Volume 5 Issue 2 April 2016

AVERA
(Association of Electrical and Electronics Engineering)

PULSE

From the Editorial

The written world has never ceased to withdraw its influence over the educated community. A written word is a record of an event, which will exist forever, long after the grandeur of that event has subsided.

Presenting you PULSE– one such avatar of the written world, which eliminates the darkness of ignorance by spreading its rays of Knowledge!

PULSE is a Newsletter associated with AVERA– the association of the department of EEE. PULSE aims at spreading the word about the events organized by Team AVERA.

This year, Team AVERA has spilt its ink on productive data, for the benefit of the Readers. Flip through the next few pages to experience :

* Vision and Mission of EEE
* Annals of 2016 - Portfolio of achievements
* What's New? - Latest technologies from around the globe
* From the Negatives - Photo gallery
* Test your Grey Cells - Activities for the brain

The Team

"A successful team beats with one heart"

This year, 2016 the team has stepped into office with high hopes and ambitions. With an able guidance of Mr Nandha Kumar (AP)EEE and Mr Muthubharathi (AP)EEE and a strong leadership under Mr Surendra Prasad, final year, EEE, and an effective team, the past year was a very productive one. With a clear cut plan and an effective & workaholic team, the past year was a uphill ride for the department of EEE. The year was busy with Guest lectures, events and workshops occupying the calendar.

Vision and Mission of EEE

Vision

Emerge as the world leader for the Electrical and Electronics Engineering Education and research for the application of knowledge to the society.

Mission

The EEE Department believes that every student is a unique and is in a process of continuous growth. In order to foster growth and empowerment, we commit ourselves to provide,

* a stimulating learning environment with a Technological orientation to maximize Individual Potential
* Continuous pursuit of quality and excellence
* Appropriate know-how and up-to-date knowledge
* Nurture creativity and ambit for research

AVERA 2015-2016

WORKSHOP ON "BOT DESIGN" USING ARDUINO

In the fore noon session of the workshop, a general introduction for ARDUINO tool was given, also installation, programming and interfacing procedures were explained practically, Simple programs such as interfacing LED, LCD were executed. In the afternoon session, design of a line follower was clearly explained and executed in front of them. With application based inputs, the workshop proved to be quite useful for the students.

"Embedded" reflects the fact that the component is an integral part of the system. Embedded Systems have become such an important part of all applications that their presence is far from obvious to the casual observer. Embedded application based projects never loose their shine.
Arduino is one such open platform advanced microprocessor which eases the programmers off vigorous coding

An intra-departmental ARDUINO workshop was conducted for the benefit of II-year students by AVERA on 29.02.2016. About 20 students participated in the workshop. AVERA members from Final year EEE organized a training programme, under the guidance of Mr T.Anand kumar, Assistant Professor, Department of EEE. The one-day workshop, held at the research lab was monitored by Mr.R.Muthubharathi, Assistant Professor, Department of EEE, Faculty Advisor, AVERA

HANDS-ON TRAINING IN IOT WITH RASPBERRY PI

An emerging concept, "Internet of Things" has marked a unique footprint in embedded programming which will connect the hardware's one to one through internet and make them interact with each other. Raspberry pi is an advanced micro processor. Using the concept of IOT in Raspberry pi will makes the programming easier for the beginners. Also programming the raspberry pi through MATLAB Simulink is an easier task. Through this beginners can learn more about IOT as well as the Simulink.

A two day's Workshop on "Raspberry Pi, MATLAB & Simulink" was organised by AVERA under the guidance of Mr.R.Muthubharathi (AP)EEE and Mr.B.Vignesh Kumar (AP)EEE, sponsored by ISTE. It was conducted for II & III year circuit stream students on 11th & 12th of March 2016. Nearly 28 students had undergone this workshop under by Mr. Moorthy, Managing Director, Enthu Tech, Coimbatore. He gave an introduction about raspberry pi and basic sensor operations using pi on the first day. Following this, he gave an idea about IOT and raspberry interfacing with Simulink on the second day with hand's on training.

GUEST LECTURES

Macro Economic Analysis

A guest lecture on "Macro Economic Analysis-with reference to India's perspective" on 06-01-2016 was conducted for the Final year EEE student's. About 138 students participated in the guest lecture. The lecture was delivered by Dr. R. Nagarajan, Ph.D., Associate Professor, Department of Economics, PSG Arts and Science College. Dr. Nagarajan gave a clear idea about, how the electrical engineering field relates with the economic growth of our country on a macro level. And also he gave important details about the current status and economic level of our nation. AVERA staff coordinators, Mr.R.Muthubarathi (Assistant professor) and Mr.A.Nandhakumar (Assistant professor) were also present during the lecture.

Power Systems

A guest lecture on "Power systems evolution and technological trends" was organized by AVERA association for III- year students on the 9th of January 2016 .Nearly 100 students attended the lecture delivered by Mr. Abhilash Gopalakrishnan from ABB Global Industries and Services Ltd, Bengaluru. He shared his wonderful experience with the students and encouraged them. Also he delivered a remarkable lecture on how the technological trends influences the power system evolution. This lecture let the students know about the remarkable evolutions that has happened in the last few decades and the present scenario in the field of power system.

TECHNICAL QUIZ

An intra-department technical quiz was conducted by AVERA association for II-year students on 30.12.2015. About 100 students participated in the preliminary round out of which 10 students were shortlisted for the second round. The participants were split up into teams comprising of 2 per team and were asked to choose questions from a particular domain. By the end of second round, three teams were selected. In the final round each team were asked to answer the logical questions. At last, among the three teams two were selected and given the first and second places. The event was monitored by the staff coordinators of AVERA, Mr.R.Muthubharathi (Assistant Professor), Mr.A.Nandhakumar (Assistant Professor) .

PRIZE	NAME	ROLLNO
I	ARAVINDHAN.K	14BEE049
	VIGNESHWAR.M	14BEE079
II	ABINAYA.S	15BEE304
	TAMIL ARASI.R	15BEE315

An inter departmental quiz program was conducted for third year on 22.02.2016. About 120 students participated in the preliminary round from which 20 students qualified for the second round. By the end of second round 10 students were selected for the final round. In the finale, they were grouped into teams of two and were given the task of designing a circuit using proteus software. The event was monitored by the staff coordinators of AVERA, Mr.R.Muthubharathi (Assistant Professor), Mr.A.Nandhakumar (Assistant Professor) .

PRIZE	NAME	ROLLNO
I	N.KEERTHI VARMAN	13BEE033
	G.BUVANESH	14BEE309
II	J.MARIA JULIAN	13BEE004
	K.L.JAYA PRAKASH	14BEE332

ALUMNI INTERACTION

Interaction is a tool of learning. The graduation day presented an opportune moment to interact and gather knowledge on the current industrial trends and requirements for the students of Pre final year.

On 2nd April 2016, a set of 10 alumni students who are currently working in reputed companies in various domains were invited to interact with the III year students of EEE. They shared their real time experiences and hurdles they faced during the course of one year of Industry experience.

The students were motivated to start preparing for the placements and get industry ready.

ANNALS OF 2016

S. No.	Name of the Student	Project Title	Name of the Institution	Date of Presentation
1	Siva Balakrishnan M, Siva Prasad R	Human protector system from elephants	Coimbatore Institute of Technology, Coimbatore	11.09.2015
2	Koushik Narayanan.C , Thiyagu R, Vinoth Kamli. C, Jayaram.K	Multi function inverter with power quality improvement features	Bannari Amman Institute of Technology, Sathy	14.10.2015 – 16.10.2015
3	Kothainayaki E, Ragavi P, Varsha K S	Anti-bag snatching alarm	Bannari Amman Institute of Technology, Sathy	14.10.2015 – 16.10.2015
4	Supraja S, Gayathri V	Cell phone detector	Bannari Amman Institute of Technology, Sathy	14.10.2015 – 16.10.2015

Name	Paper Title	Name of the Institution
Murugan M S.Aravind	Recent Trends in Energy Conservation	SNS College of Engineering, Coimbatore (13.08.2015-14.08.2015)
Nivetha K Keerthana R	Recent Trends in Energy Conservation	
E.Gomathi S.MohanaPriya	Hyper spectral Imaging and target detection	
Karthinivasan M Thenmozhi.V	Nanotechnology	
C.Nandhini S.Nandhini	MEMS technology	Coimbatore Institute of Technology, Coimbatore (11.09.2015)
M.S.Ragavi S.Revathi	Power generation from hybrid energy (solar and Wind)	
Sasidharan R Ragul Raja P	Osmosis	
N.Abirami K.Srinithi	Gasoline – Electric hybrid vehicle technology	
E.Gomathi S.MohanaPriya	Concentrated solar power	Hindustan college of Engineering and Technology, Coimbatore (15.09.2015)
K.Poorani E.Sandhya	Conservation of renewable energy	K.S.R college of Technology (01.10.2015)
Supraja S Gayathri V	Smart Grid	Bannari Amman Institute of Technology, Sathy (14.10.2015 – 16.10.2015)
Gayathri R Vishnu priya S	Space based solar power	
Khalidha Banu Z	Recent Trends in solar energy harvesting – Solar Islands	
Karthinivasan M	VLSI	
Balaji R Vikiniswaran	HD DVD's Vs blue ray disk	
Pasupathi S	Green Computing	
Naveena R S Saranya T	Adaptive blood pressure control using PI controllers	
Vithya Prabha K Abinaya S	East west racking solar smart grid	
Anusuya D Jeevitha K S	Smart grid in India	
Divyadharini S R Jeyasri K	Bionic Eye	
Sethupriya R Manjusha Rahini I	PEM fuel cells	
Danusha U	Osmotic Power Plant	
Maria Julian J K.L.Jayaprakash	Green Computing	
P.Rahavi E.Kothainayaghi	Micropower harvesting using piezoelectric effect	
R Gopinathan , D Darshan Hemprasath R	Virtual Reality based Robotic Automation	Kumaraguru College of Technology, Coimbatore (12.02.2016)
N Suseendran , Arun.K.Sajeev R.Arun Kumar	Direct Torque Control of PMSM	
Aravind S	Carbon monoxide monitoring system	
Murugan M	Space Vector PWM Inverter	Karpagam Academy of Higher Education, Coimbatore (02.03.2016)
Priyatharshini S Mari Shenbaga Selvi K	Wireless Monitoring of PV cells	
Kathir Eswaran D Lingesh Kannan B	Nanotechnology	Sri Krishna College of Engineering and Technology, Coimbatore. (31.03.2016)
Jeyasri Divyadharini.S.R	Bionic Eye	
Varsha.K.S Khalidha Banu.Z	Machine for Rescuing Children Trapped in Bore wells	
R Mukesh Krishna KL Jayaprakash	FPGA based digital control of DC-DC boost converter	

S No	Student's Name	Branch and Department	Details of event	Organizer and Place of program	Date
1	RAGUNATH	II BE /EEE	Workshop on "BOT De-sign" using Arduino	EEE- AVERA ASSOSIATION	29/02/2016
2	GANESH KUMAR				
3	RAGUL RAJA P				
4	ARAVINDHAN K				
5	KAMALAHASAN L				
6	LOKESHWARAN S				
7	SELVARAJ K				
8	MOHAN RAJ P				
9.	SUDHAKAR C				
10	KARTHIGEYAN G				
11	KISHORE BALAJI G				
12	MOORTHY				
13	HEMA P				
14	SRIHARI S				
15	KATHIR EASWAR				
16	MURALIDHARAN B N				
17	ASHOK				
18	KARTHIKEYAN M				
19	KARTHIK RAJA R				
20	PRADEEP				

PLACEMENT DETAILS

Soliton
Vision for a Better World

Surendra Prasad.B

UST Global

Selvakumar Perumal
Udhayaprakash D
Om Prakash.R
Tamarai Selvan.T

NTT DATA

Alousiys Richard
Rozario.E
Dhivya.R
Elakkiah.C
Keerthana.K
Nandhini priya.R
Balavenkateshwaran.C
Priya.R.M
Sabthagirivasan A
Shalini D
Sivaranjani M
Sowmiya K

iKOSMIK

Udhayaprakash D

GoFrugal
CONNECTING BUSINESS

Sruthi.K

SUTHERLAND
GLOBAL SERVICES

Sairanjith K
Anisha Nazrin.K
Annie Marit Vijila.N.P
Chandhana.M
Harish.R
Monnikha.K
Gayathri.R
Sujithra
Saranya K
Sudhakar C
Sowmiya N

hp

Syed Mohammed Ashik A

Tech Mahindra

Shibu Chakravarthi S
Valli Pavithra N

Infosys
POWERED BY INTELLECT
DRIVEN BY VALUES

Aarthi N
Ajay J
Arockia Revanth F
Gunasundari B
Jayalakshmi V
Kamaladharshini D
Kanimozhi S
Karthika M
Keerthiga K
Udayashankar S
Lavanyagowri S
Manoj Kumar S
Nivetha S
Ponsankari S
Prabakaran N
Prasanth B
Praveen Kumar R
Rajkumar T
Shilpa V M
Sivakumar N
Sridharan R
Suburaman M
Sudhakaran B
Sukanya K
Sumrudhah I
Syed Yusuf G
Victoria K
Saranya Ananda Lakshmi.S

PLACEMENT DETAILS

Udayashankar S

Nandhini priya R
Balavenkateshwaran C

Anisha Nazrin K
Chitra M
Gayathri R
Uthradevi S

Kannan babu S
Sowmiya N

Sabariraj T
Jeya vigneshwar T
Naga Arjun D
Manikanda boopathi P
Ramar S
Pradeep kumar K

Pratik P Rao
Manoj prabakharan S
Prakash S
Vijayaraghavan B
Suganthan S
Ganeshkumar M
Saravanakumar K

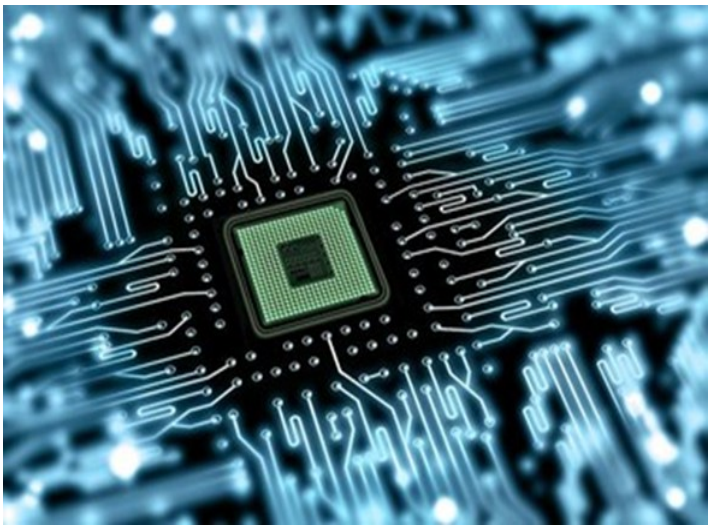
Kalidas R
Gowtham S
Mathankumar T
Mathankumar K
Pradeep kumar K
Raghul R
Santhosh B
Selva Krishna S S
Soundhararajan p
Thamburaj R
Arunprakash S
Vigneshkumar M
Rukmanathan K
Muthuramalingam A
Naga Arjun D
Dineshkumar S
Arunshankar T

Srinivasakarthik V
Mahendran M

Sarolin S
Sangeetha K

What's New?

SILICON PHOTONICS PIONEER LOOKS TO EASE THE DATA-CENTRE NETWORKING PROBLEM



Those architecting the so called 'mega datacentres' are on red alert, according to Dr Andrew Rickman, CEO of Rockley Photonics. "The industry is on a mad path," he contended. "Moore's Law is proving difficult and costly but, with the right combination of elements, we can break the cycle".Dr Rickman is no stranger to the world of photonics; he founded Bookham Technology in 1988 and saw the company rise to FTSE100 status. Part of Bookham's appeal was its production of developers in his sights."I've looked at other efforts in silicon photonics and have seen little progress. Where Bookham had telecomms in its sights, we can see the market for datacentre technology will be bigger."In his opinion, the basic issue is the amount of data being handled and the speed at which it is being transmitted. "The line rate in network equipment is rising from 1G to 10G to 25G," he said. "And the distance over which electronic signals can be driven is becoming ever shorter; there are a lot of backplane problems. I think there are opportunities to move forward with a combination of silicon photonics and CMOS technology in the same package. Rockley's mission is to develop massively scalable photonics technology."

The use of photonics will, he believes, bring lower cost, more compact datacentres that consume less power.

"Operators are increasing the number of servers in their datacentres," he noted, "and these can benefit from Moore's Law, with more compute capacity for less cost. But the network equipment has two problems. When you double the number of servers you want to connect, the amount of network equipment needed increases by a factor of six. And Moore's Law doesn't help this I/O problem; the more transistors you put on a chip, the more it becomes a bottleneck in terms of the number of connections you can make."

Rockley is looking at the creation of an optimum switch architecture, with the best combination of CMOS and photonics technologies. "We want to create something that can be 'dropped in," he continued, "and which can scale in a linear fashion."He pointed to the number of layers in a network. "We're looking to compress the number of switch layers through an innovative architecture and the introduction of photonics. If you replace electronics switching with optical switching, you don't need to go to smaller and smaller CMOS nodes."In effect, Rockley is looking to build a photonic ASIC. "But it needs to have all the right features, so we are integrating silicon photonics with CMOS technology, creating a series of networking components based on silicon photonics technology. "We had silicon photonics in high volume production," he noted. "Then the dot com crash came. Bookham was on the right track, but there was massive disruption."

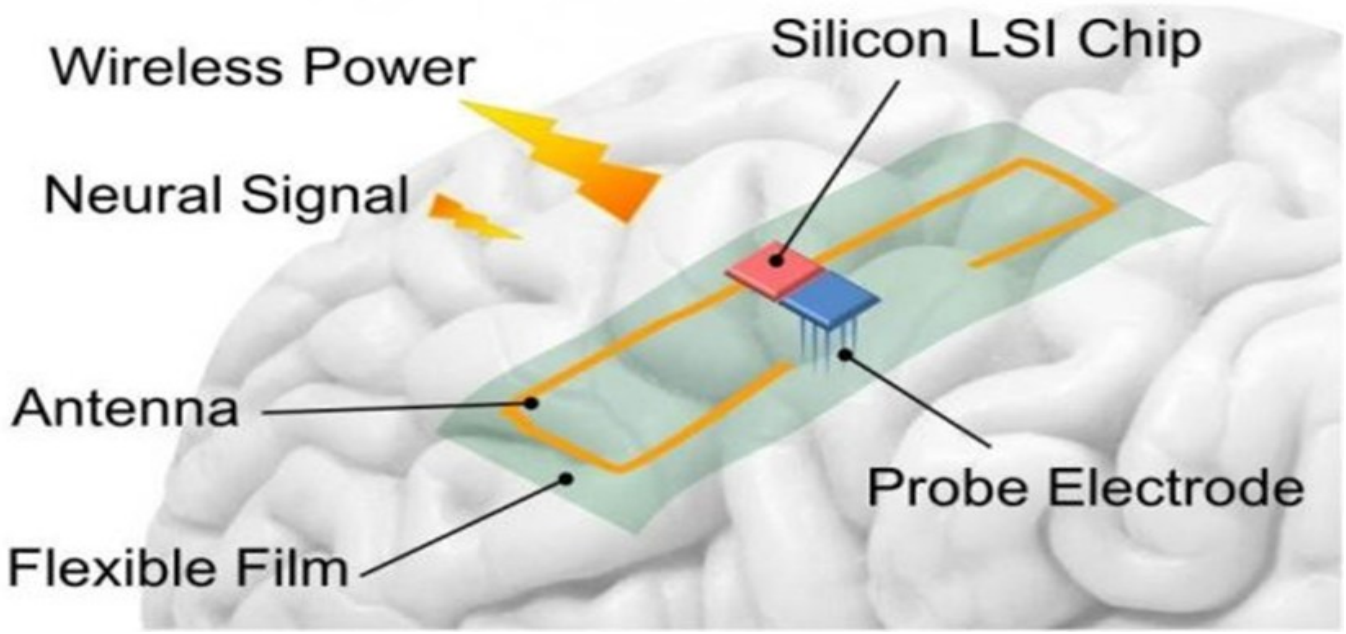
Since then, Dr Rickman has remained involved in the photonics industry,but has had a lower profile. Now, he has come back into the spotlight with Rockley, with solutions to the problems building blocks that don't exist anywhere else," said Dr Rickman.If you were able to 'take the top off' of one of these devices, you'd see the CMOS element handling packet processing, while the silicon photonics content dealing with switching and transmission. "These devices must be able to communicate within a card, a rack and across a datacentre. If you only produce a photonics device that gets data off the chip, you need to go back into the electronic domain to regenerate the signal and then return to the optical domain.

"Our approach has powerful photonics which can get anywhere and do that using less power than it takes to push a 25G signal across a couple of inches of PCB track."Rockley has developed its own silicon photonics process, but remains a fabless company. "

-P.MANIKAVASAGAM(3rd EEE)

"Our virtues and our failings are inseparable, like force and matter. when they separate, man is no more. " Nikola Tesla

WIRELESSLY SUPPLYING POWER TO BRAIN



Human and animal movements generate slight neural signals from their brain cells. These signals obtained using a neural interface are essential for realizing brain-machine interfaces (BMI). Such neural recording systems using wires to connect the implanted device to an external device can cause infections through the opening in the skull. One method of solving this issue is to develop a wireless neural interface that is fully implantable on the brain.However, the neural interface implanted on the brain surface should be of small size and minimally invasive. Furthermore, it requires the integration of a power source, antenna for wireless communication, and many functional circuits.Now, a research team at the Department of Electrical and Electronic Information Engineering at Toyohashi University of Technology has developed a wafer-level packaging technique to integrate a silicon large-scale integration (LSI) chip in a very thin film of a thickness 10 μm. The approach is realized using flip-chip bonding. The researchers have fabricated a wireless power transmission (WPT) device including a flexible antenna and rectifier chip by using the proposed method.

The first author PhD candidate Kenji Okabe said, "We have investigated how to integrate flexible antenna and high-performance circuits and tried this fabrication method with process conditions obtained through experiments." Assistant Professor Ippei Akita, who is leading the project, said, "Using flexible device technology is a good solution to implement bio-compatible passive devices such as antennas or sensor electrodes. On the other hand, silicon-based integrated circuit technology, which has long history, is suitable for ultra-low-power systems with many functionalities. So, we believe that combining these technologies is essential to establish such minimum invasive implantable devices."

The fabricated device is of size 27 mm × 5 mm, and 97% of the device area is composed of a flexible film as the silicon chip has a small area. Therefore, it has sufficient flexibility to fit the shape of the brain surface. In addition, the researchers achieved WPT to the device immersed in saline.

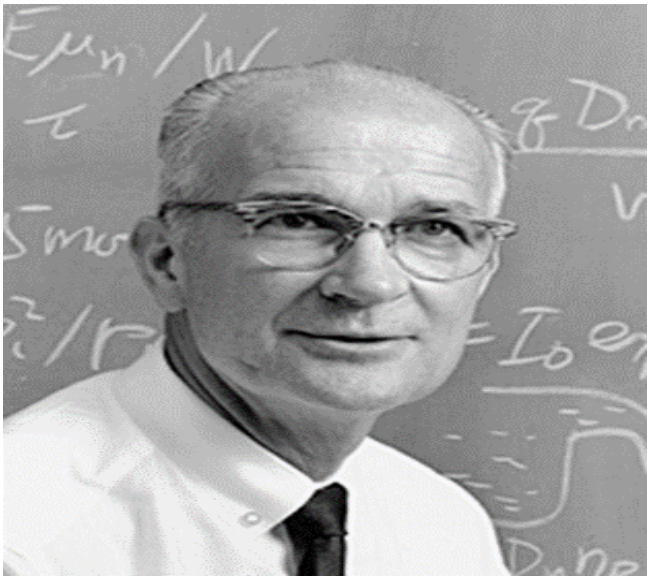
This WPT device can supply electricity to other circuits included in the neural interface. The researchers are trying to integrate more functions (e.g., amplifiers, analog-to-digital converters, signal processors, and radio frequency circuits) to an LSI chip. This study may contribute to the development of safer BMI systems.

-VITHYA PRABHA.K(3rd EEE)

"Mathematics is the language in which God has written the universe." Galileo Galilei

WILLIAM SHOCKLEY

Synopsis:
William Bradford Shockley clearly was one of the brightest scientists of the 20th century, yet he lived a life of noisy desperation.
He was a modern hero taken from one of the ancient Greek tragedies, caught in an age he helped invent. Like Orestes and Oedipus, Shockley was driven by the internal demon of hubris. Unlike Orestes and Oedipus, however, he never found redemption. Yet without him, you would probably be doing something less interesting right now.



William Bradford Shockley, who shared a Nobel Prize in physics for his role in the creation of the transistor and earned the enmity of many for his views on the genetic differences between the races, died of cancer of the prostate at his home in California on Saturday. He was 79 years old and lived on the campus of Stanford University.
He was a professor emeritus of electrical engineering at Stanford. In addition, he lectured and wrote extensively.Many of his early endeavors became clouded by controversy, however, because of his pronouncements on race.
He preached a philosophy of "retrogressive evolution." Stipulating in human evolution.that intelligence was genetically transmitted, he deemed blacks genetically inferior to whites and unable to achieve their intellectual level.

Start of Electronic Age:
In 1947, he and two colleagues from Bell Telephone Laboratories, the research arm of American Telephone & Telegraph Company, produced their first semiconductor device. And in 1956 he shared the Nobel Prize with the two, John Bardeen and Walter H. Brattain.
The invention of the transistor became the basis for the electronic age. From it flowed virtually every one of today's devices installed in airliners and cars, calculators and computers, wristwatches and washing machines.
Dr. Shockley left Bell Laboratories in 1954 and founded a semiconductor factory. A rebellion among his employees, who set up their own companies, began the phenomenon near Stanford University known as Silicon Valley.
Dr. Shockley went on to lecture at Stanford in 1958 and served as Alexander M. Poniatoff professor of electrical engineering and applied sciences from 1963 to 1975.

Debate on I.Q. Tests :
His theory on racial differences set off a national argument over the use and applicability of I.Q. tests. Evidence that blacks tend to score lower than whites was discounted by most experts who saw the explanation in cultural and social rather than genetic terms.
Stanford University, which announced the death late yesterday, said Dr. Shockley regarded his work on race more important than his discovery of the transistor. Quoting his wife, the announcement said he continued to sift data and prepare papers on it until a few days before he died.
Dr. Shockley had alienated many of his fellow scientists by straying far beyond his ken. He drew further scorn when he proposed financial rewards for the "genetically disadvantaged" if they volunteered for sterilization.
He sued The Atlanta Constitution for a 1980 column likening that suggestion to Nazi experiments in genetic engineering. In 1984 a Federal jury in Atlanta found that he had been libeled but awarded him just $1 in actual damages.

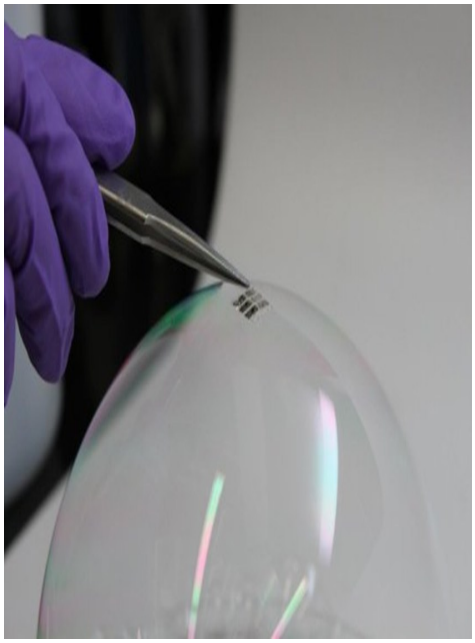
Trial and Error:
The team of Dr. Shockley, Dr. Brattain and Dr. Bardeen started out with the concept of the tubeless radio and proceeded from there by trial and error or, as Dr. Shockley later put it, by "creative-failure methodology."
"A basic truth that the history of the creation of the transistor reveals," he said, "is that the foundations of transistor electronics were created by making errors and following hunches that failed to give what was expected."

-K.JEYASRI(3rd EEE)

"If the misery of the poor be caused not by the laws of nature ,but by our institution, great is our sin." **Charles Darwin**

SOLAR CELLS AS LIGHT AS A SOAP BUBBLE

Imagine solar cells so thin, flexible, and lightweight that they could be placed on almost any material or surface, including your hat, shirt, or smartphone, or even on a sheet of paper or a helium balloon.Researchers at MIT have now demonstrated just such a technology: the thinnest, lightest solar cells ever produced. Though it may take years to develop into a commercial product, the laboratory proof-of-concept shows a new approach to making solar cells that could help power the next generation of portable electronic devices.The new process is described in a paper by MIT professor Vladimir Bulovic, research scientist Annie Wang, and doctoral student Joel Jean, in the journal Organic Electronics.



Bulovic, MIT's associate dean for innovation and the Fariborz Maseeh (1990) Professor of Emerging Technology, says the key to the new approach is to make the solar cell, the substrate that supports it, and a protective overcoating to shield it from the environment, all in one process. The substrate is made in place and never needs to be handled, cleaned, or removed from the vacuum during fabrication, thus minimizing exposure to dust or other contaminants that could degrade the cell's performance.

"The innovative step is the realization that you can grow the substrate at the same time as you grow the device," Bulovic says.

In this initial proof-of-concept experiment, the team used a common flexible polymer called parylene as both the substrate and the overcoating, and an organic material called DBP as the primary light-absorbing layer. Parylene is a commercially available plastic coating used widely to protect implanted biomedical devices and printed circuit boards from environmental damage. The entire process takes place in a vacuum chamber at room temperature and without the use of any solvents, unlike conventional solar-cell manufacturing, which requires high temperatures and harsh chemicals. In this case, both the substrate and the solar cell are "grown" using established vapor deposition techniques.

One process, many materials The team emphasizes that these particular choices of materials were just examples, and that it is the in-line substrate manufacturing process that is the key innovation. Different materials could be used for the substrate and encapsulation layers, and different types of thin-film solar cell materials, including quantum dots or perovskites, could be substituted for the organic layers used in initial tests.But already, the team has achieved the thinnest and lightest complete solar cells ever made, they say.

To demonstrate just how thin and lightweight the cells are, the researchers draped a working cell on top of a soap bubble, without popping the bubble. The researchers acknowledge that this cell may be too thin to be practical -- "If you breathe too hard, you might blow it away," says Jean -- but parylene films of thicknesses of up to 80 microns can be deposited easily using commercial equipment, without losing the other benefits of in-line substrate formation.

A flexible parylene film, similar to kitchen cling-wrap but only one-tenth as thick, is first deposited on a sturdier carrier material -- in this case, glass. Figuring out how to cleanly separate the thin material from the glass was a key challenge, explains Wang, who has spent many years working with parylene.

The researchers lift the entire parylene/solar cell/parylene stack off the carrier after the fabrication process is complete, using a frame made of flexible film. The final ultra-thin, flexible solar cells, including substrate and overcoating, are just one-fiftieth of the thickness of a human hair .

-B.N.MURALIDHARAN
(3rd EEE)

"My expectations were reduced to zero when I was 21.Everything since then has been a bonus." **Stephen W. Hawking**

ULTRA-EFFICIENCY IN 64-BIT COMPUTER

The move to 64-bit:
The Cortex-A35 processor is based on the latest ARMv8-A architecture, and supports both 32-bit and 64-bit computing. Since software development activity in the 32-bit domain remains strong, legacy support is vital. However, the superior memory- and data-handling capabilities of 64-bit compute deliver clear advantages when challenged by the increasing sophistication of applications. Efficiency when processing large files is also improved.

This allows for faster data manipulation for modern mobile workloads and compute-intensive applications. It also opens the opportunity for applications that address more than 4GBytes of RAM.
to previous generations by incorporating enhancThe ARMv8-A architecture supports distinct 32-bit and 64-bit processor execution states. The 32-bit state, known as AArch32, delivers improved 32-bit performance compared ements such as new cryptographic and floating-point instructions. The currently published benchmarking analysis for Cortex-A35 processor has been done in AArch32 execution state.Several mobile workloads like web browsing and multimedia are very memory intensive, causing large amounts of data movement between memory and the processor. The Cortex-A35 processor is architected to deliver significant improvements in memory performance compared to Cortex -A7 processor.

Connecting users to the web:
For some entry-equipment users, particularly those in developing nations that have little wired infrastructure, a mobile device is the main tool used for accessing the web. Hence a good browsing experience is essential. Figure 2 shows how browsing performance is significantly improved over Cortex-A7 processor. A 16% boost is achieved when testing like-for-like processor configurations clocked at the same frequency, whereas a performance-optimised implementation of the Cortex-A35 processor running at 2.0GHz delivers 84% better performance than the Cortex-A7 processor running at 1.2GHz.

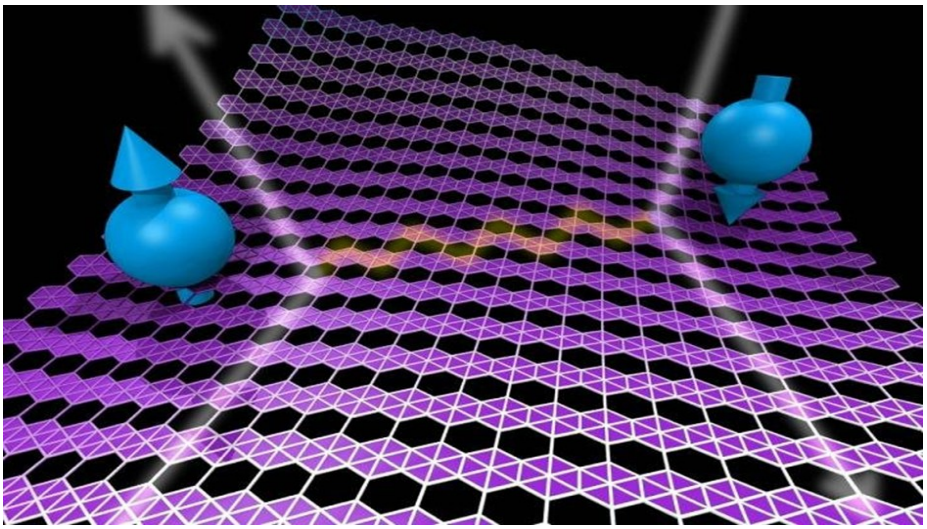
.**Video and gaming on the move:**
Other important mobile workloads, such as gaming and video or audio playback are not only dependent on moving large quantities of data quickly and efficiently, but also demand high compute performance. Gaming, in particular, places heavy demand on floating-point operations to calculate movements or trajectories.
The ARMv8-A architecture features improvements in the NEON media-processing engine that improve both single-precision and double-precision floating-point performance. The NEON and floating-point pipelines are also extremely area-efficient. Figure 3 expresses the improvements, relative to Cortex-A7 processor, in integer, floating-point and video performance that are critical for great gaming experiences. The video comparison is done with the NEON engine running video decoding for some popular video formats like MP4. The Geekbench single-core benchmark also shown includes the integer, floating-point and memory-streaming tests, and confirms an overall 40% improvement for the Cortex-A35 processor compared to Cortex-A7 processor.

Performance boost, power savings:
While increased performance is essential to deliver the user experiences expected from next-generation mobiles, designers remain under pressure to stay within a tight power budget allocated to the processor in the SoC platform. Size and cost constraints limit typical power for entry smartphones to under 100 to 150mW per processor core, and careful power management is needed to maximise battery life. The design of Cortex-A35 processor has tackled both dynamic power consumption and idle power management. Changes to the processor's micro architecture, such as the enhanced pipeline, have yielded significant reductions in dynamic power.

- Saravanamoorthi (3rd EEE)

"Be less curious about people and more curious about ideas ." Marie Curie

FLAT BORON - A SUPERCONDUCTOR



Rice theoretical physicist Boris Yakobson and his co-workers published their calculations that show atomically flat boron is metallic and will transmit electrons with no resistance. The work appears this month in the American Chemical Society journal *Nano Letters*.The hitch, as with most superconducting materials, is that it loses its resistivity only when very cold, in this case between 10 and 20 kelvins (roughly, minus-430 degrees Fahrenheit). But for making very small superconducting circuits, it might be the only game in town.

The basic phenomenon of superconductivity has been known for more than 100 years, said Evgeni Penev, a research scientist in the Yakobson group, but had not been tested for its presence in atomically flat boroninto it."

Electrons with opposite momenta and spins effectively become Cooper pairs; they attract each other at low temperatures with the help of lattic."It's well-known that the material is pretty light because the atomic mass is small," Penev said. "If it's metallic too, these are two major prerequisites for superconductivity. That means at low temperatures, electrons can pair up in a kind of dance in the crystal."

"Lower dimensionality is also helpful," Yakobson said. "It may be the only, or one of very few, two-dimensional metals. So there are three factors that gave the initial motivation for us to pursue the research. Then we just got more and more excited as we got e vibrations, the so-called "phonons," and give the material its superconducting properties, Penev said. "Superconductivity becomes a manifestation of the macroscopic wave function that describes the whole sample. It's an amazing phenomenon," he said.

It wasn't entirely by chance that the first theoretical paper establishing conductivity in a 2-D material appeared at roughly the same time the first samples of the material were made by laboratories in the United States and China. In fact, an earlier paper by the Yakobson group had offered a road map for doing so.

That 2-D boron has now been produced is a good thing, according to Yakobson and lead authors Penev and Alex Kutana, a postdoctoral researcher at Rice. "We've been working to characterize boron for years, from cage clusters to nanotubes to planer sheets, but the fact that these papers appeared so close together means these labs can now test our theories," Yakobson said.

"In principle, this work could have been done three years ago as well," he said. "So why didn't we? Because the material remained hypothetical; okay, theoretically possible, but we didn't have a good reason to carry it too far.

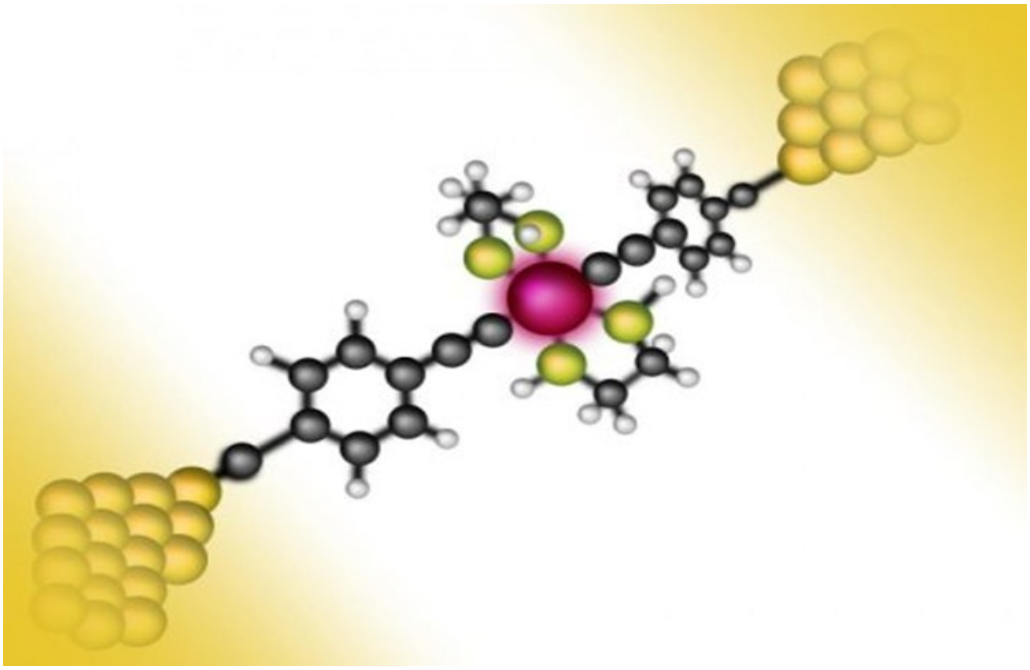
"But then last fall it became clear from professional meetings and interactions that it can be made. Now those papers are published. When you think it's coming for real, the next level of exploration becomes more justifiable," Yakobson said.

Boron atoms can make more than one pattern when coming together as a 2-D material, another characteristic predicted by Yakobson and his team that has now come to fruition. These patterns, known as polymorphs, may allow researchers to tune the material's conductivity "just by picking a selective arrangement of the hexagonal holes," Penev said. Penev suggested that isolating 2-D boron between layers of inert hexagonal boron nitride (aka "white graphene") might help stabilize its superconducting nature

-Z Khalidha Banu (3rd EEE)

"Experimentaion is the elast arrogant method of gaining knowledge. The experimenter humbly asks a question of nature. " **Issac Asimov**

THE SWITCH MOLECULE



New kind of switch can be altered in a targeted manner using a single electron.

In electronics, nothing works without transistors: they are the fundamental building blocks on which the logic circuits in our computer chips are based. They usually consist of silicon crystals, doped with other types of atom. One Swiss/Austrian research team (TU Wien, the University of Vienna, the University of Zurich, IBM Zurich) has now succeeded in developing a transistor that functions in a fundamentally different manner and consists solely of a single molecule. Instead of three electrodes, as in a conventional transistor, this switch molecule only requires two. The new nanoswitch has now been presented in the specialist journal *Nature Nanotechnology*.

Zero or one:

"The key feature of a transistor is that it can assume two different states," explains Robert Stadler from the Institute of Theoretical Physics at TU Wien (at the start of the project he was still working at the Department of Physical Chemistry at the University of Vienna). Depending on which state the transistor is in, it either allows current to flow or not. A conventional transistor made of silicon crystals therefore has three contacts: the current is supplied by one of these, and is able to flow into the second one; whether this actually happens or not depends on the voltage applied at the third contact, which is known as the 'gate contact'.In order to accommodate ever more transistors in an ever smaller area, transistors have continued to reduce in size over the last few decades. This has drastically improved efficiency in electronics, but does, however, bring with it ever greater technical problems. With conventional silicon technology, physical limitations are encountered as a result. "With extremely small crystals you no longer have sufficient control over the electronic properties, particularly if only a small number of dopants remains and the gate's insulating layer allows increasingly more leakage," explains Stadler. "However, if you switch from crystals to organic molecules at the nanoscale, you then have new opportunities to change the transport characteristics."

From molecule to transistor:

At the University of Zurich, chemists have therefore synthesised organometallic molecular structures endowed with individual metal atoms of iron, ruthenium or molybdenum. These designer molecules, which are only around two and a half nanometres long, are then carefully connected using two gold contacts at the IBM research lab in Rüschlikon before voltage can be applied to them.

For one of the molecule types tested, which has a molybdenum atom placed at its core, some quite remarkable properties were observed: similarly to a silicon transistor, this molecule switches back and forth between two different states, which differ by three orders of magnitude as regards their conductivity. Complex computer simulations were required in order to understand the underlying process; these were carried out by Robert Stadler and his doctoral student Georg Kastlunger at the Vienna Scientific Cluster (VSC). This allowed the mechanism to be decoded at a quantum physical level.

-M Arun(3rd EEE)

"Truth is never found in simplicity, and not in the multiplicity and confusion of things." **Sir Issac Newton**

SELF-HEALING SENSOR BRINGS 'ELECTRONIC SKIN' CLOSER TO REALITY

Scientists have developed a self-healing, flexible sensor that mimics the self-healing properties of human skin. Incidental scratches or cuts to the sensors "heal" themselves in less than one day.Flexible sensors have been developed for use in consumer electronics, robotics, health care, and space flight. Future possible applications could include the creation of 'electronic skin' and prosthetic limbs that allow wearers to 'feel' changes in their environments.

One problem with current flexible sensors, however, is that they can be easily scratched and otherwise damaged, potentially destroying their functionality. Researchers in the Department of Chemical Engineering at the Technion -- Israel Institute of Technology in Haifa (Israel), who were inspired by the healing properties in human skin, have developed materials that can be integrated into flexible devices to "heal" incidental scratches or damaging cuts that might compromise device functionality. The advancement, using a new kind of synthetic polymer (a polymer is a large molecule composed of many repeated smaller molecules) has self-healing properties that mimic human skin, which means that e-skin "wounds" can quickly "heal" themselves in remarkably short time -- less than a day.

A paper outlining the characteristics and applications of the unique, self-healing sensor has been published in the current issue of *Advanced Materials*.

"The vulnerability of flexible sensors used in real-world applications calls for the development of self-healing properties similar to how human skins heals," said self-healing sensor co-developer Prof. Hossam Haick. "Accordingly, we have developed a complete, self-healing device in the form of a bendable and stretchable chemiresistor where every part -- no matter where the device is cut or scratched -- is self-healing."

The new sensor is comprised of a self-healing substrate, high conductivity electrodes, and molecularly modified gold nanoparticles. "The gold particles on top of the substrate and between the self-healing electrodes are able to "heal" cracks that could completely disconnect electrical connectivity," said Prof. Haick.

Once healed, the polymer substrate of the self-healing sensor demonstrates sensitivity to volatile organic compounds (VOCs), with detection capability down to tens of parts per billion. It also demonstrates superior healability at the extreme temperatures of -20 degrees C to 40 degrees C. This property, said the researchers, can extend applications of the self-healing sensor to areas of the world with extreme climates. From sub-freezing cold to equatorial heat, the self-healing sensor is environment-stable.

The healing polymer works quickest, said the researchers, when the temperature is between 0 degrees C and 10 degrees C, when moisture condenses and is then absorbed by the substrate. Condensation makes the substrate swell, allowing the polymer chains to begin to flow freely and, in effect, begin "healing." Once healed, the nonbiological, chemiresistor still has high sensitivity to touch, pressure and strain, which the researchers tested in demanding stretching and bending tests.

Another unique feature is that the electrode resistance increases after healing and can survive 20 times or more cutting/healing cycles.

-S Sarath(3rd EEE)

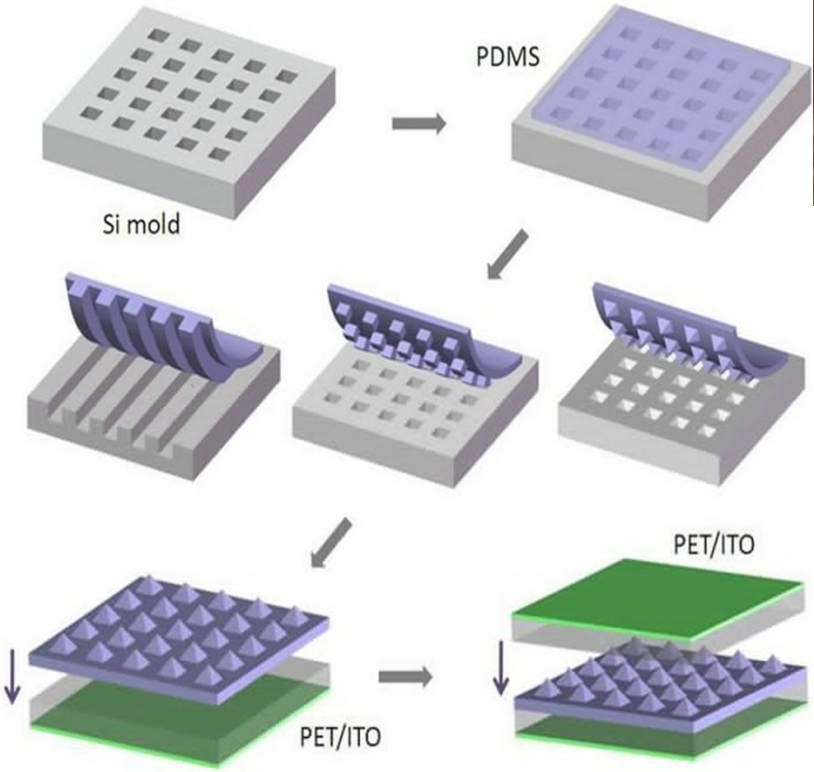
"As far as Mathematics refers to reality, they are not certain ; and as far as they are certain, they do not refer to reality." **Albert Einstein**

SMART PHONES COULD GENERATE OWN

A transparent material that can be attached to a smartphone's touch screen could help the device generate electricity whenever anyone taps it, researchers in China say.

Touch screens are now found on most cell phones and tablet computers. Using touch screen typically involves finger taps and scientists at Lanzhou University in China reasoned that the mechanical energy could be converted into electricity to charge the phone batteries which could significantly extend the working time of these portable devices.

The researchers developed a new material based on a transparent silicone rubber known as PDMS. Scientists embedded wires in this rubber that were made of Lead Zirconate Titanate that were only 700 nanometres or a billionth of a meter wide. This is about 140 times thinner than the average width of a human hair. As the rubber solidified, the researchers used electrical fields to align the nanowires in the rubber in columns. This alignment helped set both the material's electrical and visual properties.
Whenever such nanowires are bent - for instance, whenever anyone taps on the material – they generate electricity, a phenomenon known as piezoelectricity. By making sure the nanowires are lined up with one another, the researchers helped ensure that they would react to finger taps in unison, generating as much energy from the motions as possible.When the material is viewed head-on, these incredibly narrow wires are largely invisible and the material can look mostly transparent. As such, the nanowires can harvest taping energy on a screen without influencing the screen's normal working. In addition, when the material is viewed from an angle, the nanowires interfere with light rays, which means that anything seen through the material at that angle will look blurry. As such, the material can also help protect a user's privacy by preventing anyone nearby from being able to peek at someone else's smartphone screen.



In experiments, tapping on the material generated an electrical current of 0.8 Nano amperes or about one-millionth of the electricity used by a hearing aid. The scientists noted that the results of future research could help their material generate more current to efficiently recharge the batteries of mobile devices.

-U Danusha, (2nd EEE)

THE FUTURE OF THE WINDMILLS

Wind power has become a legitimate source of energy over the past few decades as larger, more efficient turbine designs have produced ever-increasing amounts of power. A Spanish company called Vortex Bladeless is proposing a radical new way to generate wind energy. Vortex says its bladeless turbines will generate electricity for 40 percent less than the cost of power from conventional wind turbines.This latest entry promises a radically different type of wind turbine: a bladeless cylinder that oscillates or vibrates. Their idea is the Vortex, a bladeless wind turbine that looks like a giant rolled joint shooting

into the sky. The Vortex has the same goals as conventional wind turbines: To turn breezes into kinetic energy that can be used as electricity. Instead of capturing energy via the circular motion of a propeller, the Vortex takes advantage of what's known as vorticity, an aerodynamic effect that produces a pattern of spinning vortices. Vorticity has long been considered the enemy of architects and engineers, who actively try to design their way around these whirlpools of wind. The Vortex's shape was developed computationally to ensure the spinning wind (vortices) occurs synchronously along the entirety of the mast. In its current prototype, the elongated cone is made from a composite of fiberglass and carbon fiber, which allows the mast to vibrate as much as possible (an increase in mass reduces natural frequency). At the base of the cone are two rings of repelling magnets, which act as a sort of nonelectrical motor. When the cone oscillates one way, the repelling magnets pull it in the other direction, like a slight nudge to boost the mast's movement regardless of wind speed. This kinetic energy is then converted into electricity via an alternator that multiplies the frequency of the mast's oscillation to improve the energy-gathering efficiency. Its makers boast the fact that there are no gears, bolts, or mechanically moving parts, which they say makes the Vortex cheaper to manufacture and maintain. The founders claim their Vortex Mini, which stands at around 41 feet tall, can capture up to 40 percent of the wind's power during ideal conditions (this is when the wind is blowing at around 26 miles per hour). Based on field testing, the Mini ultimately captures 30 percent less than conventional wind turbines, but that shortcoming is compensated by the fact that you can put double the Vortex turbines into the same space as a propeller turbine. It's less expensive to manufacture, totally silent, and safer for birds since there are no blades to fly into. The turbine would cost around 51 percent less than a traditional turbine whose major costs come from the blades and support system. It is cheaper to manufacture than current pinwheel turbines. Maintenance prices are also lower because there is no friction from mechanically moving parts (e.g., the blades on a traditional turbine), which reduces the need for oiling and bolt replacement. It is completely silent and birds can fly around them safely (though it has yet to be announced whether the turbine is nest-proof.) New wind technology, however, always receives some skepticism:

Most wind-harvesting technologies only work at a fraction of their most efficient output. Wind turbines need smooth, laminar airflow; the kind you only really find at about 100 meters (328 feet) above the ground. The wind that we know and love to hate is turbulent, messy and generally no good for wind turbines.

While this invention might not revolutionize Earth's renewable power sources just yet, it's still exciting to see what designers are creating.

-Nachammai, (2nd EEE)

Test Your Grey Cells

TRICKY PUZZLES

Questions:

1.There is a room with no doors, no widows, nothing and a man is hung from the ceiling and a puddle of water is on the floor. How did he die?

2.A boy and a doctor was fishing. The boy is the doctor's son but the doctor is not the boy's father. who is the A doctor?

3.Which word is the odd one out:
First Second Third Forth Fifth Sixth Seventh Eighth

4.What ends in a 'w' but has no end?

5.Who's bigger: Mr. Bigger, Mrs. Bigger or their baby?

6.A boy and a doctor was fishing.The boy is the doctor's son but the doctor is not the boy's father.who is the doctor?

7.What ends in a 'w' but has no end?

Answers

:

1He was standing on a block of ice and it melted

2.His Mother!

3.Forth; it is incorrectly spelt, it should be fourth

4.A rainbow

5.Their baby because he is a little bigger! Get it? Little bigger than the others.

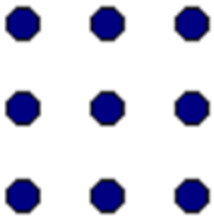
6.His Mother!

7.A rainbow

BRAIN TEASERS

Questions:

1How should the four lines be drawn**?**



Nine dots are placed in three rows of each three dots, as shown in the picture. these nine do ts must be connected by four straight, connected lines (i.e. without 'lifting up pen' in between).

2.What can you put in a barrel which makes it lighter**?**

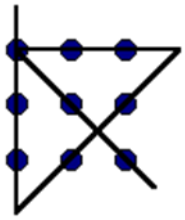
3**.**Where can you find August before July**?**

4**.**The equation shown here is not correct.

5.A pink house is made of pink bricks and a brown house is made of brown bricks. What is a green house made of?

Answers:

1.



2. .A hole.

3.In the dictionary!

4.Add a line to make a 4 in the first plus line..

Carbon dioxide

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We develop a globally competitive workforce and entrepreneurs.

Mission of the institute:

Dr.Mahalingam College of Engineering and Technology, Pollachi endeavours 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.

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Emerge as the world leader for the Electrical and Electronics Engineering education and research for the application of knowledge to the society.

Mission of the department:

The EEE Department believes that every student is a unique and is in a process of continuous growth. In order to foster growth and empowerment, we commit ourselves to,

- Provide a stimulating learning environment with a technological orientation to maximize individual potential.
- Continuous pursuit of quality and excellence.
- Provide appropriate know-how and up-to-date knowledge.
- Nurture creativity and ambit for research.

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PEO2. Own their professional and personal development by continuous learning and apply to create new knowledge.

PEO3. Conduct themselves in a responsible, professional and ethical manner supporting sustainable economic development, which enhances the quality of life

Programme Outcomes

PO1	**:**	Apply the knowledge of Mathematics, Science and Engineering to solve problems in the field of Electrical and Electronics Engineering
PO2	**:**	Identify, formulate/model, analyze and solve complex problems in the field of Electrical and Electronics Engineering
PO3	**:**	Design an Electrical/Electronic System/Component, or Process to meet specific purpose with due consideration for economic, environmental, social, political, ethical, health and safety issues
PO4	**:**	Design and conduct experiment, analyze and interpret data to provide valid conclusions in the field of Electrical and Electronics Engineering
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PO6	**:**	Apply contextual knowledge to provide engineering solutions with societal, professional & environmental responsibilities
PO7	**:**	Provide sustainable solutions within societal and environmental contexts for problems related to Electrical and Electronics Engineering
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