

The Institute

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Standards Uproar Leads To Working Group Overhaul

BY KATHY KOWALENKO

The move this year to suspend the IEEE working group developing the latest version of high-speed broadband Internet access was rare, but not unprecedented. It forced the IEEE Standards Association's Standards Board to take a hard look at who is on its working groups and to tighten procedures to ensure that IEEE standards are developed in a fair and open process.

The working group, IEEE 802.20, was formed in 2003 as an offshoot of the IEEE 802.16 standard activity, often referred to as WiMax, the technology enabling fixed wireless broadband access as an alternative to cable and DSL. The proposed IEEE 802.20 standard would do that but with a twist: [Continued on page 15]



Activities of the working group for the proposed IEEE 802.20 standard—a version of WiMax—were suspended in June.

High-Tech Methods To Cut Medical Costs

BY TRUDY E. BELL

It seems like a vicious good news–bad news cycle: bio-medical engineers invent effective techniques for diagnosing and treating diseases, and the medical profession readily adopts them.

But as medicine and medical research goes increasingly high-tech, their costs go higher and higher. R&D must be amortized over the life of a product. Technicians must be trained to run new machines. Companies must make a profit. And it is the basic nature of research that no one knows what techniques will prove effective and which ones will simply turn out to be expensive dead ends.

The result? Patients, physicians, and insurance companies all see the cost of health care skyrocket. It can look as though high tech is part of the problem rather than part of the solution.

But engineering can also lower costs, if it can be focused on early detection of disease before any symptoms are apparent, as well as on wireless electronic monitoring and diagnosis at home. That's the theme of a high-level conference being organized by the Biotechnology Council—a consortium of the IEEE and eight other biomedical and engineering non-profit societies: the Society for Biological Engineering, a technical community of the American Institute of Chemical Engineers; the American Medical Informatics Association; the American Society



of Mechanical Engineers; the Biomedical Engineering Society; the Healthcare Information and Management Systems Society; the Radiological Society of North America; the Society for Computer Applications in Radiology; and the Society for Biomaterials.

The council's Bioeconomics Conference, scheduled for late September in Washington, D.C., is expected to address the economics of biomedical technology and health care. The invitation-only conference is intended to attract not only industry executives, health-care association managers, prominent engineers, and physicians, but also economists, members of the U.S. Congress, state and local government officials, and other policy-makers.

"We want to point out that spending money on biotechnology is not a bottomless pit, but can be cost-effective for the nation and have a positive influence on local, state, and federal economies. We must, however, evaluate which evolving technologies to concentrate on," says Dr.

Michael Rozen, a physician and an IEEE senior member serving as the IEEE's representative to the Biotechnology Council and as the conference chair.

"It used to be that technology only raised costs," says Dr. Jerome Grossman, physician, senior fellow, and director of the Harvard/Kennedy School Health Care Delivery Program, who is serving as honorary chair of the conference. "Now it can lower costs in two ways. First, it can make medical diagnosis and treatments more precise. Second, it can shift care downward from doctor to nurse to assistant to patient."

REAL EARLY DETECTION "The ultimate vision is to treat illnesses before they become symptomatic," Grossman says. Early diagnosis and targeted treatment mean more effective results, shorter treatment times, less medication, fewer side effects, faster [Continued on page 12]



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CONTENTS



7 What You Value About IEEE Membership

BY KATHY KOWALENKO

The results of a survey that asked members what they value about the IEEE could lead to changes in the types of offerings that come with basic membership.

9 Strengthening Financial Oversight

BY ANNA BOGDANOWICZ

With corporate corruption on the rise, the IEEE is looking to encourage the reporting of financial misconduct.

10 Spam Filtering, Anyone?

BY WILLIE D. JONES

The IEEE's spam filtering service is an effective yet underused tool for combating unsolicited commercial e-mail.

17 Talk Time For Portables People

BY IVAN BERGER

The makers of portable communication and information devices will meet face-to-face to swap ideas at the International Conference on Portable Information Devices in Orlando, Fla.

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LOOK FOR THESE ARTICLES ON 5 DECEMBER:

ELECTION The results are in.

NEWS Why the IEEE's group health-care insurance plan is closing its enrollment to new applicants.

FEATURED CONFERENCE The world's foremost advances in solid-state circuitry and single-chip systems are scheduled to be unveiled in February during the IEEE International Solid-State Circuits Conference in San Francisco.

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NEWS

- 4 **IEEE Recertified For Continuing Education**
New Way to Support The IEEE Foundation
Program Seeks Members To Act as Mentors
Tom Bartlett Receives First Herz Staff Award

DEPARTMENTS

- 5 **MARKETPLACE OF IDEAS**
- 5 **LETTERS TO THE EDITOR**
- 8 **MEMBER PROFILE**
- 12 **EDUCATION**
- 13 **PRODUCTS AND SERVICES**
- 14 **SOCIETY SPOTLIGHT**
- 16 **BEST PRACTICES**
- 18 **AWARDS**
- 19 **MEMBER RECOGNITION**
- 19 **IN MEMORIAM**

1 High-Tech Methods To Cut Medical Costs

BY TRUDY E. BELL

High costs can turn new medical technologies into both a blessing and a curse, but the IEEE and a group of other technical societies are working to break the cycle.

1 Standards Uprouar Leads to Overhaul

BY KATHY KOWALENKO

Infighting and internal politics caused the working group developing the latest version of high-speed Internet access to derail. Now the IEEE Standards Board is making sure it doesn't happen again.

PRESIDENT'S COLUMN

6 Creating a New IEEE Membership Model

BY MICHAEL R. LIGHTNER

The hard facts presented by a wide-ranging member survey are troubling, yet they are important tools for improving the benefits of membership.

ART & PHOTO CREDITS: Page 1: www.jasonsneider.com [top right]; Steve Bronstein/Getty Images [middle]; Jackie Alpers/Getty Images [bottom]; Page 3: Paul Trapani/Mova; Page 4: IEEE [left]; Lise Gagne/iStockphoto [right]; Page 5: Dane Wirtzfeld/iStockphoto; Page 6: E.J. Carr; Page 8: Paul Trapani/Mova; Page 9: Pai Wei/iStockphoto; Page 10: Skip O'Donnell/iStockphoto; Page 12: William Fawcett/iStockphoto; Page 13: Pekka Jaakkola/iStockphoto; Page 14: IEEE Vehicular Technology Society; Background: Getty Images; Digital Vision [left]; Courtesy of Mobile VCE [center]; Courtesy of Smart [right]; Page 15: Kenneth C. Zirkel/iStockphoto; Page 17: www.jasonsneider.com; Page 19: Steve Castillo [top]; Cliff Lau [bottom].

NEWS

FROM AROUND THE IEEE & THE WORLD

Tom Bartlett Receives First Herz Staff Award

TOM BARTLETT, FORMER associate general manager of the IEEE's finance and administration department, is the first recipient of the new Eric Herz Outstanding Staff Member Award. The IEEE-sponsored award recognizes demonstrated leadership and contributions to the success of the IEEE over a long period of time.

Bartlett is being recognized for his 47 years of service working in finance, first for the American Institute of Electrical Engineers and then for the IEEE. Following the 1963 merger of the AIEE with the Institute of Radio Engineers to form the IEEE, he was charged with creating a financial reporting system for the new organization. Bartlett also was cited for successfully negotiating a settlement in 1978 between the U.S. Internal Revenue Service and the IEEE, putting to rest a potentially costly legal battle.

Bartlett, who retired in 1992, received a US \$5000 honorarium, an award certificate, and travel expenses to attend

the award presentation, which was on 17 November in New Orleans during the IEEE Board of Directors meeting. He made the trip from East Northport, N.Y., with his wife, Nelly.

The biennial award is named for

Herz, a longtime volunteer and staff member who served for 13 years as IEEE general manager and executive director before retiring in 1992.

Present and past full-time staff members with at least 10 years of service are eligible for the award. Only IEEE members may submit

nominations; IEEE staff and members of the IEEE Awards Board—including its board of directors and selection committee—cannot. The board of directors of the Awards Board selects the winner.

The nomination deadline for the 2008 Eric Herz Outstanding Staff Member Award is 31 January 2008. For more information, or to nominate a candidate, visit <http://www.ieee.org/portal/pages/about/awards/sums/ericherzsum.html>.



Tom Bartlett

IEEE Recertified For Continuing Education

THE INTERNATIONAL Association for Continuing Education and Training has recertified the IEEE through September 2011 as an authorized provider of continuing education units (CEUs). Providers need to reapply every five years to maintain their status.

A CEU is a measure of a person's participation in a formal, though non-credit, continuing-education program, such as a self-study course, a semi-

nar, or a tutorial. IEEE Educational Activities oversees the institute's CEU program and works with IEEE societies, sections, and chapters that want to offer CEUs for their education programs.

For more on CEUs, including how to tie them in to courses you offer to IEEE members, visit <http://www.ieee.org/web/education/ceus> or send a message to eab-ceuadmin@ieee.org.

New Way to Support The IEEE Foundation

THE PENSION PROTECTION ACT of 2006 offers new possibilities for U.S. donors age 70½ or older to make charitable gifts to organizations such as the IEEE Foundation. Under the IRA charitable rollover provision, donors can draw on funds from their traditional or Roth Individual Retirement Accounts between now and December 2007 to make tax-free donations to qualified charities.

Gifts of up to US \$100 000 per year per person are allowed, and couples with separate IRAs can each give up to the maximum. However, you must direct your IRA manager to transfer funds directly to your charity of choice. To learn more, or to find out how to make a donation to one of the IEEE Foundation's more than 100 funds, visit <http://www.ieee.org/organizations/foundation>.

Program Seeks Members to Act As Mentors

THE IEEE MENTORING Connection Program is looking for members to help guide young professionals and recent grads with career planning and professional development. Mentoring is open to all except student and life members. Mentors need to commit at least two hours per month to the one-on-one partnership, which lasts for a year. Communication with the mentee can be by phone, by e-mail, or in person.

Prospective mentors must complete an application that asks for a short biography, including technical background, which is used to create a men-



tor profile. Each mentee will be asked to choose a mentor based on the contents of the profiles.

For more information, visit <http://www.ieee.org/mentoring>.

IEEE Quick Guide

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Correction

IN "TOWNES AND REDDY Share Award for Lifetime Contributions" [September, p. 23], Charles Townes was named as the inventor of the laser as well as the master. The credit for the laser goes to Gordon Gould, for its invention in 1957.

In "E-Cycling Made Easier" [Sep-

tember], a photo caption on p. 19 should have stated that the more stringent the recycling guidelines, the longer it would take for electronic equipment to become obsolete. That is because, to meet the guidelines, products must carry extendable warranties and be upgradable with common tools—which prolongs service life.

—News compiled by Jason Laday

Borrowed Rules

Earlier this year, William Swanson, chief executive of Raytheon Co., publicly apologized and was docked approximately US \$1 million in pay by the company after it was revealed that he had plagiarized sections of his popular 2004 book, *Swanson's Unwritten Rules of Management*. It seems that 16 of Swanson's 33 rules were lifted word for word from W.J. King's *Unwritten Laws of Engineering*, published in 1944 by the American Society of Mechanical Engineers.

Do you think Swanson's punishment was appropriate, too severe, or not severe enough?

It's a Copy-and-Paste World

Swanson's punishment was appropriate. It was a visible example that may deter others from not attributing copied text. It will somewhat reduce Swanson's income, but he can continue to focus on doing his best at being the CEO of Raytheon, and maybe earn it back in the future.

In today's copy-and-paste world, it's easier than ever to assemble material without proper attribution.

One must also note the nauseatingly uncreative self-plagiarism commonly accepted from today's authors, including those of us who publish with the IEEE. It's like driving above the local speed limit—we're often too busy to do things right.

RAY SPERBER
Syren, Luxembourg

Symbolic Fines

According to *The Boston Globe*, the \$1 million "fine" was out of a \$7 million pay

package in 2005. At such a level, the fine was largely symbolic.

A company should look for a CEO who can set the overall direction and create the right morale and work ethic. Clearly Swanson has shown that he has lost his moral compass and should be discharged with no benefits based on his breach of an implied contract.

BOB QUEENAN
Idaho Falls, Idaho

An Honorable Man

I am a Raytheon employee disgusted that we seem to delight in punishing CEOs for whatever transgression can be fabricated and reinforced by the media. Bill Swanson is an honorable man who was trying to help people find their way in today's upside-down organizational culture. I was never under the impression his booklet was Bill's exclusive intellectual property when it was distributed.

A good friend of mine once said, "No good deed goes unpunished." I doubt

that he originally wrote that statement, so perhaps we should take away a portion of his pension?

LELAND JOHNSON JR.
Goddard, Kan.

The Crime of Getting Caught

Of course plagiarism is wrong, and a person who knowingly plagiarizes should be punished. However, until we begin to apply the same rules of conduct to college professors as we've applied to Swanson, we'll continue to have young people graduating from our "institutes of higher learning" believing that the only "crime" is to get caught or to not be politically well-placed enough to avoid consequences.

VAUGHN AKINS
Austin, Texas

Executive Excess

I see no reason for his continued employment. He knowingly plagiarized and set himself and his work up as an example. It's typical of American big business today. We take unethical and often illegal actions, minimally penalize executives, and make examples out of workers.

I retired from both IBM and Motorola, and the bad stuff I saw has worsened and seemingly grown more acceptable. Meanwhile, as executive pay goes through the ceiling, workers get reduced benefits and compensation. Professional discretionary income has been in decline since 1970, while executive pay continues to increase to form an oligarchy.

I would add that I've had a number of managerial and technical accomplishments, so I'm not talking from a position of being fired or downsized.

BOB MUNROE
Dallas



THIS MONTH'S QUESTION

Big Brother In the Sky

Developers working on a project called Security of Aircraft in the Future European Environment claim new on-board technology will be foolproof against hijackers. The system uses sensors, cameras, and microphones to monitor passengers' behavior. In an emergency, an autopilot would automatically be activated to land the plane safely.

Is the increased safety worth being so strictly monitored and giving up so much of your privacy?

RESPOND TO THIS QUESTION by e-mail or regular mail. Space may not permit publication of all responses, but we'll try to draw a representative sample. Responses will appear in the March issue of *The Institute* and may be edited for brevity. Suggestions for questions are welcome.

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LETTERS

Apparent Double Standard

Concerning "Games Engineers Play" [September, p. 1], the gaming industry has claimed for years that playing video games does not modify behavior, particularly in response to concerns that violent video games teach violent responses. Is it now saying that people learn from games designed to teach, but still are not affected by games that are solely for the purpose of entertainment? One wonders how the industry manages that.

CHANDRA T. REIS
Latham, N.Y.

A Wolf Among the PCs

I enjoyed reading the article on recycling old electronics ["E-Cycling Made Easier," September, p. 1]. But as a resident of India

I am worried. We have been classified as a developing country, and the flow of technical waste is from the developed world to the developing world. So when a scheme for a US \$100 laptop is announced, or a cheap PC is released, I hope it's not a marketing cover-up for the transfer of waste when these become obsolete. A toxic wolf in well-marketed sheep's clothing, maybe?

Some may argue that it's good that someone's garbage is another's treasure—the very principle of a garage sale—but after a certain period of time, the PC and its components perish. Then what?

Developing countries don't have an infrastructure that allows every individual access to a computer, so the scheme may win hearts initially. But they also don't have good waste-disposal schemes. India plays

a leading role in the outsourcing business. I hope we're not taking on too much.

REHAB CHOUGLE
Mumbai, India

Accreditation Aches

I agree with your article about ABET accreditation of non-U.S. programs and that the need for academic standards is acute ["IEEE to Beef Up Its Global Accreditation Role," September, p. 16]. I have taught at universities in the United States and the European Union. I have also established training programs for students in Russia and India. I'm therefore quite familiar with the bewildering disparity in academic standards.

A. CHOUDRY
Noordwijk, Holland

In Defense of Sandia

Contrary to the underlying premise in John Bagley's letter concerning the ethics of researchers at Sandia National Laboratories [Letters, September, p. 6], I can think of nothing more immoral and unethical than asking our children to protect our freedoms, Constitution, and way of life without providing them with the best means to end a war quickly with as little loss of life on both sides as possible. Thus, the nuclear option in wartime is not something our government should remove from its list of choices when confronting enemies that seek to destroy our way of life.

KURT PETERS
Hampton, Va.

Creating a New IEEE Membership Model

Early this year, I challenged our organization to examine the possibilities of changing the IEEE's membership model to help attract and retain more members.

After accepting this challenge, the IEEE's Membership Development and Research departments worked with an independent research firm to conduct online surveys of two important groups—higher-grade members (students and life members were excluded) and key volunteers. These groups were invited to assess the benefits currently available under the IEEE's fully bundled membership model, as well as a limited set of potential new offerings [see "What You Value About Your Membership," p. 7]. The volunteer group—those currently serving on the IEEE Board of Directors, the six major IEEE boards, and the committees that report either to the IEEE Board or to the Executive Committee—completed the survey from their personal perspectives as IEEE members.

The findings of the two surveys are dramatic and, I believe, very instructive. That is why, for my last column as IEEE President, I have chosen to review this important new data. As my purpose here is to offer commentary, I will mention

only a few specific areas of the survey. The survey results I am commenting on have a margin of error of plus or minus 5 percent, at the 95 percent confidence level.

A strong, viable IEEE for future generations demands that 21st-century technology professionals have the useful, affordable member benefits that they need and want—without our organization sacrificing either its prestige or its financial strength to provide them.

In my opinion, the results of the two studies show troubling disparities—a disconnect between the IEEE's key volunteer leadership and our rank-and-file members. One unsurprising finding is that the IEEE leadership lives mostly in the United States and much less in Latin America, Europe, and Asia. Yet 41 percent of our members live outside the United States.

Key IEEE volunteers are significantly older than members, at average ages of 65 and 45 years, respectively. Volunteer leaders also have much more professional experience, hold higher IEEE membership grades, and generally earn

more money than the members surveyed. This last detail means our key volunteers have fewer concerns about the affordability of membership or time for volunteer leadership activities.

At the same time, key IEEE volunteers are also strongly positive in their assessments of IEEE membership, perhaps because they have had the years to learn about and use many IEEE benefits. But current and former rank-and-file members indicate things could be better—for example, only 75 percent of current members said they are satisfied with their membership, compared with 95 percent of key volunteers. In addition, only 29 percent of current members would definitely recommend IEEE membership, compared with 87 percent of volunteer leaders.

One survey finding that concerns me is the high percentage—25 percent—of the volunteer leaders who are retired, compared with 3 percent of rank-and-file members. Please do not misinterpret this statement, because I greatly admire our retired leaders' enormous commitment and important contributions to the IEEE. But retired individuals simply have different needs and preferences than do rank-and-file members. As a result, our leadership risks misjudging how broadly many current and potential offerings truly appeal to the younger group, whose professional interests and development are so dissimilar.

The difference in response for each group's assessments of IEEE products and services is especially revealing. For instance, key volunteers have greater electronic access to IEEE content, especially through their IEEE society memberships, than do rank-and-file members. One reason is that 93 percent of volunteers belong to at least one society, compared with 66 percent of current members. As one result, when volunteers were asked how they would value the possible addition of downloads



from the IEEE Xplore digital library, they were much less interested in this potential membership benefit than are many members. This indicates that volunteer leaders may be undervaluing the desirability of an important membership benefit.

How can the IEEE meet the challenge of better serving its members? I believe we must develop a greater, ongoing reliance on data collection, analysis, and reporting. Because the IEEE leadership's professional and personal preferences differ so significantly from the rank-and-file's, leaders must be more sensitive to how their perspectives can lead them to different choices than those of many members. We need to be more closely in touch with our larger body of members through more frequent, in-depth surveys and in-person interactions, including professional mentoring.

With my term at its close, I want to thank the 2006 Board of Directors and more volunteers and staff than space here permits me to acknowledge. I want to thank Past President Cleon Anderson for his outstanding contributions and for teaching me so much about the IEEE. Your 2007 IEEE President, Leah Jamieson, possesses exceptional knowledge, experience, and skill, and I have every confidence that she will continue to advance the IEEE.

I welcome your comments on this important topic, at lightner.column@ieee.org.

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What You Value About Membership

BY KATHY KOWALENKO

Which benefits are most important to members? According to a survey commissioned by the IEEE Membership Development Committee, the answers are a society membership, a subscription to *IEEE Spectrum*, and downloads from the IEEE Xplore digital library included with basic membership.

Members were asked to rate how valuable they find the IEEE's current 67 benefit offerings and 13 proposed new ones. The results of the Member Value Survey could lead to major changes in the IEEE's model for membership, which now bundles products and services together for one price.

"Increasingly, members are telling us that the price is too high for the perceived value," says Senior Member Jan Brown, chair of the Membership Development Committee. "However, when presented with the complete list of benefits, members are amazed at how many there are. This survey is only the first step in understanding how we might change our membership model."

The seeds for a review of the current membership model were sown early this year when IEEE President Michael R. Lightner issued a challenge to each unit of the IEEE. He asked them to consider how they would restructure their activities and offerings if the IEEE reduced its dues to cover just the cost of basic services, such as processing membership applications and mailing membership cards. For all other services, members would pay extra. The first step in answering Lightner's challenge was to find out from members how they value the IEEE's offerings [see "Creating a New IEEE Membership Model," p. 6].

An online survey was sent to 5985 current and 9991 former higher-grade members between 16 and 25 May 2006. Of those, 1502 current members (students and life members were excluded) and 969 former members (those who let their membership lapse since 2004) answered the survey, a response rate of 25.1 percent and 9.7 percent, respectively. The numbers were considered representative of the entire membership.

Respondents were asked to select from among the current offerings and the proposed new ones, and to rate each

according to its desirability [see "What Members Value"]. The current offerings include, for example, subscriptions to publications, membership in any of the IEEE's 39 technical societies, travel and career services, discounts on IEEE conference fees, and educational programs

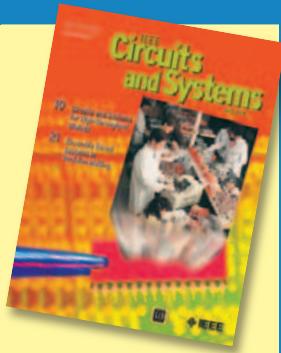


—otherwise known as the à la carte category—respondents were asked to choose benefits for which they would be willing to pay a "reasonable extra fee" on top of nominal basic dues. Here the respondents tended to hold onto their wallets. Current members said they

were the IEEE History Center, the proposed magazine for practitioners, and programs aimed at improving the image of the profession.

"We offer a smorgasbord of benefits, so it's not surprising that the majority of people don't find value in every ben-

WHAT MEMBERS VALUE*

Top Societies	Popular Offerings
<ol style="list-style-type: none"> 1 Computer 2 Communications 3 Circuits and Systems 4 Engineering Management 5 Signal Processing 6 Power Engineering 7 Instrumentation and Measurement 8 Consumer Electronics 9 Information Theory 10 Control Systems 	<ol style="list-style-type: none"> 1 <i>IEEE Spectrum</i> (print) 2 IEEE Xplore downloads (proposed) 3 Discounts on books 4 <i>Proceedings of the IEEE</i> (online) 5 Subscription to a society publication 6 Discounts on journal articles 7 <i>IEEE Spectrum</i> (online) 8 Discounts on standards 9 Discounts on conference proceedings 10 IEEE Xplore expanded abstracts

* In order of preference

that benefit the public and the profession. Proposed new offerings included a limited number of downloads from the IEEE Xplore digital library, automatic membership renewal, and a magazine targeted at engineer-practitioners rather than researchers.

Current members were asked in three different ways to choose the benefits they value most. In the "Ideal" membership, the sky was the limit; they could choose as many benefits as they wanted without concern for price. All told, of the 1502 respondents, 1475 different combinations of benefits were selected.

In a "Limited" membership, members had to restrict themselves to 10 offerings. But that proved to be more than many felt they needed. They chose an average of 8.4 benefits, while former members chose 7.3.

In the "Would Pay Extra For" cate-

gory, respondents would pay extra for 5.3 benefits on average, while former members said they would pay for 3.2.

HOW VALUABLE? The results indicate that most members find only a small subset of benefits to be of value. Further, this subset is very different for each member. While no one benefit had universal appeal, each appealed to some members. The three mentioned at the beginning of this article—a limited number of IEEE Xplore downloads is a proposed benefit—were in the top 10 of those most highly valued. The IEEE Computer Society was the most popular of the societies.

Other benefits rated highly include discounted conference fees, the IEEE e-mail alias, and a possible new offering that lets members join for more than one year at a time. Rated as less valuable

efit," Brown says. "But the reason they buy a membership in the first place is because they receive value—whether it's getting our technical information, interacting at the local level, or reading *IEEE Spectrum*," Brown says.

NEXT STEPS Armed with the survey's findings, the IEEE is now conducting Phase 2 of the study. Different membership models offering various benefits are being tested with eight focus groups. The groups are made up of current higher-grade members and former members who were with the IEEE for at least two years, along with current graduate students, former student members, and nonmembers. Results of this phase of the study were not available at press time. Phase 3 will then test prices for the models that the focus groups find most appealing. Findings of that phase are to be released early next year. ●

Steve Perlman: Getting Real With Animation

BY ANNA BOGDANOWICZ

Technology, art, and invention were never strange concepts to Steve Perlman. His passion for all three began when he was a boy.

“Even as a toddler, I loved to make things,” Perlman says, noting the excitement he felt when his father taught him how to illuminate a light bulb by connecting it to a battery.

As Perlman grew older, he added photography, movies, and animation to his list of hobbies. In junior high school, he began making short films using clay animation. And a few years later, he built his first computer and designed his own video games for it.

It was in those teenage years that Perlman says he realized his true calling in life: “building technologies to allow people to create artificial worlds and interact with one another.” It’s a goal that has led him to invent something that is certain to take video games and films to new heights. With his Contour Reality Capture system, this IEEE member is changing the face of digital reality as we know it—literally.

The system films actors wearing phosphorescent powder—glow-in-the-dark makeup—under short bursts of fluorescent light. The images captured in the dark

and in the light are used to create three-dimensional faces that can be manipulated to make digital characters appear more real than ever before.

“The creative opportunities are enormous,” Perlman says.

The camera system employs a technology called motion-capture, which is used in films and video games. However, current technology captures only the movement, not the appearance of an actor. Contour replicates the entire surface of the face.

“I don’t really think there’s a limit now when it comes to how real digital characters can appear,” Perlman says.

Contour captures images at a resolution close to that of high-definition television. Due out in a few months,

Contour is being offered through San Francisco-based Mova, a subsidiary of Rearden, a company Perlman founded in 2000, also in San Francisco.

Perlman unveiled Contour in July at the Siggraph computer graphics conference in Boston. It was an immediate hit there, with participants first learning how difficult it is to realistically capture faces, only to find out later “how readily we can capture them,” Perlman says.

Also, it can take animators six to eight weeks to develop a 3-D character because the markers provide a low-resolution representation of the actor. That’s where Contour comes in.

FACIAL FEATURES For Contour, an actor’s face is sponged with a random pattern of phosphorescent makeup, a 10-minute process. The phosphor grains enable the face to be captured in high resolution. In a light-tight room, modified ballasts fire fluorescent lights up to 120 flashes per second—so fast that the room appears steadily lit.

In addition, two arrays of video cameras are set up around the actor’s face. The first array films the actor when the lights are off, recording the glow from the random phosphorescent makeup patterns. The second array of cameras records the actor when the lights are on.

The glowing patterns captured in the dark are correlated to create a precise 3-D surface of the face, while the illuminated images provide texture. With the entire surface of the face captured, Perlman says emotion can be portrayed in a way not currently possible.

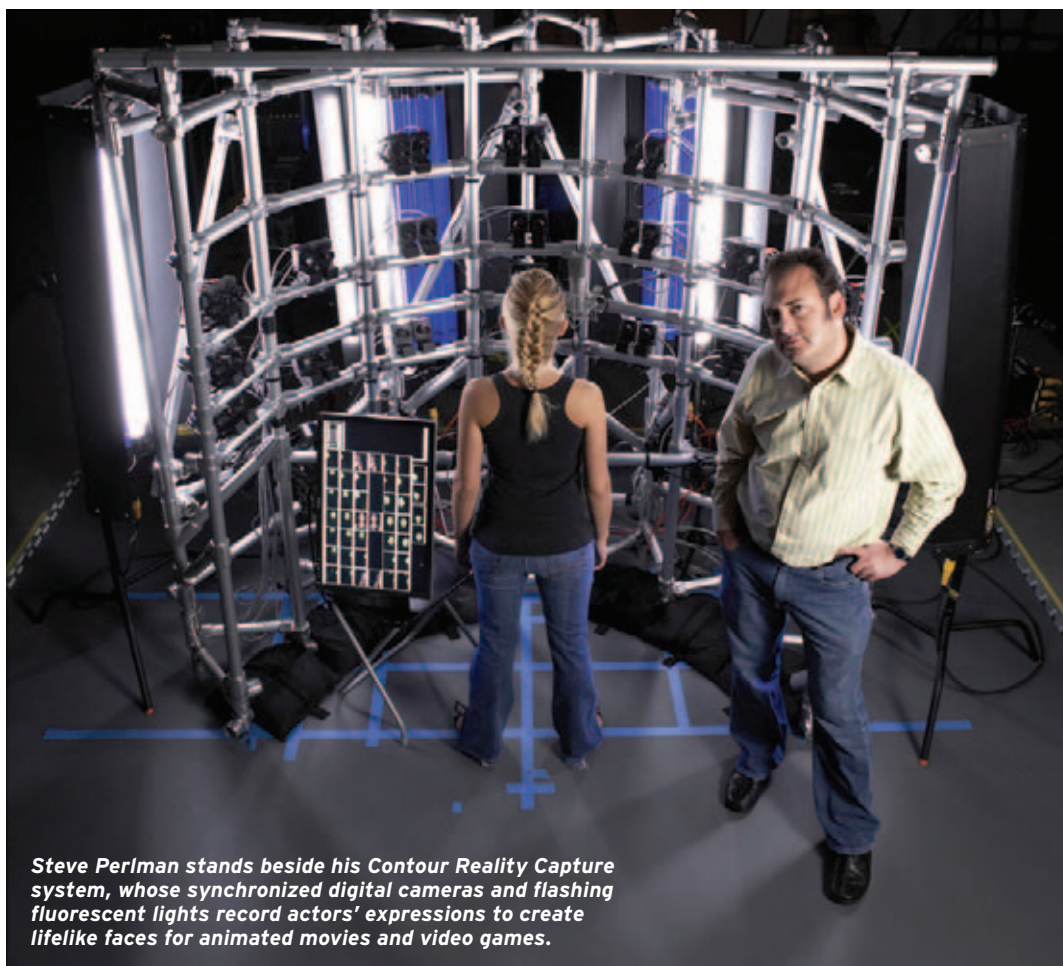
“We’re capturing wrinkles, sudden movements of the lips, and the flare of nostrils,” he says, “the subtle things that make human faces expressive.”

The shots then are uploaded into computers that can process the images overnight. Results can be delivered the next morning, ready for editing.

A former engineer at Apple Computer, Stephen G. Perlman has a résumé that includes more than 30 years of technology development. His list of accomplishments includes WebTV, the technology behind QuickTime, and Dish Network’s Dishplayer satellite receiver.

Perlman graduated with a bachelor’s degree in liberal arts in 1983 from Columbia University. Throughout his career, he says, his IEEE membership has been “immeasurably helpful.”

“I do hardware engineering and software, so I spend a lot of time reading IEEE publications,” he says. “The IEEE is a great organization. It has excellent sources of information.”



Steve Perlman stands beside his Contour Reality Capture system, whose synchronized digital cameras and flashing fluorescent lights record actors’ expressions to create lifelike faces for animated movies and video games.

THE OLD WAY Today’s motion-capture technology is tedious. To digitize an actor, hundreds of retro-reflective markers are placed in a specific pattern on the actor’s face and body—which takes up to two hours. The actor is then filmed in motion, cameras track the markers, and the 3-D marker position images are uploaded into a computer.

Because the markers track the motion and position of body parts, animators can make the character do whatever they want, realistically, in whatever world they computer-generate. But the marker process has serious limitations.

“It can’t capture the subtleties of human expression,” Perlman says, adding that lips must remain free because the markers interfere with the actor’s speech.



Strengthening Financial Oversight

BY ANNA BOGDANOWICZ

In the wake of new legislation sparked by recent corporate scandals, many organizations, including the IEEE, are beefing up their financial oversight practices. This year the institute's Board of Directors named longtime IEEE volunteer Lloyd A. "Pete" Morley to a newly created position, that of corporate integrity contact person, to handle reports of suspected financial misconduct. And next year, the board will consider establishing a new set of standards for volunteers and employees, called the Code of Business Conduct, which is now being drafted.

The reason for the code? It's "good business practice," says Ron Jensen, chair of the IEEE Audit Committee and an IEEE senior member. The standards come at the recommendation of the IEEE's legal counsel that the organization should follow the principles of behavior included in the 2002 U.S. law known as the Sarbanes-Oxley Act. That legislation established new reporting and monitoring requirements for management and boards of directors of all U.S. public companies. It also specified that the companies must have a mechanism—as

embodied in the corporate integrity contact person—for receiving and handling reports of financial misconduct.

The IEEE has standards of conduct in place that are outlined in its Code of Ethics and its employee handbook—for which Morley has provided review and counsel. Although the new code will include standards laid out in the two existing compliance documents, it will go into greater



Lloyd A. Morley

detail in the area of financial misconduct, which will be Morley's bailiwick. The new code will also establish a formal process for investigating suspected violations.

Of course, the IEEE already prohibits volunteers and employees from accepting bribes or kickbacks of any kind from IEEE members, staff, customers, or

vendors. But the Code of Business Conduct will give specific examples of what constitutes inappropriate actions.

Also, the new code will explain situations that represent a conflict of interest, such as operating an outside business that markets products to, or in competition with, the IEEE. Also, under the code, those entrusted with confidential information such as technical product specifications or internal financial data

will be expected to discuss it only with those who have a "need to know."

Employees and volunteers have always been asked to report instances of what they regard as inappropriate actions. IEEE Human Resources and the IEEE Ethics and Member Conduct Committee (EMCC) have received and processed misconduct complaints from employees and members, respectively, all along. But Morley will focus on handling complaints of financial improprieties by members and employees.

CODE MONITOR An IEEE Fellow and veteran volunteer who has chaired and served on many IEEE boards and committees, Morley is a full-time electrical engineering professor at the University of Alabama, in Tuscaloosa. The appointment came as a great surprise, he says.

"When I read that the person who

fills the role must be of unquestioned integrity, I was really honored to be asked to serve," Morley says.

The one thing he says he hopes people realize is how important it is to report suspected financial misconduct. It's better to report such suspicions, even if it turns out there is no wrongdoing, than to remain quiet, he says.

Morley gets involved once someone reports a financial misconduct violation of the code—either by e-mail to corp-integrity@ieee.org or by postal mail to him at the IEEE in Piscataway, N.J. Complaints can be made anonymously; all matters will be handled confidentially to alleviate any concerns of retaliation.

Morley will investigate the complaint and, if it seems valid, interview the person accused of committing the wrongful act, reporting to the IEEE Audit Committee throughout the process. Next, he will determine if misconduct did occur and file a report with the committee. If the complaint is about a member, the report is released to the EMCC. If it is about an employee, the report goes to the IEEE's Human Resources Department. Those bodies process the complaint, and then it's up to the IEEE executive director (in the case of employees) or the Board of Directors (for member complaints) to make a final ruling.

Code violations could lead to disciplinary actions, including membership termination for volunteers and employment termination and prosecution for employees.

Morley says he believes in the code's efficacy and the importance of his position, and he hopes to make the reporting of possible violations as painless as possible.

"I want to make people within our organization—staff and volunteers—feel comfortable about what to do if they find someone doing something they suspect to be wrong," he says. ●

NOTICE

A Message to the Membership From the Office of the IEEE Executive Director

AT ITS MEETING on 25 June 2006, the IEEE Board of Directors sustained a finding of cause and imposed sanctions on a member charged with a material violation of the IEEE Code of Ethics. The Board of Directors also determined that this notification to the IEEE membership should be made.

In 2005, a complaint was received by the IEEE Ethics and Member Conduct Committee for alleged violations of the IEEE Code of Ethics and Bylaws. The hearing board found cause based on material violations of (i) Article 2 of the IEEE Code of Ethics in that the member charged failed to avoid a real or perceived conflict of interest and failed to disclose the same to affected parties and (ii) IEEE Policies 6.3.2.D in that the member charged made unauthorized use of the IEEE logo.

Having found cause, the hearing board determined that the member charged shall be censured by the IEEE and recommended a series of prohibitions on certain publishing and conference activities.

The IEEE Board of Directors sustained the hearing board's finding as to cause and the determination that the member charged shall be censured by the IEEE. In addition, the Board of Directors determined that the member shall have no leadership or management role in any IEEE conference activities for a period of five years. ●

Spam Filtering, Anyone?

BY WILLIE D. JONES

There are many benefits to an IEEE e-mail alias. An alias immediately indicates an association with the institute, makes it easier for IEEE members and staff to know how to contact one another, and serves as a permanent point of contact, regardless of whether an alias holder changes jobs or Internet service providers. And it can also help eliminate a major headache: spam.

More than 100 000 members have signed on for the IEEE Personal E-mail Alias Service. It provides them their “name@ieee.org” address, which they can then keep as long as they remain members. But few who use the alias take advantage of the companion spam-filtering service, available since 2003. Roughly 80 percent of alias owners have yet to sign up to have the IEEE block or tag unsolicited commercial e-mail (UCE) that could be spam. When the IEEE adds a tag to the subject line of a message that’s suspected of being junk e-mail, the recipient can either delete the message immediately or route it to a folder for reading at a more convenient time. When a message is blocked, it gets deleted.

The fact that alias holders are ignoring the spam filter doesn’t necessarily mean they are being overwhelmed by spam. Many alias holders rely on spam-filtering technology provided by their ISPs or on software they’ve installed on their own computers, says Gilberto Santiago, manager of IEEE electronic mail and security services, in Piscataway, N.J. “Some members don’t feel they need the IEEE’s software,” Santiago says.

That won’t cause the IEEE to stop offering the spam filter, however. “Having accepted responsibility for receiving and handling the mail, it makes sense to assist in combating all the major problems of e-mail, including spam and viruses,” says Senior Member David Green, who is part of the IEEE’s IT Strategy Committee.

And, adds IEEE Life Fellow Robert Alden, who helped lay the groundwork more than eight years ago for the IEEE e-mail aliases, Web hosting, and mailing lists, “You can’t have too much protection. I have virus protection on my PC. I have it provided by my ISP. And I have it through the IEEE.”

Some alias owners may fear that the

filtering will invade their privacy. They are under the mistaken impression that “there is a person reviewing messages for particular content that may be interesting,” says Robert V. Jones, staff director of IEEE IT infrastructure and operations, also in Piscataway.

AUTOMATIC SCAN What they apparently are unaware of, Jones says, is that since the alias service’s inception in 1998, the IT department has scanned incoming

messages. The spam filter, which consists of software installed on the IEEE server that manages the aliases, detects junk e-mail by analyzing its contents.

The IT department faces major challenges in that regard. As the engines that identify spam have become more sophisticated, spammers have in turn become more ingenious. “It’s just like the police using a better speed-detection radar system, and manufacturers developing a better radar detection system,” Jones says. If

technology, the IT department reports it has seen an 11 percent reduction in the volume of e-mail delivered to alias holders (262 million messages in 2005, compared with 294 million in 2004). If anything, as the economy has grown, so should the number of spam messages.

Another challenge is making sure that what is detected is really spam. “What’s spam for me may not be spam for you,” Jones says. “Some people may enjoy receiving messages about mortgages and medical products, so you cannot make a blanket declaration that ‘All this kind of content is always spam.’” Instead, the IEEE has adopted a policy that puts the alias owners in control; they choose whether the system simply tags messages or completely blocks them. They also get to choose just how aggressive the spam-checking technology is [see figure for instructions, taken from the IEEE E-mail Alias page].

Jones notes that the spam filter scores incoming messages based on how often words or phrases typically associated with spam occur. Alias holders who set the filter on Low might not be alerted to the presence of messages even with the highest scores, while those who set the filtering level on High would see tags put on messages with even the lowest scores—if they receive them at all. Users can also create a list of preferred senders (known as a white list) whose messages always get through—unless they contain a virus—and one (called a blacklist) containing addresses whose messages will always be blocked.

Spam is a community problem. There are many challenges, and the Internet community needs to get involved to control it, Santiago says. In many cases, universities have been identified as sources of spam; as a result, e-mail sent from them to the IEEE or to an ISP might be delayed. Spam prevention technology is widely used and on occasion, the flow of e-mail will be impacted. It is something we all must learn to accept, according to Santiago, given that there is no silver bullet to solve the spam problem.

To sign up for spam filtering, enter your IEEE Web account on the IEEE Personal E-mail Alias page (<http://www.ieee.org/alias>) and click the UCE/Spam Filtering Service link. From there, you can set your spam filtering preferences.

Instructions for setting up the IEEE UCE/spam filtering options

Select the sensitivity level

Option 1 UCE/Spam Tagging Select a **tagging sensitivity level** below

- Low
- Medium
- Aggressive

Option 2 UCE/Spam Blocking Select a **blocking sensitivity level** below

- Low
- Medium
- Aggressive

Option 3 UCE/Spam Tagging and Blocking
Select a **tagging and blocking sensitivity level** below

- Medium Tagging With Low Blocking
- Aggressive Tagging With Low Blocking
- Aggressive Tagging With Medium Blocking

Option 4 Disable UCE/Spam Filtering (No Tagging or Blocking)

- Do Nothing About UCE



messages and attachments for viruses. Infected correspondence is captured and a notice is sent to alert the alias holder that, for example, “Message X with subject line Y has been intercepted and deleted.”

Jones reports that in the first three months of this year, the alias service’s virus scanner detected 1.8 million messages with infected attachments. “Obviously, the virus scanning and spam technology have to scan the contents of a message to determine whether it’s spam, but staff members do not read e-mail, and the IEEE does not store it,” he says.

The alias arrangement is simply a forwarding service. IEEE servers receive the e-mail, process it, and turn it back around for delivery to its destination. “In the process, we help out by scanning it for viruses—and, if you want, also process it for spam detection,” Santiago

notes, spammers will implement techniques such as inserting spaces or punctuation marks to try to fool the software.

One IT department countermeasure, introduced in 2004, makes the IEEE’s domain less attractive to spammers.

“Spam sources typically behave in a particular way—for example, opening an unusual number of connections to gather end user e-mail information (directory harvesting attacks), or to transmit unsolicited commercial e-mail,” Jones says.

Once the IEEE alias server determines that is going on, it slows down connections from the suspected server trying to deliver e-mail to the IEEE servers. That, in turn, slows down the number of spam messages that can be sent in a particular time. Since introducing the

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Get Certified in Communications Technology

BY NANCY SALIM

The IEEE Communications Society is introducing a new certification program geared toward technical professionals who want to sharpen their communications technology skills. Those who pass an exam in one of several specialties will earn a Certificate of Communications Expertise.

The first exam, available by the end of 2007, will be on wireless cellular technology. Certification will also be offered in technologies that include transmission, switching and routing, network protocols, wireless communications, optical communications, and access networks. The Board of Directors approved US \$200 000 in June to develop the exams along with instructional courses that prepare people for the test.

"Most people seeking the certification will probably be new employees or those with a few years of experience," says John

Pape, head of the IEEE Communications Society's marketing department in New York City, which oversees the program. "Some may be employed in other areas of engineering and want



to change jobs, but need more credentials, which the certification program provides. The program will also be valuable for consultants who want to enhance their records."

Pierre Perra, an IEEE senior member and chair of the IEEE Communications Certification Committee, the group responsible for developing the certification program, says he hopes companies will incorporate certification in their hiring and promotion policies. Certification could help employers evaluate an applicant's qualifications and provide a measure of the person's commitment to the field, Perra says. Those obtaining certification would be better positioned for promotions and pay increases, and

they would have greater job security and job mobility, he adds. Perra also sees the certification program serving as a model of change for educational institutions.

"The high level of knowledge and competence required to pass the certification exams may become an incentive for educational institutions to reexamine their communications engineering courses," he says. "The program may also serve as a guide for schools that want to establish new communications engineering departments."

Celia Desmond, vice president, IEEE Technical Activities, and one of the initiators of the new program, says certification will establish an international standard of competence in wireless communications engineering.

"It transcends schools, programs, and even work experience to demonstrate that the certified individual meets defined levels of knowledge," Desmond says.

Developing the exams will require industry support. "We need industry to partner with us to develop test questions to accurately reflect a candidate's knowl-

edge," Pape says. "We need the assistance of companies across the globe."

ELIGIBILITY Higher-grade IEEE members—which do not include life members or students—and graduate student members automatically qualify to take the test. People who want to take the test but are not IEEE members must hold a bachelor's or equivalent degree in engineering or physical sciences from an institution of higher learning recognized by the IEEE.

Exam application and registration fees are yet to be determined. A certificate will be good for three years. The instructional courses will be developed along with the tests, although taking the courses will not be mandatory.

FOR MORE INFORMATION, visit <http://www.comsoc.org>. Those who are not IEEE members can visit <http://www.ieee.org/portal/cmsdocs/membership/rep/repinstitutionsbyregionandsection.pdf> for a list of educational institutions recognized by the IEEE.

MEDICAL COSTS from page 1

recovery, and a better quality of life for the patient—all for less money.

The decade-long project to map the human genome—the full genetic structure of a human being—revealed that genes hold the keys to disease. "Almost all deviations from the norm have a genetic biomarker," Grossman explains. "Already, that is allowing early diagnosis and more targeted treatment of cancers." He points out that a number of genes have been associated with breast cancer, and a new treatment for people with two of the genes is about to be approved.

The genome-mapping project also revealed that engineering is key to lowering costs. "Mapping the human genome required extremely sophisticated computer tools for the analysis, and each generation of equipment did it faster and cheaper," Grossman recounts. "The spectrometers that dissected and identified genes during the 10-year project did 50 percent of the work in just the last two years." The Biotechnology Council wants to harness that high-tech analysis multiplier as well as the huge database of information resulting from human genome mapping.

"How can potential investors and policy-makers evaluate which technologies will be most efficient for lowering medical costs instead of raising them?" Grossman asks. In his view, three sets of technologies stand out.

One involves genetic screening—identifying the biomarkers for major diseases. Today, "the cost of screening a person for biomarkers is quite high—much higher than is usually spent on the diagnosis and treatment of a breast-cancer patient," Grossman says. "But advanced tools double in power and halve the cost every 18 to 24 months, so that cost is falling exponentially."

Eventually, identification of biomarkers will become affordable for most major diseases, he says—even for so-called orphan diseases, which are relatively rare ailments that can cost a stratospheric US \$30 000 to \$100 000 per year to treat.

The second set of technologies tailors treatments using genetic molecules—which involves traditional medicines attached to genomic delivery systems to aim treatments at tumors or find the locations of disease.

The third high-tech area deals with devices for delivering health care at home. For chronic diseases such as diabetes, many patients already manage their

own care, administering blood tests, reading results, and taking medication. But such care is beyond the capacity of many people. What Grossman calls "machine-mediated care" could solve that problem. The process involves wireless, implantable devices that monitor blood-sugar levels, heartbeat, blood pressure, or other parameters and transmit the results to a physician via the Web. Such home monitoring would reduce the need for visits to a doctor's office or for in-home nurse's visits, while allowing "one doctor to oversee many patients and be more productive," as Grossman puts it.

BATTLING THE STATUS QUO In the United States, at least, such technical approaches are radical and challenge the nation's infrastructure of medical insurance and reimbursements. So the conference is likely to point out that policy-makers must focus on more than just engineering and medicine. They must also rethink medical insurance. "As health care moves from the doctor to the patient," Grossman says, "the insurance industry must change to reimbursing for a condition regardless of who gives the care."

A second challenge is that the United States, like most of the developed world, must deal with its aging population. Within the next two decades most of the U.S. baby-boom generation, born between 1946 and 1964, will be retiring—including many physicians, right at the time when the population will need doctors most.

And thirdly, with some "45 million people—a sixth of the U.S. adult population—medically uninsured and with a relatively high rate of infant mortality, health-care delivery in this nation has to change," Rozen declares. In his view, biotechnology can be part of that change, through identifying the genetics of disease, targeting therapies, monitoring health care, and communicating with physicians.

According to Grossman, those three challenges "spell the need for a fundamental shift in the paradigm of diagnoses and treatment" in the United States—a shift in which careful engineering can offer great improvements and lower costs.

FOR MORE INFORMATION about the Bioeconomics Conference, contact Bichlien Hoang, IEEE staff liaison to the Biotechnology Council, at +1 732 562 5549 or b.hoang@ieee.org.

Missed the Conference Tutorial? Don't Worry, Buy it Online

BY NANCY SALIM

Need to know the whys and wherefores of a breakthrough technology? Too busy to go to the conference tutorial where this was discussed? Not to worry—you can now get it online at the IEEE Expert Now Web site.

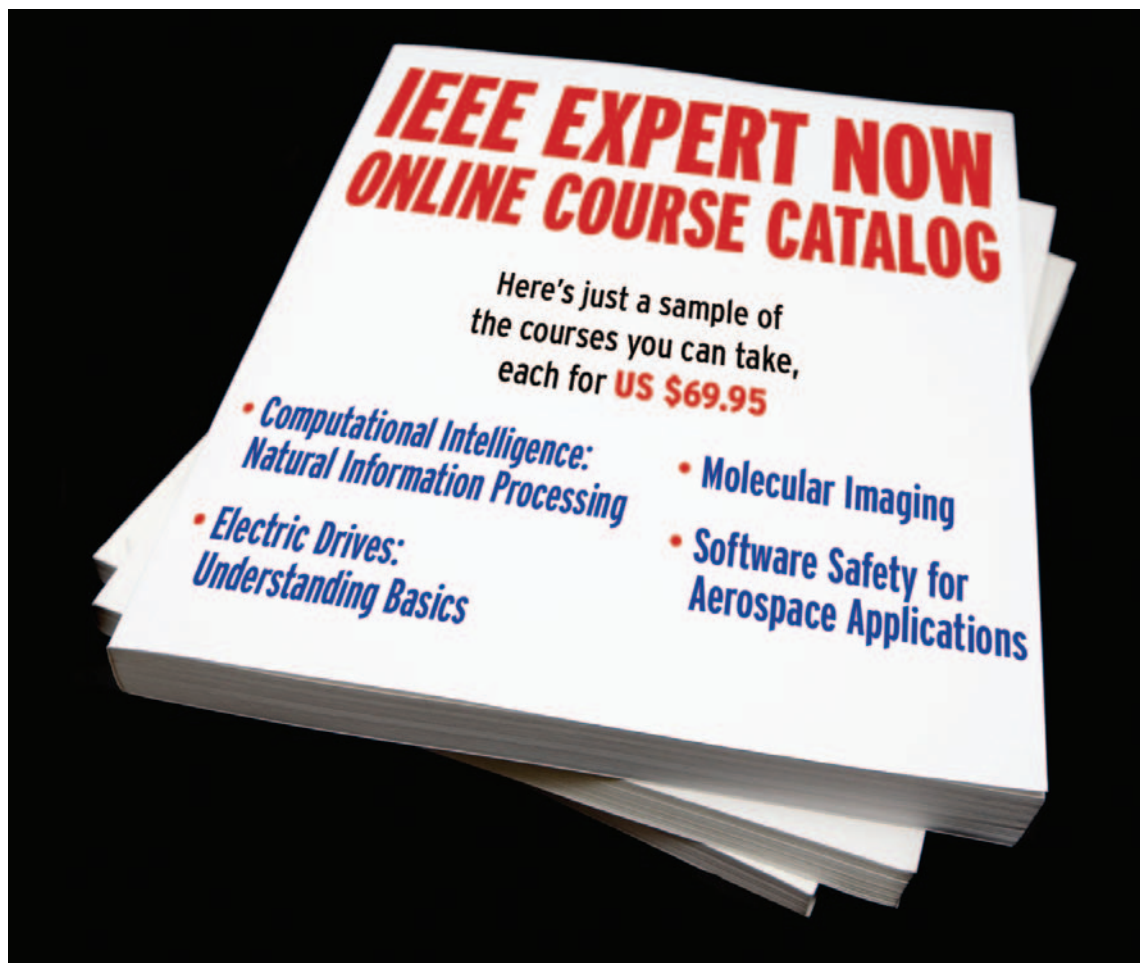
The site contains one- to two-hour training courses that cover more than 50 topics in fields including aerospace, lasers, optics, signal processing, and vehicular technology. Previously, IEEE Expert Now was available only through company subscriptions, so only members at those companies had access. But now individual IEEE members can purchase the tutorials.

James Tien, former vice president, IEEE Educational Activities, developed the Expert Now concept in 2003. His idea was to repurpose the tutorials and workshops presented at IEEE technical conferences to reach more people.

"It meets the needs of our members, our industry partners, and our profession in yet another step toward establishing the IEEE as the global resource of choice," Tien says.

ONLY THE BEST Fifteen IEEE societies are involved with the program, and they pick the best sessions with the most knowledgeable experts from the hundreds of conferences they sponsor each year. Then Thomson NETg, an online professional education company selected for the program, develops and produces the courses from the material presented at the sessions. It edits and formats them and can add custom graphics, animation, and homework assignments. All courses have glossaries of terms and references for more information, and students can provide the IEEE with feedback on the quality of each course.

Bill Van Der Vort, executive director of the IEEE Electron Devices Society, explains that his society got involved with Expert Now after its members expressed strong interest in technical tutorials. The society had been trying to launch its own tutorial program, and



saw working with Educational Activities on the Expert Now product as a great opportunity.

In 2004, IEEE Educational Activities asked EDS and three other societies—the Computer Society, the Communications Society, and the Solid-State Circuits Society—to participate in developing Expert Now. Once the initial four courses were complete, Educational Activities received funding to develop 25 more courses

to build a collection of online learning courses.

Throughout 2005, Educational Activities staff asked the rest of the IEEE societies to work with them on Expert Now. Fifteen societies took up the offer to convert their strongest conference tutorials into online courses. And this year, most of the same 15 societies funded the development of new courses. The societies' commitment to Expert Now does not come cheap—each course costs the society US \$20 000 to produce—but it will create a new revenue stream for IEEE societies.

All courses include a quiz at the end. Those who pass can earn 0.3 continuing education units, the credits needed to maintain professional licenses.

Each course sells for \$69.95, with 30 days of access. Courses not completed in that time must be purchased again. More courses are being developed. To access the Expert Now course catalog, visit http://www.ieee.org/web/education/Expert_Now_IEEE/modules.html.

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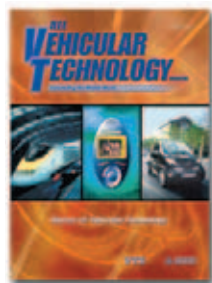
FOR MORE INFORMATION, contact Donald Miklas, IEEE Educational Activities, at +1 732 562 5488 or d.miklas@ieee.org.

The IEEE Vehicular Technology Society BY LINDSAY ELKINS

One of the smaller IEEE societies, with a little more than 4200 members, the IEEE Vehicular Technology Society was created in 1949 to cover all aspects of automotive electronics. Since its founding, the VTS has expanded its outlook to include road and land transportation as well.

In July, the society launched the quarterly *IEEE Vehicular Technology Magazine* (or *VT Magazine*), a bigger and better version of the quarterly *VTS News* that it replaced, according to Senior Member James Irvine, the editor in chief. The new publication, which focuses on tutorial and applications articles, has more impact. It has 64 pages, compared with its predecessor's 44, and five features per issue instead of three, plus full color throughout. Feedback from members about the content of *VTS News* was instrumental in deciding to launch the new magazine, says Life Fellow Dennis Bodson, the society's president.

FIELDS OF INTEREST For road vehicles, *VT Magazine* encompasses the electronics aspects of vehicular propulsion systems, as well as all manner of vehicular equipment and systems, including mobile radio services, GPS and other navigation systems, motors and engines, and automotive electronics. For railroads and mass transit systems, the concern is with traction power, signals, and communications and control systems.



PUBLICATIONS In addition to the new magazine, the society publishes the bimonthly *IEEE Transactions on Vehicular Technology*, a research-oriented publication that reports on technical advances in the field. Articles cover theoretical concepts and experimental systems, in

contrast to *VT Magazine's* tutorial and applications focus.

"An article [for *VT Magazine*] gives something new to members in its technical area of interest while still being of interest to members in other areas," Irvine explains. "*Transactions*, on the other hand, has a much narrower audience."

VT Magazine also covers standards, educational activities, and news about the society. The first issue had articles on smart antennas, the history of vehicular technologies, and the potential for high-definition radio to bring about innovative services for the automotive industry.

CONFERENCES The society maintains two large conferences: the semiannual IEEE Vehicular Technology Conferences. In 2007, they are scheduled for 23 to 25 April in Dublin and 1 to 3 October in Baltimore.

AWARDS The society sponsors many awards and fellowships, including:

- The Jack Neubauer Memorial Award, which honors the authors of the best systems paper published in *IEEE Transactions on Vehicular Technology*.
- The Avant Garde Award, which recognizes contributions that promote advances in vehicular communications and technology.
- The Stuart Meyer Memorial Award, which recognizes members who have served the society and have made outstanding contributions to the development of radio technology and science.

MEMBERSHIP The VTS is one of the few IEEE societies whose membership increased in the past year. Its membership grew by 5.1 percent from August 2005 to August 2006.

TO JOIN THE SOCIETY, go to <http://www.vtsociety.org>.

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it would support broadband wireless for laptop computers and other devices used in fast-moving vehicles such as cars and trains.

Originally, the IEEE 802.16 working group wanted its standard to support such mobile access as well. But some members didn't want to build the feature on top of a standard created for a fixed application—hence the emergence of IEEE 802.20.

Intel, Kyocera, Motorola, Qualcomm, and other giants with stakes in the market all had representatives on the new working group, which numbered roughly 175 people. Members of working groups are expected to vote as individuals and not represent their companies' interests. But charges flew from the very beginning that members' votes were driven by company loyalties. A disputed 2003 election of officers for the group led to allegations that consultants who had failed to disclose their affiliations with major industry players had participated.

In the third quarter of 2005, individuals affiliated with Intel and others feared that the group's decision to cut the technology submission phase from six months to one month would not allow them sufficient time to prepare their proposals. What's more, when they tried to get the group to consider their proposals they were repeatedly voted down. By last January, the working group had narrowed its deliberations to a joint proposal from Qualcomm and Kyocera that could become a competitor to IEEE 802.16e, in which several companies, including Intel, have a big stake. IEEE 802.16e, an amendment to 802.16, addresses mobility and calls for operation at just below 6 gigahertz, while 802.20 supports access at bands around 3.5 GHz.

Employees of Intel and Motorola on the working group filed appeals with the Standards Board, challenging the group's procedures. Qualcomm officials in turn accused Intel of using procedural maneuvers to delay the adoption of the standard.

CEASE AND DESIST In June, the Standards Board stepped in and suspended all activities of the group until it could conclude its investigation, citing "irregularities," as evidenced by the multiple appeals. In September, after hearing from about 20 individuals, the Standards Board concluded that additional steps had to be taken. Standards Board Chair Steve Mills, an IEEE member, noted, "We believe there was the possibility of [company] dominance in multiple forms, and the working group was

in a state where it was difficult to make progress because of the interactions of the various players."

The Standards Board took drastic action to get 802.20 moving toward a consensus: it removed the working group's top four officers in an effort to "provide clearly neutral leadership and to eliminate perceptions of possible bias." In October, the board named Life Member Arnold Greenspan as the

take their positions to make sure that no single organization dominates the standards-development process.

"The board doesn't have a problem with several people from one company on a working group," Mills explains. "It only becomes a problem if someone is being hurt as a result of that involvement. We aren't saying companies can't have multiple people involved; what we're saying is that they can't do it for the pur-

document then moves to the sponsor ballot phase.

IEEE 802.20 has already gone through the first round of working group balloting. Now it's up to the working group, under the guidance of its new officers, to decide where in the process to resume its work.

How long the release of the IEEE 802.20 standard could be set back is uncertain. The standard had been on track to be completed by the third quarter of 2007. Now the completion date depends on whether the working group decides to continue with the current version of the document or go back to an earlier stage.

Mills notes that it wasn't clear that the process was indeed set back. "We were going to have to consider the allegations of dominance and irregularities at some point, because they were an indicator of a lack of consensus," he says.

"If we had waited until the end of the process as it had been proceeding, we might have had to start over from the beginning, and we would have been doing that at a later date," he continues. "One of the reasons for acting now was to try to avoid that kind of delay at the end of the process."

WHAT WENT WRONG? Economic pressures impacted the working group right from the start, according to Mills.

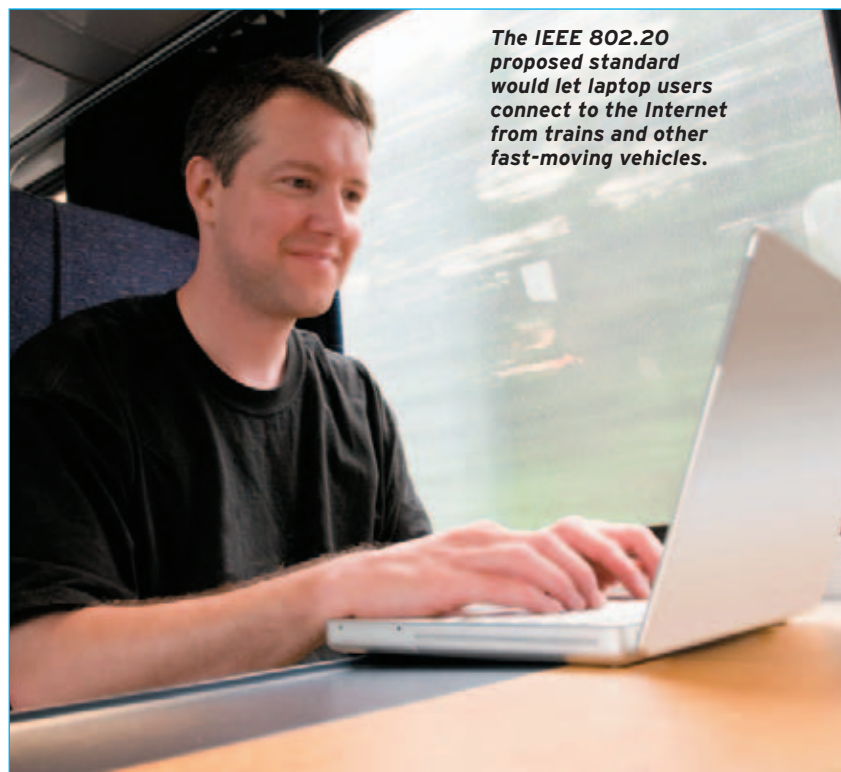
"It appears that problems emerged because there was enough interest in the potential economic value of such a standard," he says.

Mills sees three factors at play when it comes to standards development: technology, economics, and politics. Each factor can underscore the others, and when they collide as happened with IEEE 802.20, problems crop up. The Standards Board wants to mitigate those problems.

"In light of the growing economic and political stresses in today's global standards-development environment," Mills says, "we are taking additional steps to help ensure the standards process remains fair and open while recognizing the desire of companies to be involved."

Those steps, which affect all the working groups, include tightening up procedures to make it clearer what is expected of the working group, identifying the working group members' affiliations, and ensuring that no single organization dominates the process.

"The IEEE 802 brand has real commercial value," Mills concludes, "and we want to protect the integrity of that brand." ●



The IEEE is taking additional steps to help ensure the standards process remains **FAIR AND OPEN**

group's new chair. At the time this issue went to press, the group's activities were set to resume on 12 November and the Standards Board was seeking candidates for the remaining officer positions.

FAIR DISCLOSURE The board also tightened the requirement that members of the working group disclose their affiliations with any company that employs, pays for, or sponsors their participation in the group. In the past, members were not required to state such ties so explicitly.

The IEEE 802 Executive Committee, a body that oversees the various IEEE 802 working groups, will work with the new chair and officers when they

pose of dominating the work." Members of a working group each have a single vote, regardless of their affiliation.

In addition, the working group's ballot body was dissolved and will be reconstituted by the group's new leadership. The ballot body is responsible for voting on each draft of the standard before it goes to the final approval stage, the sponsor ballot. Each vote determines how close its members are to a consensus. If voting members disagree with the document, their concerns have to be resolved and the document revised. Members keep voting and revising the document until the draft receives the required number of "yes" votes. The

Searching Made Easier

BY MIKE RIEZENMAN

Users of IEEE Xplore—the online digital library—may have noticed a seeming paradox. Finding articles on esoteric subjects is relatively easy. The reason is simple: the more obscure the subject, the fewer articles have been written about it. The search engine returns a fairly small number of results, which you can easily scan for the ones you want.

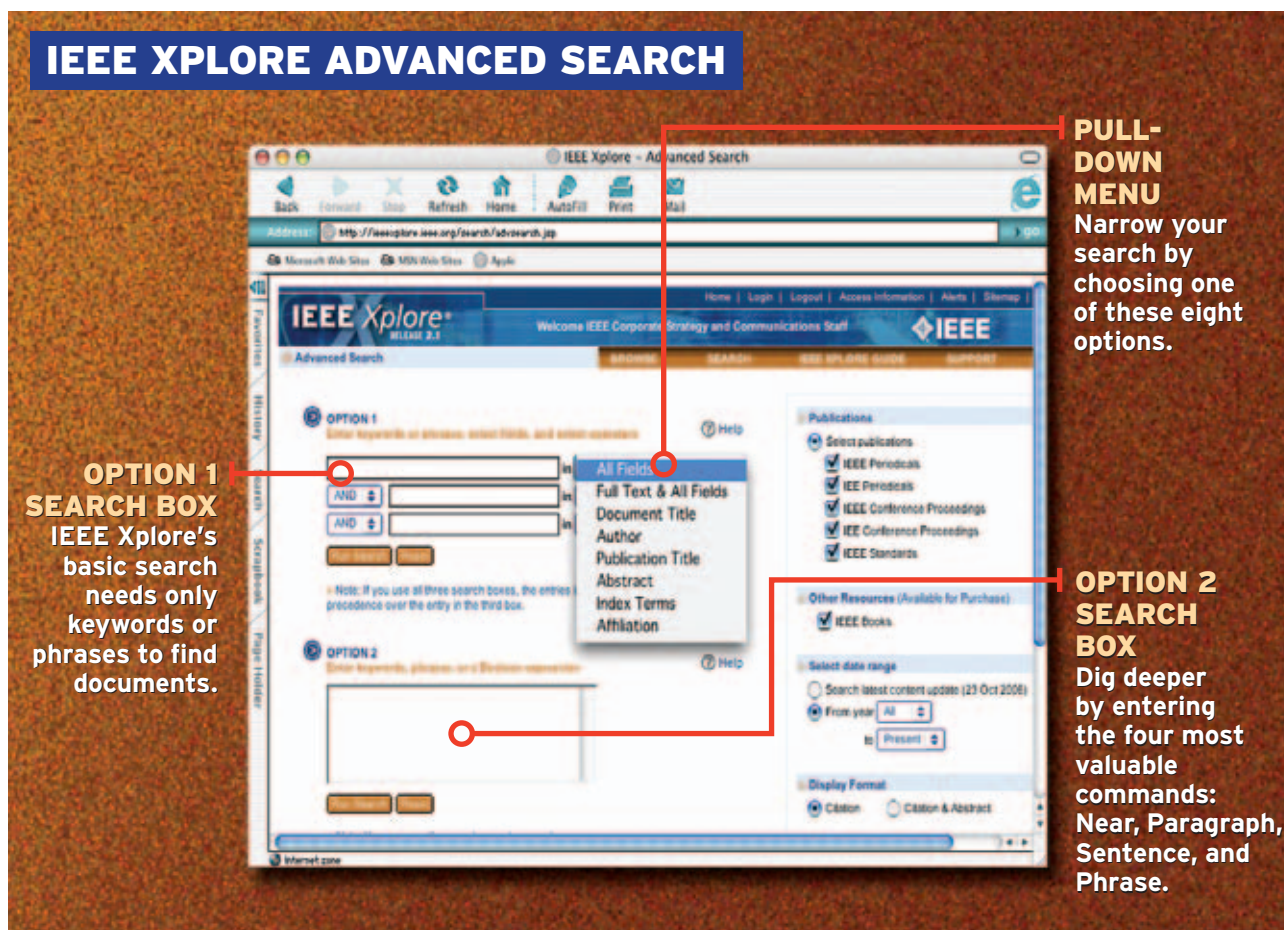
But if the subject is of more general interest, or if you're new to it and don't quite know what you're looking for, then the search may be more difficult. To aid with these more difficult searches, IEEE Xplore has a number of features to make searches both easier and more precise.

UNLIKE GOOGLE Probably the most important thing to remember is that the IEEE Xplore search engine differs from Google's and many others—by automatically treating a string of words as a phrase, not as a set of individual terms. Google, by contrast, generally requires that a text string be enclosed within quotation marks to be treated as a phrase. So if you want to search for information in IEEE Xplore on, say, adaptive filters, you simply type “adaptive filters” into the search box—no quotation marks needed, thank you. But if you want to find an article that mentions both power and frequency, you must type “power<and>frequency.”

IEEE Xplore also will search for variants on input words, unless you tell it not to. For example, if you type in the word filter, IEEE Xplore will return results that include filter, filtered, filtering, and filters. To limit the results strictly to filter, you must put the word in quotation marks.

With those basics understood, let's look at IEEE Xplore's four so-called proximity commands, which, according to Rachel Berrington, manager of IEEE Client Services, are among the more valuable, yet underused, features. The four commands—Near, Paragraph, Sentence, and Phrase—must be typed in the Option 2 box on the advanced search page [see screen shot].

The Near command takes the form `x<near/#>y`, where `x` and `y` are expressions (or single words) and `#` is an integer. The command calls for all instances in which expression `x` occurs within `#`



words of expression `y`. For example, typing “silicon <near/3>oxide” will find “silicon” within three words of “oxide” and return expressions such as “silicon and its oxides.”

Using the Paragraph command, `x<paragraph>y`, you can find all cases in which `x` and `y` occur within the same paragraph. The <sentence> command works the same way, but for sentences.

The Phrase command, `x<phrase>y`, is useful for two-word expressions when you are not sure of the word order. Thus “optic<phrase>fib??” will find such occurrences as “fiber optic,” “fibre optic,” and “optical fiber.” The use of <?>, known as a wild card, allows the single search to recognize both “fiber” and “fibre.”

GOING FURTHER The Affiliation command searches for articles based on the affiliation of the author or authors. This feature is especially valuable for users such as grad students contemplating an internship who want to know the names

of the researchers at an organization and the research being performed there. That information can be most easily found by using the Option 1 box, where Affiliation is one of the choices in the pull-down menu [see screen shot, again].

Of course, typing, say, “Intel,” into the search box and choosing Affiliation from the pull-down menu is going to lead to hundreds of matches; it's going to list every article with at least one author who works at Intel Corp. That may be valuable for someone who has the time to page through all the titles, or even the abstracts, of papers from that company. A person who wants to know what Intel is doing in the area of gallium arsenide research, say, should type “gallium arsenide” in the second line of Option 1 and leave the corresponding pull-down menu set to All Fields (of the IEEE Xplore record).

Finally, a little-known feature of IEEE Xplore is the command Accepted for Future Publication. This command, entered by itself in Option 1 or 2, returns a list of all articles that are

available online but have not yet been published in print journals. It serves as an ideal tool for keeping abreast of the latest developments in any field. Most users, of course, will not be interested in all prepublication articles, so the command is most effectively applied in combination with a subject or two. Typing, for instance, “accepted for future publication<and>active filter” in the search box, will return a list of the latest articles on active filters.

The result of any search will be a list of titles and authors. But you also get a hyperlink to a service called Abstract-Plus, which provides an abstract of the article, the authors' affiliations, and a variety of information (publication name, date, ISSN, and so on). Abstract-Plus also includes a section called Index Terms, which uses a controlled vocabulary for all the subject areas covered in the article.

FOR MORE INFORMATION about IEEE Xplore, visit <http://ieeexplore.ieee.org>.

Talk Time for Portables People

BY IVAN BERGER

No matter how many portable information and communications devices an IEEE member might carry (how many chargers are in your ac outlets?), there's still a need to meet face-to-face. For those who design, make, and use portable devices and their related infrastructures, that time will come in March at the Portable 2007 Conference in Orlando, Fla.

Conferences abound for the various specialties involved in the design of portables. But for portable information devices (PIDs) to be effective, easy to operate, mechanically reliable, and environmentally durable, a lot more is required than just circuit and device design. Also essential are packaging, ergonomics, mechanical and reliability engineering, materials science, a vast variety of software, and various infrastructures to receive, handle, and deliver the information.

Designs that have worked in larger devices may not work in PIDs without at least some degree of rethinking. To begin with, the ergonomic requirements differ—for example, speech interfaces gain importance as keyboard space shrinks—and security is more of an issue in devices that may be more easily lost or stolen.

Portables are also far more likely than desktop devices to be dropped, rained on, or exposed to temperature extremes. Even a user's pocket can be a harsh environment, subjecting its contents to motion, shock, the salty steam of perspiration, and scratches from such common items as house keys. PIDs' connectors must be smaller than those of desktops, yet they also have to tolerate frequent connection and disconnection.

Efficiency becomes more of an issue when battery power is involved and fewer cooling options are available. Antenna performance tends to be more limited at all but the highest frequencies. Also, portables may be used in environments rife with electromagnetic interference and in places where the devices themselves generate EMI—which can cause problems.

Portables are now also called upon to handle many more complex functions

than before. A cellphone is no longer just a phone. It can be a camera, a PDA, an e-mail reader, a video display, and a navigation system all rolled into one. Yet PIDs—and their control surfaces—keep shrinking.

Solving all the problems calls for such a variety of skills that the broad range of people who design and make PIDs rarely get to meet, mingle, swap ideas, and learn of the constraints each discipline imposes on the others. Hence the need for Portable 2007, the short name for the first International Conference on Portable Information Devices.

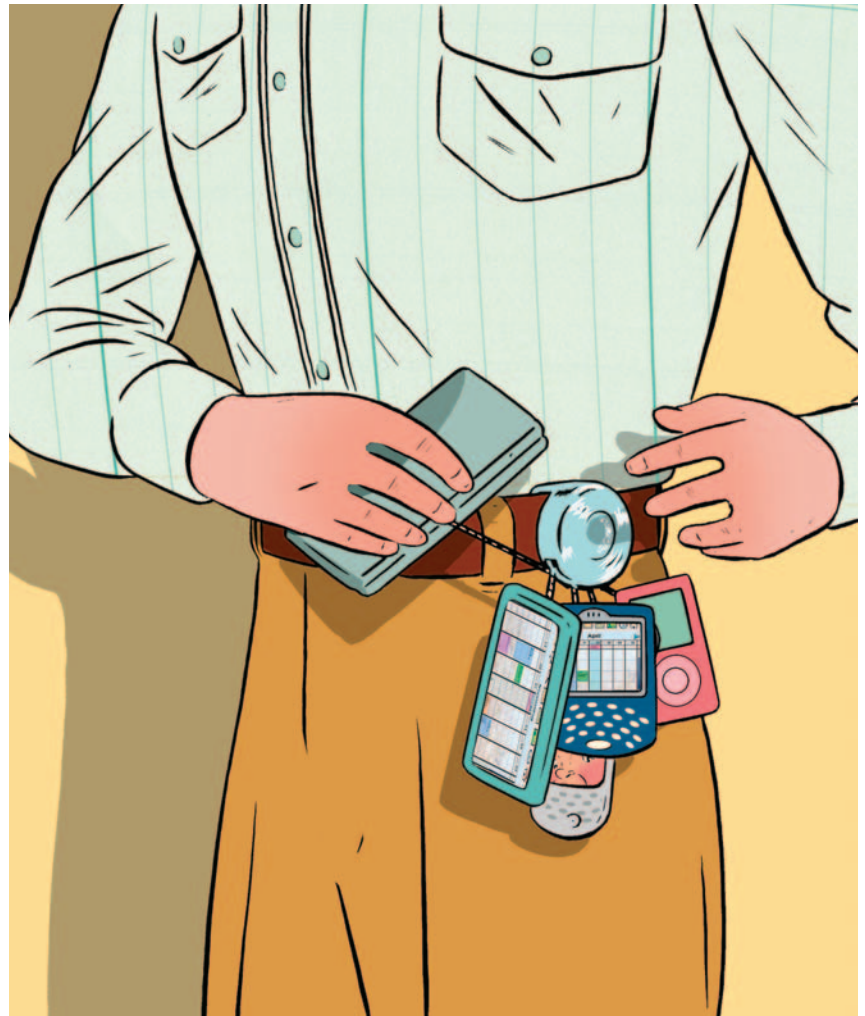
MULTIPLE SPONSORS The number of IEEE societies sponsoring Portable 2007 illustrates the conference's interdisciplinary nature. The societies include the Components, Packaging, and Manufacturing Technology Society; the Broadcast Technology Society; the Communications Society; and the Electron Devices Society. Additional technical support is supplied by the Engineering in Medicine and Biology Society, the Vehicular Technology Society, and the University of California at Santa Cruz (UCSC).

Heading the list of sponsors is the New Technology Directions Committee of the IEEE Technical Activities Board. The NTDC is devoted to facilitating advances in new and evolving technologies not currently addressed by any single IEEE society or council, points out IEEE Fellow Ephraim Suhir of UCSC, who is general co-chair of Portable 2007 and a member-at-large of the NTDC.

"Until now," Suhir says, "there has been no single forum for portables, no single place where specialists in different areas could interact. There is tremendous interest, and there are tremendous possibilities in the field, but information is fragmented among various groups, conferences, and publications."

It was the need to pull together such fragmentation in a number of new fields that led to the NTDC's formation in 2003 and the organization of Portable 2007.

"We aimed the conference first of all at tech—but also at business-oriented—



Portables handle many more complex functions than ever before. A cellphone can now be a camera, a PDA, a video display, and a navigation system all rolled into one

people who are involved or interested in the state of the art and the future of portable devices," Suhir says.

CONFERENCE TRIO Portable 2007, which runs from 25 to 27 March, will not take place on its own. Because PIDs are rarely hard-wired into network connections, getting information to and from them commonly requires wireless communications. Therefore, Portable 2007 will run together with two IEEE wireless conferences, also in Orlando.

The Mobile WiMax Symposium is scheduled to run 27 and 28 March and is being sponsored by the IEEE Communications Society. And the IEEE International Symposium on Broadband Multimedia Systems and Broadcasting 2007, sponsored by the IEEE Broadcast Technology Society, is slated for 28 and 29 March. The three events will run in conjunction with the CTIA Wireless conference and will be promoted together

as IEEE @ CTIA Wireless. CTIA is an association for the wireless telecommunications industry.

Portable 2007 includes eight half-day tutorials, plus technical sessions and panel discussions. Major topics to be covered are the emerging and disruptive technologies for future PIDs; the future roles of PIDs in medicine and biology; nanotechnologies and PIDs; viral communications; wearable computers; and digital TV. Other topics being considered as program material are wireless technologies, manufacturing issues, signal processing systems (including voice and image recognition), homeland security matters, economics and business problems, and the social impact of current and future PIDs.

To learn more about the International Conference on Portable Information Devices, visit <http://www.ieee-portable.org/2007>. For more information on IEEE @ CTIA Wireless, visit <http://www.comsoc.org/conf/ieee>.

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For outstanding contributions to material and device science and technology, including practical application.

Sponsors: the Federation of Electric Power Companies, Japan, and the Semiconductor Research Foundation

IEEE ROBERT N. NOYCE MEDAL

For exceptional contributions to the microelectronics industry.

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For exceptional achievement in systems engineering and systems science.

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MEMBER RECOGNITION

Marconi Award Goes to DSL Pioneer

BY NANCY SALIM

IEEE FELLOW JOHN M. CIOFFI, whose groundbreaking research helped create digital subscriber line (DSL) technology, has been named the 2006 Marconi Fellow and awarded the US \$100 000 Marconi Prize. The award recognizes scientific contributions in communications science and the Internet. It is given annually by the Marconi Society, a group at Columbia University in New York City that promotes awareness of major innovations in telecommunications with an emphasis on understanding how they change and enhance society.

Cioffi says he had no idea he was being considered for the award, and he feels honored.

“We’re not always successful with everything we try, but when it is successful, it’s a tremendous reward, and it’s not the financial part,” he told *The Institute*. “No engineer could ask for a better reward than to see his technology being used by a large number of people.”

Cioffi, whose work brought broadband Internet access to millions, is sometimes referred to as the father of DSL in the telecommunications industry. He earned a bachelor’s degree in electrical engineering in 1978 from the University of Illinois at Urbana-Champaign and master’s and doctoral degrees in electrical engineering in 1979 and 1984, respectively, from Stanford University in California.

He joined Bell Laboratories, in Holmdel, N.J., in 1978 as a modem designer—work that gave Cioffi his first taste of sending digital signals over analog telephone connections. He also worked on developing modems for transmitting digital signals over the twisted-pair portion of a phone connection—which is the essence of DSL technology. Cioffi’s interest in DSL began in 1979, and he explored the field at Stanford and then at Amati Communications Corp., a San Jose company that specialized in digital modem technology.



John M. Cioffi

With the breakup of the Bell system, Cioffi left Bell Labs in 1984 to work at IBM in San Jose, as a read-channel researcher on magnetic hard-disk drives. In 1986, Stanford hired him as an assistant professor of electrical engineering, and he has been a faculty member there ever

since. Today, Cioffi is the Hitachi America Professor of Engineering at Stanford. He co-founded Amati Communications in 1991 and was the company’s director when Texas Instruments, in Dallas, purchased it in 1997.

DON’T GIVE UP Cioffi maintains that to be successful, you must stick to your convictions. “There’s a certain level of confidence required—you don’t want to give up unless you’re truly convinced you’re wrong,” he says. “All the Marconi fellows must have had that kind of perseverance. They’ve made fantastic contributions because they were willing to stick with their ideas despite criticism.”

Cioffi and his Stanford team are now exploring dynamic spectrum management, a recent improvement on DSL that eliminates service interruptions due to crosstalk and common household, or impulse, noises. ●

IN MEMORIAM

Leo Young, Past President And Microwave Pioneer

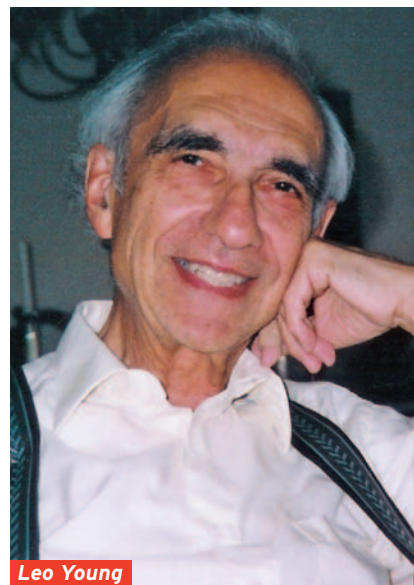
BY CLIFFORD LAU

ON 14 SEPTEMBER 2006, the IEEE lost a past president and a microwave-technology pioneer when Leo Young, 80, died.

Young was the 1980 IEEE president and also an IEEE Fellow. He was an expert on microwave technology and held 20 patents; published numerous scholarly papers; and was the author, co-author, or editor of 14 books, including *Microwave Filters, Impedance-Matching Networks, and Coupling Structures* (Artech House Publishers, 1964). Considered “the bible” by those in the field, the reference book has been translated into Russian and Japanese, and it still sells well decades after its initial publication.

Young was born in Austria to a prominent Jewish family—his father was a physician—and moved to England in 1938 to escape the Nazis. After graduating from Cambridge University there in 1949, he moved to the United States.

As an engineer at Westinghouse from 1953 to 1960, Young worked on military radar research and development, including microwave components and antennas. From 1960 to 1973, he was a fellow at Stanford Research



Leo Young

Institute, in Menlo Park, Calif., where he worked on microwave filter design. He also taught at Stanford University and consulted for industry. He taught at the Technion—Israel Institute of Technology, in Haifa—during a sabbatical in 1970 and 1971. He then joined the U.S. Naval Research Laboratory, where he was associate superintendent of the electronics division for 10 years.

He joined the U.S. Office of the Secretary of Defense in 1981 as director of research. His principal assignment was to oversee basic research, but he also played a key role in implementing a number of programs, including the Multidisciplinary University Research Initiative and the Small Business Innovation Research Program. He retired in 1994 but continued working as a consultant for several years. In retirement, he wrote his memoirs and enjoyed studying Hebrew. He also served on the board of Filtronic, a microwave-component manufacturer in Salisbury, Md. ●

IEEE Fellow Clifford Lau, a researcher with the Institute for Defense Analyses, worked with Young at the U.S. Department of Defense. This obituary was adapted from one that appeared in The Washington Post [18 September 2006].

LEO YOUNG 80

DIED 14 September 2006

EDUCATION Bachelor’s degrees in math and physics in 1946, and a master’s degree in physics in 1949, all from Cambridge University. Doctoral degree in electrical engineering in 1957, from Johns Hopkins University, in Baltimore

FIELD OF INTEREST Microwave technology, including filters, antennas, and other components

VOLUNTEER ACTIVITIES

Founding member, the National Academies’ Government-University-Industry Research Roundtable; fellow, American Association for the Advancement of Science; board of governors, American Association of Engineering Societies; president, IEEE Microwave Theory and Techniques Society, 1969; president, IEEE, 1980

AWARDS IEEE Fellow, 1968; U.S. Naval Research Laboratory Outstanding Performance Award, 1977; IEEE Centennial Award, 1984; IEEE Microwave Career Award, 1988; Robert S. Walleigh Distinguished Contributions to Engineering Professionalism Award, 1993; Woodrow Wilson Award for Distinguished Government Service, 2001; National Academy of Engineering Arthur M. Bueche Award, 2005

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