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**This Month's Meetings**

***The Great American Teach In***

***Thursday, October 2, 2008***

***5:30 p.m. to 7:30 p.m.***

***At TECO Hall***

***702 N. Franklin Street, 33602***

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***October 7th: EXCOM Meeting***

***At TECO Plaza***

***702 N. Franklin Street, Tampa***

***Meeting starts at 5:30PM and ends at 7:30.***

***Register online at <http://time2meet.com/fwcs-excom/index.html>***

***Meeting is open to all FWCS members and guests***



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***Electric Machines & Drives Seminar***

***Friday, October 17, 2008***

***Registration & Breakfast: 8:30AM – 9:00AM, Seminar: 9:00AM – 2:00PM***

***Thomas Blair, P.E., Senior Consulting Engineering, Tampa Electric***

***Location: Tampa Armature Works***

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## This Month... (Editor's Column)

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At last month's EXCOM there was a discussion about getting the Signal newsletter out to the readers in a timely manner each month. For the two previous issues I delayed sending it to the printer because we (Jim Howard and I) were trying to get some facts checked on upcoming events. The end result is that I am asking everyone that submits an article to please check for factual accuracy as myself or the reviewers may not notice it. Microsoft Word does a good job of pointing out spelling and grammar issues. The other change that was implemented is a revised timeline for submitting articles for the Signal. It is as follows:

- 1<sup>st</sup> Tuesday of the month – EXCOM Meeting
- 1<sup>st</sup> Monday after EXCOM – Signal Information to editor Deadline
- 3<sup>rd</sup> Tuesday of the month – Signal to printer
- 3<sup>rd</sup> Tuesday of the month – Labels download from HQ and printed
- 3<sup>rd</sup> Friday of the month – Signal delivered by printer
- 3<sup>rd</sup> Saturday of the month – Signal folded and labeled and taken to PO for mailing

The new guideline adds a weekend to the time someone has to prepare an article before the "official" deadline. I would like to fill the newsletter with events and news about what the members of the FWCS are doing.

I would like to thank this month's contributors, namely, Ralph Painter, Jim Anderson, Butch Shadwell and Tom Blair.

RS



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Authorized EnerSys Representative

**IEEE Power & Energy Society** - IEEE Power Engineering Society has officially changed its name to the IEEE Power & Energy Society (PES). In an announcement was made this past April, at the 2008 IEEE PES Transmission and Distribution Conference in Chicago, Illinois.

**Energy Innovations: Solar Goes Small** - Cardiff, Wales is the unlikely home of arguably one of the most innovative solar projects in the world. A solar panel manufacturing plant that will be the first facility that makes renewable energy products using only renewable energy is being built in Cardiff.

**Wind Power: The Technology** - This program provides background information about wind power, including a brief history and overview of the technology provided by experts interviewed at the 2006 IEEE Wind Power Symposium. The program highlights activity in Europe, the United States, and China.

**2007-2008 IEEE-USA Online Engineering Video Competition** - IEEE-USA's Online Engineering Video Scholarship Competition awarded three prizes totaling \$6,000 to undergraduate students who created 90-second video clips deemed most effective in reinforcing engineers contributions to the quality of life for an 11-to-13-year-old audience.  
the modern conveniences, but run entirely by the sun.



## *Call for Articles!*

Have you ever thought about writing an article for publication in a newsletter like the SunCoast Signal? I am always looking for articles written by members of the FWCS. The article can be of any topic that would be of interest to the members of the Section. Don't worry about composition, that's what Editors are for. If you are interested in sending in something for consideration, get it to me by the first Monday after the EXCOM meeting (the EXCOM meeting is in the calendar on page 8) and in Microsoft Word format and keep it to a page or less. If it's included in the Signal it will be seen by more than 2000 readers in the Section. Send to [rsancz@verizon.net](mailto:rsancz@verizon.net)





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## *EMBS Meeting August 28, 2008 A Success!*

### **Hearing Aid Technology – State of the Art**

Dr. Robert Zelski and Ms. Lynette Dornton, of USF Communication Sciences and Disorders, provided an excellent overview about everything you wanted to know about hearing and hearing aid technology. They introduced the audience to the physiology of hearing, hearing loss, and measurements. After that, they gave a grand tour of past and present hearing aid technology, using hands on displays of the many different hearing aids available. They also discussed hearing aid fitting and verification. They ended with a discussion on debunking myths about hearing loss and aids. (15 attendees)





## *Electric Machines & Drives Seminar*

**Date:** Friday, October 17, 2008  
**Time:** Registration & Breakfast: 8:30AM – 9:00AM, Seminar: 9:00AM – 2:00PM  
**Speaker:** Thomas Blair, P.E., Senior Consulting Engineering, Tampa Electric  
**Location:** Tampa Armature Works, 6312 78th Street Riverview, FL 33569  
\$100 Members, \$150 Non-Members

Includes Lunch

**PDH Credits:** 4 professional development hours will be awarded. Be sure to enter you name and PE number on the signup website as it appears on your license. IEEE Florida Provider Number 3849.

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<http://time2meet.com/fwcs-pes1/index.html>

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Attn: Dr. Paul Schnitzler

Space limited to the first 24 registrants!!! Sign up early.

**Questions:** Tom Blair at 813-228-1111, ext 34407 or [tom\\_blair@ieee.org](mailto:tom_blair@ieee.org)

PES West Coast Chapter invites you to the opportunity to attend a seminar on Electrical Machines and Drives at the Tampa Armature Works Riverview facility on Friday, October 17.

The Electrical Machines and Drives Seminar will provide an excellent overview of electric power conversion rotating machines and the drives that control these machines. The purpose of the Electric Machines and Drives seminar is to introduce the basic theory and applications of motors, generators, and drives. The first hour of the seminar will cover DC motors and DC generators. The second hour of the seminar will cover AC motors and AC generators. The last two hours of the seminar will cover solid state drives that are used to control these machines and a discussion of the various applications of rotating machines and drives. Equivalent circuits will be review to present simplified analysis methods.

After the seminar, opportunity will be provided for those interested to tour the Electric Motor Facility of Tampa Armature works – transportation from the TAW Riverview facility where the seminar will be to the TAW Electric Motor Facility will be attendee's responsibility (we will provide directions at seminar).

**Thomas Blair** has been a Senior Consulting Engineer with Tampa Electric Company for 7 years. Prior to his term at Tampa Electric, he was an engineer at Phasetronics/Motortronics for 10years. Over his past 17 years experience, Tom has designed and performed startup services for motor and drive applications. Tom currently teaches the "Powerplant Engineering" and "Electric Machines and Drives" courses as an adjunct professor at the University of South Florida. Tom received his B.S.E.E. and M.S.E.E. (Power Engineering) degrees from University of South Florida in 1991 and 2001 respectively and is a licensed Professional Engineer in the State of Florida (PE# 53239).



## *So How Do You Gracefully Leave An Engineering Job?*

In the world of Engineering we seem to spend a lot of time talking about downsizing and folks getting fired. What hasn't really been discussed is what the best way to leave a job is. Although in my younger days I was very good at burning my bridges behind me, these days I've come to realize that this is in fact a very poor long term strategy.



When I left my first Engineering job after 6 years in basically the same position for a job at a different company in a different town, I had no experience in how to break off the relationship. This very large company had a policy that you would sit down with someone from HR on your way out the door and ask you several questions. These questions dealt with issues like where are you going, why you are leaving us, and what suggestions would you like to leave us with that would improve how we do things. What I didn't realize at the time (ah, how young we once were) was that the real reason for an exit interview is to determine if the firm is going to be sued by a disgruntled employee. Pretty much everything else that you say is nice, may be noted, but really doesn't matter

Seeing as most firms don't know how to handle your leaving, what's an Engineer to do? First, you need to realize that once you announce that you are leaving the company, everything instantly changes. Some firms will show you the door immediately. Others will give you two weeks to wrap things up, but you will instantly be treated as an outsider. Even if you are willing to work at full force for those last two weeks, you are now officially a "short timer" and nobody really wants to work with you any more. What this means is that if there is anything that you really need to hand off or wrap up, you should do it BEFORE you announce that you are going to be leaving. This is always tricky to do because your close team members may start to guess that something is up. You can handle this in two ways: lie, or tell them that you are considering some offers but have not yet made up your mind. Lying is never a good idea even if it seems like the easy way out -- the truth always comes out eventually. Slowing introducing everyone to the idea that you might/are leaving seems to allow everyone time to come to grips with it.

The new job that you are planning on leaving your current firm for probably looks like the best job in the world: great cube, great people, fabulous pay, undreamed of perks, etc. Please note: the last thing in the world that you want to do is to tell everyone about these reasons for your leaving. No matter how good a teammate they were, this will make them turn green with envy and that is never a good thing. I've always found that telling everyone that I felt that I had completed what I had joined the firm to do and that the new firm had offered me a challenge that I just couldn't pass up seems to satisfy most folks and does not produce a great deal of ill will.

I guess that it goes without saying that in the world of Engineering there is always a good chance that you'll be working again with some of the folks that you are leaving. Yet another reason to leave on good terms

Jim Anderson



## *Brain Teaser Challenge Solution - July 2008*      *Butch Shadwell*

Last month's BTC was a bit easier than I like, but I was having a worse time than usual coming up with an appropriate problem. I decided to ask about LED biasing as follows: "...LEDs have a forward voltage drop of 4 volts at 25 degrees C at the junction and the forward voltage drops 3mV per degree C. Then I supply forward current to one of these LEDs through a 100 ohm resistor and a 10VDC source. So tell me the current through the LED when the junction gets up to 100 degrees C?"

Though the problem was very easy, it does point out a common design error. LEDs are usually biased through a current limiting resistor. When a higher voltage supply is available, there are often multiple LEDs in series biased by a resistor. Here is the error. When you have many LEDs in series, and they all have negative temperature coefficients, as the temperature rises the total forward voltage changes by the sum of all of the individual LED drops. This will cause more current to flow through the LEDs (and so on) and you can get a thermal runaway condition. In this example a 75 degree rise in junction temperature causes a 0.225 volt drop in the LED forward voltage. So you get 6.225 volts across a 100 ohm resistor, resulting in 62.3mA of current. But I bet you already knew that.



## Brain Teaser Challenge – August 2008

I am so tired of all of the typographical errors and occasional grammatical faux pas that I read in these columns. I think somebody should do something about it.

Over the years I have invented quite a number of new technologies, circuits, systems, algorithms, etc. A small percentage of them have been patented with the US Patent and Trademark Office. The thing is that whenever I am filing for a patent on something, I suddenly find that I have a lot of writing to do. And it's not only technical writing, but rather a strange legalistic version of a technical description. Another thing about writing patents is that you need to describe every detail of your invention so that someone with ordinary skill in the art can make one for themselves. The problem arises when you find out that the patent examiner assigned to review your claims, may not have that skill level. So you have to keep on writing.

I used to do R&D in electronic warfare. I designed a circuit once that used the voltage across a diode junction to get the log of an input sine wave function. That signal was amplified 2X and then that voltage was applied to the base of a bipolar transistor, where the collector current is proportional to antilog of the change in voltage applied to the base. What does the voltage across the collector resistor look like? In the old days we did some pretty cool math with analog components. Assume that all four quadrants are covered.



**Reply to Butch Shadwell at [b.shadwell@ieee.org](mailto:b.shadwell@ieee.org) (email), 904-223-4510 (fax), 904-223-4465 (v), 3308 Queen Palm Dr., Jacksonville, FL 32250-2328. (<http://www.shadtechserv.com>) The names of correct respondents may be mentioned in the solution column.**



## New Technology Used to Detect IED's

Among the more exotic technologies being pursued to detect improvised explosive devices, or IEDs, from a distance are terahertz-frequency waves.

Why terahertz radiation? Three reasons. It penetrates most nonmetals, such as dirt, plastic, and wood, as well as other materials that contain or conceal IEDs. It does not ionize atoms or molecules in the body, so it does not cause cancer. And it also triggers unique and detectable responses in certain molecules. "The molecules in explosives, mostly nitrogen based, have rotational and vibrational characteristics that show up in the terahertz region," says Michael Shlesinger, a division director with the Office of Naval Research (ONR), which together with the U.S. Naval Research Laboratory is spending US \$30 million a year on counter-IED R&D.

Terahertz waves are odd, not quite radio and not quite light, and they are a vast and largely unused swath of the electromagnetic spectrum [see "[T-Rays vs. Terrorists](#)," *IEEE Spectrum*, July 2007]. As you ascend in frequency, first you have millimeter waves (30 gigahertz to about 400 GHz) and then the terahertz region, from roughly 400 GHz to 10 THz, and then the far infrared.

To detect an explosive sample using terahertz radiation, researchers fire pulses from terahertz-wave lasers at an explosive sample, which absorbs specific bands of frequencies. The reflected radiation is omnidirectional, so the signal is weak, Shlesinger notes. To detect it, researchers are working with very sensitive antennas.

On the streets of a war zone, soldiers don't know where the explosives are, of course. So a practical system would have to scan a wide area, and do it fast, because it would be in a moving vehicle. "The unsolved problem is the scan rate, when the explosives are well-hidden," Shlesinger says.

If researchers can solve the scan-rate problem and build a terahertz-wave-based detection system, "there will be circumstances where it is useful, but it won't be a general answer," says Captain Mark Stoffel, a program manager in the ONR's Expeditionary Maneuver, Warfare, and Combating Terrorism Department.



## *Be a Star at the Great American Teach-In!*

Each year, local school systems invite professionals and parents into the classroom to step into the shoes of teachers and share their experiences with students. Visitors engage students in a variety of activities. Visitors often use the opportunity to share the joys and challenges of their professions. Professionals with unusual experiences or special expertise may prepare and teach classes about topics of current interest. For example, one Power Engineering Society member who was involved in the TECO/Department of Energy project to build the first commercial scale coal gasification plant in Polk county taught a class on clean coal technology to environmental science students at Bloomingdale high in Hillsborough County.

Schools in Pinellas and Hillsborough counties are holding their teach-ins Wednesday, November 19. Other counties may have teach-ins on other dates. Contact your local schools for more information.

This year, FWCS members have decided to show students what engineering is all about by engaging students in a design challenge to "Build Your Own Robot Arm." The activity was inspired by the heroic accomplishments of Apollo 13 engineers who saved the lives of the crew by adapting the command module CO<sub>2</sub> removal filters to work in the lunar module using only miscellaneous "junk" that happened to be on the spacecraft. The FWCS is holding a special meeting to prepare members to present this activity. The meeting is **Thursday, October 2, 2008 from 5:30 p.m. to 7:30 p.m.** and will be held in TECO Hall, which is on the ground floor, just off the atrium of TECO Plaza at 702 N. Franklin Street, 33602 in downtown Tampa.

Come join the fun! Whether or not you plan to participate in the Great American Teach-in, this is a cool activity you can use anytime you are called on to explain just what it is that engineers do. Attendance is free. Register on line at <http://time2meet.com/fwcs-meetings/>. For further information, please contact Ralph Painter, [rdpainter@ieee.org](mailto:rdpainter@ieee.org), (813) 228-4685 or Sean Denny, [venner20@ieee.org](mailto:venner20@ieee.org), 813-410-6982.

Here are some additional links:

<http://www.pcsb.org/Infosvcs/08-09calendar.html>

[http://www.sdhc.k12.fl.us/info/Calendars/2008\\_09impdates.html](http://www.sdhc.k12.fl.us/info/Calendars/2008_09impdates.html)



## *Four Engineers and a Broken Car*

There are four engineers travelling in a car; a mechanical engineer, a chemical engineer, an electrical engineer and a computer engineer. The car breaks down. "Sounds to me as if the pistons have seized. We'll have to strip down the engine before we can get the car working again", says the mechanical engineer. "Well", says the chemical engineer, "it sounded to me as if the fuel might be contaminated. I think we should clear out the fuel system." "I thought it might be an grounding problem", says the electrical engineer, "or maybe a faulty plug lead." They all turn to the computer engineer who has said nothing and say: "Well, what do you think?" "Ummm - perhaps if we all get out of the car and get back in again?"



While ENIAC was for years hailed as the first electronic digital computer, and the invention was credited to [John Mauchly](#) and J. [Presper Eckert](#) of the Moore School of **Electrical Engineering**, the ENIAC patents were invalidated by a US District Court decision in the case of Honeywell v. Sperry Rand in **October of 1973**.



**October 2008 Calendar of Events (For more information see P. 1) *inside this Signal...***

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
28	29	30	1	2 <i>Great American Teach-In @ TECO p.7</i>	3	4
5	6	7 <i>EXCOM Meeting at TECO Hall 5:30 PM</i>	8	9	10	11
12	13	14	15	16	17 <i>Electric Machines and Drives Seminar p. 4</i>	18
19	20	21	22	23	24	25
26	27	28	29	30	31 <i>Halloween</i> 	1

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