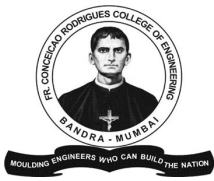


TECHNOBUZZ!!!



**IEEE CRCE
NEWSLETTER**



Celebrating 25 years of service (1984-2009)

...“And seeing ignorance is
the curse of God,
Knowledge the wing wherewith
we fly to heaven.” ...

-Shakespeare

A new year and a new sem but with the same old vibe IEEE-CRCE presents yet another exciting edition of **technobuzz**, covering the latest happenings in the outside technological world and the buzz inside our very own campus.

• **RECENT AND UPCOMING EVENTS:**

A review of the events that happened in the past days and an insight to those which are yet to come.

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• **IV REPORT:**

A brief report of the ‘Industrial Visit’ organized by IEEE-CRCE to Chandigarh and Shimla for the academic year 2008-09.

// page 4

• **TECHNICAL ARTICLES:**

Get to know about the *shrinking* batteries and the fourth and last fundamental circuit element: *memristor*.

// page 3, 5

• **KILLING ‘THE ELECTRIC CAR’:**

The true story of how the electric car was killed by the famous *faces* of this world.

// page 6

• **FUNZONE:**

Time for some serious ‘fun’... get to know some amazing facts and drill your brain to crack some mind bottling brain teasers.

• **WIE COUNCIL:**

Women In Engineering (WIE), an IEEE initiative to empower Women engineers all over the world...*mission and WIE CRCE council details for the year 2008-09.*

// page 8

This edition will give you an idea of what **IEEE-CRCE** has *in store* for you and throw light on the outside technological advancements...

For more info log on to www.fragnel.ac.in/IEEE

Please send in your comments and suggestions at IEEE-CRCE forum

-MAYANK TEWARI [TEE] ,
TECHNICAL EDITOR,
IEEE-CRCE



RECENT EVENTS

IEEE-CRCE has now in itself blossomed so splendidly, that it has expanded its horizon by spreading out its activities outside our college and casting its spell over other colleges too. This is evident from the fact that 10 colleges participated in the 'Inter-Collegiate Technical Paper Presentation' the grand event of the semester held on 26 September 2008, that won laurels for its success from every corner. Highly esteemed panel of judges comprising of erudite professors from other colleges as well judiciously judged these papers that touched various fields of engineering such as Robotics, Nanotechnology, Image Processing, Biotechnology and other core electronics subjects.

On September 30, 2008 an IV was arranged to Tata Power Plant, Trombay for the FE and SE students. 33 students (20 from TEE and 12 from FEE) accompanying Ms. Parshvi Shah were a part of

this industrial visit. The students were taken to the Control Unit wherein they were enthralled to see the fully automated process for electricity generation.

. Soon after this, followed the much awaited college Technical Festival, 'CResCendo', held on 17 and 18 October 2008. In order to teach A.B.C. of Robotics to the FE students who were keen to participate in the Robo-competitions, a small hands-on session was conducted on the same just before the fest.

Technical brain storming events such as 'Techwars', 'Best Project Idea', 'Challenge: Electronica' were the events held under IEEE-CRCE that it received an unprecedented response from students.

With the start of the fresh semester yet another event was organized by IEEE-CRCE for the SE Students on 30 January, 2009 to demonstrate the various Analog and Digital projects of the current TE students. This was with a view to help SE students get introduced to these various projects which is a part of their

academic curriculum. Some important guidelines were given to the students to avoid common mistakes that arise during project construction.

UPCOMING EVENTS

A hands-on session on 'Labview Simulation' is planned to be conducted on 13 February, 2009 by Prof. Bhoir. This is believed to provide help to the students with their current practical sessions as prescribed by the University. Yet another seminar under WIE on creative designing is in the pipeline.

IEEE-CRCE has also planned to organize an inter collegiate workshop on 'Robotics' for 3 days commencing on 21 February, 2009.

Fundamentals of Autonomous Robotics and Image Processing will be covered under this workshop.

'Inter collegiate Project Competition', the grand event of this semester is scheduled on 21 March 2009, to encourage innovative

Heartiest Congratulations!!! to
Prof. B.R. PRABHU
(Branch Mentor, IEEE-CRCE)
on his election to
IEEE India Council Committee 2009 as
Vice Chairperson — Students activities.

projects.

Another 1 day IV in the month of March exclusively for FEs is also on the agenda .

In order to brief the students on how to go about the various procedures post GRE- examination a seminar will be conducted on the same by Arjun Rao, Chairperson of our very own IEEE-CRCE.

Herein at IEEE-CRCE we have always persevered and emulated to impart all that we can from our side. However this journey will become veritable only through active participation of the students. We therefore exhort these bubbling students of FR.CRCE to nurture this benevolent tree of IEEE-CRCE which has spread out its branches to serve its members, with their continued enchanting response !

--MEGHANA GHADGE [TEE]
ORGANISER
IEEE-CRCE

NANOWIRE BATTERY

According to Moore's Law, the speed of computer chips grows at an exponential rate. Unfortunately, there is no such rule regarding battery capacity. So while computer chips trip over themselves getting faster, the batteries that power them—in laptops, cell phones and other chip-driven devices—lag behind, constrained by modern chemistry. However, someone has been working towards it, thanks to the research carried out by Stanford researcher Yi Cui, he writes that the lithium-ion batteries that power most of these devices may soon be able to hold **10 times** as much power as the ones powering today's gadgets.

AND HOW... ?

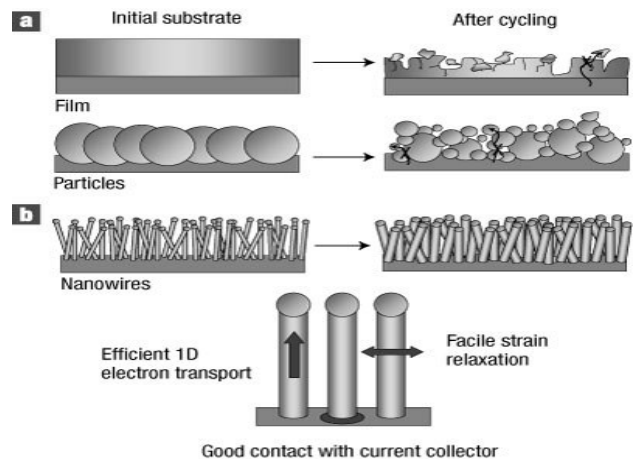
“And how is that possible?”- must be the most probable question running in your mind.

Well, the answer is today's Lithium-ion batteries work by transferring lithium ions from an anode, typically made from carbon, to a metal-oxide cathode. Carbon anodes can only hold 1 ion per 6 carbon atoms. A silicon anode, by comparison, can hold a much greater charge—4.4 lithium ions per single silicon atom thus allows a far greater energy density on the anode, thus reducing the mass of the battery. The high surface area further allows for fast charging and discharging.

Silicon placed in a battery swells as it absorbs positively charged lithium atoms during charging, then shrinks during use (i.e., when playing your iPod) as the lithium is drawn out of the silicon. This expand/shrink cycle typically causes the silicon (often in the form of particles or a thin film) to pulverize, thus showing capacity fading and short battery lifetime. (as in fig a)

NANOWIRES:

Nanowires (NWs) grown directly on the current collector do not pulverize or break into smaller particles after cycling. Each Silicon nanowires is electrically connected to the metallic current collector so that all the nanowires contribute to the capacity. They



allow for efficient charge transport. (as in fig b.)

Tests have shown an energy storage capacity of more than 4200 milliampere hours per gram, or 10 times that of a standard lithium-ion battery.

IMPACT:

Improvements in battery energy capacity could positively impact nearly everyone, extending the life and shrinking the size of cell-phones, iPods and portable computers, making possible a laptop that could run for nearly two days ,and maybe even giving plug-in cars the edge they need to catch on.

Battery safety depends on volume expansion and the surface chemistry of the electrode.

There are fundamental reasons to believe a silicon nanowire anode is going to be safer. Nanowires can handle the volume expansion, and tests show that the surface chemistry is more stable than in batteries with carbon anodes.

So, most probably in coming days we will be having something smaller and stronger to power our already ‘smaller’ devices for a considerably longer period.

References: Published in Nature Nanotechnology.

-KIRTI BHANUSHALI [TEE]
VICE-CHAIRMAN
IEEE-CRCE



I V Report

An industrial visit is an opportunity for the students to understand the practical application of their curriculum. Also as it comes close on the heels of the semester exams it gives students a good way to unwind. Keeping this in mind IEEE-CRCE organizes an IV for its members annually. This year a visit to Chandigarh – Shimla was arranged by the same.

On **January 10**, 2009, 73 students from 2nd and 3rd year descended on Bandra Terminus to begin this year's Industrial Visit. We were accompanied by two professors Mr. Ajay Koli and Ms. Parshvi Shah. There was great anticipation as the Paschim Express departed the station marking the beginning of what eventually turned out to be a wonderful trip.

After a journey of about 30 hrs the group reached the Hotel "Pearl Inn" in Chandigarh admiring the first planned city of India, on its way to the hotel. // 1st row: 9,4,5,7,1,6,2,3,8

12 January, the gloomy morning delayed the departure to Shimla by couple of hrs. On route to Shimla the group enjoyed the 2.5 km long rope way at Timber Trail and finally reached the erstwhile summer capital of India at night and were grateful for the warmth offered by Hotel "Ashiana Regency" the group's abode.

The next morning was warm and crisp, the drive to Kufri, the group's next destination, was delightful. Though the promised snow at the peak never showed up, the breathtaking views accounted for the same. The evening went by enjoying the sites and sounds of Shimla which included the Mall road, the Ridge, Christ Church amongst others.

14 January was the day for actual 'industry visits'. After a long drive we reached Baddi where "PENGUIN ELECTRONICS" is sited. It's a company that makes food processors for Philips. There Mr. Atul Gupta (Manager), showed how the assembly line works, the various divisions within the line. The testing procedures as well as the nitty-gritty of working in an industrial set up was an exciting disclo-

sure for the students. Mr Jagdeep Singh explained the organizational working of Philips right from its R&D centres to its manufacturing centres which can churn out up to 2000 units a day. The evening was spent by the group at Pinjore gardens which project a replica of the Mughal Gardens.

On **15 January**, we visited "GODREJ AND BOYCE FACILITY" at Mohali. The facility includes two factories, one manufacturing refrigerators and the other, compressors. The visit began with a presentation on the company itself followed by a briefing on how the refrigerator works. Fresh from the talk the group shifted to the factory floor where the assembly line was awe inspiring. Mr Vijendra Singh enthusiastically explained the process involved in the manufacture, right from the basic tooling to the moulding stage and finally the testing and quality control. The process of moulding was a sight to behold. Further Mr. Rajneesh guided us through the production of compressors explaining its various parts and working. The day ended with a visit to various land marks like Rock garden, Sukhna lake, Rose Garden and some shopping in Sector -17.

16 January, the last day of the visit arrived.

The group visited "ELIN APPLIANCES" at Nalagarh, a company that makes torches for Everready as well as iron and mixer – grinder for Philips. The students were taken for a guided tour of the manufacturing, final testing and quality control that goes into the making of torches, the process repeated for iron and mixer-grinder manufacturing done for Philips by the company. // 2nd row: 1,8,6,3,5,2,9,7,4

Finally the group moved on to its final destination Ambala from where the train for Mumbai was to depart. // 3rd row: 2,7,3,8,4,9,6,5,1

The train journey symbolized the end of what had been a thoroughly enjoyable as well as an interesting learning experience for the students. // 4th row: 4,9,8,2,7,1,3,6,5

-NIKET JITHRA [TEE]
IV HEAD
IEEE-CRCE

THE MISSING MEMRISTOR

For about 150 years, engineers have been running around with resistors, capacitors and inductors in their pocket with an intention to make something work and sometimes to break something which already works. These are ,or rather *were* the only three known fundamental passive circuit elements uptill now, but Williams Stanley and his group finally established the *missing* link and came up with the fourth fundamental element that possesses the power to revolutionize the circuit designing world:- *THE MEMRISTOR*.

“A 40 YEAR OLD SPARK...”

About 40 years back, Leon Chua (University Of California, Berkeley) predicted the existence of this fourth fundamental element, he called it a *memristor*. For about 40 years Leon’s prediction kept scientists all over the world brooding and then on April 30, 2008, William Stanley and his group successfully tailored the first model of memristor in HP Labs, Palo Alto, California.

OK... BUT WHAT IS IT ?

Memristor name has been formed by contraction of ‘*memory resistor*, wondering why so? – because that’s exactly what it does-to remember its history. In straight words, memristor is a two-terminal device whose resistance depends on the magnitude and polarity of voltage applied to it and the length of time that voltage has been applied. The memristor remembers its last value of resistance and starts exactly from that value on application of another voltage, be it a second later or a year later. // 5th row: 5,6,7,9,3,4,1,8,2

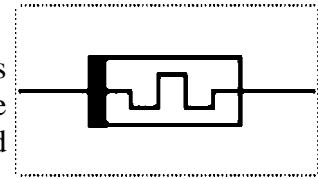
HOW DOES IT WORK ?

A memristor provides a similar relationship between magnetic flux and charge that a resistor gives between voltage and current. In practice, it means it acts like a resistor whose value varies according to the current passing through it, the exciting part is, it remembers that value even after the current disappears.

In simplest terms it can be formulated as:

$$M(q) = d\Phi/dI ,$$

Where, $d\Phi$ represents instantaneous change in magnetic flux and dI represents instantaneous change in current.



SYMBOL FOR MEMRISTOR

It can be observed that by the equation for resistance (R) can be easily obtained from the above equation by applying basic Faraday’s laws. // 6th row: 3,2,1,5,6,8,4,9,7

WHAT NEXT... ?

The freezing property of the memristor can revolutionize the entire current scenario of circuit design. If it does not sound appealing then just think about the liberty of switching a computer off without saving any file and yet not getting worried about that file or any other data loss. If your computer memory is based on memristors, not only the above thing, in fact you can pull out the battery from your laptop just to fancy yourself and pop it back in just to find your screen coming back to life exactly as you left it. // 7th row: 6,5,2,1,8,3,7,4,9

Apart from their usage as a non-volatile high density memory, they can be used to fabricate Programmable arrays having 1/10th of the present size and at least twice the speed and efficiency. // 8th row: 8,3,9,4,2,7,5,1,6

The ‘*memory*’ property of the memristor can be used to achieve some of the biggest technical challenges, for instance mimicking the functioning of the human brain. It is believed that within a decade memristors will be capable of not only simulating, but emulating the networks of neurons and synapses, that actually form the city we call ‘Brain’ inside our skull. // 9th row: 7,1,4,6,9,5,8,2,3

To probe further:

<http://www.spectrum.ieee.org/may08/6207>

<http://en.wikipedia.org/wiki/Memristor>

-MAYANK TEWARI [TEE]
TECHNICAL EDITOR
IEEE-CRCE



...KILLING 'THE ELECTRIC CAR'...

We already know about the efforts *we* are trying to put in to make our automobiles petrol/fuel free. I am sure you can still recall many science projects and assignments we did in school on how we should try to preserve our fossil fuels and try to switch over to other cleaner and greener sources of energy so that we do not spread more pollution and create more havoc than what we have already created.

...By now I guess you must have recollected your sweet school memories and the countless hours you spent thinking about *greener* ways of fuel production and consumption. If yes then dig this...

The battery technology to power a car over 100 miles an hour for over 200 miles on a single charge requiring not a single drop of fuel exists and has existed for a long time, in fact simple electric cars have existed since 1912 my friends. The problem being some battery technology is patented by the oil companies or rather forcefully acquired by them.

Facts reflect that General Motors [GM] purchased the full control of patent rights of EV batteries from Iris Ovshinsky forming a division 'GM Ovonics' in 1994. Now, under major political pressure, they sold this patent control to Texaco in 2000 and further by some *strange coincidence*, in less than a week, Texaco merged with Chevron, responsible for production and distribution of Chevron –*the Standard Oil of California*.

Now collectively Chevron and GM did the following *noticeable* things:

- Started a collaboration with Toyota and Panasonic with a suspected intention of defaming and killing the Ni-MH batteries and due to the huge financial and political backing, they were successful. Soon after Chevron sued Panasonic for 30,000,000 US dollars. The immediate result was that the production of Toyota's R4V4-EV and Panasonic's Ni-MH batteries was stopped, which could successfully power an optimum performance electric car.
- Invented low-grade and 6 times more costly Lithium ion batteries which run for 10 miles at about 40 mph causing people to believe that battery powered cars are highly inefficient and costly.

Due to above deeds, soon *hybrid automobile* ideas started swarming over the global market. These hybrid automobiles had the gasoline engine as the primary source of motive power and the Lithium Batteries were just used to *boost* acceleration and for start off.

With a well planned market strategy these companies triggered an increase in the cost of these batteries world wide, eventually as expected the cost of the so-called *hybrid cars* went up causing them to be unaffordable to public.

The result was evident...The '*electric car concept*' got killed under the strategically planned market game played by the '*big buck fellas*' of industrial world.

Though there were other *strong* contenders for the honor '*Who killed the electric car*', but the above two proved to be the *finest* of all...now I leave it to you to award this crown to the most worthy of these two.

If you still find something fishy and shady then you may visit these web links:

www.teslamotors.com

www.energyinvestmentstrategies.com

http://en.wikipedia.org/wiki/Who_Killed_the_Electric_Car

-ADITYA KHEMKA [TEE]
ORGANIZER
IEEE-CRCE



... FUN ZONE ...

...I DIDN'T KNOW THAT...

- A lightning bolt reaches up to 50,000 degrees Fahrenheit.
- A spider has transparent blood.
- A person will die from total lack of sleep sooner than from starvation. (mind this one !)
- An ostrich's eye is bigger than it's brain.
- Motor neurons are the longest cells in human body, can be 4.5 feet long, running from the spinal cord to the big toe.
- The heart beats about 100 000 times each day.
- A starfish doesn't have a Brain and though it is called a Fish, it is not a fish but an animal.



...FUN RIDDLES...

- (1) A solves 35 questions in 1 hour, B solves same 35 questions in 4 hours. If together, how much time will they take to solve these 35 questions ?
- (2) A businessman keeps two cubes on his desk. Every day he rearranges them so that they show the current day of the month. He even takes care to represent single digits as 07, for example, rather than 7. What numbers are there on the cube faces?
- (3) Add up all the numbers on the telephone dial, and then multiply that sum by all the numbers on the telephone dial. What do you get?

(Average solving time is 30 seconds per question.)

...SPARE A MINUTE...

Do u know the decimal number : 0.99999...

Is actually EQUAL to the Integer '1'.(No rounding off)

Proof: If u notice

$$1/9 = 0.11111...$$

, multiply both sides by 9 u get,

$$1 = 0.99999...$$

, that proves the argument.

Same argument can be given for every similar case .

...SUDOKU CHALLENGE...

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

15 min for a Genius

...Solutions to the **Fun Riddles** are given on page 8 and solution to the **Sudoku puzzle** is scattered on page 4 and page 5.

...For more fun log on to...

⇒ www.onlinemathlearning.com/math-trivia.html

⇒ www.syvum.com/teasers

⇒ www.stetson.edu/~efriedma/numbers.html



WIE COUNCIL 2008-2009

IEEE Women in Engineering (WIE) is the largest international professional organization dedicated to promoting women engineers and scientists.

The mission of IEEE WIE is to inspire, engage, encourage, and empower IEEE women worldwide. Keeping the same in mind IEEE CRCE introduced WIE unit under the guidance of Prof. Sapna Prabhu. On 26th September, 2008.

The WIE council members for the year 2008-2009 are:

Chairperson:	Chandni Tolaney (TEE)
Secretary:	Grishma Devtar (TEE)
Event Coordinator:	Nishigandha Shendge (TEE)
Organizer:	Jutika Gokarn (SEE) Tanvi Nagarsekar (SEE)

The very first activity conducted was 'CHLOROPHYLL' on 1 October, 2008. The event was organized with a view to avail students a platform to manifest their paper presentation skills and to come up with eco friendly remedies for the ongoing concern of Global Warming. A good competition was seen among 9 teams. The result was declared by our esteem panel of judges which included Prof. Mohandas, Prof. Khanolkar and Prof. R. Sharma after looking at the creativity and presentation skills of the students. The teams that emerged as winners were:

1st place: Febin Mathew (SEE)
Mohd. Zohaib (SEE)

2nd place: Nikhil Mascarenhes (SEE),
Nishad Karandikar(SEE)
Sampada More (SEE)

WIE has also planned activities like a creative designing workshop in the month of February and many such for the benefits of its members for this semester. So keep a watch on the notice boards.

S^{*}
SOLUTION:

FUN RIDDLES' ANSWERS:

- (1) 48 minutes
 - (2) 1st cube: 0,1,2,3,4,5
2nd cube: 0,1,2,6,7,8
 - (3) 0, zero
- More than one answer ,condition being, it is possible only if he uses '6' as an inverted '9' or vice-versa.