e-SCAN FAX IEEE CHICAGO SECTION

May 2008

Calendar Of Events

This Month

May 2, 6:30pm
Awards Dinner Dance
Chicago Section

May 13, 8:30am
10th Annual Mini-Symposium
Electro-Magnetic Compatibility

May 13, 7:00pm
Executive Committee
DeVry - Addison
Chicago Section

May 13, 7:30pm
Introduction to Eclipse and Linux
Communications

May 14, 5:30pm
NERC's CIP Standards
Power & Energy

May 19, 6:45pm
Functional Safety in Consumer Product Design Consultants' Network

May 21, 5:30pm
Lexington Pump Station Photovoltaic Industrial Applications

This Month's Articles

Chair's Column

A review of all the groups that make the Chicago Section the vital organization that it is. [more]

Upcoming Events of Special Note

Celebrate our new Fellows **Daniel Gamota of Motorola** and **Thomas Tobin of S&C Electric** on **this Friday, May 2nd** at the **IEEE-Chicago Dinner Dance**. [more]

Participate in our section election at the next Chicago Section Board Meeting. [more]

Keeping One Step Ahead of the Spammers and Phishers

At **NetSecure08**, presenters Brian Sebby and Rohyt Belani described spam and phishing as moving targets. [more]

Tomorrow's Electric Grid Will Not Be Today's

Wanda Reder announces that PES is now the **Power and Energy Society**. [more]

Big Picture Required for the Very Small

Chicago CAS/ED/SSC Chapter members learned about designing **System-on-Chip Integrated Circuits.** [more]

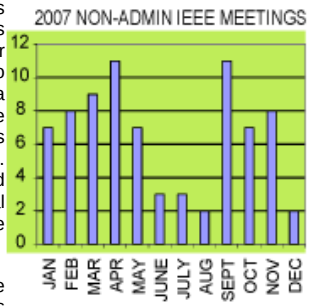
Chair's Column: Chapters and Affinity Groups – The Heart of the Chicago Section

This month, I want to acknowledge the chapters, affinity groups, and subsections that are most active. Chapters are the local groups of the interest-based international societies.

The following chapters provided leadership identifying topics of interest, finding experts and speakers, and scheduling technical meetings:

- **AP/MTT** – Antennas and Propagation/ Microwave Theory and Techniques
- **COM –** Communications
- **ED/CAS/SSC –** Electron Devices/ Circuits and Systems/ Solid-State Circuits
- **EM –** Engineering Management
- **EMC –** Electromagnetic Compatibility
- **IA/IE –** Industry Applications/ Industrial Electronics
- **PES –** Power Engineering
- **SP –** Signal Processing

In addition, this year saw the revitalization of the local Chapter of the **Dielectric and Insulation Society**. And, beyond the chapters, there is lots of other activity. The geographically defined **Fox Valley Subsection** has scheduled a series of talks of general interest to the members of our profession. The **Career Networking Group** has provided monthly opportunities for engineers seeking employment to meet, share experiences, and support each other. The **Consultants' Network** has provided similar opportunities for the members of our organization who are also consultants. In addition, a number of societies have partnered with other chapters in planning technical meetings. Overall, these efforts provided between 70-80 technical meetings per year across the Chicago Section.



These meetings provide opportunities for the members of our engineering profession to share knowledge and to learn. They also provide a setting for meeting other engineers, for

networking, and for finding new career opportunities, either jobs or new technical areas for study. We owe a great deal to these chapters and groups for the growth experiences they provide for us as engineers.

If you would like more information about Chapter activities or would like to contribute to planning efforts, please contact your Chapter chair, any member of the Executive Committee, or me. We always welcome new ideas on emerging technical topics and new opportunities for talks.

Bernard Sander
Chair
IEEE Chicago Section

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IEEE-Chicago Honors New Fellows at Dinner Dance

Please join the IEEE-Chicago Section in celebrating the elevation of two of our local members to the rank of IEEE Fellow at an **Awards Dinner Dance Friday, May 2nd** at the **White Eagle Restaurant** in Niles, Illinois.

Daniel Roman Gamota, Motorola, was elevated for leadership in nanotechnology based printed electronic products and **Thomas Tobin, S&C Electric Company**,

Daniel Gamota

Tom Tobin

for leadership in electric power switching and protection for transmission and distribution systems. The grade of Fellow recognizes unusual distinction in the profession and is conferred by the IEEE Board of Directors upon a person with an extraordinary record of accomplishments. The festivities start at 6:30pm with dinner served at 7:30pm. A short program to acknowledge the new Fellows and to recognize some of our volunteers will be followed by an evening of dancing. Cost is $45 per person and $85 per couple. Students are $20 and life members $35 per person. To register, email or call Connie Kelly at 847-297-6610. Please note that space is limited so please register to guarantee your place.

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Chicago Section Election on May 13th

Participate in our local election; attend the next Chicago Section Board Meeting! The call for nominations of candidates for Chicago Section offices, which appeared in the April issue of e-Scanfax, resulted in the filling of a number of vacant leadership positions with very qualified and enthused new leaders. The call for nominations officially closed April 15th, 2008 with the result that none of the elected positions are contested. In accordance with the IEEE-Chicago Section Operating Manual: "If only one nomination is made for each office, the election shall be made by acclamation at a meeting of the Section membership or the Section Executive Committee meeting." **The election will take place at the next Executive Committee meeting on May 13, 2008 at 7:00pm at DeVry University in Addison, Illinois.** An announcement of the results will appear in the June issue of e-Scanfax.

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Keeping One Step Ahead of the Spammers and Phishers

At NetSecure08: Computer & Network Security and Forensics Conference & Expo, attendees had some tough choices. There were four concurrent sessions going on all day from 8:00am until 4:45pm on Wednesday, March 26. The afternoon session chaired by **John Poust** of the **Chicago Chapter of the Communications Society** was on a topic of interest to anyone using a computer today: Fighting Spam and Phishing.

Some IEEE members gathered at lunchtime in the atrium of the IIT Wheaton Campus where NetSecure08 was held. From right to left are Jim Treleaven, Phil Tomzik, John Poust, Bernard Sander, Jim Fancher, and Carol Davids.

Brian Sebby of **Argonne National Laboratory** began his presentation, **"Fighting Spam: Tools, Tips, and Techniques,"** by acknowledging that the definition of spam (and how to fight it) is constantly changing. Webster defines spam as "unsolicited, usually commercial email sent to a large number of addresses." According to Brian, "The key word is unsolicited. You never asked for it." But, as Brian pointed out, "One person's spam is another's ham." A pharmaceutical company, for example, cannot filter mentions of Viagra from its email.

There are three levels of spam filtering: internet provider (IP), envelope, and content filtering. Since content filtering is the most expensive and resource-intensive, the more filtering that can be done at the IP and envelope levels, before a server accepts the email, the better. IP and envelope level techniques reject mail early in the Simple Mail Transfer Protocol (SMTP) conversation – the dialogue that goes on before a server accepts an email. IP-based anti-spam techniques make decisions about a message based solely on the IP address or network of the sender. Blacklisting is the simplest IP-based rejection method. Envelope-level anti-spam techniques make decisions about a message based on the MAIL FROM, RCPT TO, and other aspects of the SMTP mail "envelope." Envelope-level greylists provide for wiggle room that IP level blacklists and whitelists do not.

Every anti-spam product has occasional false positives and no anti-spam product will ever be 100% effective. Different spam fighting techniques are appropriate for different companies, depending on their size, types of users, and types of mail. Because spam filters can consume a lot of resources and bog down mail servers, IT managers seek a balance between perfect spam filtering and efficient and speedy mail delivery.

Rohyt Belani of **Intrepidus Group** started his presentation, **"Phishing 2.0: Breaking into Wall Street, Military Labs and Critical Infrastructure,"** with a definition of phishing and noted that, like spam, its definition is changing as users and phishers become more sophisticated. His phishing 1.0 definition, "The act of sending an email to a user falsely claiming to be an established legitimate enterprise in an attempt to scam the user into surrendering private information that will be used for identity theft," has evolved into phishing 2.0: "The act of electronically luring a user into surrendering private information that will be used for identity theft or conducting an act that will compromise the victim's computer system."

A large company with state-of-the-art security protocols found its computer system compromised. Like a detective, Rohyt took the attendees through his process of discovering the cause: one employee had received an email ostensibly from the Human Resources Department about changes in the company's healthcare policies with an attachment, "healthcare_update.chm." In an example of phishing 2.0, that one person opening up that one attachment had set off the fatal chain of events.

How did this compromise happen? The company had fallen into a lull with of security behind its firewall. Once inside it, phishers found a "soft chewy center." Corrective measures included not allowing chm attachments, which are theoretically innocuous (but unnecessary) help files, and not giving a computer that is close to critical infrastructure a direct internet connection. But, Rohyt's biggest recommendation was not technical. He advised educating employees by conducting mock phishing exercises. While the legal and human resources departments are often initially resistant to deliberately tricking employees, when Rohyt points out that it's either actual phishers or him, they see the wisdom of the technique, which is recommended by the SANS Institute and Carnegie Mellon. After people fail a mock phishing exercise, their attention at a

mandatory training or brown bag lunch is very focused. For this case study, 82% of employees fell for the first mock phishing email while only 4.5% fell for the third one within the year, which was significantly more sophisticated.

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Tomorrow's Electric Grid Will Not Be Today's

The growing and changing demand on the nation's aging electrical infrastructure will require creative problem solving and new technologies such as smart grids, renewable energy sources, energy storage, and power quality. That was the take-home message of the **IEEE PES Transmission and Distribution Conference and Exposition, Powering Toward the Future**, held at McCormick Place in Chicago April 21-24. The change in the name of the society – from the IEEE Power Engineering Society to the **IEEE Power and Energy Society** – announced by **IEEE PES Chair (and Chicago Section member) Wanda Reder** at the opening plenary session, reflects the need to redefine the problems the power industry is tasked with solving. "The challenges," Wanda said, "are complex, requiring multiple disciplines to address. The name, Power and Energy Society, better positions us to collaborate and appeal to professionals outside of engineering whose knowledge and experience are necessary for future industry problem solving." In addition, future engineers expressed more interest in joining a group called "Power and Energy" than "Power Engineering."

Wes Kegerise of the Okonite Company shows IEEE student tour leader and field engineer with Commonwealth Edison Jabbar Nelson (red shirt), Suni Smith (standing next to Jabbar) and other IIT students the high voltage electrical cable the company sells.

While the nation's transmission and distribution grid has been altered very little since its initial development, that is about to change. In her talk at the student luncheon, Wanda pointed out that even with the increased emphasis on renewable energy and energy-efficient appliances, our energy consumption is increasing: "Virtually all our homes have air conditioners; the average U.S. household owns 26 consumer electronic products, and the typical home has increased 72% in size in the last nine years, currently averaging over 2400 sq. ft. The moral of the story is that our basic product, electric power, is very much in demand, even if the public is requesting it to be more efficient and more green."

"What does all of this mean?" Wanda asked. "Big bucks, for one thing! The Edison Electric Institute (EEI) estimates an investment of over $400 billion in generation by 2030 and another $300 billion in transmission, distribution, and environment-related investments." If capital investments to avert climate change are included, the forecast increases threefold. The National Electrical Manufacturers Association (NEMA) also predicts many more billions of dollars associated with investments in making the grid "smart."

And, while North American demand is growing, demand is growing even faster in China. China's CO_2 emissions actually surpassed those of the U.S. in 2007 and are continuing to escalate. "Global industrialization," Wanda concluded, "means that no geographic area in the world is immune to the energy challenge and the consequences of our actions."

While the demand for power engineers is increasing, a recent survey forecast 46% of U.S. power engineering jobs could be vacated by 2012. The need for new engineering talent wasn't lost on Suni Smith, a fourth year undergraduate at Illinois Institute of Technology (IIT). Suni reported that attending the conference and exposition confirmed his desire to pursue a master's degree in power engineering in the fall. "Because a large number are retiring, I can see the opportunity in power engineering. Going where the

demand is greatest gives me the most latitude. It's not just a maintenance job. I'll have an opportunity to rebuild and have a hand in developing a new power system in the U.S. That will be my trademark."

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Big Picture Required for the Very Small

The **April** meeting of the joint **Chicago Chapter of the Electron Devices, Circuits & Systems, and Solid State Circuits Societies (CAS/ED/SSC)** featured two speakers from **Avent Electronics Marketing** on "**Design Considerations for Creating System-on-Chip Integrated Circuits.**"

Attending the SoC IC presentation were former Chicago Section Chair Norm Phoenix, Chicago CAS/ED/SSC Program Chair John Stuebbe, presenter and Avnet Senior Applications Engineer Dale Chalkey, Paul Ridl, Ramesh Tirumala, Roland Simonis, Stanley Gadgeff, Fred Chu, and presenter and Avnet Senior Applications Engineer Kevin Speilberger.

Putting multiple integrated circuits – for power management, analog integration, and programmable logic, for example – on one chip allows cell phones, camcorders, and digital cameras to become more sophisticated while also decreasing in size. But, fitting all that information on the available real estate is tricky. The evening's presentation revealed the secrets of successful **System-on-Chip Integrated Circuits (SoC IC)**.

Dale Chalkey and **Kevin Spielberger** walked the attendees through the four phases of creating an operational SoC IC: project kick-off planning, front-end design actions, back-end design actions, and system verification. Project planning requires assessing the funding commitments and time-to-market pressures as well as technology trade-offs. Front-end design involves capturing the marketing requirements and translating them into engineering requirements. Dale walked attendees through the high-level architecture down to the level of programming with Hardware Description Language (HDL). Block diagrams can help engineers think pictorially about the required functions, such as heat sinking and clocking, and develop the appropriate system level architecture. Back-end design entails the actual work of putting all the components together, creating a clock tree to prioritize the faster and slower clocks on the different circuits and designing the "floor plan" for the chips. The final step is verifying the system with a prototype and full testing to see if the preliminary computer simulations were, indeed, accurate.

IEEE CAS/ED/SSC Chicago Chapter Chair **Ramesh Tirumala** hosted the meeting, which began with a light supper, at **Bowe Bell+Howell** in Wheeling.

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