror is just one way of demonstrating non-contact diagnosis of vital signs of the body, the principle of which can be integrated with a laptop or any mobile phone which has a camera. As of now, the device measures heart rate, breathing rate and heart rate variability which tracks the beat to beat variations in heartbeat.

This invention of Ming-Zher Poh highlights the importance of a simple device which can be modified to suit our demands. A mirror which was used to just reflect the appearance of a person has now turned out to be a 'diagnostic weapon'.

H.Akshaya, Final year



Bag of Words

What comes to your mind as you come across this phrase, maybe a dictionary or a thesaurus?

Interestingly, it is actually a classification technique adopted in Pattern Recognition tasks in fields like Image Processing or text analysis. First, a feature detector of some sort is employed to extract all the features from the complete training set. As the raw features are too many in number to be used directly in the classification process, a clustering algorithm is run to express the features in a compact way. Each cluster is analogue to a "word" in a dictionary. In the dictionary, words do not have any relative information about the class they belong to or their relative location with respect to others. Instead, they are image characteristics that

are often repeated throughout the classes; therefore they are likely to be good representatives in the classification process. Once the dictionary is built, the features of each sample are mapped to words and a histogram of word frequencies for each image is created. Then, these histograms are used to build a classifier and the learning phase ends. When a new image is presented to this type of system, its raw features are extracted and their word representation is searched in the dictionary. Then, the word frequency histogram is built and presented to the trained classifier which makes a decision on the nature of the image. "Bag of keypoints" based biomedical image retrieval approach is by detecting affine covariant regions. Covariant region simply refers to a set of pixels or interest points which are invariant to affine transformations, as well as occlusion, lighting and intra-class variations. To describe the intensity pattern within the interest points the Scale-Invariant Feature Transform (SIFT) is used. The SIFT features are then vector quantized to build a visual vocabulary of keypoints by utilizing the Self- Organizing Map (SOM)-based clustering. By mapping the interest points extracted from one image to the words in the visual vocabulary, their occurrences are counted and the resulting histogram is called the "bag of keypoints" for that image, similar to the "bag of words" based representation of documents in text retrieval. To exploit the correlations between the keypoints in the collection, a global similarity matrix is constructed to be utilized in a distance measure function to compare the query and database images. A systematic evaluation of image retrieval on a biomedical image collection demonstrates the advantages of the proposed image representation and similarity matching approaches in terms of precision-recall.

Lakshmi.A, Final year

Researchers at University of California have evaluated more than 500 people who they thought might have highly superior autobiographical memory. The scientists confirmed just 33 cases, including the 11 in the study, but identified another 37 strong candidates who needed further testing. Most of these differences, unsurprisingly, were in areas associated with autobiographical memory. The researchers note that people with the condition of hyperthymesia did not score high on routine memory tests and have a different kind of super memory than people who can remember long lists of facts and numbers.

Amazing Medical Inventions

Large Touch and Gesture Controlled Microscope

The invention makes use of a mix of web-based microscopy and a 46-inch multi-touch display. Using pinch gestures or handed stretch, the device allows users to zoom images in and out down to 1000x magnification. The biological samples are placed into a microscopy scanner that digitizes them and afterwards stores on an image server. At high magnification the scanned sample represents a combination of up to 50000 separate digital images arranged into a mosaic. The size of one such image can be up to 200 GB. The technology is able to recognize the hands of several users simultaneously. For those of us who have struggled to focus specimens in lab, this will sure come in handy.

Landmark: 1951-Work starts to build oxygenator for CPB. The first successful open-heart surgery is performed in 1954.

Robot Suit to Help the Disabled Walk, Climb, Lift Weights

The invention is a **robotic suit**, developed to help people who suffer from strike-induce paralysis or those who had spinal cord injuries – *"upgrade the existing physical capabilities of the human body"*. The device weights **23 kilograms** and includes robotic limbs along with a backpack that features the battery and computer system. The technology works as follows: whenever an individual tries to make a move, the brain sends nerve signals to the muscles. The robotic suit then identifies these weak signals from the surface of the human skin with the help of a sensor that is attached on the wearer's skin. Then the signal is transmitted to power unit, signaling the unit to start moving in harmony with the limb of the wearer. **On a full charge the suit will function for about 5 hours.**

Infant Warmer

The new invention is an ingeniously simple, portable, reusable infant incubator that requires no electricity and costs less than $30. It was created to solve the problem of premature babies and neonatal deaths. It has no moving parts and can be easily sterilized. It looks like a tiny sleeping bag but its design is very clever. It has a pouch that contains a phase-change wax material that radiates heat throughout the insulation at a temperature of 37°Celsius (98°F) - the temperature critical for the child's survival.

Contact Lenses Medicate Eyes

A contact lens that can dispense a regular dose of antibiotics to your eye for more than a month – now that's innovation! A biodegradable polymer film is mixed with a medication (antibiotic) and coated with hydro gel, which is the same material used to make contact lenses. The film slowly releases the medication into the eye at a rate of 134 micrograms each day for 30 days. This new medical invention will dispense eye medication more easily and effectively for patients who find eye drops cumbersome and often forget to take it.

Water Drop Lens

The invention is a liquid optical lens. Using a process known as electro-wetting, a water drop is deposited on a metal substrate and covered by a thin insulating layer. When a voltage is applied to the metal, it modifies the angle of the liquid drop. The liquid lens is comprised of two liquids, water and oil; one is a conductor while the other is an insulator. A variation in the voltage causes a change to the curvature of the liquid to liquid interface, which changes the focal length of the lens. The use of liquids allows for low cost construction. The electrical consumption is extremely low. The lens has a large inverse focal length range, quick response, high optical quality and operates in wide temperature range.

Digital Infrared Laser Thermometer

The Wide Range Infrared Laser Thermometer is a standard size thermometer that has a range of -58 to 1400ºF (-50 to 760ºC), with a 16:1 distance to spot ratio. Designed for maximum performance, the infrared laser thermometer features high resolution of 0.1º up to 199.9º, automatic Data Hold, and auto power-off. A backlit display allows reading of measurements in low light areas or at night. The unit comes with a 9V battery and hard carrying case.

Archana.J , Final year

Q: Has the biomedical imaging engineer done anything useful lately? A: No, he's mostly been working on PET projects

Robotics In Medicine

Robotics is the branch of technology that deals with the design, construction, operation, structural disposition, manufacture and application of robots and computer systems for control, sensory feedback and information processing. The technology deals with automated machines that can take the place of humans in various applications.

A robot is a machine designed to execute one or more tasks repeatedly, with speed and with precision. There are as many different types of robots as there are tasks for them to perform.

On a basic level human beings are made up of major five components - A body structure, a muscle system to move the body structure, a sensory system that receives information about the body and the surrounding environment, a power source to activate the muscles and sensors, a nervous system that processes the sensory information and instructs the muscles on what to do

A robot is made up of the very same components - a typical robot has a movable physical structure, a motor of some sort, a sensory system, a power supply and a computer "brain" that controls all of these elements. Robots are man-made versions of life they are machines designed to replicate human and animal behavior.

Existing types of robots includes industrial, domestic or household, medical, service, military, entertainment, space robots, etc. Certain types of robots are used in medical institutions; first and foremost in surgery, also some as automated guided vehicles and maybe as lifting aides. Robots are currently used to test medical students; pregnant humanoid robots, for instance, prepare students for various birth complications. Robots are also affecting the way hospitals are run and medications distributed.

Robotic surgery involves the use of the surgeon assisted robotic equipment for performing surgical operations. The da Vinci surgical system, ZEUS robotic surgical system and AESOP robotic system are the top three electronic applications of robotics in the field of surgery globally. The FDA (USA) has permitted the use of the da Vinci surgical system as a viable tool in the operating room, making it the first technology to be accepted in the USA.

We have seen how technology has changed mass production of automobiles and just as in manufacturing, the operating room will soon need fewer personnel which will perhaps produce even better results. For instance traditional cardiac bypass surgery requires that a foot long incision be made - the surgeon will first cut through skin, then subcutaneous tissue, fascia, muscle and then finally gets to the heart. With the use of da Vinci surgical system or any other system it is possible to perform surgery on the heart by making three small incisions in the chest, each about one centimeter in diameter, hence ensuring that patients experience much less pain and far less bleeding.

Remote surgery enables a doctor to perform surgery on a patient even though they are not physically in the same location; it is a form of telepresence. A robotic surgical system generally consist of one or more arms (controlled by surgeon), a master

Landmark:1897 - Chemist Felix Hoffmann successfully combined and stabilized acetylating salicylic acid with acetic acid to form what we now refer to as aspirin

controller, a sensory system giving feed robotics and cutting edge communication technology such as high speed data connections. Remote surgery is essentially advanced telecommuting for surgeons, when the physical distance between the surgeon and the patient is immaterial. Benefits of robot assisted surgery include decreased post-operative plan, decreased risk of infection, decreased blood loss and shorter hospital stays.

In 1997 a surgery was performed in Cleveland using the ZEUS system - the operation successfully corrected a woman's fallopian tubes.

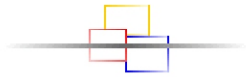
In May, 1997 the first robotically assisted operation for a heart bypass surgery in Germany was successfully performed using the da Vinci surgical system.

The first coronary artery bypass graft was performed using the ZEUS robotic surgical system in October 1999, in Canada.

The first unmanned robotic surgery was performed in Italy (May, 2006).

In India, Apollo hospitals have a da Vinci surgical robotic system.

Renugadevi.S, Third year



A Medical Sensor You Can Swallow

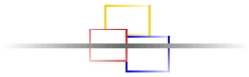
Yes, even pills are going digital.

The U.S. Food and Drug Administration (FDA) approved an ingestible sensor that can be packaged inside a pill. The sensor, made by Proteus Digital Health, is intended to help patients stick to their medication schedules. When it reaches the stomach, it sends a signal to a patch that the patient wears on the skin. The patch records the time when the medication and its sensor were ingested, and transmits that information along with some other health stats like heart rate to a smartphone app. The patient can then share his records with doctors, family members, or anyone else who's helping him monitor his medication.

The tiny sensor is made of silicon and is the size of a grain of sand. It powers up when it hits the stomach and encounters fluids. Electrodes are made of magnesium and copper and the fluid acts as the ion bridge for the electrochemical reaction. Proteus says it's investigating applications for patients with diabetes, people with diseases of the central nervous system like schizophrenia and Alzheimer's, and organ transplant recipients who have to follow strict drug regimens to suppress their immune systems.

While no pharmaceutical companies have yet come out with "digitized" medicines, Proteus has picked up industry collaborators like Novartis. And in the EU, where the system has already received regulatory approval, a retail pharmacy chain has announced plans to sell packages that include both inert sensor-enabled pills and the patient's usual medications.

D. Saranya Priyadharshini, Final year



"It would be possible to describe everything scientifically, but it would make no sense; it would be without meaning, as if you described a Beethoven symphony as a variation of wave pressure." - Albert Einstein

Potpourri

Srishti is that time of the year when creativity becomes an accepted norm. So when you read our non-technical section with its diverse array of topics, don't be surprised - its what we do best !

What I could not see, he could……

It was the Indo-Pak Sharjah clash and the match was all set for a nail biting finish. My phone rang for the seventeenth time since Sachin had taken his guard. This 'unknown number' was going to get it from me. Can't an electrician take a day off, have a drink and watch the match. The damned fault could wait a day. So I switched off my phone and was all set for Pakistan's chase.

Next morning was another late start; the last gulp of victory got me sleeping well beyond my usual hours. And of course, my alarm was switched off. Just as I stepped into the division office, it was my familiar ringtone and the same old number. The voice on the other side belonged to a young man, probably in his twenties. He verified the number and introduced himself as Salim, a shopkeeper on Thilak Street. He had a problem with a night lamp which fused out. It apparently lit the intersection, a relatively dangerous turn into the street. 'Come on, cars and bikes have enough lighting on them, they don't need street lamps.' I gave him the usual lazy response and assured him that it would be taken care of by the next day.

Two days later it was Salim again, with a patient reminder. This is the state electricity department; you cannot expect things to be done as promised. There were no replacements in stock - I did not know for sure but that was what I told him.

Three days later, I was at a junction officer's residence installing an extra line for his Air Conditioner, it happened to be close to Thilak street. Salim was persistent for sure, he reminded me twice every day since our first conversation. I ran out of excuses and decided to get the work done.

There was this minor wiring issue, nothing wrong with the bulb as such and the work was done in about ten minutes. I decided to call the office and inform them, Mr.Saravanan kept a judicious account of the complaints. My phone was short on balance, so I stepped into a nearby store and made the call. Just as I paid the three rupees, I accidently pushed the tin box with the day's earnings in it. It fell down with a clutter. The owner's response was kind of delayed. He went to the floor and as I bent to the floor to help him out, the man was feeling for the coins. He was frantically crawling on the floor, extending his hands into every corner in search of his treasure.

Once every coin was back in the box he thanked me and introduced himself as Salim. The man was blind, light and colour to him were strings of imagination, a distant reality, a longing desire.

Yet, the man saw well beyond the horizons my sense of sight could ever take me.

Ashwin Varadarajan, Final year

It was in 1976 when addressing a group of doctors, His Holiness Sri Jayendra Saraswathi, the Sankaracharya of the Kanchi Kamakoti Peetam spoke of the need to create an eye hospital with a missionary spirit.It was named Sankara Nethralaya, which means "The Temple of the Eye". On the auspicious day of Vinayaka Chaturthi, the sixth day of September in the year 1978, the hospital came into existence. On an average, 1200 patients walk through their doors and 100 surgeries are performed every day.

In 33 years, the hospital has gained international excellence and is acclaimed for its quality care and compassion. Sankara Nethralaya today has grown into a super specialty institution for ophthalmic care and receives patients from all over the country and from abroad. Sankara Nethralaya family today has over 1000 individuals with one vision – to propagate the Nethralaya philosophy

I am a blind person

I am a blind person,
Is there anyone,
who will understand me,
Who will listen to me,
Except my eyes, I am just like you,
You can see this beautiful world, I cannot,
The way you think I can think,
The way you work, I also can,
I have the same emotions, feelings like you,
I am also human like you,
But why do you treat me like a helpless person?
Why do you think, I can't do anything?
Why do you treat me like a poor beggar?
Why do you think, I can't earn my bread and butter?
God has not created me for begging,
God has not created me for singing in the trains,
If God gives one minus,
He gives two pluses also,
I request you; I don't need your sympathy,
Please allow me to learn and fight the odds of life,
Please allow me to stand on my feet,
Please let me handle the reverses of my destiny,
I want to lead life like a normal person,
I am sure, I will be able to do it and I shall succeed,
And if I develop a Habit of dependence on you,
My learning life will be finished,
My passion for success will be finished,
My purpose for life, will be finished,
And,
I don't want to die before my death,
I am like you only.....

D. Saranya Priyadharshini, Final year

Borrowed Angel

It's a bright breezy day,
Too good for a funeral;
Strangers walking in and out of the altar,
I never took my eyes off her;
Not because she's the most beautiful nineteen year old woman
I ever met, who stole the moonlight;
Not because she's one good friend
Who believed in my stupid philosophies?
May be because I was not ready to let her go;
Or May be because she was too young to leave;
Am not surprised and my eyes were clear and dry,
For we knew this day would come;
Man can own nothing,
What you lose today has never been yours,
She told me long before;
As her beauty fades away,
With a smile I stand today,
To say good bye,
For my Angel,
That I borrowed.

Praveen Richard Ebenezer,Final Year

A new chapter in my life

Peak hour. Heavy traffic. It was about 6 in the evening. Everyone was eager to reach home after their hectic days and before the heavens open up. With my hands tight on the window grills I just looked to see whether my stop had come. It was raining cats and dogs. For Chennai it's actually a treat.
With my half closed eyes I noticed that half the people in the bus were staring at me as I was the only one there with my luggage nearly equaling my height. Two ladies in front of me were wondering why I was all alone. The conductor was, as usual, shouting at me as if only my luggage was blocking the way. Well, never mind…

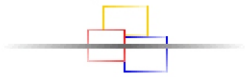
I was on my way to a place where I had never been before and everything was going to be new for me. A feeling of 'left all alone' to lead my independent life was in me.

I finally got a chance to rest in the bus as the crowd started to thin. The mild breeze brought with it a lot of memories including thoughts of that very morning when my family had bid goodbye to me. I had just moved out of my home town, wondering how I am going to get accustomed in a new place where no one knows who I am.

With this sense of mixed emotions my eyes dozed off slightly. 'SSN' shouted the conductor.
Yes! This will be my stop not only for now but for four whole years. With many hopes and a little confidence I entered.

And it has been 3 years now! Happy and content. A sense of satisfaction to have lead my own life with attitude (hope so!).Small pride in taking new decisions, Hostel life, Adventurous trips, new characters and the list goes on. Experienced the best here. . Nothing was to my expectation and wish but I learned to live with what was there. It has taught me how to accept things and make them beautiful
And here I am, saying to myself "Way to go!"

R.C.Tharani, Final year

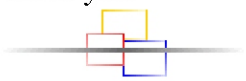


The Lost History of Indian Independence

The History of the world is nothing but the biographies of great men and history can be well-written only in a free country. These great quotes apply very well to Indian History. History is a record written on people who changed or caused a change in the world. Their life story remains unaffected by the sands of time. They were common people who took an uncommon path. Indian Independence was attained due to the many sacrifices by the Martyrs, who willingly yielded to death rather than to renouncing their beliefs. Of all the revolutionaries, Khudiram Bose was one of the youngest revolutionaries who fought for the cause of Independence. During the public lectures that were held for the student community, Khudiram's young blood boiled with anger and inspiration. Words have a lot more power than weapons. They totally changed his views and took control of his life. With the help of Bhagavad Gita, he chose the path of a martyr. As a teenager, he dreamt of freeing India from the hands of British who were curbing the birth right of his country – Freedom. As a result he planned a mission to bomb a Police station and blow up the carriage of Kingston, the magistrate of Muzzaffarpur, Bihar. To his horror, two innocent women were killed in that process and his friend Prafulla committed suicide after being caught by the Police. Soon after, Khudiram's fate was sealed. The trial which started on May 13th ended in June when the Judges gave the verdict as death penalty without considering his age. He was prepared to embrace his destiny and answered with a smile as he knew his efforts won't go in vain and that his dreams would become reality someday. He started the revolution which was soon followed by many young people of Bengal and spread around India like a wild fire. The great people did not sacrifice their lives for themselves but they did it to set us free. In this present age, where we can exercise our fundamental rights, we must remember that there were hundreds of Khudirams who gave up their lives for the dream they believed would come true. As Gandhi said, a small body of determined spirits fired by an unquenchable faith in their mission can alter the course of

history. But who would have thought that a boy like him, who distributed handbills printed “Vande Mataram” would actually bring glory? But he did. And to praise his deeds, even a thousand salutes won’t do justice.

L.Sadhani, Third year



MC - The "Olympic Diva" of India

MC Mary Kom or 'magnificent Mary' lived up to her billing of a world champion with a Bronze at the London 2012 Olympics in the under 51kg flyweight category. The road to glory had its share of hardships.

The Kom Ancestry

Mangte Chungneijang Mary Kom was born on March 1st, 1983 in Kangathei, Manipur. MC's parents Mangte Tonpa Kom and Mangte Akham Kom worked in the jhum fields. MC did her primary schooling at Loktak Christian Model High School, Moirang. Due to the families’ economic predicament, there were times when MC worked in the fields, cutting wood. She was an enthusiastic kid who loved sports since childhood but kept it secret for the betterment of the family. She then moved to Imphal for high school. Later, she quit school and appeared for NIOS examination and graduated from the Churachandpur College. Her spouse K Onler Kom and twin sons, Rechungvar and Khupneivar have always been a source of great support. MC is a Police officer with the Manipur force.

MC's Paradise

The Mary Kom Regional Boxing Foundation, formerly known as M.C. Mary Kom Boxing Academy is a Trust body that was established in the year 2006. The academy consists of 27 students, both residential and non-residential. The sports academy is exclusively meant for the under-privileged youth of Manipur and works under the motto “Quality Boxers with Prestigious Sports Medals from under-privileged potentials" and has produced state and national level medalists in various weight categories. The UNACCO (United Aroma Commercial Company) Foundation Trust has helped raise funds for the academy. The foundation plans to help women in particular and provided Rs.5000 per month till the Olympic Games 2012 and further help will be given based on the changing sporting circumstances.

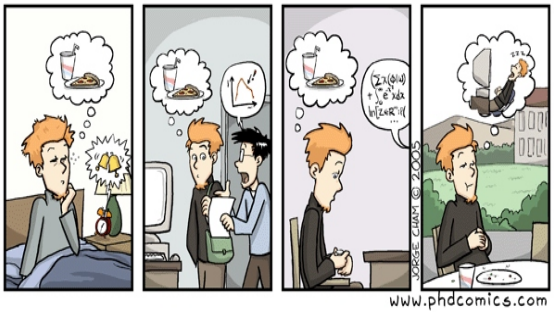
Olympic Diva's Love for Boxing

MC was awarded the Arjuna Award in the year 2003 after winning the gold in the 46 kg category at the Asian Women’s Boxing Championships. Kom’s inspiration was Dingko Singh and she started working towards her goal in the year 2000. She is currently the five time world champion in the under 51 kg flyweight category. Kom had the privilege of holding the Queens baton at the opening ceremony of the Commonwealth games 2010 at Delhi but was unable to compete as boxing was not a part from the Commonwealth games. In the 1st round of Olympics 2012, Kom battled against Karolina Michalczuk of Poland and won, 19-14. In the quarter finals, she won against Maroua Rahali of Tunisia with a score of 15-6. During the semi-finals the people of Manipur decried the electricity board and the people from MC's village vandalized the police station. The Hindustan Times quoted Kom's father, '“All we want is 8-10 minutes of uninterrupted power when her semi-final starts,”. Kom’s opponent was the 2 time World Champion Nicola Adams of England and she was defeated 11-16 which earned her the bronze medal. MC said 'I used to practice with men heavier than me and that helped me stay strong throughout the action'.

After securing the bronze medal at the London Olympics, Kom dropped her plan of retiring and declared that she would compete in the 2016 Olympics at Rio de Janeiro.
'If you don't have a streak of anger in you, you can't be a very good boxer' **- M.C. Mary Kom**

Mary Kom Medal Record
2001 - Silver (Pinweight, 45kg) - Women's World Boxing Championships, Scranton
2002 - Gold (Pinweight, 45kg) - Women's World Boxing Championships, Antalya
2005 - Gold (Pinweight, 46kg) - Women's World Boxing Championships, Podolsk
2006 - Gold (Pinweight, 46kg) - Women's World Boxing Championships, New Delhi
2008 - Gold (Pinweight, 46kg) - Women's World Boxing Championships, Ningbo City
2010 - Gold (Light flyweight, 48kg) - Women's World Boxing Championships, Bridgetown
2010 - Bronze (Flyweight, 51kg) - Asian Games, Guangzhou
2012 - Gold (Flyweight, 51kg) - Asian Women's Boxing Championships, Guangzhou
2012 – Bronze (Flyweight, 51kg) – Olympics 2012, London

Abigail, Third year



Emblem of Endurance

I miss those days when spent in laughter
I miss those moments shared together;
Every time my sis would go shouting at my causes
And my brother mocking me at sobs
Those big bushes of roses would miss me
Every time it blooms a number for me;
Those small sparrows would miss me sweep
All the time when they dirt to make me weep
I miss those trees and shades ever-pleasing
Where with friends I spent playing;
Of all those things momma and papa-
I miss your love that makes me sprout.
I feel the sin of loneliness - for
Your love is the emblem of endurance!!!

Ajitha Bharathi A.V, Third year

Dreams vs Reality

The 12th grade, the so called "life deciding year for all students" wasn't very easy for me either. I remember the sleepless nights, 'Test series' even during government declared holidays, festivals and heavy showers. The dream that kept me going was the feeling that 'college would be loads of fun' .Nevertheless the motivating words of my mother, "It is just 12th.After that you need not work so hard" and the movies which only portrayed perfect campus fun provided a strong foundation for my dreams. Don't mistake me for the technical words that I use like "foundation". It's all purely the impact of civil engineering on me. I spent the entire four months of holidays planning the type of dresses I would wear and collecting accessories. I always slept

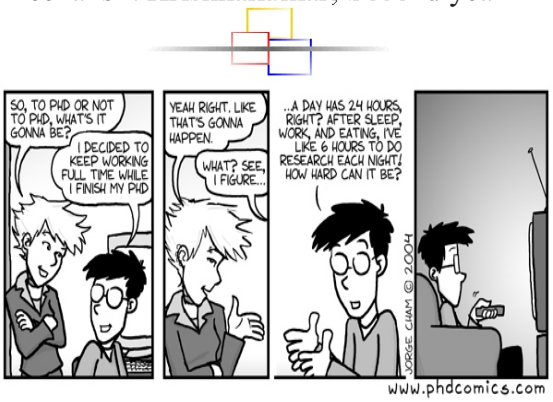
dreaming about being a part of a big gang and having fun with friends. The minute I finished my board exams I thought that there would be no more records, assignments, classwork, stressful studying and strict rules ever in my life again. Everything seemed rosy.

Talking casually to a senior friend who was doing Engineering, I understood that it was not child's play. Immediately, I tried convincing my parents to allow me to pursue a course of my interest like 'Fashion Designing' or 'Psychology' '.I even cited the example of the movie '3 idiots' but was forced to accept the bitter truth that reality is far from the 3 hour portrayal on screen. I knew my parents wanted me to get a professional degree and I understood the pride they felt in addressing their daughter as a future engineer. What for are we kids if we can't make them happy? So now my focus shifted to searching for a good engineering college. That was when I came across our college, SSNCE and by the grace of God, I got admission here.

The very first day of college, I was exposed to a great shock. The college bus would come to the main road at 7am. I know I should not be complaining as I am one of the last to be picked up and one among the first to be dropped back home. But it was initially hard for a person like me who was used to getting up at 8 and having the school bus picking me up right at the doorstep. I also had to take notes in class and maintain records and observations. Oh God! I could feel all my dreams shattering. The worst part was that whenever there was no UT the TV channels would broadcast captain Vijaykanth's movies and on the weekend preceding our UT the best of movies and award functions would be telecast. This has always been students' plight. I know that I have been very pessimistic complaining about every single issue but I never forget to thank God when I compare myself with my friends in other Engineering colleges. We at SSNCE are respected for our high scores, hard work and treated mostly like how teens should be treated [though not always!], given a lot of freedom, allowed to wear comfortable clothes of our choice and so on. Although we are stressed during UT'S, it would be unfair on our part not to accept the fact that we are asked to clear only 2 of the 3 UT'S. So brooding over the negatives will not allow us to cherish the best four years of our life. Rather, it is left to us to make use of every single opportunity and making it memorable. Piling up arrears, getting into 2 or 3 relationships, having very low attendance does not define enjoyment in college. The world outside is very competitive and we need to be one among the best to survive the rat race. It is just not the 'bookworms' that the world outside would require but a 'complete individual' with a pleasing personality, practical knowledge and good communication skills. College provides us a platform to work on all such areas. So taking part in academic and non-academic activities gives us a good opportunity to mould us in the right way.

Dear friends, this is reality. These four years can never be got back. So let us use it to the fullest in the most positive manner so that we would have no regrets later

Meenakshi Krishnakumar, Second year



The Biomedical Kolaveri !

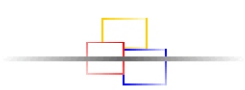
We are among those crazy people who manage to sit through a java class right after an elaborate lecture on the evolution of the DNA structure. We are one of the most peculiar new arrivals in India-"the biomedical engineers"! Now, when I say peculiar, I do mean it in all sense .We are those super humans who drudge through four years of learning the subtle intricacies of the cockroach's digestive system, but still without the slightest of regret squeeze out a plastic smile to our bosses in a dingy 15*15 cell at a yet-to-be authorized IT company not many years later. Mind you, my work is not a mere ctrl + v job, but an outcome of sheer frustration right from day one that I entered this field.

Owing to the chatterbox nature of mine, it wasn't quite difficult to start a conversation with a girl sitting next to me for the admissions. I was in fact pleasantly surprised to know that she had given biomedical engineering (BME) as one of her course preferences like me and "unlike" most others. But, later what she said came down as a huge blow to me. She had a smart strategy (at least according to her ,that is) :go through the motions of the course for 4 years and at the end of it ,join an IT company as if you don't give a damn about all that you learnt in these years(that's what she said most BME guys did).But why BME?" because that's relatively easy" ,was her argument! I didn't think of anything else, all that came to my mind was "lights off, pack up" enough of all the good insights about this field already, let me just shut my mouth now. There was no dearth for such incidents after that."Macha! She wouldn't have got any other group da!" oh God! People just give me a break; I've heard this like a zillion times. And of course, the instance when a girl said,"Hey! How come even the BME has got HoDs teaching them, while our department hasn't got any. Really unfair! ". Now trust me ,I just felt like slapping each one of these idiots who treated us like "soup BME", but all I could do was mumble within myself. But the good news is, this is only the Indian version of the story, nevertheless, in countries like the US, BME is one of the most prosperous and widely opted fields of study where job opportunities go up by 35 % every year. Recently, a professor at the UA College, Arizona, was granted with $1 million for his research in this field. At one instance, when my aunt from the US had rung up, she seemed so curious that she kept asking me about the field. I was puzzled at her curiosity but apparently it turned out that she just had wanted to update her current affairs knowledge, there being a great bustle about it abroad .Now, when so much is happening around the world and when you still get to hear those mocking words "Dude! She didn't have any other choice, but to end up in BME", it only shows how ignorant we are as students and about India's future. We, BME engineers are actually honing ourselves for jobs that currently do not exist (stress "currently" here). We are the ones who save lives without having the need to see blood, we are the ones who personify the word "multifaceted" and we, undoubtedly, are the proud technologists of a "futuristic" science.

Make way for BME, make way for FUTURE!

PS: This article has been written with all due respect to SSN COLLEGE OF ENGG, one of the very few colleges in the whole of India that recognizes BME as a branch of engineering and encourages it as a career option.

R.Prasanna Bharati, Second year



தமிழ் மொழி ஆர்வலர்களின் புதையலாய்
செம்மொழிக் கவிஞர்களின் பொக்கிஷமாய்
பைந்தமிழ்மொழி வித்தகர்களின் கருவூலமாய்
திராவிட மொழி வாசகர்களின் செல்வக்குவியலாய்
சிரித்து மகிழ ஒரு நகைச்சுவை விருந்தாய்
தந்திரம் மிக்கவர்களுக்கு ஒரு புதிராய்

தமிழ் களஞ்சியம்

பார்வை

இரு விழிகள் வழியே வரும் ஒளி-பார்வை

கரு விழிகள் தரும் ஒளி-பார்வை

மனம் பேசும் மொழி பார்வை

சினம் கொண்டால் ஒரு வகைப் பார்வை

மகிழ்ச்சி கொண்டால் ஒரு வகைப் பார்வை

காதல் கொண்டால் ஒரு வகைப் பார்வை

கருணை கொண்டால் ஒரு வகைப் பார்வை

கவலை கொண்டால் ஒரு வகைப் பார்வை

கடவுள் அளித்த இவ்வகைப் பார்வை

கண்கள் இருந்தால் மட்டுமே சாத்தியம்

ஆகவே கண்தானம் செலுவோம்
வழிகாட்டியாய் திகழ்வோம்

-மாரீஸ்வரி,இரண்டாம் ஆண்டு

படம் பார்த்து கதை சொல்

இந்தியன் என்று சொல்லடா

பிறந்தது டில்லியிலே
வளர்ந்தது சென்னையிலே

உற்றார் உறவினர் உத்திரப்பிரதேசத்திலே
உள்ளம் கவர்ந்த நண்பர்கள் ஊட்டியிலே

பட்டாடை உடுத்தி நடந்தேன் காஞ்சியிலே
தோனியிடம் கையொப்பம் வாங்கினேன்
ராஞ்சியிலே

சிற்பத்தின் அழகு கண்டேன்
மஹாபலிபுரத்திலே
இயற்கையின் நிறம் கண்டேன்
திருவனந்தபுரத்திலே

ராஜராஜ சோழனின் கலைநயம் வியந்தேன்
தஞ்சையிலே
விறுவிறுப்பான உலகைக் கண்டேன்
மும்பையிலே

மக்களுள் வேற்றுமை கண்டேன்
பாரதத்திலே
என் இடம்,என் இனம்,என் நிறம் என
ஒற்றுமையற்றுத் திரியும் ஓரினங்கேளீர்

எருதுக்குள் இனமுண்டா;எறும்புக்குள்
மதமுண்டா
குதிரைக்குள் குலமுண்டா;பிரிந்திருந்தால்
பலமுண்டா

எல்லொருக்கும் ஒருயிர் எல்லொருக்கும்
ஆறறிவு
இதில் பிரிவிற்கு இடம் எதற்கு

துறப்போம் பிரிவை,அடைவோம் உயர்வை
ஒற்றுமைக்குச் சான்று நாமென்று சொல்ல
நாவிலே சுரப்போம் செந்தெனை !

-இரா.அக்ஷயாதேவி, இரண்டாம் ஆண்டு

இனியொரு விதி செய்வோம் !

சுமக்கவில்லை உன்னைக் கருவறையிலே
சுமக்கிறாள் தன் இருதய அறையிலே

உயிர் தந்தவளை தாயென்கிறாய்
உயிர் தாங்கும் இவளை ஏன்
துன்புறுத்துகிறாய்?

சீர்மிகு வளங்களை முடிந்தவரை
அனுபவித்தாய்
சிறகில்லா பறவையால் இவளை ஏன்
அகதியாக்குகிராய்?

கண்காணா தூரத்திலிருப்பவன் இவளை
போற்றுகிறான்
கண்ணிருந்தும் அறிவிலியாக ஏன்
வாழுகிறாய்?

பாராட்டி வளர்த்த சீர்மிகுந்தவளை
மறவாதே
பாரெங்கிலும் இவள் போலொரு தாய்
கிடையாதே

விண்ணுயர்ந்து நிற்கும் இவள்
முன்னேற்றங்களை
மண்ணோடு புதைக்க நினைப்பவர்களை நீ
களை

விழிகள் மூடாமல் கனவுகள் கண்டு
வீழாத நம்பிக்கையுடன் மீண்டெழுந்து
விடா முயற்சியால் எழுச்சிமிகு பாரதத்தை
உருவாக்குவோம்!!

-பூங்காவனம்.ப,இரண்டாம் ஆண்டு

கண்டுபிடி

பார்க்கப் பச்சை, பழுத்தால் சிவப்பு
பல்லிலே பட்டால் கண்ணிலே நீர்

விடை:மிளகாய்

2020 இல் வல்லரசாவோமா?

சட்டையோடு சேர்த்து
நெஞ்சை தைக்கிறது
தேசியக் கொடி குத்தும் ஊசி...
சுதந்திரக் காற்று காலம் காலமாய்
உயர் மாளிகைகளின்
கற்கோட்டைகளால் தடுக்கப்பட்டு
வெறும் உஷ்ணத்தை மட்டும்
குடிசைகளுக்கு உமிழ்கிறது

இந்தியா வளர்கிறது!!
2020 இல் வல்லரசாம்!!
விலைவாசி உயர்வு
பாமரனை பாதிக்காதாம்!!
குளிர்சாதன அறையில் அதிகாரிகளின்
அறிக்கை!!

இன்று வளர்ச்சி என்று எதை மார்தட்டிக்
கொள்கிறோம்?
வார விடுமுறையில் ஆயிரம் ஆயிரமாய்
செலவிடுபவன்
2000 ரூபாய் இருந்தால் மட்டுமே
சட்டை கூட வாங்க முடியும் என்று,
பெருவணிகக் கடைகளை நாடி
செல்வதைத்தான்.

என் இந்தியாவின் மறுமுகம் தெரியுமா ?
80 சதவிகிதம் மக்கள் ஏழைகள்
20 கோடி பேர் இரவுனவு இல்லாமல்
உறங்குபவர்கள்
2.5லட்சம் விவசாயிகள் குறுகிய காலத்தில்
தற்கொலை
சுடுகாடு,சுரங்கம்.விளையாட்டு,உணவு
இப்படி எல்லாத் துறைகளிலும் ஊழல் ஊழல் !
இப்படிப்பட்ட கோரமுகம் தான்
இந்தியத்தாய்க்கு

எப்படிச் சொல்வேன் '2020'இல் இந்தியா
வல்லரசாகுமென்று?

-இரா.ஷாந்தினி,நாங்காம் ஆண்டு

பார்வையற்றோரின் ஏக்கம்

அழகிய இயற்கையாம்....

பூத்துக் குலுங்கும் மலர்களின்
மணத்தை முகர்ந்து மகிழ்ந்தேன்!

பட பட வென்று கூவிப் பறக்கும்
பறவையின் குரலைக் கேட்டு மகிழ்ந்தேன்!

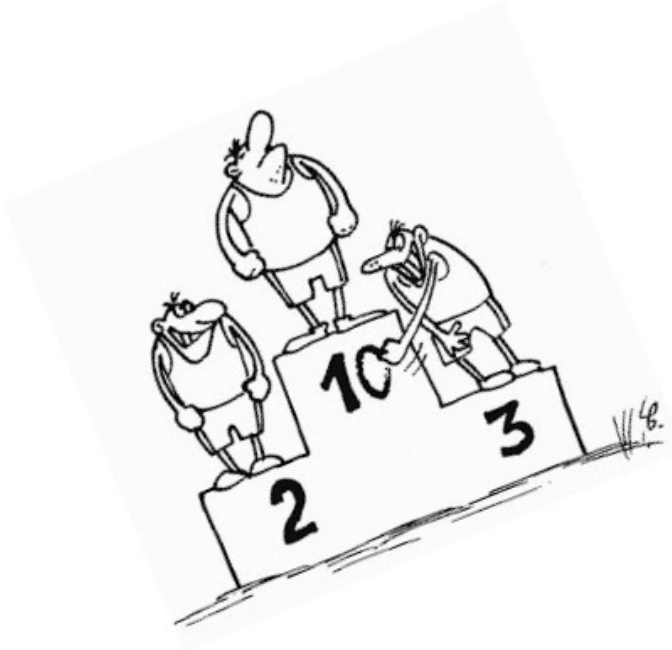
பானை போல வயிறாம் யானைக்கு
அதைத் தொட்டு மகிழ்ந்தேன்!

தெய்வத்திற்கு நிகரான என் தாய் தந்தையை
அழைத்து மகிழ்ந்தேன்!

ஆம், இயற்கை அழகுதான்....
ஆனால் , இவை அனைத்தையும் பார்த்து
மகிழும் சக்தி மட்டும் ஏன் இல்லை
எனக்கு???

-அ.சரண்யா,மூன்றாம் ஆண்டு

இன்றைய சமுதாயம்



சொல்லுங்க பார்ப்போம்

1. யார் தெச்ச சட்ட
   தாத்தா தெச்ச சட்ட

2. ஏழை கிழவன் வாழைப்பழத் தோல்
   வழுக்கி
   சருசருக்கி வழுவழுக்கிக் கீழே
   விழுந்தான்

3. ஓடுற நரியில ஒரு நரி கிழ நரி

-ஹ.அக்ஷயா,நான்காம் ஆண்டு

கண்டுபிடி

1.ஏறினால் வழுக்கும்;
இலையென்றால் சுருளும்;
பூவென்றால் துவர்க்கும்;
பழமென்றால் இனிக்கும்

2. சிவப்புப் பெட்டிக்குள்
சின்னச்சின்ன செய்திகள்
அது என்ன ?

விடை: வாழை, தபால் பெட்டி

இதல்லவோ தன்னம்பிக்கை

வானம் அது நீலமோ

வானவில் அது வண்ணமோ

கடல்கள் அவை ஆழமோ

மலைகள் அவை உயரமோ

பூக்கள் அவை மலருமோ

ஈக்கள் அவை குமியுமோ

எழுத்துக்கள் அவற்றின் வடிவமோ

காற்று அதன் வேகமோ,நான் அறியேன்

நான் மிக அழகோ? நான் காணேன்

செவி வழி மட்டுமே இவை கேட்டேன்

மகிழ்ந்தென்..... வருந்தவில்லை....

தன்னம்பிக்கை இழக்கவில்லை

வாழ்க்கை பாதையில்

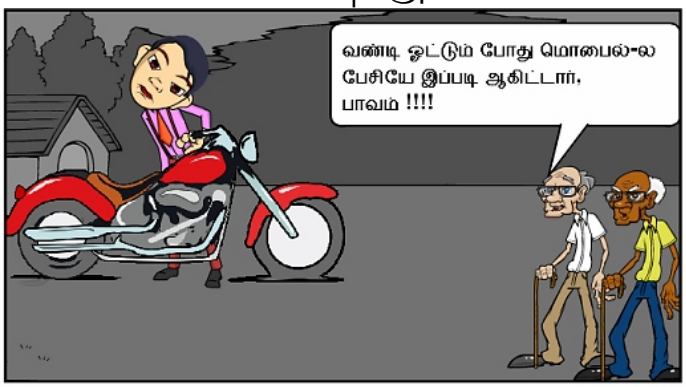
வெற்றி இலக்கை நாடுகிறேன்

வெற்றியைக் காண்பேன்

என் அறிவுக் கண்களால்

-ஹ.அக்ஷயா,நான்காம் ஆண்டு

கைப்பேசி செய்யும் அட்டகாசம்



சிந்தனைகள்

மரம்

காய்,கனி,நிழல் தந்து உதவும் உன்னை
காக்க ஒரு கை கூட இல்லையே

தூண்களை(மரம்) இழந்து கண்ணாடி
போன்ற துளிகளை(மழை)
இழந்து தவிக்கிறது இந்த பாவப்பட்ட
உலகம்

வயது முதிர்ந்து இலைகள் உதிர்ந்து
பிறக்கும்
நிழல் தந்து காக்கும் நீயும் ஒரு தாய் தான்

உடலும் உயிரும்

கடல் போன்ற அன்பைத் தந்தாய்
உணரவில்லை
உலகையே கொண்டு வந்து தருவாய்
என்றாய், தெரியவில்லை
உன் உடலைப் பிரிந்த பிறகு தான்
உணர்ந்தேன் நீ
இல்லையெனில்
நானும் இல்லை என்று

தந்தை

போர் களத்தில் போர் புரிபவன் வீரன்
என்றால்
தினம் தினம் போர் போன்ற வாழ்க்கையை
சந்திக்கும் என் தந்தை,வீரனல்ல மாவீரன்

பிரிவு

நீ காத்துக் கொண்டு இருந்தாய் எனக்காக
ஆனால் அன்று எனக்கு புரியவில்லை
இன்று நான் உனக்காகக்
காத்துக்கொண்டு
இருக்கிறேன் நீ இல்லை என்பது மறந்தும்

-க.சோனா
கு.திருமகள், மூன்றாம் ஆண்டு

தமிழில்தான் சொல்லுங்களேன்

chalkpiece	-	சுண்ணத்துண்டு
blackboard	-	கரும்பலகை
pen	-	பேனா
pencil	-	கரிக்கோல்
signature	-	கையொப்பம்
engineering	-	பொறியியல்
biomedical engineering	-	மருத்துவ ஆய்வு பொறியியல்
tubelight	-	குழல் விளக்கு
tea	-	தேநீர்
paper	-	காகிதம்
newspaper	-	செய்தித்தாள்
internet	-	இணையதளம்
wireless connection	-	கம்பியில்லா இணைப்பு
laptop	-	மடிக்கணினி
projector	-	ஒளிப்படக்காட்டி
lecturer	-	விரிவுரையாளர்
professor	-	பேராசிரியர்