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— Chicago Section —

Unused Spectrum Beckons to the Innovators and Dreamers

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— Chicago Section —

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Features

- 4 Unused Spectrum Beckons to the Innovators and Dreamers

Upcoming Events

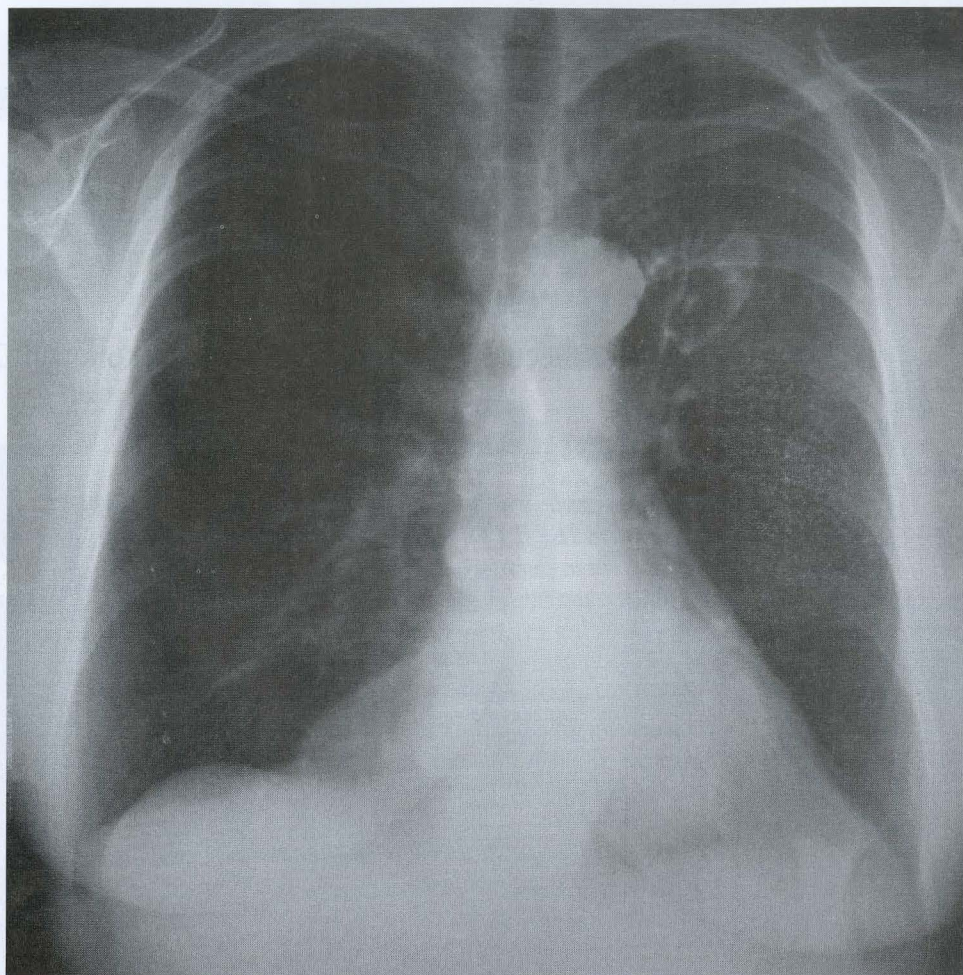
- 6 **IEEE Communication/Computer Society Chicago Chapters (Joint with IEEE Fox Valley Subsection)**
From Grid to Pervasive Computing: Where is the Breakthrough of the Next IT Boom?
Wednesday, April 7, 2004
- 7 **IEEE Communication/Computer Society Chicago Chapters (Joint with IEEE Fox Valley Subsection)**
Internet Services for Wireline and Wireless Telephones
Wednesday, April 14, 2004
- 8 **Chicago Chapter of the IEEE Power Engineering Society**
Powering Today's Technology in a 24 x 7 World
Wednesday, April 14, 2004
- 8 **IEEE Fox Valley Subsection and IIT Rice Campus**
Dual/High Voltage Automotive Electrical Power Systems
Wednesday, April 21, 2004
- 9 **IEEE EMC Society Chicago Chapter**
Update on Ferrite Technology Advances
Wednesday, April 21, 2004
- 9 **IEEE-IAS/IES Dinner Presentation**
Basics of Airfield Lighting
Wednesday, April 21, 2004
- 10 **IEEE EMC Society Chicago Chapter**
6th Annual EMC Mini-Symposium
Tuesday, May 18, 2004

Departments

- 11 **Advertiser Index**
- 11 **Professional and Business Directory**

CHICAGO SECTION EXECUTIVE COMMITTEE MEETING
Tuesday, April 13, 2004, 7:00 p.m.
DeVry DuPage, Room TBA, 1221 N. Swift Rd., Addison, IL
No Registration Needed

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Unused Spectrum Beckons to the Innovators and Dreamers

By Paul Zukowski

The electromagnetic spectrum in all its glory, from gamma and X-rays through light and into radio waves, glowed unknown and unused (except for sight) for nearly all of human history until Maxwell and Planck pried out its secrets and Marconi and others put parts of it to work.

Now we have so much going on in the airwaves that special agencies like the Federal Communications Commission and bodies like the International Telecommunication Union meet to re-divvy and re-allocate spectrum to meet changing needs. About every three years, the ITU holds a World Radiocommunication Conference with delegates from nearly every country on the globe. Last summer it was held in Geneva, Switzerland, and in 2000 it was held in Istanbul.

In 2000, new frequency bands were allocated for use in IMT2000 third-generation cellular telephony systems. In 2003, weighty but specific issues like harmonizing public protection and disaster relief radio services, readying spectrum for proposed high-altitude cell platforms, and giving airline passengers broadband Internet access were resolved.

Probably of greatest interest was getting more spectrum for wireless local-area networks like Wi-Fi (IEEE 802.11). Proliferating in the 2.4 GHz or so-called "unlicensed" band, these networks must compete with the likes of microwave ovens and garage door openers. The ITU agreed to allocate the 5150–5350 MHz and 5470–5725 MHz bands for wireless access services. Here in the U.S., a 300 MHz chunk of the 5 GHz band was already allocated, but a world standard will lead to equipment being standardized.

The spectrum crunch is so serious an issue that President George W. Bush in June ordered the Commerce Department to conduct a year-long review of ways to improve the management of the spectrum and make recommendations for improvements. The Pentagon's roughly 6% chunk is a ripe field for further sharing.

But what if the spectrum could be used more efficiently and the broad divisions started 75 years ago became largely irrelevant? Some say the airwaves are mostly empty, even in the licensed bands.

To test that, an intrepid entrepreneur in Washington D.C. named Mark McHenry carried a 10-foot antenna and other gear to the roof of a seven-story building and measured the actual usage of airwaves in the Capital during business hours in June. His conclusion: Only 19% to 40% of the spectrum was occupied at any moment during an eight-hour period. Imagine if you tried to run a hotel or an airline like that.

A change in this wasteful allocation of great swaths of spectrum is already underway. The use of digital signal processing technology in cell phones is leading the way, receiving much higher use of the allocated bands than analog equipment ever could. The next wave to come out of the R&D labs will involve intelligent networks technologies known under names like smart antennas, mesh networks, and agile radios.

Instead of the way a radio station broadcasts its signal willy-nilly, smart antennas could focus transmissions in just the direction of the users, sending a signal farther with less power and less interference with other signals. One of the smart antenna systems already out of the lab is San Francisco start-up Vivato Inc. It clusters 128 pencil-size antennas and can project Wi-Fi signals as far as 2.5 miles.

With mesh network, each device doesn't have to be within range of a base station, it just has to be in range of another device similarly equipped. Each laptop or cell phone searches for signals from others and sets up ad hoc networks that reach the base station. Right now, this sort of network puts a big drain on portable batteries, but is being tested for police car-mounted laptops powered by the vehicle's battery.

Agile radios take another approach and use software to transmit and receive on several different frequency bands. This is of great interest to the U.S. military because the branches of armed services use different parts

of the spectrum and often can't talk to each other. This could be used by civilian devices as well, empowering them to hop in and out of different bands in the spectrum, using frequencies nobody else is using. With this technology, a camcorder would not only record your child's basketball game, it could also send a live digital video feed to the grandparents' television.

All these spectrum-sharing ideas and more are part of a movement called Open Spectrum that got its name in the last couple of years but has been active as a concept for much longer.

Participants in the movement are a diverse group and have diverse viewpoints. Open Spectrum backers all share the idea that the law shouldn't dictate where on the spectrum you transmit but rather make sure that devices are designed and engineered to use multiple frequencies.

The most ardent Open Spectrum believers say the entire spectrum should be opened up while others only want to open up certain parts. Those companies that have already paid a great deal to license parts of the spectrum are not thrilled with the idea of sharing it for

free with a host of devices, no matter how well designed not to create interference.

We should soon hear what the Commerce Department review comes up with and how the FCC reacts to its recommendations. The pressure from inventors, innovators and visionaries to free the spectrum will probably only grow stronger as technology makes the dream an ever more possible reality. ■

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EVENING MEETING

IEEE Communication/Computer Society Chicago Chapters (Joint with IEEE Fox Valley Subsection)

From Grid to Pervasive Computing: Where is the Breakthrough of the Next IT Boom?

Wednesday, April 7, 2004

Professor Xian-He Sun, Department of Computer Science, Illinois Institute of Technology

About Topic:

After the recent IT bubble, what is the trigger point of the next IT boom? In addition to making computing devices ever smaller and faster, what can the IT industry offer to its users? Technology advances tell us the so-called IT era is not yet over. Scientists are cumulating knowledge and building the technical foundations for the next IP boom. New disciplines of computing are emerging. In this talk, we introduce two new concepts of computing: Grid Computing and Pervasive Computing. Grid computing mimics electrical power grid by bringing remote computing power to the users. Pervasive computing emphasizes anywhere, anytime services and 'human-centered' view of computing. It forms the 'smart space' in which IT service naturally available as the air we breathe. In addition to the general introductions, we also will discuss the current technical issues and challenges of both grid and pervasive computing and their implication in providing the next generation 'must have' IT services.

About the Speaker:

Xian-He Sun is a Professor of Computer Science at the Illinois Institute of Technology (IIT), a guest faculty at the Argonne National Laboratory, and the Director of the Scalable Computing Software (SCS) laboratory at IIT. Before joining IIT, he was a Staff Scientist at ICASE, NASA

Langley Research Center and a Professor at the Louisiana State University. Dr. Sun has published over one hundred research articles in the field of computer science and communication, has seven granted and pending US patents, and his research is well supported by NSF and other US government agencies. His research in mobility of legacy code is one of the first nine projects supported by the National Science Foundation under the Middleware Initiative program. His memory-bounded (the so-called Sun-Ni's law) and memory access delay performance model are introduced in many modern textbooks as a must known in performance evaluation of scalable computing systems. Chicago Sun-Times called his recent work in cross-network service as turning "POTS (plain Old Telephone service) into PANS (Pretty Amazing New Stuff), moving (landline) phone into the internet loop." Dr. Sun is a distinguished speaker of IEEE CS Society. He is an editor or guest editor of five international professional journals. He has served and is serving as the chairman or a member of program committee for numerous international conferences and workshops. He received the ONR and ASEE Certificate of Recognition award in 1999, the Best Paper Award at ICPP in 2001, and the Best Poster Award at the IEEE SC03 in 2003.

Location:

IIT Rice Campus, Room 166

Directions:

The IIT Rice campus is on the northeast corner of the junction of East Loop Road at Butterfield Rd. The intersection is about 3 miles west of IL 355 and IL 53.

Map: <http://www.rice.iit.edu/directions.html>.

Time:

6:30 PM Social (Free snack and beverages),
7:00 PM Presentation

Sponsorship:

IEEE Communication Society Chicago Chapter, Computer Society Chicago Chapter and IEEE Fox Valley Subsection.

Cost:

There is no charge for attending the seminar.

Reservations:

Reservations are not required, but registering your intent of attendance at ieechi@yahoo.com is very appreciated.

For More Information:

Visit IEEE Chicago Section website at: <http://www.ewh.ieee.org/r4/chicago/>, or contact: Yigang Cai ycai@ieee.org or Jack Sherman j.sherman@ieee.org, Jerry Kattke g.kattke@ieee.org, or Joe Weesner joe.weesner@ieee.org.

EVENING MEETING

IEEE Communication/Computer Society Chicago Chapters (Joint with IEEE Fox Valley Subsection)

Internet Services for Wireline and Wireless Telephones

Wednesday, April 14, 2004

Vijay K. Gurbani, Department of Computer Science Illinois Institute of Technology and Lucent Technologies/Bell Labs

About Topic:

By the year 2025 the entire world will be encased in a communications skin, according to experts at Lucent Technologies' Bell Labs. "We are already building the first layer of a mega network that will cover the entire planet like a skin," declared Arun Netravali, then President of Bell Labs in 1999. "As communication continues to become faster, smaller, cheaper and smarter in the next millennium, this skin, fed by a constant stream of information, will grow larger and more useful."

The merging of the Internet and the Public Switched Telephone Network (PSTN) is leading to a realization of that communication skin. Here, we will focus on the communications aspect of computing, especially the telecommunication facet. The Internet has emerged as a new communication medium and it is increasingly being applied to the Public Switched Telephone Network (PSTN). The services that are apparent when these two networks co-operate can result in an immersive communication experience for the user. This talk proposes and discusses the implementation of an architecture that leverages both the PSTN (wireless and wireline) and the Internet to provide a pervasive communication infrastructure. Our approach as embodied in the architecture is to merge the best of the Internet protocols (SIP, XML) and technologies

(instant messaging, presence, location) with the PSTN to provide a general framework for personalized pervasive communications.

About the Speaker:

Vijay K. Gurbani is a distinguished member of technical staff in the Wireless Next Generation Architecture and Evolution Department of Lucent Technologies. He received his B.Sc. and M.Sc. degrees in computer science from Bradley University in 1988 and 1990, respectively. He is a Ph.D. candidate in computer science at the Illinois Institute of Technology, Chicago, Illinois. He is currently involved in the specification, prototyping and implementation of services based on SIP. His research interests are Internet telephony services, Internet telephony signaling protocols, pervasive computing in the telecommunications domain, distributed systems programming and programming languages. He is a member of the ACM and IEEE Computer Society. Vijay holds one patent and has four applications pending with the US Patent Office.

Location:

IIT Rice Campus, Room 166.

Directions:

The IIT Rice campus is on the northeast corner

of the junction of East Loop Road at Butterfield Rd. The intersection is about 3 miles west of IL 355 and IL 53.

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For More Information:

Visit IEEE Chicago Section website at: <http://www.ewh.ieee.org/r4/chicago/>, or contact: Yigang Cai ycai@ieee.org or Jack Sherman j.sherman@ieee.org, Jerry Kattke g.kattke@ieee.org, Joe Weesner joe.weesner@ieee.org

Engineers Week



DuPage Area Engineers Week celebrated its 20th anniversary and was once again hosted by Illinois Institute of Technology's Rice Campus in Wheaton. Thank you to all who made this event a success including Jim Fancher.

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LUNCH MEETING

Chicago Chapter of the IEEE Power Engineering Society Powering Today's Technology in a 24 x 7 World Wednesday, April 14, 2004

Michael Bordenet, Zonatherm Products, Inc./Liebert Corporation

About the Topic:
Michael's presentation will cover electrical distribution design of dual bus systems. New load demands on dual corded systems are hitting 300 watts per square foot. How much higher can load density go? Examples of 24 x 7 system one lines will be presented and discussed.

About the Speaker:
Michael Bordenet started his career at Zonatherm Products in 1982. Zonatherm is a Manufacturers Representative of high available UPS and air conditioning systems. Michael attended the Milwaukee School of Engineering and is presently the Alumni Chapter President. Michael has taught classes

at the College of DuPage and is currently the Vice President of Power Sales and Engineering at Zonatherm Products.

Location:
Chicago Bar Association, 321 South Plymouth Court, Chicago, IL (near the intersection of Jackson and Dearborn)

Time:
11:30 AM Social
12:00 PM Lunch (optional)
12:15 PM Presentation
1:00 PM Adjourn

Reservations:
Please call the IEEE Business Office by noon on Monday 12 April 2004 at (312) 253-4333 or (800) 898-IEEE to make your reservation. Lunch tickets can be purchased in the lobby bookstore (\$11.00).

Continuing Education:
IEEE technical meetings may be acceptable as continuing education where required for maintenance of professional engineering licensure. Refer to the individual state's requirements for details.

For More Information:
Please visit the Chicago Chapter IEEE PES web site: <http://peschicago.org>.

EVENING MEETING

IEEE Fox Valley Subsection and IIT-Rice Campus Dual/High Voltage Automotive Electrical Power Systems Wednesday, April 21, 2004

Vahe Caliskan, Motorola

About the Topic:
The demand for increased electrical power in future automobiles has resulted in requirements that are beyond the capabilities of today's 14V electrical system. The increase in electrical power requirements are due to the introduction of advanced engine and body controls and new electrically controlled systems. An electrical system with a higher distribution voltage is required in order to support the enhanced functionality of future vehicles. This talk will present an architecture for implementing a dual/high voltage automotive electrical system consisting of a high-performance alternator with switched-mode rectifier and a dc/dc converter. The alternator employs a novel control strategy that allows improved power output over a wide range of speeds. The dc/dc converter allows high performance transient control and energy management to be implemented.

About the Speaker:
Vahe Caliskan received the B.S. (with honors) and M.S. degrees from the University of Illinois at Chicago and the Ph.D. degree from the Mass-

achusetts Institute of Technology. At the University of Illinois, he was a Research Assistant at the Power Electronics Research Laboratory and a Teaching Assistant in the EECS Department where he received the Outstanding Teaching Assistant Award. At the Massachusetts Institute of Technology, he was a Research Assistant in the Laboratory for Electromagnetic Electronic Systems where he was involved in the development of dual-voltage automotive electrical power systems under the sponsorship of the MIT/Industry 42V Consortium. Presently, Vahe is a Senior Staff Engineer with Motorola's Automotive Communications and Electronic Systems Group where his research interests include power electronics, automotive electrical/electronic systems, analog circuit design and computer-aided modeling/simulation. Vahe is a member of Tau Beta Pi, Eta Kappa Nu and Sigma Xi.

Location:
IIT's Rice Campus, 201 East Loop Road, Wheaton, Illinois.

Directions:
Take Rt.56/Butterfield Rd. to first stoplight east of intersection of Butterfield & Naperville roads. Turn north onto East Loop Road (Grady's Restaurant and Phillip's 66 Gas Station on the corners); the campus will be on your right about a block north of Butterfield Road. More detailed directions and a map are available at <http://www.rice.iit.edu/directions.html>.

Time:
6:00 PM Networking time
7:00 PM Presentation

Sponsorship:
IEEE's Fox Valley Subsection and Illinois Institute of Technology's Center for Professional Development (Rice Campus).

Reservations:
Reservations are not required. Professional Engineers: this meeting qualifies for Professional Development Hours. The Fox Valley subsection web page is at www.ieee.org/foxvalley.

EVENING MEETING

IEEE EMC Society Chicago Chapter Update on Ferrite Technology Advances Wednesday, April 21, 2004

John Horner, Fair-Rite Corporation

About the Topic:
This presentation will review and discuss the most recent advances in Ferrite component technology. Areas to be addressed will include ferrite component use and installation techniques, as well as effects of temperature on permeability and frequency response. Also reviewed will be advances in materials technology as changes in manufacturing methodology and material morphology provide enhanced product performance.

About the Speaker:
The presenter will be John Horner of the Fair-Rite Corporation. John is a member in good standing with the IEEE EMC Society, and is a past presenter at the IEEE International Symposium on Electromagnetic Compatibility as well as a presenter at the IEEE EMC Society Chicago Chapter Mini Symposium on EMC. John currently holds the position of Sales Manager of Fair-Rite Products and has over 21 years experience in the field of EMC.

Meeting Location:
DLS Electronic Systems, Inc.
1250 Peterson Rd.
Wheeling, IL 60090

Time:
6:30 PM Social Hour
7:00 PM Meeting Start

Reservations:
RSVP Jack Black, DLS Electronic Systems
1-847-537-6400.

For More Information:
IEEE EMC Society
www.ewh.ieee.org/soc/emcs/chicago.

EVENING MEETING

IEEE-IAS/IES Dinner Presentation Basics of Airfield Lighting Wednesday, April 21, 2004

Anees Rahman, Burns & McDonnell

About the Topic:
Airport lighting consists of land side and air side airfield lighting systems. The land side lighting includes the terminals, parking lots, roads, and closely resembles lighting systems for similar public and industrial facilities. Airfield lighting systems require specialized luminaires, distribution equipment, circuiting, and control for proper runway and taxiway delineation and to provide the pilots with the proper guidance for landing their aircraft. Mr. Rahman will describe the FAA runway classification system, the lighting systems that are required for each class of runway, and how the lighting systems are powered, designed and operated. He will also cover the regulations from the FAA and other agencies that govern the installation of airport lighting on both the land side and air side.

About the Speaker:
Education: BS, Electrical Engineering - University of Illinois, Chicago.
Mr. Rahman is a Senior Electrical Engineer with Burns & McDonnell. He received his bachelor's degree in electrical engineering from the University of Illinois at Chicago. He is a licensed professional engineer. He has been in consulting for 17 years and has worked on airport projects in Illinois, Michigan, Ohio, Florida, Minnesota, Wisconsin and New Jersey.

Location:
Costa's (Greektown)
340 S Halsted St.
Chicago, IL

Directions:
Costa's is located in Greektown on the corner of Van Buren and Halsted.
See www.iaschicago.com for detailed directions and a map.

Time:
5:30 PM Social
6:00 PM Dinner
7:00 PM Presentation

Cost:
Your cost includes the presentation and a four-course dinner with a choice of the main entree - Roast lamb, Chicken, or Fish. (Vegetarian or special dietary meals available upon request). Cost is \$25 IEEE Member and \$30 non-member. Valet parking is included with your meal.

Reservations:
Please call the IEEE Business Office at (800) 898-IEEE or (312) 253-4333 with your reservation. Please note any special meal requests at the time of the reservation. You can also make your reservations on line at www.iaschicago.com.

Note: For P.E. licenses that require continuing education for renewal, attendance at IEEE Technical Meetings is acceptable as one Professional Development Hour (PDH) per meeting.

ALL DAY EVENT

IEEE EMC Society-Chicago Chapter
6th Annual EMC Mini-Symposium
Tuesday, May 18, 2004

Dr. Tom VanDoren, Professor, University of Missouri-Rolla

About the Topic:

The Mini Symposium provides a great opportunity to receive world-class EMC training to improve your understanding of EMC design principles, regulations, test methods, and test equipment.

About the Speaker:

The featured presenter this year will be Dr. Tom VanDoren, a Professor of Electrical and Computer Engineering at the University of Missouri-Rolla. For the past 23 years he has specialized in electromagnetic compatibility education and research. Over 17,000 engineers and technicians have attended his short course on "Grounding and Shielding of Electronic Systems." He is a Fellow of the IEEE.

Dr. VanDoren's presentation, "Experimental Demonstration of EMC Principles," will be used to enhance the understanding of some very important electromagnetic compatibility principles. The demonstrations will show:

- What path current takes
- That wires do not have inductance

- How to contain electric and magnetic fields by self shielding
- That grounding connections do not carry current
- Where to connect the shield on a twisted pair cable
- How magnetic-field shielding works
- How to make metal enclosures electromagnetically tight
- Several practical examples involving circuit boards and cables will be presented that show how these principles are applied to improve electromagnetic compatibility.

In addition to Dr. VanDoren's presentation, there will be an afternoon session covering a variety of EMC topics. Plus there will be an exhibits area with over twenty vendors available to discuss their EMC related products, test equipment, and services.

Location:

Holiday Inn - Itasca, IL
860 West Irving Park Rd.
630-773-2340

Time:

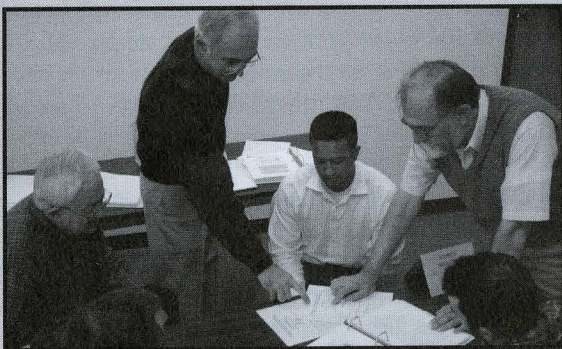
8:00 AM-5:30 PM

Cost:

Admission for IEEE members is \$35 (\$45 non-members, \$15 students) and includes breakfast rolls, coffee, lunch, and entry into several door prizes raffles.

Reservations:

To participate in the Mini Symposium contact Ray Klouda or Steve Laya at Elite Electronic Engineering (630-495-9770) to receive a registration form. Additional information on the symposium and a copy of the registration form is available on the Chapter web site: <http://www.ewh.ieee.org/soc/emcs/chicago/sect/files/events.htm>



During three days of classes before the workshop, students will study EMC design techniques and the calculations required to design a product to meet compliance regulations.

In the Workshop: Using an example of a real life product and following typical design principles, students will:

1. Develop a block diagram.
2. Determine the product's parameters.
3. Calculate the probable emissions and immunity of the:
a. Circuit boards b. Power supply c. I/O lines d. Enclosures
4. Determine if there are EMC concerns.
5. Find cost effective mitigating steps while the product is still on paper.

Who should attend:

1. Those needing a working knowledge in the field of electromagnetic compatibility (EMC) for their product, including:
a. technical manager b. electronic designers c. system engineers d. test and instrumentation engineers and technicians
2. Those interested in a design process to avoid EMC problems in the future.
3. Those concerned with FCC, CE, EU, CISPR, IEC, Mil 461, RTCA, Canada, and VCCI.
4. Those designing: Aircraft, Control systems, Medical equipment, Printing presses, Appliances, Hand tools, Microphones, Scientific test equip. Audio equipment, Home entertainment, Military vehicles and more.

For more information: Please contact, Jack Black at jblack@dlsemc.com
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