

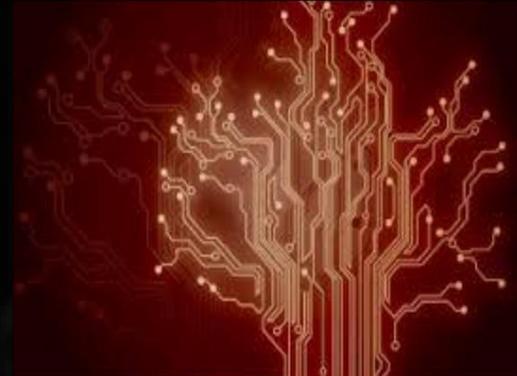
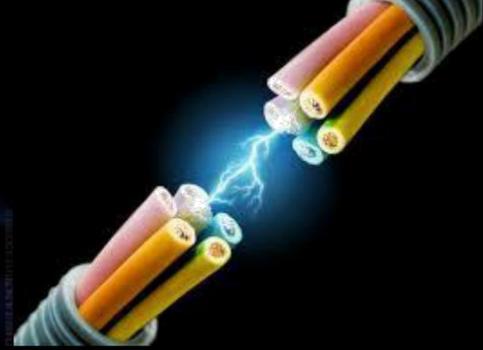
# ELECTRAZE

version - 4.1

ONE TEAM

ONE SPIRIT

ONE SUCCESS



## SPECTRUM

Department of ECE



DR MAHALINGAM



COLLEGE OF ENGINEERING AND TECHNOLOGY

Enlightening Technical Minds

**DR.MAHALINGAM COLLEGE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)**

NPTC –MCET Campus, Udumalai Road, Pollachi-642 003.

Ph:04259-236030/40/50;Fax:04259-236070.

**VISION OF THE INSTITUTE:**

We develop a globally competitive workforce and entrepreneurs.

**MISSION OF THE INSTITUTE:**

Dr.Mahalingam College of Engineering and Technology, Pollachi endeavors to impart high quality, competency based technical education in Engineering and Technology to the younger generation with the required skills and abilities to face the challenging needs of the industry around the globe. This institution is also striving hard to attain a unique status in the international level by means of infrastructure, start-of-the-art computer facilities and techniques.

**VISION OF THE DEPARTMENT:**

To strive for excellence in Electronics and Communication Engineering education, research and technological services imparting quality training to students, to make them competent and motivated Engineers.

**MISSION OF THE DEPARTMENT:**

Department is committed to

- Impart quality engineering education in the areas of Electronics , Signal Processing, Embedded Systems and Communication Networks.
- Equip the students with professionalism and technical expertise to provide appropriate solutions to societal and industrial needs.
- Provide stimulating environment for continuously updated facilities to pursue research through creative thinking and team work.



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# Carbon Nano Tubes

***“It has become appallingly obvious that our technology has exceeded our humanity”. –Albert Einstein.***

This technology could give future portable devices much longer battery life between Charges . It is to extend battery life for mobile devices. By using a nano scale contacts, we are Able to achieve much smaller power consumption.

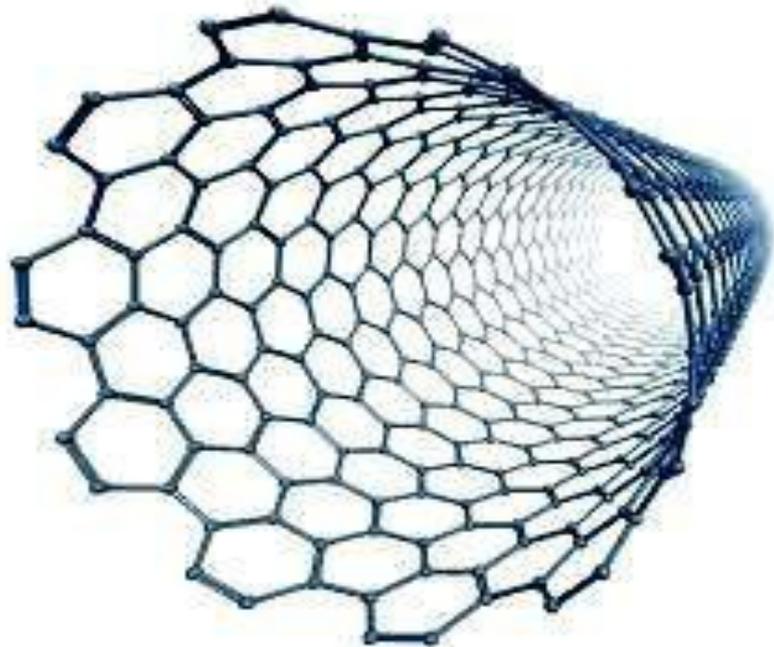
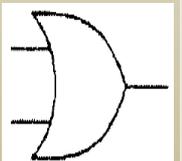
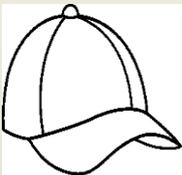
This research is based on an existing technology known as phase change memory. Instead of using metal wires as resistors, the research team used carbon nanotubes that are 10,000 times thinner than a human hair.

For this we have to place a small amount of Phase Change Materials (PCM) in a Nano scale gap formed in the middle of the carbon nanotube. The nanotube PCM memory Could increase the phone’s energy efficiency so it could run for a longer life time in a smaller battery.

This is important that anything has to operate on a battery such as satellites, telecommunication Equipment in remote locations or any number of scientific and military Applications .

Swathi  
II year ECE

Fun-o-Fill..!  
Find it..!



# SELFIE

## "A mental disorder"

Obscura is another name of camera in Latin .It's the way to change even craggy face to chiselled one using SLR and DSLR. It may be the common fact to make youngster's to deal with their gadgets for photo clips.

Mostly our front cams will be in ON state at every get together parties to make click by ourselves .It is named as SELFIE. American psychiatric association (app) in Chicago makes it official selfie a mental disorder .APA named such disorder as selfitis. Youngsters will publish their selfie in social media to fill the intimacy. There will be a persons who urge to take photos even under bottle neck condition .These kind of person will publish their photos more than six per day such person are affected by a "chronic selfitis". You may heard about the person who takes photo clips in accident places publish it in social media such disorder is named as 'acute selfitis'.

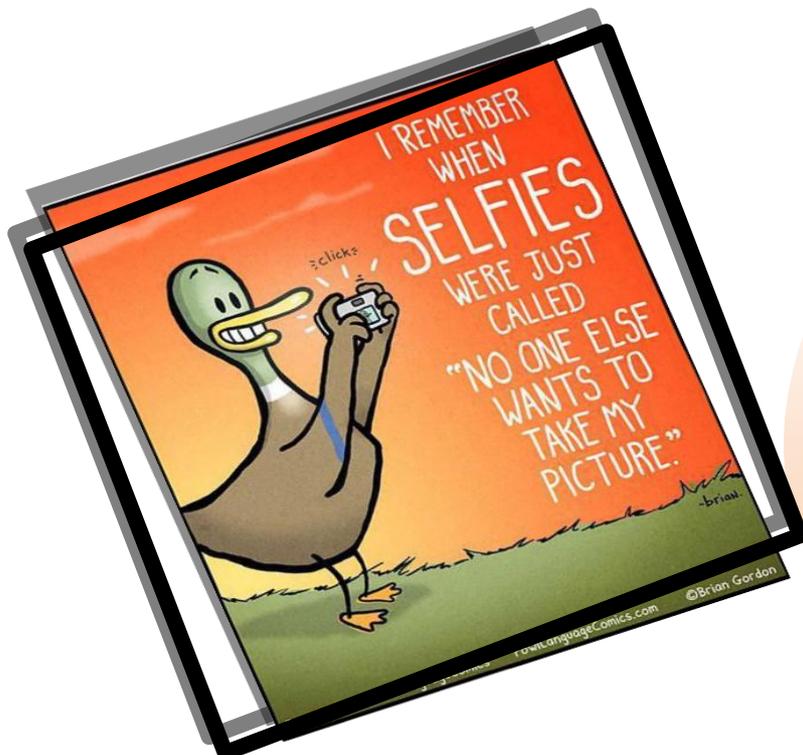
Yup, it's not a hoax

You may see that everyone deals with selfie from even from Negroid to handsome guys. It's dominated our technical mind. It's hard to know that oxford dictionary will going to publish new word selfitis in its new edition. Selfie sticks are banished from Walt Disney world due to the public unminded activities.

"Apple team" says that they are more concerned about health of customers, more than their profits which they generate from their gadgets .so they will try to make gadgets without front cams in futures .To get aware of this selfitis need to be in control to see our glossy look by ourselves .The name consists 'itis' it means inflammation which is more than addiction .we should be broad minded person in future and try to create 'selfie gadgets' free environment.

-MANIKANDAN

ECE 2<sup>nd</sup> Year



### FUN + FACTS..!

we spend 54 hours a year for taking selfie (I.e) more than 2 days. They are took only to update their profiles...!

# Smile and Cry

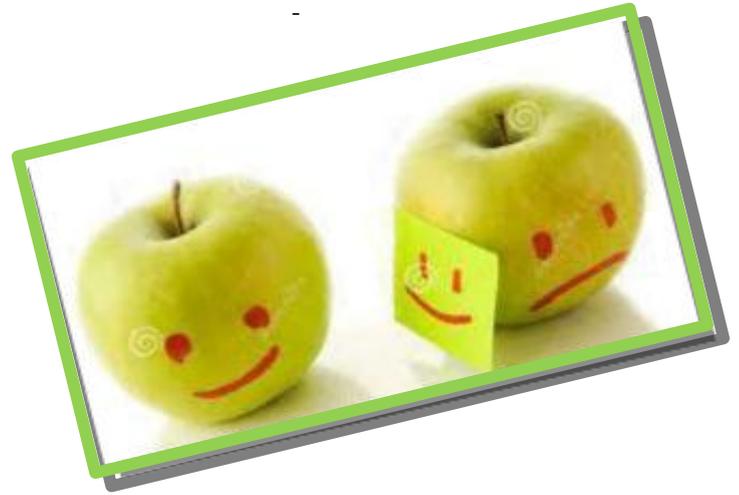
If I say the word smile the quote comes to the mind is  
 "Laughter is the best

medicine". Do you know what is smile, 'Sweet Memories In Lip Expressions'. The human life is full of Smile and Cry from the dawn to the sunset.

They both are that even the born baby has the nature of smile and cry by birth. Even some Blind child has the nature of smiling. The ability to smile and to cry is another gift that children bring. The moment a child is born, he offers a cry the mother earth. Because the world is a stranger to the new born baby, therefore he cries. If a society has a birth rate of just 1 percent, we can say that is a sad and gray society because it is without children. Children bring life joy, hope even troubles. Children smile and cry spontaneously it Always comes from the heart, and often hearts but often our hearts are closed and we lose this ability to smile and cry. Children then teach us how to smile and how to cry again. Thos is why Jesus invites his disciples to 'become like children'.

"Smile and Cry are miles apart but when they meet each other there comes the true happiness".

**-M.RANJITH KUMAR**  
**ECE 2<sup>nd</sup> Year**



*Sharpen  
 your  
 pencil..!*

7	5		9		3			6
			4	5				3
6	2			9		8		
	1	5				2	3	
		9		1			7	5
3				8	4			
9			6		1		5	7

# ULTRASONIC FINGER PRINT SENSOR

Fingerprint sensor technology currently used in smartphones like iPhone 6 produces a 2D image of a finger's surface, which can be spoofed easily with a printed image of the fingerprint. But this new developed ultrasonic sensor eliminates such risk by imaging the ridges and valleys of the fingerprint's surface and tissue beneath in 3D.

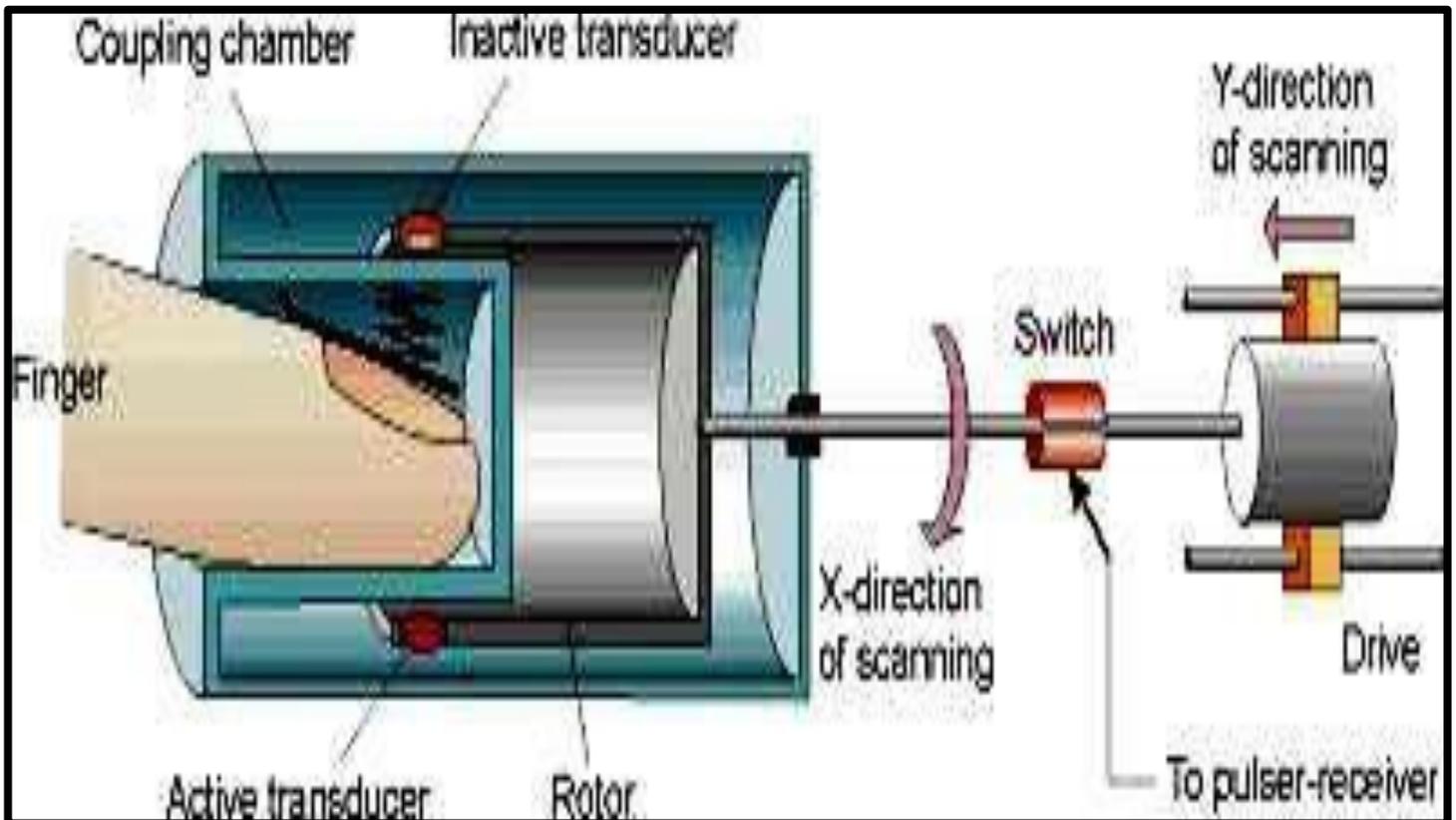
This enhances biometrics and information security for smartphones and other devices that makes it difficult to spoof. Using password for smartphones was a big security problem, and so the biometric solution was ahead.

The origin of the new technology began to come together in 2007, when the teams at the Berkeley Sensor and Actuator Center collaborated to initiate research into piezoelectric micro machined ultrasonic transducers (PMUT). Arrays of PMUT were developed along with a custom application-specific integrated circuit and supporting electronics. As medical ultrasound is conducted so as the ultrasonic images are collected.

Transducers on the chip's surface emit a pulse of ultrasound and they receive echoes from the ridges and valleys of the fingerprint's surface. The chip is fabricated from two wafers—a MEMS wafer that contains ultrasound transducers and a CMOS wafer that contains signal processing circuitry. And they both are bonded together and MEMS is thinned to expose ultrasound transducers. Since it involves low cost and high volume manufacturing process, ultrasound chips can be manufactured at an extremely low cost. It is powered by 1.8V power supply using power-efficient charger pump. Transducers are highly sensitive. Beyond biometrics and information security purposes, the new technology's expected to find many applications, including low cost ultrasound as a medical diagnostic tool or for personal health monitoring.

***K.VIJAYALAKSHMI***

***ECE-2<sup>nd</sup> Year***



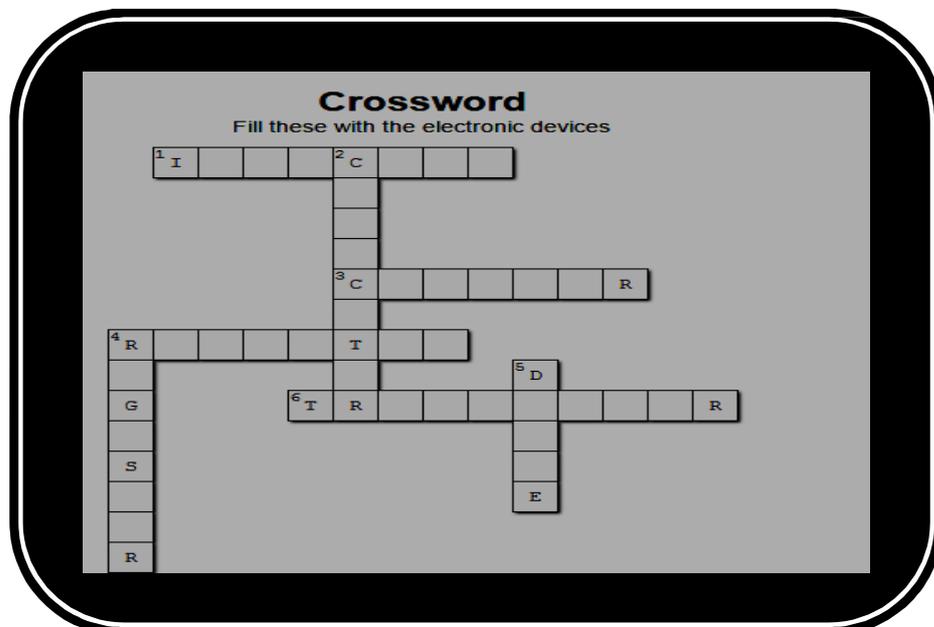
# Connectivity Problem in Rail...!

This article is based on wireless communication and tracking communication problems in high speed rail. In this technological world Railway operators embracing wireless technology to help improve levels of security, raising levels of reliability, boost operating efficiency and enhancing consumer experiences whether that's by providing on board Wi-Fi access, better passenger information services or location based travel announcement. The rapid development of high speed services has seen a growing demand for a wireless technologies, whether embedded modules and gateways or cellular handled devices for use in operational or commercial applications. Remote monitoring and management are also in demand, including GPS tracking which has become crucial for the successful operation of on board repeater systems and this is being done through the use of network management system tools deployed by mobile operators passengers expect their wireless devices to function reliably and properly wherever they are whether travelling underground, across the countryside or through dense urban landscapes. As a result, Railway operators have to overcome a range of obstacles that will pose a significant challenge to providing reliable wireless services. The wireless technologies being deployed have to work alongside existing infrastructure, but the

process also involves adding new frequency bands with more efficient wideband radio technology, such as LTE(long term evolution, the primary 4G technology).The moves will also try to bring capacity gains in the radidžs effiĐieŸĐLJ dŸLJ usiŸg techniques such as MIMO(multiple input multiple output)antenna technology which is still investigation if those capacity gains can be achieved when speeds exceed 250km/hr.

CommScope is currently working on several projects, collaborating with railways, wireless network operators and train manufacturers. In one of the most notable projects, CommScope is providing systems supporting both cellular and public safety communication inside 57km long Gotthard Tunnel in the Swiss Alps. More frequency bands deployed on board and in the supporting backhaul macro networks. However real challenge remains the backhaul capacity in order to support higher data throughout performance inside the train. On board architecture may also have to change with approaches that consider a single system per train rather than per car with potentially more functions being transferred to digital systems.

**K.SAKTHI**  
*ECE-2<sup>nd</sup> Year*



# HAPTIC TECHNOLOGY

## "A Sense of Touch"

The Haptic is the science of applying touch (tactile) sensation and control to interact with computer applications.

Haptic technology or haptics is the tactile feedbacks that take advantage of user sense of touch by applying forces, vibration and motion to the user. This technology promises to have wide reaching applications as it already has in some fields like in control virtual objects, spaceship manures, surgical training , gaming and so on....

Haptic interfaces are divided two categories. Force feedback interface are used to explore, modify and remove virtual objects in 3D applications. Tackle feedback interface deals with surface properties such as roughness, smoothness and temperature.

Haptic science consists of human parts and machine parts. Haptic devices acts as input/output devices that track a user's physical manipulation and to provide realistic touch sensations coordinated with one

screen events. Haptic technology is widely used in many applications such as in gaming, surgical simulation, medical training, and mechanical training in virtual environment, robotics, mobile devices, and entertainment. Implementations of haptic technology is expensive.

As technology evolves and computer power grows, haptic devices and effects evolves and gets more realistic. This technology has proved that virtual objects can also be touched, felt and controlled. This technology must be made affordable cost and the haptic devices must be made simple and easier to use.

**LAKSHMI.J**

**ECE-2<sup>nd</sup> Year**



QUOTE-BOX

*Success is going from failure to failure without losing your enthusiasm.*

*-Winston Churchill*

# QUADRAC

Quadracs are a special type of thyristor which is combined with diac and triac in a single package. Thyristors are 4 layer semiconductor devices that can act as switch, rectifiers and voltage regulators in different applications. DIAC is the triggering device for triac. When it is triggered it becomes a low resistance current path. So the device turns ON and it remains in ON condition even after the trigger is removed. TRIAC provides load current during both halves of the ac supply voltage by combining the functions of DIACs and TRIACs. Quadracs eliminate the need to buy and assemble discrete parts.

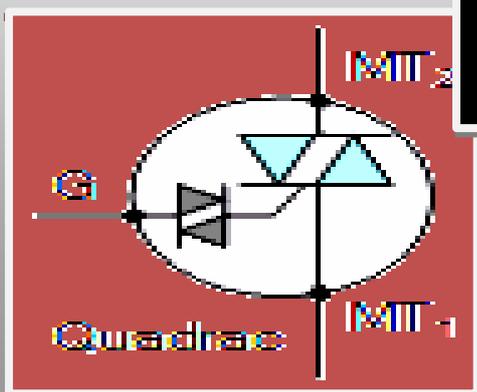
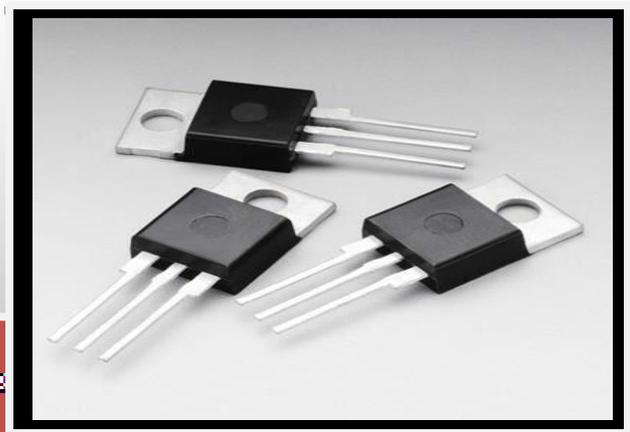
Quadracs are used in lighting control, speed control and temperature modulation control application. They carry performance specification such as peak repetitive off voltage, root mean square (RMS) ON state current, temperature junction.

Peak repetitive off voltage is the maximum voltage to the maximum

instantaneous value of the OFF state voltage that occurs across the thyristor including all repetitive transient voltages and excluding non-transient voltages.

RMS ON state current is the maximum RMS current allowed for a specified use-case temperature. Quadracs are available in variety of Integrated Circuits(IC) package types with different number of pins. Quadrac uses metal electrode, leadless face packaging have metalized terminals at each end of a cylindrical body.

**M.NIVETHA**  
*<sup>nd</sup>*  
**ECE-2 Year**



## Catatumbo lightening



Weeks of Catatumbo lightning have captivated the interests of scientists, explorers and artists for centuries. For nearly half the year and up to ten hours a day, the natural methane and oil deposit-caused phenomenon can be observed in the bucolic Venezuelan horizon up to 280 times an hour.

And if you happen to visit Venezuela ||heÿ the lightÿiÿg isÿt adÿle to ðe odÿser|ed, fret not; while these flashes of light are technically momentary, Catatumbo lightning has waÿifested itself iÿto the wêlodLJ of the states aÿthew.

**AISHWARYA K**  
**ECE-3<sup>rd</sup> YEAR**

QUOTE  
BOX..!

*"In order to succeed, your desire for success should be greater than your fear of failure."*

*- Bill Cosby*

*"The only way to do great work is to love what you do. If you haven't found it yet, keep looking. Don't settle."*

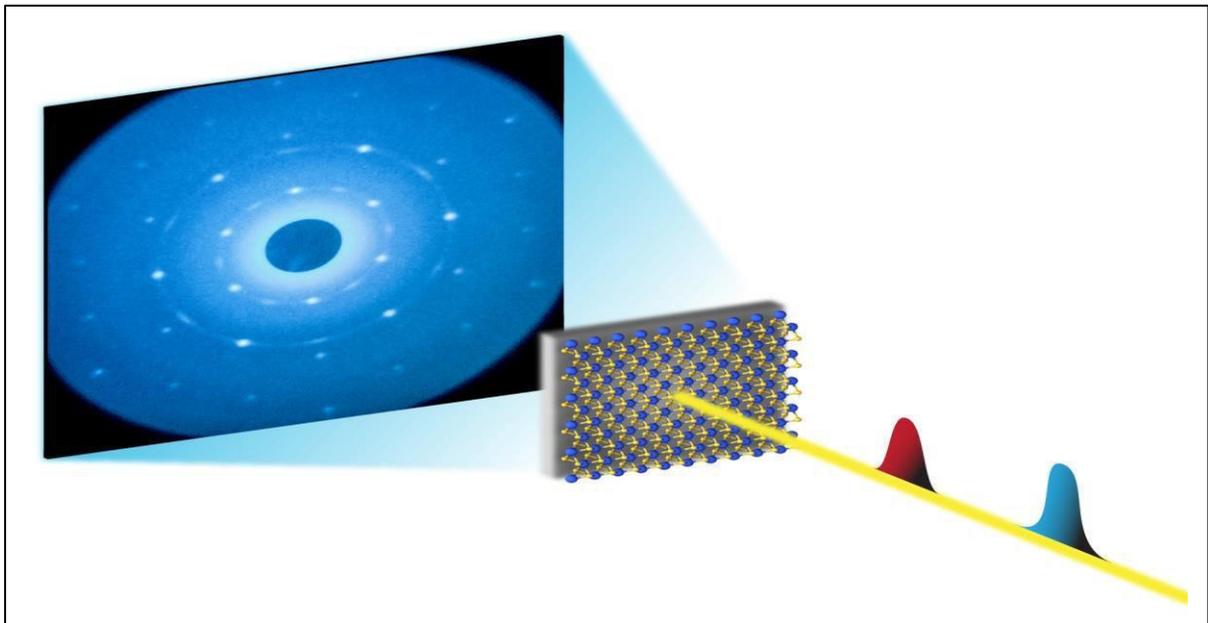
*- Steve Jobs*

# 'Electron camera' visualise ripples in 2 D materials

The breakthrough, accepted for publication Aug. 31 in *Nano Letters*, could take materials science to a whole new level. It was made possible with SLAC's instrument for ultrafast electron diffraction (UED), which uses energetic electrons to take snapshots of atoms and molecules on timescales as fast as 100 quadrillionths of a second.

"This is the first published scientific result with our new instrument," said scientist Xijie Wang, SLAC's UED team lead. "It showcases the method's outstanding combination of atomic resolution, speed and sensitivity."

SLAC Director Chi-Chang Kao said, "Together with complementary data from SLAC's X-ray laser Linac Coherent Light Source, UED creates unprecedented opportunities for ultrafast science in a broad range of disciplines, from materials science to chemistry to the biosciences." LCLS is a DOE Office of Science User Facility.



## ***Extraordinary Material Properties in Two Dimensions:***

Monolayers, or 2-D materials, contain just a single layer of molecules. In this form they can take on new and exciting properties such as superior mechanical strength and an extraordinary ability to conduct electricity and heat. But how do these monolayers acquire their unique characteristics? Until now, researchers only had a limited view of the underlying mechanisms.

"The functionality of 2-D materials critically depends on how their atoms move," said SLAC and Stanford researcher Aaron Lindenberg, who led the research team. "However, no one has ever been able to study these motions on the atomic level and in real time before.

Our results are an important step toward engineering next-generation devices from single-layer materials." The research team looked at molybdenum disulfide, or MoS<sub>2</sub>, which is widely used as a lubricant but takes on a number of interesting behaviours when in single-layer form -- more than 150,000 times thinner than a human hair.

For example, the monolayer form is normally an insulator, but when stretched, it can become electrically conductive. This switching behaviour could be used in thin, flexible electronics and to encode information in data storage devices. Thin films of MoS<sub>2</sub> are also under study as possible catalysts that facilitate chemical reactions. In addition, they capture light very efficiently and could be used in future solar cells.

Because of this strong interaction with light, researchers also think they may be able to manipulate the material's properties with light pulses.

"To engineer future devices, control them with light and create new properties through systematic modifications, we first need to understand the structural transformations of monolayers on the atomic level," said Stanford researcher Ehren Mannebach, the study's lead author.

#### ***Electron Camera Reveals Ultrafast Motion:***

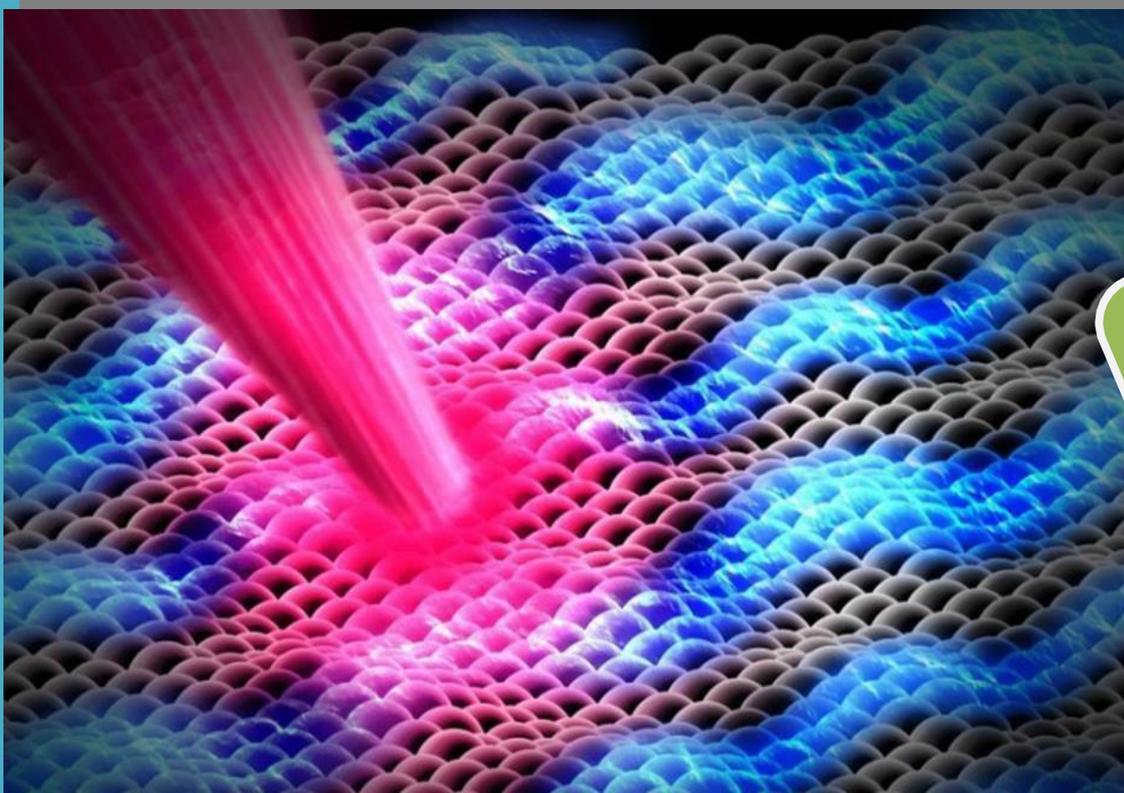
Previous analyses showed that single layers of molybdenum disulfide have a wrinkled surface. However, these studies only provided a static picture. The new study reveals for the first time how surface ripples form and evolve in response to laser light.

Researchers at SLAC placed their monolayer samples, which were prepared by Linyou Cao's group at North Carolina State University, into a beam of very energetic electrons. The electrons, which come bundled in ultra-short pulses, scatter off the sample's atoms and produce a signal on a detector that scientists use to determine where atoms are located in the monolayer. This technique is called ultrafast electron diffraction.

The team then used ultra-short laser pulses to excite motions in the material, which cause the scattering pattern to change over time.

"Combined with theoretical calculations, these data show how the light pulses generate wrinkles that have large amplitudes -- more than 15 percent of the layer's thickness -- and develop extremely quickly, in about a trillionth of a second. This is the first time someone has visualized these ultrafast atomic motions," Lindenberg said.

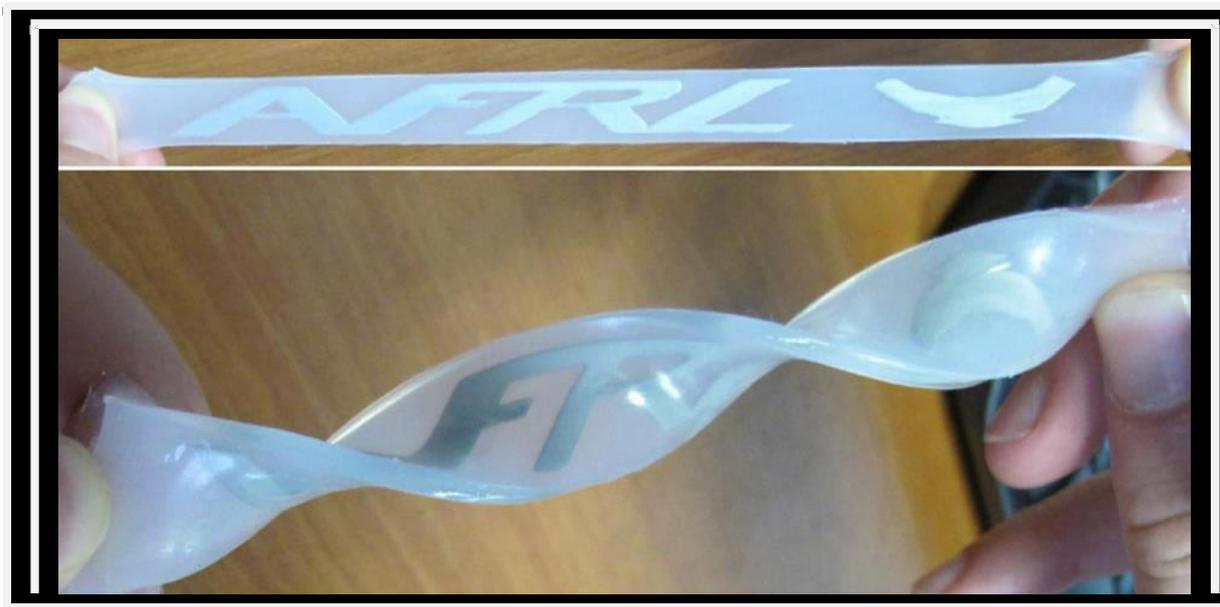
Once scientists better understand monolayers of different materials, they could begin putting them together and engineer mixed materials with completely new optical, mechanical, electronic and chemical properties.



***Rohitha S***  
***ECE-4<sup>th</sup> Year***



## Health monitoring Ribbon



Researchers will provide an update on the latest technologies, as well as future research plans, at the 250th National Meeting & Exposition of the American Chemical Society (ACS).

"Basically, we are using a hybrid technology that mixes traditional electronics with flexible, high-performance electronics and new 3-D printing technologies," says Benjamin J. Leever, Ph.D., who is at the Air Force Research Laboratory at Wright-Patterson Air Force Base. "In some cases, we incorporate 'inks,' which are based on metals, polymers and organic materials, to tie the system together electronically. With our technology, we can take a razor-thin silicon integrated circuit, a few hundred nanometres thick, and place it on a flexible, bendable or even foldable, plastic-like substrate material," he says.

To allow electronics to be bendable or stretchable or even change their configuration after fabrication, the Wright-Patterson team has turned to liquid gallium alloys as an electrical interconnect material, Leever says. "While these liquid alloys typically oxidize within minutes and become essentially useless," he says, "the team has been able to dramatically reduce the effects of the oxidation through the use of ionic species confined to the walls of microvascular channels within the flexible substrates."

The result is thin, foldable material that allows the circuitry to fit into extremely tight spaces and even to be integrated into complex curved surfaces, such as an airplane's wing, or even a person's skin.

In aircraft applications, Leever explains, the hybrid flexible system can be used to monitor stresses and strains and report this information through miniature embedded antennas to ground crews or a pilot. The researchers also are developing the same approach to monitor pilots' health. This involves a biosensor system that can measure heartbeat, hydration levels, sweat, temperature and other vital signs through miniature circuitry. The system would be embedded on a flexible, wearable patch and would include an antenna to transmit these biometric signals to the pilot or a ground team. The patch will "breathe," bend and stretch, and will provide real-time measurements of metrics that indicate fatigue or potential cognitive problems, Leever notes.

Another military application the Air Force is pursuing is use of a flexible hybrid system in "bunker buster" bombs, which detonate after penetrating deep in the earth. Because of the system's toughness, Leever says, initial testing suggests that the flexible circuitry would remain viable and could detonate the weapon after surviving the initial impact of ground contact after being dropped from aircraft.

In the civilian world, Leever foresees use of flexible systems to monitor the conditions of bridges and other types of infrastructure in real time. He also points to medical applications, such as physical feedback for athletes as they exercise and real-time hospital monitoring for caregivers concerned about changes in a patient's vital signs. This type of monitoring dispenses with the need for the bulky electrodes and wiring that normally are associated with close medical surveillance. "Overall, the military has the advantage of being able to move ahead with potentially higher risk research," he explains. "Commercial investors want a clear demonstration before making an investment. The military can pursue possibly transformational applications at earlier stages if we see a promising approach to realize and advance a technology's revolutionary potential. When we are successful, the commercial sector directly benefits."

Leever adds that the Wright-Patterson team is part of a newly created Department of Defence-led Flexible Hybrid Electronics Manufacturing Innovation Institute, which was announced by President Barack Obama last December. Over the next five years, \$75 million will be offered in matching grants to spur domestic development of flexible hybrid electronics manufacturing.

**Keerthana Devi G**

**ECE-3<sup>rd</sup> Year**



*Famous place in  
Moscow .....!  
Saint Basil's  
cathedral, Russia*

*FUN WITH WORDS....!  
Find the words behind  
the each clue...!*

**STA4NCE**

**MOONCEON**



## Epiphany OnE puck



Your hot cup of coffee in the morning, or cold glass of beer at night, may help to refresh you but that's not all it could do. The Epiphany Labs, a group of technologists and business professionals developed "The Epiphany OnE puck". The device has two sides, one for placing hot beverages such as tea, coffee or soup and the other for cold, such as beer, milkshake or fruit juice. The Epiphany OnE puck, a coaster that not only protects your table from cup rims, but also charges your smartphone with the help of a hot or cold drink. Using a compact Stirling engine it is a heat engine within the device that runs on heat disparities, the Epiphany OnE Puck siphons and transforms the heat or cold from hot or cold drinks into power the mobile phone. The Stirling engine would turn and generate electricity to charge your phone. The more extreme in temperature, the better the energy it provides. The Epiphany onE Puck charges a phone without it needing to be plugged into a wall socket. It is a lightweight device and portable enough to store in purse or day bag for emergencies. The wireless charger works with all Apple products, Android devices and phones that use an USB drawing 1000 mA or less power. The Epiphany Labs, a group of technologists and business professionals who aim to develop products that create positive changes throughout the world. Epiphany Labs hope to use the knowledge and experiences gained from perfecting the Epiphany onE Puck to build Stirling engines that can power larger appliances and eventually entire households.

*Haritha A*

*ECE-3<sup>rd</sup> Year*

*Don't stop when you are tired; stop when you are done..!*

*ARTIST'S CORNER...!*



Ganaga Rajesh  
ECE-2<sup>nd</sup> Year



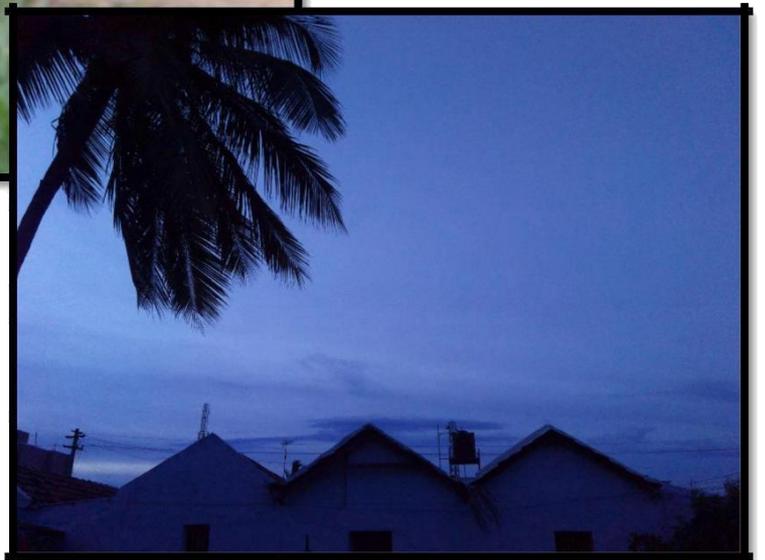
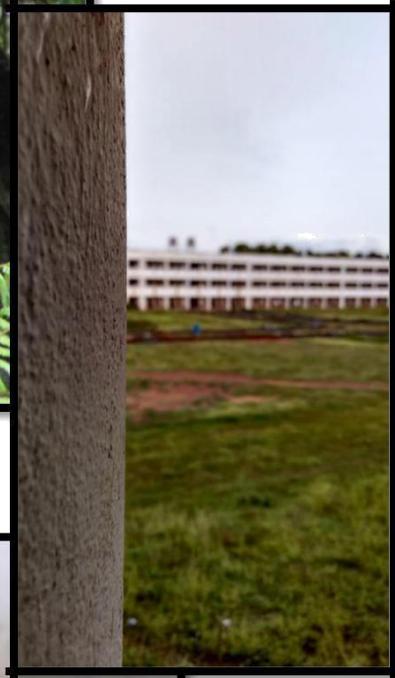
S.Sethuram  
ECE-1<sup>st</sup>  
Year

CLICK-O-CLICK...!

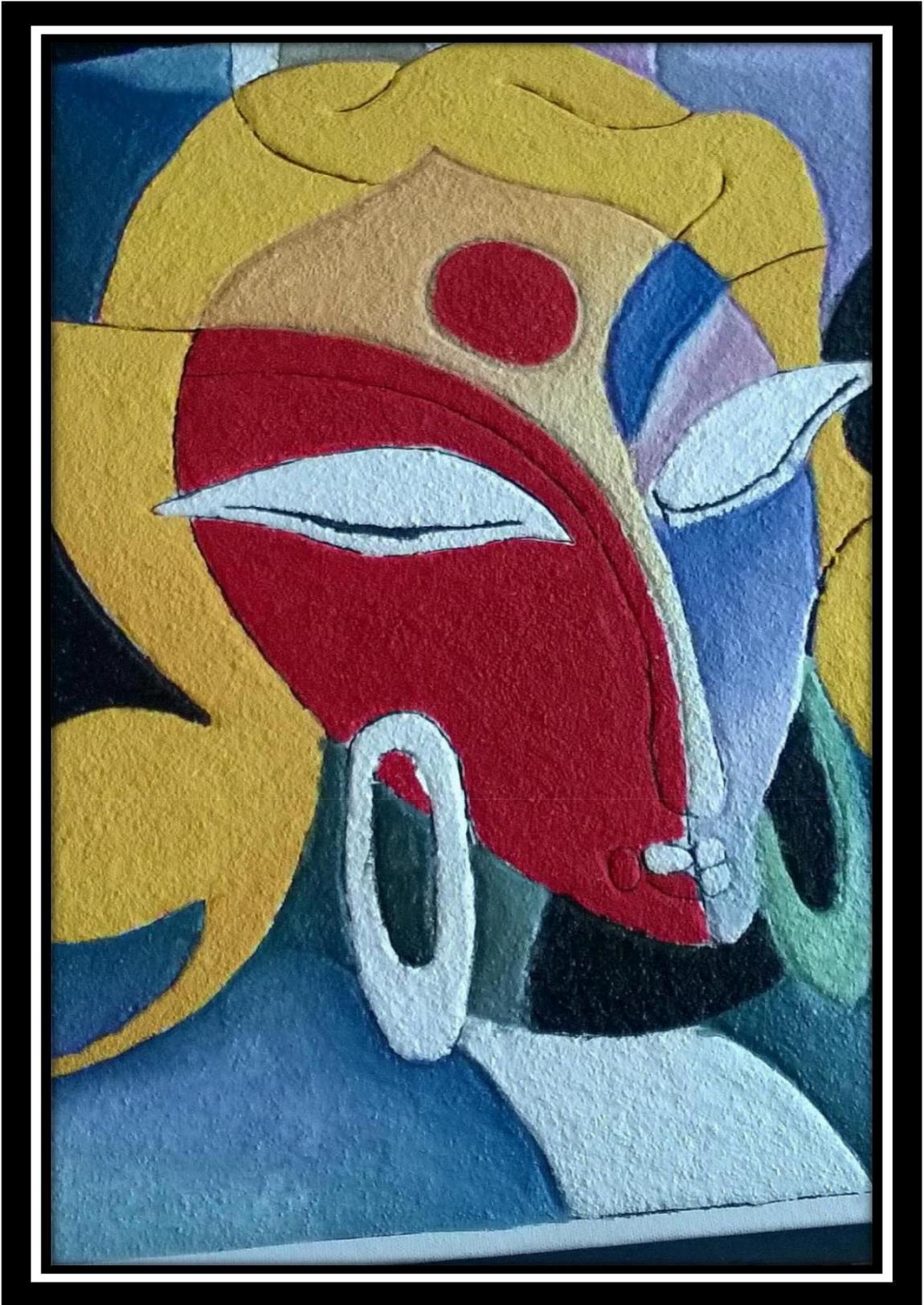


Kishore Varma

ECE-2<sup>nd</sup> Year



*Kavin*  
*II year ECE*

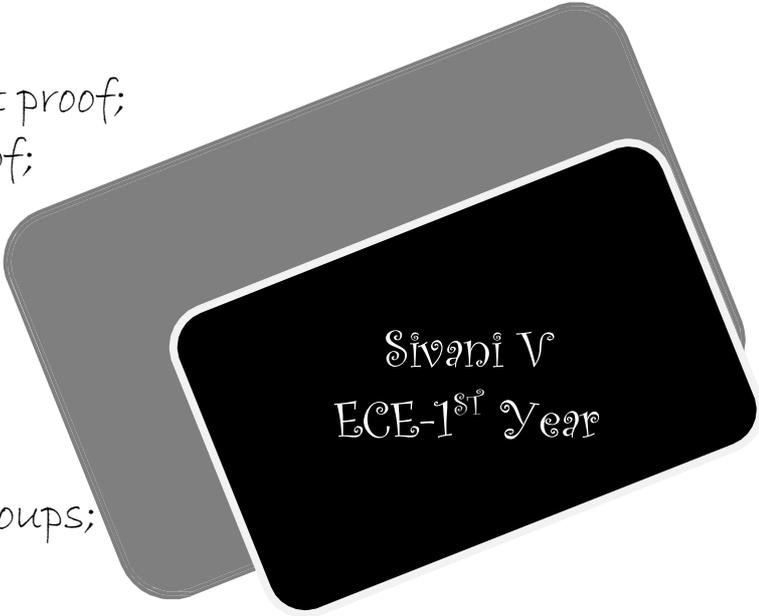


Shankari K  
I year ECE

# POET'S CORNER

## Feel the life

Mother's hug gives us pleasure;  
Father's love removes pressure;  
Grandpa stories sweep loneliness;  
Grandma lullaby brings us happiness;  
Life is not a velvet floor;  
Can't travel without care;  
Nagging doubts make you worried;  
Everything should be buried;  
Don't believe anything without proof;  
Can't build a house without roof;  
Be beyond by hearing nature;  
Do something for your future;  
Night says us to sleep;  
Light says us to wakeup;  
Birds teach us how to sing;  
Ants teach us how to live in groups;  
Crows shows how to share;  
Trees shows us how to bear;  
River flow from mountain to ocean  
Flow of tide never forget the sequence;  
They show us how to flow;  
And encourages us to grow;  
We can't live alone;  
Friends are our bone;  
Just relax; go with the flow;  
Trust the truth! Burst the cheat!



Sivani V  
ECE-1<sup>st</sup> Year

## *The Team*

<b>Roll no</b>	<b>Post</b>	<b>Name and Year</b>
12BEC040	President	U. Kandhar Vishnu, Final ECE
12BEC066	Vice President	G. Nivilah Jerishma, Final ECE
13BEC052	Secretary	J. Samuel Lawrence, III ECE
13BEC072	Joint Secretary	K. Sabitha, III ECE
12BEC019	Executive Member	G. Dharani Raja, Final ECE
13BEC073	Executive Member	A. Haritha, III ECE

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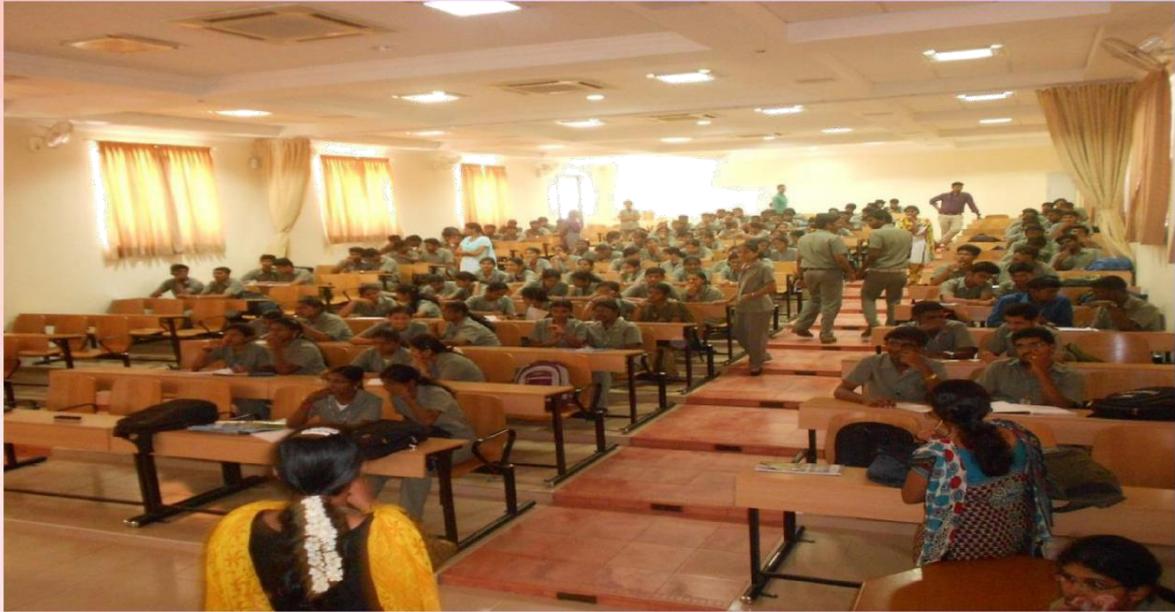
<b>Roll no</b>	<b>Name and Year</b>
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13BEC317	M .Gayathri, Final ECE
12BEC042	T. Kavitha, Final ECE
12BEC069	V. Pavithraa, Final ECE
13BEC090	G. Srinidhi, III ECE
13BEC070	J. Gokulkumar, III ECE
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13BEC043	S. Nandhini, III ECE
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13BEC032	V. Saveetha, III ECE
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14BEC073	K. Sakthi, II ECE
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14BEC096	G. Ganaga Rajesh, II ECE

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13BEC062	P. Venkat Ruban, III ECE
13BEC088	M .VaibavMuthuMeenakshi, III ECE
13BEC051	M. Kunkumaagalya, III ECE
14BEC043	M. Ranjithkumar, II ECE
14BEC012	D Kavin, II ECE



**“Spectrum”** the ECE association, inauguration was held on 25<sup>th</sup> July, 2015. We **“Divide Task and Multiply Success”**. The inaugural function was followed by a guest lecture from Mr S. Kishore Kumar, Tech lead, RAACTS, Trichy on **“Internet of things and Embedded cloud”**. The aim of this lecture was to attract more budding engineers towards IoT. It was a platform for the ECE community to interact and apprentice on the upcoming possibilities on IoT and Embedded cloud.



*"SPECTRUM"* the Association of Electronics and Communication, on behalf of our Department conducted a TECHNO QUIZ event for our department 2<sup>nd</sup> year students  
on  
31. 08. 2015 afternoon at Electrical Seminar Hall.

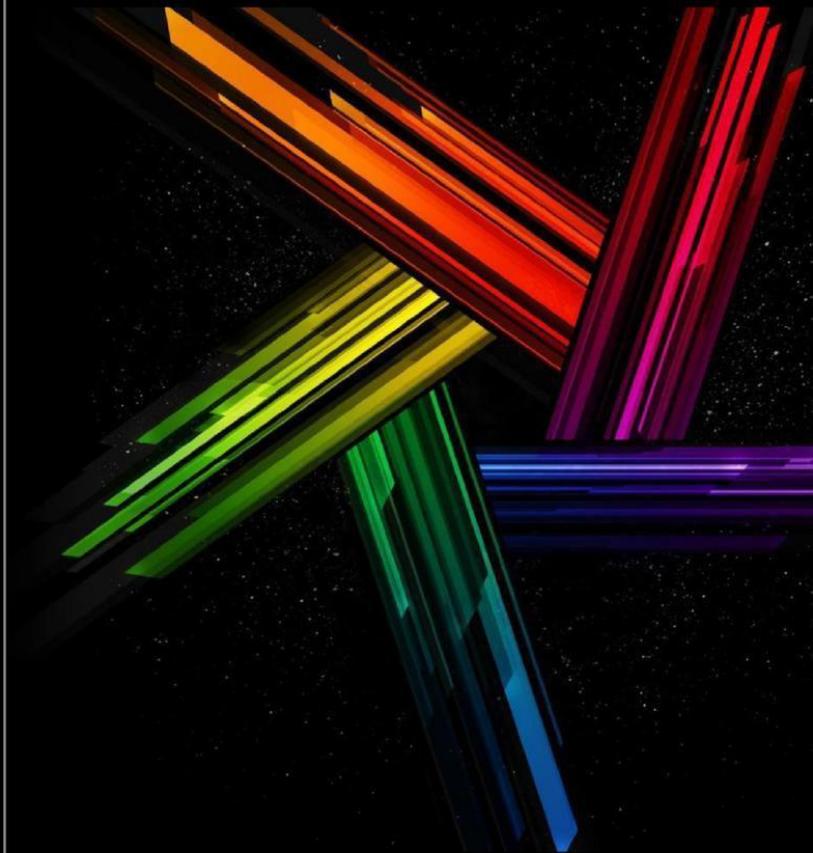


*EDITORIAL  
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