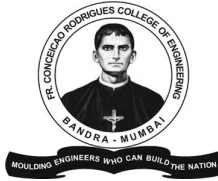


TechnoBuzz!!!



Celebrating 25 years of Service (1984-2009)

**IEEE CRCE
NEWSLETTER**



... The acquisition of any knowledge is always of use to the intellect, because it may thus drive out useless things and retain the good. For nothing can be loved or hated unless it is first known...

- Leonardo Da Vinci

IEEE-CRCE brings you the fascinating and the newest edition of TECHNOBUZZ. Its time to take a *chai-break* and see what are the happenings around you. Hereby, we make an attempt to acquaint you with the events planned for the upcoming semester and give you an insight to the BUZZ!!! going on in the technological world.

Lets have a peek view of the things we have on our agenda:

- **CHAIRMAN'S ADDRESS:**
Lets hear it from the most experienced and perhaps the most efficacious member of the council about his journey till the fourth year...
//page 2
- **RECENT EVENTS:**
What's been going on in the IEEE CRCE Chapter, since the last time we took such a break with snacks over the table and a "TECHNOBUZZ" in hands...
//page 3
- **UPCOMING EVENTS:**
Exciting events planned for the upcoming semester...
//page 4
- **TECHNICAL ARTICLES:**
An insight to the latest buzz in the ever-evolving technological world; introduction to MRAM and the farfetched implausible concept of *Invisibility*...
//page 5
- **FUN-ZONE:**
Lets have some '*fun*' by getting accustomed to some incredible facts and also know stuff what only "we engineers" are meant to know...
//page 8
- **THE BROOKLYN BRIDGE:**
A story which depicts the undying and unforgettable persistence and determination of a man...
//page 9

Many more interesting articles, news & useful stuff at www.fragnel.ac.in/IEEE

Please send in your comments & suggestions at IEEE CRCE forum.

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



Chairman's Address

IEEE. An acronym that drew me towards it, right in the First year of engineering and has ensconced me in its grip ever since. And what a journey it has been. From being a greenhorn in the technology field to having acquired relatively decent knowledge about the same, it would be cruel of me if I do not attribute some of this to IEEE-CRCE. I do not say this, just because the article demands something of the sort, but purely based on something that I have myself experienced in the last couple of years.

IEEE-CRCE has been quite the recipe for immense success considering the various ingredients involved. For example, consider the exposure that you get by merely being a part of the most active technical group in an engineering college. The best part about such an association is the fact that there is a feeling of pride when you join IEEE. Added to that is the fact that we are the flag bearers of the foremost technical group in the world, IEEE. Coupled with this is the amount of exposure that you get by playing an active role in the organization of the activities that are being conducted by the IEEE-CRCE council on a regular basis. There is plenty of national exposure that you can get by attending paper presentations and other such activities through the year. Moreover, the acquaintance of the scores of people that you interact with at such meetings is invaluable. After all, the purpose of education is the all-round development of an individual. The prescribed syllabus of the University is a necessity because it is part and parcel of a student's life. However, there comes a time in each of our lives when we need to think out-of-the-box and unleash our creative thinking. While it is not the only way to do it, being a part of IEEE-CRCE is certainly one way to tread on the aforesaid path.

Over the year 2007-2008, our council did some outstanding work and certainly helped students put some things into perspective. Well that's the whole point of being a part of such a group of people. It's bound to be a give and take relationship where knowledge gets disbursed by the dozen. It provides a forum for people to voice their thoughts and let their imagination run riot. Doesn't the prospect sound delectable?

This is not presenting a picture of IEEE-CRCE through rose-tinted glasses. Infact, this is the real deal. You have got to be in it to know it.

It would be impolitic of me if I failed to mention the work that is being carried out by the present council 2008-2009. The zeal and determination shown by them is commendable. I am sure in the coming months, we will present a series of events which will elevate all previous standards of excellence, in providing the IEEE-CRCE members with the best that is available.

*-ARJUN RAO [BEE],
CHAIRMAN,
IEEE-CRCE.*

****Murphy's Law for engineers****

The probability that a circuit will not work rises exponentially with the number of people watching it and the part of a circuit that has failed is

- The part which is the most difficult to de-solder
 - The part rarest to find.
 - The part which is the most expensive in the entire circuit.
-



AVR Microcontrollers



MICROCONTROLLER...???

:A microcontroller is primarily a computer-on-a-chip consisting of a processor or MPU (MICRO PROCESSING UNIT), memory and input –output functionalities. Microcontrollers are frequently used in automatically controlled products and devices, such as automobile engine, control systems, remote controls, office machines and even toys. In addition to the usual arithmetic and logic elements of a general purpose microprocessor, the microcontroller integrates additional elements such as read-write memory for data storage, read-only memory for program storage, EEPROM for permanent data storage, peripheral devices, and input/output interfaces.

WHAT IS AVR ?

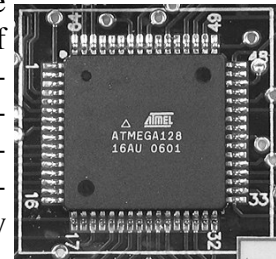
The avr atmega is a series of microcontrollers commercially produced by ATMEL, these are perhaps the most powerful and popular components in the circuitry of electronics engineers the world over. They are a real treat in terms of handling, compatibility, programming and its ever-expanding fan club provides more resources and reasons to work over this beauty of an invention.

The AVR is a Modified Harvard architecture 8-bit RISC single chip microcontroller (μC) which was developed by Atmel in 1996. The acronym AVR has been reported to stand for Advanced Virtual RISC, but it has also been rumored to stand for the initials of the chip's designers: Alf and Vegard [RISC].

WHY AVR ?

There are many features of the avr μC that puts it a notch above the others. Firstly, it has a flash memory, so it can be recoded and re-used. It has (32 in case of a 48-pin atmega μC) Multifunction, Bidirectional General

Purpose I/O ports. It has multiple internal oscillators, 8-bit and a 16-bit timer along with a watchdog timer. These allow the programmer to control the time of various functions using the pulse received from these timers. it is low-powered, has special lighting and motor velocity control system (pwm), its analog to digital converters coupled with an LCD display are capable of providing values of analog data it is receiving ,helping various programs requiring counting like distance measurement, light intensity etc.



REALLY ??

These microcontrollers are being used by some of the best companies all over the world, for instance the German legend BMW Daimler-Chrysler, TRW use these microcontrollers in car computer control systems. For more....the USB-based AVRs have been used in the Microsoft Xbox hand controllers.

The most tedious part of using a μC is the cumbersome process of programming it. Most of the programming techniques use assembly language, which is pretty mind-boggling for a new user. Recently there are many c-compatible programmers available like winavr, iccavr etc. which have reduced the need of learning assembly language for using the μC .

Avr μC are rapidly increasing their expanse and looking at their versatility, it appears like it has a very long way to go. And with the recent avr32 launched by atmel, there is no stopping what they might come up next!

-AMEY ASGAONKAR
IEEE-CRCE



[Recent Events]

IEEE-CRCE is and has always been the hallmark of all the ebullient technical activities and has sustained its charm through these various events. The preceding semester serves as a strong testimony to the zeal with which the previous committee has endeavored to elevate IEEE-CRCE to the pinnacle of glory.

The Technical Paper Presentation Competition that was organized on 3rd April 2008 was a phenomenal event that earned applause from one and all. Preceding this competition reverend Principal of our college, Dr. A. S. Deshpande gave an impressionable seminar on 28th March 2008 on how to give an effective technical presentation. An erudite panel of judges comprising of Prof. B. R. Prabhu, Prof. Shrija Unnikrishnan and Prof. Sapna Prabhu assessed the contestants in this cut-throat competition to decide the following deserving winners:

1. **Nirbhay Shah and Naresh Bharasadiya**
2. **Arjun Rao and Karan Mhatre**
3. **Karthik Raman and Gaurav Kirtane**

A demonstration of the projects that have to be undertaken in the Vth Semester under 'Electrical Workshop', was given on 30th April 2008 to the students of S. E. Electronics to intimate them about the umpteen things that have to be taken into account while making these projects and the various ways of troubleshooting. Yet another seminar was conducted on GRE by Abhishek Gupte, IEEE-CRCE ex-Chairman who shed light on various nuances of GRE examination and procedure to be followed post examination.

IEEE-CRCE resumed its activities in the current semester by conducting fresh events galore. A seminar-cum-workshop on 'Introduction to the lab' was organized on

31st July 2008 with a view to give the Second Year students a first hand acquaintance with the various commonly used electronic components and instruments. Prof. Dilip, a highly experienced faculty member of our college was the speaker for this edifying seminar. Another seminar on Web-Designing and 2D Animation was conducted on 14th August 2008 by Mr. Nilesh, a mentor from 'Work Station' who enthralled the audience with his effective oration and fascinating slide shows. IEEE-CRCE came up with yet another splendid seminar on 21st August 2008 on GRE, GMAT and TOEFL. It was conducted by a highly eminent, man of letters, Prof. K. P. Singh teaching at the Institute Of Management and Foreign Studies (IMFS). The seminar hall was flooded with whetted students as the Professor apprised them to a T about the test format. He also exhorted them to follow an ideal exam calendar to manage engineering smoothly and judiciously along with these examinations.

What is noteworthy is that IEEE-CRCE has never been endemic to a group of core electronics students but has spread out its wings to other branches too. The same can be bolstered by the multitude of events and seminars that have been conducted so far for the students of all the departments. Dynamic organization that IEEE-CRCE is, we assure that the upcoming semesters will be as eventful as the previous ones. With an enchanting and vibrant response of the student members blended with perseverance of IEEE-CRCE Council we hope to build resplendent edifice of IEEE-CRCE that would continue to embellish the Fr. CRCE activities.

*-MEGHANA GHADGE[TEE],
ORGANISER,
IEEE-CRCE.*



Not DRAM or SRAM ...but MRAM!!!

We all have heard of DRAM,SRAM but there is one more thing which is keeping the researchers all over the world buzzing for quite a time now...and that is MRAM a whole new thing in the data storage world...

WHAT'S BEEN THERE...

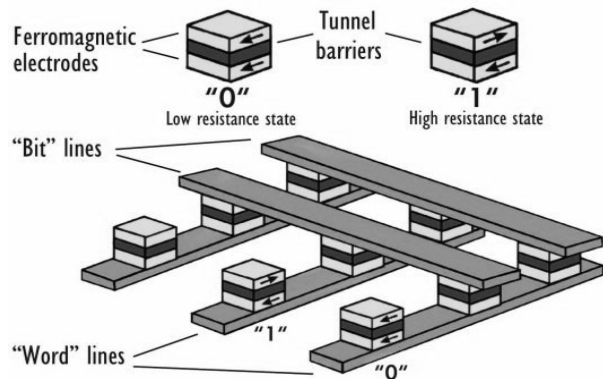
Magneto-resistive Random Access Memory (MRAM) is a non-volatile computer memory(NVRAM) technology, in which data is not stored as electric charge or current flows, but by magnetic storage elements. The elements are formed from two ferromagnetic plates, each of which can hold a magnetic field, separated by a thin insulating layer. One of the two plates is a permanent magnet set to a particular polarity, the other's field will change to match that of an external field. A memory device is built from a grid of such "cells".

“READING” is accomplished by measuring the electrical resistance of such cells. Typically if the two plates have the same polarity this is considered to mean "0", while if the two plates are of opposite polarity the resistance will be higher and this means "1".

“WRITING” is quite a task, done in many ways but the simplest way being that, each cell lies between a pair of write lines arranged at right angles to each other, above and below the cell. When current is passed through them, an induced magnetic field is created at the junction, which the writable plate picks up. Sounds simple but it takes time which is the major hurdle in today's fast-paced world.

WHAT'S NEW...

A research team at the German metrology institute PTB (Braunschweig, Germany) has developed an MRAM that can write in less



than 1 nanosecond as compared to earlier MRAM that took about 10 nanoseconds while the very best conventional RAM needs around 30 nanoseconds for an equivalent operation.

Now that's a news which is making waves in the technological world. Reason being in near future we may have MRAM's which promise a very high memory density (i.e. small size) and a much faster speed which may revolutionize the "Data Storage World" and eventually become dominant for all types of memory, becoming a true "universal memory".

Wondering what occurred to them? Well, earlier in order to reliably switch the information bit contained in a cell it was necessary to apply the pulse over several revolutions. For this reason the write process required some 10 ns. But the Braunschweig researchers found that a bit can be written into such an MRAM cell within one revolution by achieving what they call "ballistic switching" by combining the correct current pulse parameters with a low-intensity static magnetic field.

To probe further:

<http://www.eetimes.com>

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

-OVES BADAMI,
TEE.



[Upcoming Events]

IEEE-CRCE has heralded upon the scene with percipient vision to propel technological innovations and the very vision propels itself on to reach for the summit.

First on the charts is the 'Solder of Fortune', a prime soldering event held by IEEE-CRCE annually. A brain child of IEEE-CRCE, the event this year would be reinvented in a new avatar with equal emphasis on soldering skills and technical knowledge. The event organized for F.E. and S.E. students would equip them with the indispensable art of soldering. A panel of professors from the college would adjudicate the event and proclaim the final three winners.

With the intercollegiate Technical Paper Presentation scheduled in the penultimate week of September, IEEE-CRCE would announce itself upon the intercollege scene.

The event expected to generate participation from engineering colleges all over Mumbai would provide students with a platform to manifest their skills and exposure to the prolific era of technological innovations. An esteemed panel of judges (from all walks of life) would select three winners.

Also scheduled in the penultimate week of September is the one day Industrial visit, which is perhaps *the most awaited activity undertaken* by IEEE-CRCE. The students would visit TATA POWER Ltd. at Trombay and this experience would *deepen* their understanding of their future workplaces.

Following provides a laconic view to the activities in the pipeline. A MATLAB workshop is on the cards, this workshop is aimed at providing insight into the most versatile software of its generation. Justifying its reputation of coming up with myriad of

novel and unique events IEEE-CRCE adds another feather to its cap with a workshop on KEIL software. This workshop especially planned for T.E. students would help them a great deal in their Microcontroller projects. The Workshops on embedded systems and autonomous robotics are also under contemplation. The workshop on autonomous robotics would help students strengthen their foothold in the field of Robotics.

IEEE-CRCE would also engineer Robotics and technical events in CResCEndo 2008.

The events would be of highest standard striving towards the common goal of making CResCEndo a grand success. Finally culmination of the semester comes with the week long industrial visit in the month of January. The visit would facilitate the students with requisite practical skills.

We at IEEE-CRCE are working with sheer exuberance have dared to look beyond the horizon and open up new vistas. Without an iota of doubt the council aims at carrying on with its Endeavour with complete purposefulness.

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

****Handy Guide to Science****

- If it confuses, it's Mathematics
 - If it hurts, it's Mechanics
 - If it stinks, it's chemistry.
 - If it doesn't work, it's physics.
 - If it's green or wriggles, it's biology.
-



Meta materials Bring Invisibility Closer

They say “satisfaction is the end of growth”. The University of California, Berkeley seems to be never satisfied in their quest to be a step closer to science fiction. This time they have designed new optical materials that bend light in unusual ways leading to much tinier transistors, microscopes that are able to peer at smaller cellular structures and even **invisibility cloaks**.

Metamaterials

Two types of Metamaterials (materials that bend light) are developed by researchers. One is the first three-dimensional material to have a negative index of refraction, which allows it to bend light in the opposite direction of what you would expect from any other material. The other, also 3-D, doesn't have a negative index but still provides some negative refraction, and unlike previous metamaterials, it does so in the visible part of the spectrum.

For instance, we observe that a fish swimming in water appears slightly closer to the surface than it really is, because of the difference between the refractive indices of air and water. If the fish were swimming in water with a negative index of refraction it would appear to be swimming above the water.

An index of refraction has an electrical component (permittivity) and a magnetic component (permeability). Building a metamaterial with a structure having features substantially smaller than the wavelengths of light it's meant to refract, causes resonance between the atoms in the material and the photons. This reverses the permittivity and the permeability, making the refractive index negative.

Newbies

One of the new metamaterials, consists of 21 alternating 30-nanometer-thick layers of silver and 50-nm-thick layers of MgF₂.

Each layer is laid out like a fishnet, with lines 565 nm wide crosshatched by lines 265 nm wide.

This material produces a negative index of refraction for infrared light with wavelengths between 1.5 and 1.8 μm , that broadband response is more useful than the single frequencies other metamaterials can handle. More important, the loss of light passing through the material was very low. That's because the light essentially hopped from one dielectric to the next, with little of the absorbing resonance taking place in the metal. The figure of merit used to measure light loss in a structure was 3.5 in this case, a great improvement over previous materials, most of which have been less than 1.0

Getting further into the visible or even the ultraviolet part of the spectrum, where wavelengths are even shorter, is an engineering challenge the group is working on.

This property of metamaterials opens the door to whole new ways of manipulating light.

What may be coming...

The prospect that really captures the imagination is —using these materials to cloak a person or an aircraft in a shield of invisibility. There's no physical reason why you shouldn't be able to direct light around an object and send it on in its original direction, rendering the object invisible. The figure of merit of 3.5 has been successful in rendering 2-d objects invisible however in order to make 3-d objects invisible we would require a much higher figure of merit. This may be an extremely big challenge for engineers but the University of California, Berkeley is optimistic about it, in the hope that one day science fiction would turn into a reality.

-ADITYA KHEMKA [TEE],
IEEE CRCE.



...FUN ZONE...



I DIDN'T KNOW THAT...

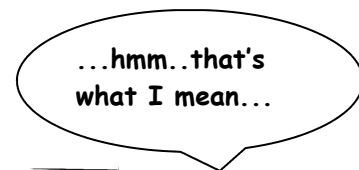
- A typical hurricane produces the energy equivalent to 8,000 one megaton bombs.
- The temperature on the surface of Mercury exceeds 430 degrees C during the day, and, at night, plummets to minus 180 degrees centigrade.
- There are 62,000 miles of blood vessels in the human body - laid end to end they would circle the earth 2.5 times.
- Ice does not melt when kept in liquid ammonia.
- Quick silver is not silver, but it is another name of mercury. It is so heavy that piece of iron floats on its surface.
- The cicada, a fly found in Africa, spends 17 years of its life sleeping; and only two weeks is awake during which mates and then dies.
- Perfumed talcum powder is made from mineral called Talc. It is the softest possible mineral known to man.
- 2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN (TCDD) is a man-made chemical which is 150,000 times more deadly than cyanide.

ENGINEER'S DICTIONARY...

- Developed after years of intensive research
We mean :It was discovered by accident.
- Test results were extremely gratifying
We mean: It works, and we are surprised!
- Preliminary operational tests are inconclusive
We mean: The damn thing blew up when we threw the switch.
- The entire concept will have to be abandoned
We mean: The only guy who understood the thing quit.
- Requires further analysis and management attention.
We mean: Totally out of control.
- Modifications are underway to correct certain minor difficulties
We mean: We threw the whole thing out and are starting from scratch.
- The delivery is scheduled for the last quarter of next year.
We mean: This leaves us plenty of time to decide who to blame for it being late.



Take any three figure number in which the first figure is larger than the last, say 521. Reverse it, making 125 and subtract the smaller from the larger, making 396. Now add the result to the same number reversed, 693. The answer is 1089, and will be 1089 whatever number you start with !!!





...*Story of THE BROOKLYN BRIDGE*...

... **1883**, a creative engineer named John Roebling was inspired by an idea to build a spectacular bridge connecting New York with the Long Island. However experts throughout the world thought that this was an impossible feat. It was not practical & It had never been done before.

Roebling could not ignore the vision he had in his mind. Day and night he thought and he knew deep in his heart that it could be done. He just had to share the dream with someone else. After much persuasion he managed to convince his son Washington, an upcoming engineer, that the bridge in fact could be built.

Working together for the first time, the duo developed concepts of how it could be accomplished and how the obstacles could be overcome. With great excitement and inspiration, they hired the crew to shape up their dream.

The project started well, but when it was only a few months underway, a tragic accident on the site took the life of John Roebling. Washington was injured and left with a certain amount of brain damage, which resulted in him not being able to walk or talk or even move.

"We told them so."

"Crazy men and their crazy dreams."

These were the words that everyone had for them and the "EXPERTS" felt that the project should be scrapped since the Roeblings were the only ones who knew how the bridge could be built.

In spite of his handicap Washington was never discouraged and still had a burning desire to complete the bridge and his mind was still as sharp as ever.

He tried to inspire and pass on his enthusiasm to some of his friends, but they were too daunted by the task. Everyday he looked into the sky and it seemed that there was a message for him - "*not to give up*". Suddenly an idea hit him. All he could do was move one finger and he decided to make the best use of it. By moving this, he slowly developed a code of communication with his wife.

He touched his wife's arm with that finger, indicating to her that he wanted her to call the engineers again. Then he used the same method of tapping her arm to tell the engineers what to do. It seemed foolish but the project was under way again.

For 13 years Washington tapped out his instructions with his finger on his wife's arm, until the bridge was finally completed. Today the spectacular Brooklyn Bridge stands in all its glory as a tribute to the triumph of one man's undying spirit and his determination, not to be defeated by circumstances. It is also a tribute to the engineers and their team work, and to their faith in a man who was considered mad by half the world. It stands too as a tangible monument to the love and devotion of his wife who for 13 long years patiently decoded the messages of her husband and told the engineers what to do.

Perhaps this is the best example with which we can quote that:-

*"Even the most distant dreams can be realized with determination and persistence of mind,
heart and soul ..."*



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