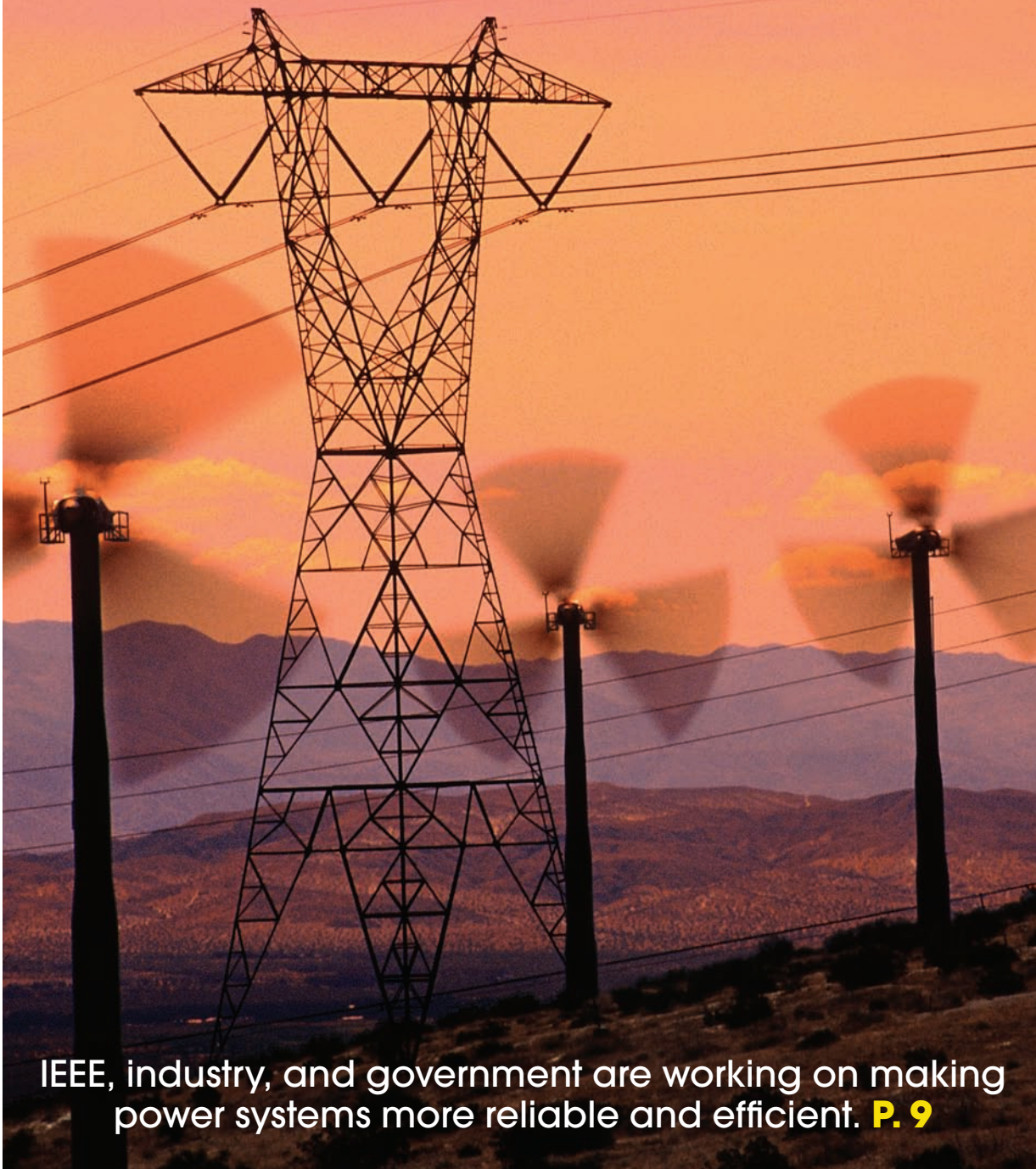


the institute

PERFECTING THE POWER GRID



IEEE, industry, and government are working on making power systems more reliable and efficient. **P. 9**

INSIDE

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place of Ideas / 13 President's Column
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Corner / 23 Recognitions / 23 In Memoriam

ELECTION



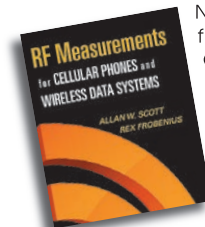
Moshe Kam (left) and Pedro Ray had a lot to say at Candidates Night about IEEE's future and the issues that matter to members. **P. 6**

PUBLIC VISIBILITY

IEEE is working to raise its visibility around the world and improve the engineering profession's image. **P. 8**



BOOKS OF INTEREST



New releases from Wiley-IEEE Computer Society Press and Wiley-IEEE Press, plus an interview with two authors. **P. 18**

PART-TIME PASSIONS

A German student member invents BMX tricks. In Italy, a senior member is often on her toes. **P. 21**



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HISTORY NETWORK

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For complete details and eligibility requirements, visit iee125.org/ChangetheWorld

Prizes:

| | |
|--|-------------------|
| IEEE Student Humanitarian Supreme: | US\$10,000 |
| IEEE Distinguished Student Humanitarian: | US\$5,000 |
| IEEE Exceptional Student Humanitarian: | US\$2,500 |
| IEEE Outstanding Student Humanitarian: | US\$1,000 |
| (up to five awarded) | |
| People's Choice (online vote): | US\$500 |



Celebrating 125 Years
of Engineering the Future

IEEE AROUND THE WORLD

REGION 3: Southeastern United States and Jamaica

- Palm Bay Community Charter School, in Florida, receives US \$4000 from the IEEE Foundation to help establish the Technology Student Association, a program designed to teach students ages 5 to 14 about engineering and related fields.

REGION 4: Central United States

- Milwaukee (Wis.) Section and Red River Valley (N.D.) Section form GOLD affinity groups.
- IEEE Southeastern Michigan Section forms WIE affinity group.

Region 6: Western United States

- The 1959 invention of the semiconductor planar process, by Jean A. Hoerni, and of the integrated circuit, by Robert N. Noyce—both of which took place at Fairchild Semiconductor Corp., in San Jose, Calif.—are named IEEE Milestones.

Region 7: Canada

- The first external cardiac pacemaker, invented by electrical engineer John Hopps in Toronto in 1950, is named an IEEE Milestone.

REGION 1: Northeastern United States

- Springfield (Mass.) Section forms Graduates of the Last Decade (GOLD)/Women in Engineering (WIE) joint affinity group.
- Ithaca, Long Island, and Mohawk Valley sections, all in New York, form GOLD affinity groups.

REGION 2: Eastern United States

- The Smithsonian Institution's National Museum of American History, in Washington, D.C., receives a \$47 440 grant from the IEEE Foundation for new cabinets to store the museum's artifacts, displayed on open shelves for almost 50 years.

REGION 8: Europe, Middle East, and Africa

- Bilkent University in Ankara, Turkey, receives \$7245 from the IEEE Foundation for its Towards University program. The initiative sponsors visits by university representatives to high schools in Turkey to talk to students about engineering and pays the travel costs of 50 high school students to tour the university and participate in conferences, labs, and workshops.
- IEEE Turkey Section receives an IEEE Foundation grant of \$29 464 to fund its Technologies Connect to Life Contest for university students whose projects best demonstrate how science and technology improve the lives of people with disabilities.
- IEEE forms Tunisia Section.
- University of Ibadan, Nigeria, forms WIE student branch affinity group.
- Student branches formed at Helwan University, Cairo; Hamburg-Harburg Technical University, Hamburg, Germany; Federal University of Technology, Akure, Nigeria; and Ras Al-Khaimah Women's College, United Arab Emirates.

REGION 9: Latin America

- The IEEE Morelos Section, in Mexico, receives a \$30 000 grant from the IEEE Foundation for its Robotics Workshop at School, a project in which teachers help students from Mexico's secondary schools build robots.
- Federal University of Rio Grande do Sul, Colombia; the Technical Institute of Nuevo León, Mexico; and Rafael Urdaneta University, Maracaibo, Venezuela, form student branches.

REGION 10: Asia and the Pacific

- Student branches formed at Macau University of Science and Technology, China; Bhajarang Engineering College, Tamil Nadu, India; and Tokushima University, Japan.
- WIE student branch affinity groups formed in India at National Institute of Technology, Calicut, and Netaji Subhas Institute of Technology, New Delhi.
- IEEE North Queensland Section changes name to IEEE Northern Australia Section.

LEGEND

- REGIONS 1–6
- REGION 7
- REGION 8
- REGION 9
- REGION 10

Send your region or section news to institute@ieee.org.

Time Running Out to Vote

You've got until 1 October—a month earlier than usual—to return your annual election ballot, which was sent out in August.

In addition to the two candidates for 2009 IEEE President-Elect, 33 others are running in 15 election categories in IEEE

divisions and regions, as well as in the IEEE Standards Association, IEEE Technical Activities, and IEEE-USA.

Those on the ballot represent a diverse group of people dedicated to serving the IEEE membership and, perhaps of equal importance, can afford to devote the time to their prospective responsibilities.

Members who paid their dues in full as of 30 June

at member grade or higher are eligible to vote. Graduate student members of IEEE also may vote.

Marked ballots must be received by the election vendor in Eden Prairie, Minn., by noon U.S. Central Time (17:00 Greenwich Mean Time) on 1 October. Members can also access the ballot and related materials electronically. To learn more, visit the election site at <http://www.ieee.org/elections>.

Dues to Rise \$3

Basic IEEE membership dues for 2009 will be US \$129, a \$3 increase over this year's dues. This will be the first time since 2003 that an increase is less than the rate of inflation in the United States.

Dues remain the same for student and graduate student members.

For U.S. members, the additional combined assessment for IEEE-USA and ABET, the accrediting body in the United States for academic programs in applied science, computing, engineering, and

technology, will be \$40, an increase of \$1. Of that, \$37 goes to IEEE-USA and \$3 to ABET.

The assessment for Region 8 will increase \$2, to \$13.

The fee for society affiliates, which is set at half the basic IEEE dues rounded to the next dollar, will increase to \$65. Affiliates, who may belong to one or more IEEE societies but are not IEEE members, pay the affiliation fee for each society they join plus the membership dues charged by that society.



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AG-6132

36986 (06/08)
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NEWS

IEEE to Mark 125th Anniversary

Preparations are under way for next year's celebration of IEEE's 125th anniversary. Throughout 2009, IEEE, which traces its origins to the founding of the American Institute of Electrical Engineers in 1884, will host activities around the world to celebrate the organization's successes, to leverage its prestige, and to help increase its visibility and that of its members and the profession.

"The anniversary theme, Celebrating 125 Years of Engineering the Future, acknowledges our pride in the past with a look forward to an even greater future," says IEEE President-Elect John Vig, chair of the 125th anniversary committee. The theme will be displayed prominently all year by a special anniversary graphic.

Members can learn about anniversary activities by visiting <http://www.ieee125.org>. The site enables members and IEEE groups to view and upload congratulatory messages, videos, and photos; add to the calendar of anniversary events; and find tools to help them organize their own celebrations.

In particular, student members are invited to take part in the Presidents' Change the World competition, which encourages students to develop projects that benefit humanity (see "Competition Challenges Students to Change the World").

Competition Challenges Students To Change the World

IEEE student members are invited to participate in the IEEE Presidents' Change the World competition, being held in conjunction with the 125th anniversary celebrations. The competition will reward students individually or in teams who apply engineering, science, computing, and leadership skills to solve real-world problems. This could include, for example, the design and implementation of projects to improve the lives of the poor, the sick, or those with disabilities, or that could lead to a more sustainable world.



OTHER ACTIVITIES INCLUDE:

- A series of IEEE-sponsored Engineering the Future celebrations to be held in major cities including Beijing, Boston, and Munich.
- A forum for journalists on new and emerging technologies and trends.
- A celebration to be held in August in Philadelphia in conjunction with the IEEE History Center's biennial history conference.
- Dedication of numerous IEEE Milestones, including a ceremony recognizing the development of the compact disc audio player to be held in March in Eindhoven, Netherlands.
- A lighthearted contest on YouTube featuring videos that illustrate how people have used technology to improve their living spaces.

Plans for the anniversary should pick up steam at the Sections Congress being held from 19 to 22 September in Quebec City. There, section leaders will be encouraged to register their interest in organizing local celebrations to garner attention for IEEE and its members.

"The competition is designed to recognize the passion IEEE student members have for helping humanity," says John Vig, IEEE President-Elect. "It's an opportunity for students everywhere to communicate their ideas, apply their creativity, and demonstrate their ability to make a difference in the world. Surprises are welcome."

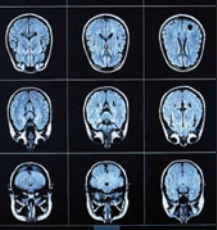

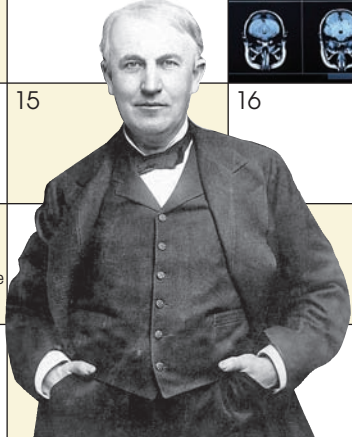


Submissions will be accepted between 1 September 2008 and 28 February 2009. Entry forms can be found on the competition Web site at <http://www.ieee125.org/ChangeTheWorld>.




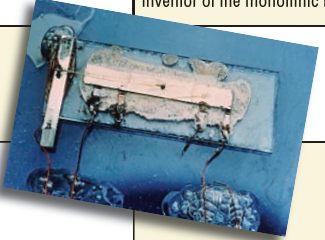
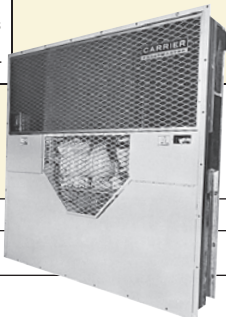
The top three prizes are US \$10 000, \$5000, and \$2500, with other awards of \$1000 and \$500. Winners will be notified by 10 May 2009.

www.ieee.org/theinstitute

CALENDAR

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
|--|---|--|---|--|--|--|
| <h1>September</h1> | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 1901: Birth date of Ernst Weber , IEEE's first president after the merger of AIEE and IRE in 1963. |
| 7  | | 9 | 10 1960: Color television transmission begins in Japan. |  | 12 | 13 |
| 14 | 15 | 16 | 17 | | 19 19-22 September IEEE Sections Congress in Quebec City. | 20  |
| 21 | 22 ▲ 1791: Birth date of Michael Faraday , chemist, physicist, and discoverer of electromagnetic induction. | 23 | 24 1960: The USS <i>Enterprise</i> , the first nuclear-powered aircraft carrier , is launched, traveling more than 333 000 kilometers before refueling. | 25 | 26 | |
| 28 |  | 30 1882: The Vulcan Street Plant in Appleton, Wis., one of the earliest hydroelectric central power stations and an IEEE Milestone, begins operation. | | | | |

| | | | | | | |
|------------------|---|--|---|--|---|---|
| <h1>October</h1> | | | | | | |
| | | | 1 1971: Sir Godfrey Hounsfield produces the first computer-aided tomography image of a patient. |  | 3 | 4  1957: The Soviet Union launches <i>Sputnik 1</i> , the first artificial Earth satellite. |
| 5 | 6 1987: Microsoft releases Excel , its first Windows application. | 7 | 8 |  | 10 | |
| 12 | 13 1928: Telephone service inaugurated between the United States and Spain. | 14 | 15 | | 17 1919: Radio Corporation of America formed. | 18 |
| 19 |  | 21 1931: At 9:59 p.m. Eastern Time, most of the United States turns off its lights for one minute to honor Thomas A. Edison , who died three days earlier. ▶ | | | 24  | |
| 26 | | 28 1955: Birth date of Bill Gates , personal computer software pioneer and co-founder of Microsoft. | | | 31 | |

| | | | | | | |
|---|---|---|---|---|--|--|
| <h1>November</h1> | | | | | | |
| | | | | | | 1 |
| 2 |  | 3 | 4 |  | 6 | 8 1923: Birth date of IEEE Member Jack St. Clair Kilby , Nobel Prize winner and inventor of the monolithic IC. |
| | | 10  | 11-16 November: IEEE Board Series in New Brunswick, N.J. | | 13 | 14  |
| | | 17 | 18 ▲ 1928: Walt Disney's <i>Steamboat Willie</i> , first sound-synchronized animated film , premieres in New York City. | 19 ▲ 1954: First automatic toll-collection machine goes into service on the Garden State Parkway in New Jersey. | 20  | 21 |
| 23 ▲ 1977: European Space Agency launches its first weather satellite , Meteosat-1. | 30 | 25 | 26 1876: Birth date of Willis Haviland Carrier , inventor of air conditioning. ▶ | | | 28 |
| | | | | | | 29 |

Historical events provided by the IEEE History Center

*IEEE events indicated in RED

Kam And Ray Have Their Say

The candidates tackle the issues

BY ANNA BOGDANOWICZ

Our last issue introduced you to the two candidates for 2009 IEEE President-Elect by filling you in on some of their personal interests and background [June, p. 6]. Now it's time to get down to business and learn where Moshe Kam and Pedro Ray stand on the issues of importance to you and IEEE.

At the 20th annual Candidates Night on 24 June, Kam and Ray weighed in on such topics as their top priorities for the organization, alternate models for membership, public access to technical literature, and the future of IEEE Press. The IEEE Philadelphia Section hosted the event at The Inn at Penn, in Philadelphia.

Here's what the candidates had to say in answer to questions posed to them by members in Philadelphia and via e-mail.

If you were IEEE President in 2010, what would be the top two priorities on your to-do list?

KAM My first priority would be to develop effective services for practicing engineers. Practicing engineers make up 60 to 70 percent of our membership, but we are not serving them that well. We've been facing this problem for quite a few years, and it's time to solve it. We can do this by creating collections of practice-oriented papers and application notes from our archives, and by producing continuing edu-

cation programs aimed at practicing engineers.

Next, I would expand IEEE's technical scope. We cannot continue to rely on our traditional technical areas. We should get aggressively involved with new areas that intersect our traditional fields. For example, very interesting work is being done at the intersection of electrical engineering, computer engineering, computer science, and the life sciences. This is work that IEEE must not only become part of but lead.

RAY The first would be membership—coming up with a three-tiered model under which people can join IEEE. I would base it on different prices for different packages of IEEE products and services. The idea is for members to get more for their money than they're getting now.

My second priority would be to work on the long-term financial health of the institute by developing another smash-hit product to go with IEL [the IEEE/IET Electronic Library]. IEEE is relying too heavily on this one product for its revenue.

Do you think IEEE should change to a different membership model?

RAY Of course. The one we have now has served us well, but I know our members are asking for a new

one. We raise our membership dues every year to keep up with inflation, and members need to get something back for that money. The way to give back is to offer three tiers of membership, including, for example, packaging subscriptions to societies or IEL. We are now researching what the right packages should be.

KAM There's another aspect to this, namely who our future members will be. We have ceased to be a society of just electrical and computer engineers. We should find ways to increase the breadth of our organization so that people engaged in advanced technology of all kinds see IEEE as their professional home. By this I mean, for example, information technology specialists, physicians who do biomedical research in areas close to electrical engineering, and teachers of science and technol-

ogy. We should try to bring them into IEEE. Technology has applications that transcend the field of engineering. In order to continue to lead, we need to encompass more fields and encompass more professionals.

Do you support open access to IEEE's information?

RAY No, I don't. IEEE provides value in its published products. When someone buys something, that product has gone through a long process of peer review. Like any organization, IEEE must recoup that cost.

IEEE obviously needs to be part of the open-access movement to some degree—and our publications group is experimenting with it. But I do not believe IEEE should give away its intellectual property to everyone.

MOSHE KAM

MEMBER GRADE
Fellow

EMPLOYMENT
Head of the Electrical and Computer Engineering Department at Drexel University, Philadelphia

AGE 52

TOP IEEE PRIORITIES
Developing programs and publications for practicing engineers, expanding IEEE's involvement in emerging technical fields, and improving IEEE's public image



BOTH PHOTOS: BILL GRAMER

KAM To some extent we are providing open access already. You can find about 30 percent of IEEE's papers online right now because we allow our authors to publish their papers on their Web sites. This 30 percent fraction is pretty significant.

I agree with Pedro that we should not rush to open our library to everyone for free, but I want to caution that at some point we may be forced to do just that. In a few years, the subscription model we use now may no longer work. We need to acknowledge the very successful run we have had under the current model; but the success of the electronic library may eventually end, and we need to be ready for that day.

IEEE should have a plan to participate in open-access experiments, and to respond to emerging trends in that arena.

IEEE Press is a money-losing operation. Should IEEE discontinue it, outsource it, or continue to run it as a benefit of membership?

KAM By itself, the fact that IEEE Press is a "money-losing operation" does not concern me. We are a not-for-profit. Financially, we are supposed to have a positive bottom line overall, but not necessarily for each and every activity. Quite a few activities do not make money—for example, our participation in the accreditation of academic programs. No one expects that activity to make money. We work on pre-university engineering education, and again no one expects students who visit our educational Web sites to pay for them.

The future of IEEE Press has been discussed for a long time. We should weigh the prestige of the titles and the degree to which these titles are popular with our target audience. The goal should be to do the right thing by the IEEE name. If we are achieving this goal, it is fine to continue the operation even if it loses money. If we are not, then close IEEE Press down.

RAY As an IEEE Board member, I voted in the past to close it down, but this issue keeps surfacing. IEEE Press should not continue as it is. It should be outsourced. It's a matter of printing the material where it can be done most efficiently.

How should we encourage young people to join IEEE?

KAM IEEE is already very active in this area through two main

vehicles. One is the online portal Tryengineering.com, which introduces young people to engineering, and encourages them to go into engineering fields. The portal has been very successful. Last year its English-language version had 2.5 million hits.

The other vehicle is the Teacher In-Service Program (TISP), which has our volunteers working with middle school and high school teachers to show them how to bring engineering projects and engineering design into their classrooms. We are doing a lot with TISP, but we are not doing enough. We now work with between 1000 and 2000 teachers a year. We need to get corporate support so that we can reach 20 000 to 30 000 teachers a year.

RAY I don't have a different answer. We should get behind those two programs and make them even more successful.

Is volunteer governance still a good idea for IEEE?

RAY It is, in the long term. It should continue to be a mix of volunteers and some professional governance. IEEE has tried to change its governance many times and has always failed. I think that no matter what I say, it will never change.

KAM Compared with other professional associations, IEEE is much more volunteer-driven and volunteer-governed. In spite of obvious shortcomings, such as not having paid staff people helping with every task, IEEE has been very successful—so successful that a couple of years ago someone calculated that it would cost IEEE between US \$2 billion and \$3 billion to replace all its volunteer force with professionals.

We have done pretty well with volunteer governance, and we are likely to continue to be governed by volunteers for many years. Overall, it has been a success story.

What do you see as the IEEE of the future, and as president, how would you influence that?

KAM The key to IEEE's future success is to be at the forefront of technology. In the future, I foresee IEEE standing for more than just the "Institute of Electrical and Electronics Engineers." Rather, it will be the

PEDRO RAY

MEMBER GRADE
Senior Member

EMPLOYMENT
Chief executive officer,
Ray Engineers, Old
San Juan, Puerto Rico

AGE 48

TOP IEEE PRIORITIES
Developing an alternative membership model, publishing periodicals for practicing engineers, and developing another successful product to build on the popularity of IEL



home of technologists and practitioners at the forefront of a variety of technical fields, including optoelectronics, nanotechnology, technology for medicine and health care, biotechnology—almost every technological discipline at the cutting edge. We will widen our scope so that we lead in all modern technologies.

The first step in making this happen is to open IEEE's doors to all practitioners, scientists, researchers, and individuals who investigate natural and technical phenomena. We started doing this long ago in terms of our rules. [IEEE's fields of interest once included only electronics, radio, allied branches of engineering, and the related arts and sciences. In 2005, the Board of Directors changed the rules concerning who can become a member by expanding IEEE's technical scope to include engineering, computer sciences and information technology, biological and medical sciences, mathematics, physical sciences, technical communications, education, management, law, and policy.]

However, so far we have only changed the rules. We have not done much to let professionals in the new fields we recognize know of their eli-

gibility to become members, nor have we done much to develop services that would attract them. A massive campaign is long overdue to explain to these technologists that IEEE is their professional home. We must act now to make sure that in the future we will be leaders in all emerging technology.

RAY I agree. Our name should be IEEE, and we should be the leader of all engineering—not just electrical engineering. A few years ago, I made a motion to the Board of Directors to take out the words "electrical and electronics engineers" from our name and just make it IEEE, but the motion was voted down. Our goal should be to cover all technical fields, not just the ones we are involved with now through our 38 societies. We aren't focused enough on emerging fields. ■

FOR MORE INFORMATION: You can listen to an audio recording of the event by visiting the IEEE Election Web site at <http://www.ieee.org/elections>. Also on the site is a set of questions from members posed by 2004 IEEE President Arthur Winston.



Boosting IEEE's Visibility And Prestige

BY GAILANNE BARTH

IEEE has embarked on a multi-million-dollar Public Visibility Initiative, a five-year communications program that seeks to raise the organization's global visibility and improve the image of the engineering profession.

"Our goal is to increase the public's understanding of how engineering, computing, and technology benefit humanity," says 2007 IEEE President Leah Jamieson, chair of the Public Visibility Ad Hoc Committee. "We want to reestablish the pride and prestige of the profession and position IEEE as the world's trusted source, the forum and the 'voice' for the profession. Ultimately, we want to make IEEE a household name."

Studies have indicated that the public in many parts of the world has a meager understanding of engineering and of IEEE. At the same time, IEEE members rank the organization's visibility as critically important. That's why a major goal of IEEE's Envisioned Future, the organization's strategic plan released last year, is to get the public to "increasingly value the role of IEEE and technical professionals in enhancing the quality of life and the environment."

Until now, IEEE has had no coor-

ordinated institute-wide messages promoting the benefits of engineering, technology, and computing. Nor has there been a concentrated effort to reinforce pride in the engineering profession or bolster its prestige. Compounding matters is the fact that there is no consensus as to what "public visibility" means for the organization. The initiative aims to change all this on multiple fronts.

BASILINE RESEARCH First, IEEE Corporate Communications, which oversees the initiative, together with Ruder Finn, a New York-based global public relations firm, did research. To understand what people think about IEEE, the research team surveyed four target audiences: the public, industry professionals, university and preuniversity students, and members and volunteers. The "perception audit" asked questions regarding global issues as well as such questions as "Have you heard of IEEE?" (42 percent of all the audiences had) and "What's your opinion of IEEE?" (42 percent had a "very favorable" opinion). The research identified messages that move each audience and uncovered key global themes and topics that reso-

nate with each group. "Hot" topics include sustainable energy, health care, biomedical engineering, Earth observation, security, and gaming. The results also established starting points from which to measure the initiative's success.

Based on the survey findings, Corporate Communications and Ruder Finn developed messages that define IEEE's mission and the benefits of joining the organization. Other messages include talking points for IEEE spokespersons and an "elevator speech"—a description of IEEE's goals that can be summed up in less than a minute.

In addition, the hot topics—the top two are developing sustainable energy sources and maintaining a sustainable world—were prioritized in terms of importance to the survey's respondents. Information about the topics was developed into dozens of feature articles and white papers by the IEEE team, citing IEEE's involvement through its publications, conferences, societies, and committees.

Next, a database was put together of members who are authorities on those topics. They form the basis of a speakers bureau, a community of members worldwide who can

speak on the issues or offer comment to reporters working on technical subjects.

Messages were also targeted at 10 countries chosen according to criteria that included ratings for technical innovation in each country and the number of IEEE members and student members each has. The countries include Brazil, Canada, China, Germany, and the United States.

THE PRESS IEEE then approached the media, using a database of media contacts and journalists in the 10 countries who cover the leading technology issues identified by the research. Members of the speakers' bureau and the feature articles and white papers were made available to traditional and Internet media channels, including blogs and influential Web sites that cover technology.

IEEE began contacting members of the media in May about covering the top technology themes—sustainable energy, maintaining a sustainable world, and Earth observation applications—and putting them in touch with its experts. It scored several successes. Reuters was one of the news organizations that spoke to IEEE Fellow Saifer Rahman, vice president of new initiatives for the IEEE Power & Energy Society, who discussed the global energy crisis and rising gas prices. Articles ran in 14 news outlets, including *Forbes.com*, *The Economist*, and *The Guardian*.

In July, IEEE was a program partner at *Fortune* magazine's Brainstorm Tech, a conference held in Half Moon Bay, Calif., of movers and shakers who deal with shaping the future of the tech world. Leah Jamieson; IEEE Fellow Victor Lawrence, a former Bell Labs-Lucent executive; and Susan Hassler, *IEEE Spectrum* editor, represented IEEE. They provided *Fortune*'s editors with insight into technology issues, story ideas, and suggestions for the program's content.

Another project improved IEEE's online newsroom at <http://www.ieee.org/web/aboutus/newsroom.html>, giving it a new look and feel and more content, including RSS feeds, podcasts, and videos. A central repository of news articles about IEEE and its members, the site provides journalists access to timely, accurate information.

To update members on the progress of the initiative, the monthly *IEEE Engaging the World Newsletter* was launched in July. You can view it at http://www.ieee.org/go/visibility_newsletter. ■

Perfecting The Power Grid

BY IVAN BERGER

Power demands have been mounting around the world. U.S. electricity consumption, for example, has been growing 10 percent per year, while investment in electrical infrastructure has been moving in the other direction, decreasing 5 percent annually. Today's aging power plants and old technology have managed to handle the rise in demand, but utilities face new challenges including possible greenhouse-gas limits, heightened security, skyrocketing fuel costs, and potential fuel shortages. Simply expanding the existing infrastructure is no longer enough.

"The electrical infrastructure has been on life support for decades, with very little innovation," says Kurt Yeager, executive director of the Galvin Electricity Initiative, who has authored articles in a number of IEEE journals. However, various groups, including IEEE, already have plans for fixing the infrastructure.

CHANGE Around the world, industry and government groups and foundations such as the Galvin Initiative envision a new, technologically advanced infrastructure. Once it's installed, tomorrow's electric power systems should deliver more power, more reliably, and with greater efficiency, wherever and whenever needed. Outages and brownouts should be infrequent, localized, and quickly resolved. Less energy should be lost in generating, transmitting, and delivering electricity, and every conceivable source of electric power should be used.

Many of those goals can be attained, Yeager says, "using our infrastructure better, and using more renewable energy." However, the intermittent nature of renewable wind power and solar energy requires a great deal of energy backup and storage. "A smart, electronically controlled grid can eliminate much of the backup power requirement, fundamentally improving the cost and environmental performance," Yeager says.

Most of the necessary technologies are available; a few have already been deployed, and progress is being made on others. But regulatory changes also might be needed. In the United States, the regulatory structure sometimes discourages innovation. On the technical side, control is fundamental. "In today's

electronic sensors operating at the same speed as the power flow, will let utilities reroute power instantly." Thus, he says, "Utilities will be able to increase existing lines' power throughput from one-third of theoretical capacity to as much as two-thirds, without exceeding thermal limits or requiring new lines."

Rates consumers are charged should also depend on the time of day. Smart two-way electric meters can extend digital control to customers, encouraging them to shift power-hungry activities to when demand and price are lowest. The shift, called power shedding, could even be automated, Von Dollen says, with "devices that might decide, from price-

when demand and rates are lowest.) Italy, Spain, and the Netherlands are aggressively deploying smart meters, Von Dollen says, while France is developing a smart-meter system. Pilot programs are under way in Korea. Meters in Japan and Singapore are relatively advanced.

"This gives the operator another lever to pull if things start getting close to the edge, shedding load only when and where it's needed," Von Dollen says. U.S. law now encourages utilities and regulatory commissions to consider power shedding.

Digital electronic control will make the delivery system "self-correcting and self-healing," Yeager says: "Problems will be isolated rather than cascading. There should be no outages." And when repairs are needed, utilities can query their power meters to find out what's needed and where. "Today utilities know in general where work is needed, but not which transformer or which pole. Often they must ask customers where the outage is," he says.

MICROGRIDS Reliability can also be increased by dividing the power system into microgrids, which are local power networks with a degree of self-sufficiency. A microgrid could be a single home or an area with several small generators, like a university campus. With those resources, Yeager says, "even if something knocks over the power poles, enough power should be available from local generation and storage, possibly including the batteries of plug-in hybrid vehicles, to maintain power service for hours or days. There's much of this already in Europe, and Tokyo Electric Power is a world leader in the field. But in the United States, the regulated business model makes this harder to achieve." Although local generators can't match large power plants' economies of scale, their proximity to users lets more power get through without the resistive and other power losses that now waste 10 to 15 percent of the power in long-distance transmission lines.

Conservation could help, Von Dollen says. "When electricity is cheap and abundant, you use a lot—the United States uses more per capita than other countries. We need to readjust our thinking," he says, "and motivate users to conserve." ■

FOR MORE INFORMATION on the IEEE Power & Energy Society, visit <http://www.ieee.org/pes>.



grid, power flows the way it wants to flow, and you don't have much control over which electron goes where," says IEEE Member Don Von Dollen, chair of the Intelligent Grid Coordinating Committee of IEEE's Power & Energy Society (formerly the Power Engineering Society). But soon, Yeager says, "digital control of the power grid, with comprehensive

ing and demand predictions, to cool my house in the morning and then just coast, with little or no cooling through the afternoon." Some utilities are already switching to smart meters. (Even without such meters, which cost at least US \$100 more than traditional meters, many utilities can adjust or cycle users' air conditioners and other heavy loads to times

IEEE Milestones Program Reaches Quarter-Century Mark

BY WILLIE D. JONES

This year marks the 25th anniversary of the IEEE Milestone program, designed to raise the public's awareness of great technological achievements. Since the Westinghouse atom smasher—the first major industrial program in nuclear physics—was named the first IEEE Milestone in 1985 (two years after IEEE began its search for milestones), more than 80 other achievements have been honored. Commemorative bronze plaques displayed at the sites remind us of how different life would be without these accomplishments.

Rarely do we give a second thought to when or where so many of the things we use today were invented or introduced. Take the telephone. Who besides a handful of historians knew that the first long-distance voice transmission, on 10 November 1876, linked Alexander Graham Bell, listening to a receiver in a telegraph office in Paris, Ont., Canada, to a group gathered before a transmitter at another telegraph office in Brantford, 13 kilometers away?

Or the computer. How many people checking their e-mail or watching videos on YouTube know that the first true digital computer was built to help defeat Germany in World War II? The Colossus machine, the world's first programmable electronic digital computer, went into service in February 1944, at Bletchley Park in Buckinghamshire, England. It allowed British cryptologists to break an entire day's communication between Berlin and German commanders in the field.

Each of those developments is an IEEE Milestone in Electrical Engineering, and commemorative bronze plaques have been placed at the sites where they first saw the light of day. (In 2000, the Milestones name was changed to Milestones in Electrical Engineering and Computing to more accurately reflect the breadth of IEEE's fields of interest.)

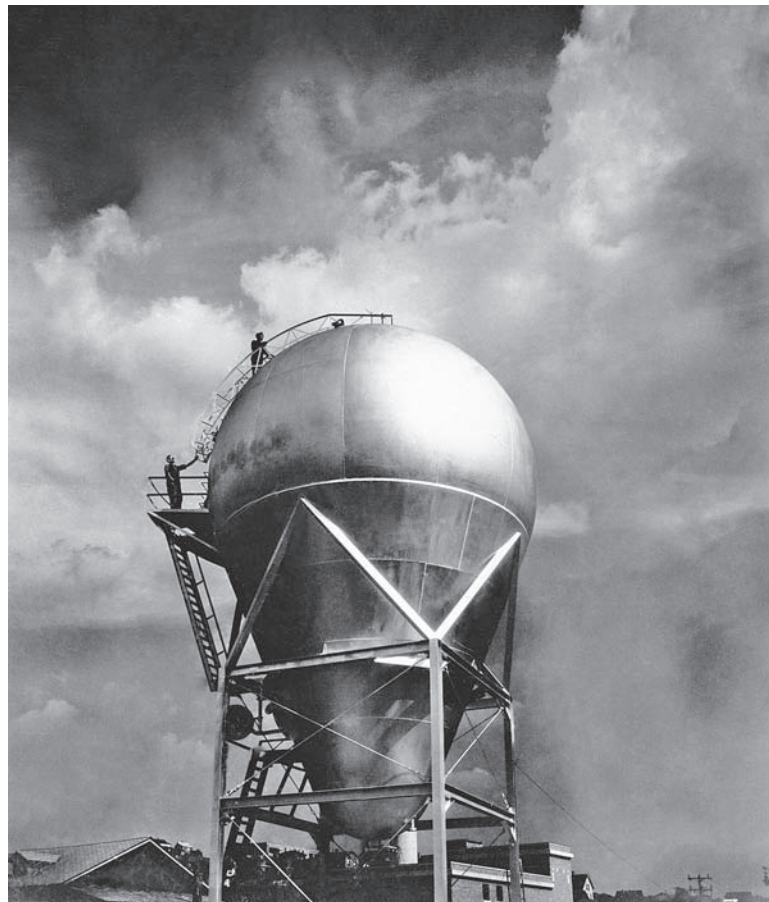
Still, many noteworthy achievements have yet to be nominated. Where, for example, should plaques be placed to commemorate the first

statements of Ohm's Law (1827) or Maxwell's equations (circa 1861), or the development of the slide rule (around 1620)? Or how about the cellphone? How many know that Martin Cooper of Motorola placed the first call from a mobile handset on 3 April 1973 while walking in New York City?

NOMINATIONS WANTED Turning an achievement into a Milestone occurs in two stages. It starts with a short proposal that asks and answers the question, "Does this invention stand a chance of becoming a Milestone?" Why waste time gathering information on something that may not be related to IEEE's fields or where, all kidding aside, there's no logical place to hang a Milestone plaque? If the Milestones program coordinator gives the go-ahead, members of the chapter, section, or society looking to laud the achievement begin work on the more detailed formal nomination. The nomination process takes about a year, with half the time allotted to gathering material in support of the nomination. The IEEE History Committee spends nearly as much time reviewing the documentation before giving its recommendation to the IEEE Executive Committee, which gives the nomination the final yes or nay.

A Milestone Enhancement Committee was formed this year to put more oomph behind the Milestones program by singling out more achievements. One proposal involves listing the top 30, 100, 300, and 1000 milestones, much like the *Forbes* magazine list of the world's richest people, says committee head Emerson Pugh, a Life Fellow. The lists could then be placed on IEEE's soon-to-be-launched online Global History Network.

Details are yet to be worked out, but individual IEEE members will be able to recommend an achievement for inclusion on one of the lists by briefly describing its merits and listing supporting historical documents. (Milestone proposals, on the other hand, can come only from an IEEE chapter, section, or other orga-



IEEE's first Milestone was the atom smasher at Westinghouse Electric and Manufacturing Co.'s East Pittsburgh research laboratories. A critical subsystem was an electrostatic direct-current generator housed in this tank, shown in a 1945 photo.

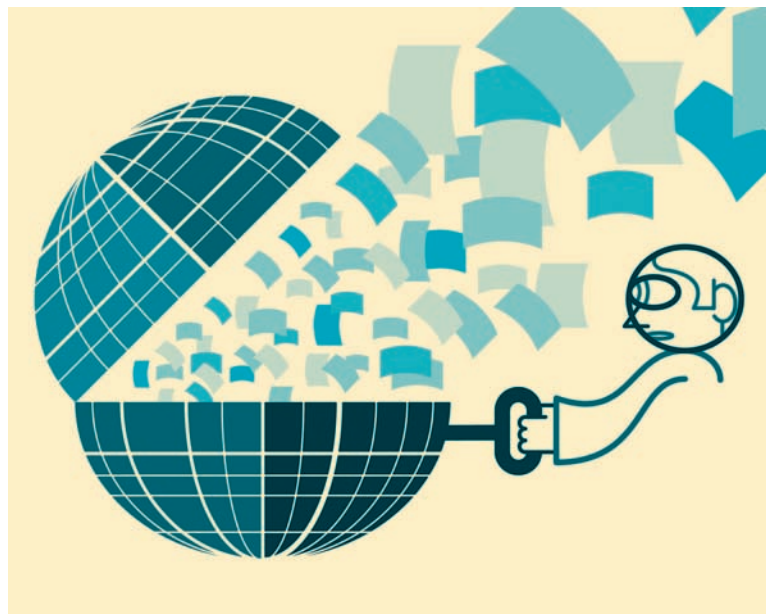
nizational unit.) The recommended items would not require History Committee or Executive Committee approval; a separate group of technical historians would decide what makes the lists. IEEE members would then be invited to add to descriptions of the achievements using the history network's wiki technology.

The History Committee also wants to name more Milestones jointly with other national societies. So far, eight achievements—including the Shinkansen bullet train, the world's fastest (reaching speeds of up to 210 kilometers per hour) when it began service in 1964 in Nagoya, Japan, and the Stanford Linear Accelerator, which led to the discovery of subatomic particles such as quarks after it was completed in

1962—have received joint designations from IEEE and, respectively, the American Society of Mechanical Engineers and the American Society of Civil Engineers. Joint recognition has the dual benefit of expanding the sources of nominations and giving the milestones broader attention.

The History Center's Web page at <http://milestonemaps.ieee.org> shows the locations of IEEE Milestone plaques, along with addresses, maps, and satellite images from Yahoo Maps. ■

FOR MORE INFORMATION about the IEEE Milestones program, visit http://www.ieee.org/web/aboutus/history_center/milestones_intro.html.



IEEE Experiments With Public Access To Its Literature

BY KATHY KOWALENKO

IEEE's public-access-friendly attitude is starting to show results. During the past few months, IEEE has announced a number of experiments that promise to provide free online access to some of its technical material. One is a collaboration with the Sponsoring Consortium for Open Access Publishing in Particle Physics, known as SCOAP3, which is made up of high-energy-physics organizations and their libraries. The group is working to give free online access to physics literature usually available only by subscription.

Another is a partnership between the IEEE Signal Processing Society and Connexions—which produces free Web-based educational materials—to develop an online repository on signal processing. Still another approach involves a new online-only peer-reviewed journal on photonics in which authors can opt to make their articles available free of charge in exchange for paying an up-front publishing fee.

NEW MODELS The collaborations are the result of new policies the IEEE Board of Directors instituted last year

that encourage organizational units to experiment with new ways to distribute their information. The initial policy statement, approved in June 2007, set the direction by encouraging societies and other units to explore new business models. Another pol-

icy, approved in November, is a set of principles providing guidelines for units that want to develop new publishing models [see “Principles of Scholarly Publishing”].

IEEE has always allowed authors to post articles on their personal or institutional Web sites where readers can access them for free. The publishing principles outline IEEE's position on the larger topic of public access.

“IEEE's Principles of Scholarly Publishing give us a platform from which to advocate our support of public access,” says John Baillieul, vice president, IEEE Publication Services and Products. The challenge, he says, “is how to do this in an economically viable way.”

Many in the academic research community are in favor of public access to scholarly publishing. According to Baillieul, the IEEE Board of Directors is sympathetic to some of these stands. In particular, he credits 2008 President-Elect John Vig with encouraging the organization to find ways to make its vast technical literature available as widely as possible.

SELF-SUPPORTING The Connexions and SCOAP3 partnerships got the green light from the Publication Services and Products Board because they will be financially self-sustaining, one of the key principles. Proposals from other IEEE societies were turned down because those societies did not develop business models that would cover the costs of providing free access.

The self-sustaining requirement allows IEEE to recover the costs of running a publishing operation that includes an automated peer-review system, converting manuscripts into an electronic format, and maintaining the IEEE Xplore digital library.

SCOAP3 will direct the money its institutional members pay for subscriptions to high-energy-physics journals toward article publishing fees of journals that give free online access to their material. Articles from the *IEEE Transactions on Nuclear Science* are slated to be among the first included once the program is launched next year.

Material developed by the Signal Processing Society and Connexions will be made available under a Creative Commons “attribution” license. The nonprofit organization enables authors to share their work, and offer it for free, while reserving some rights to it.

The *IEEE Photonics Journal* is scheduled to launch next year, covering photonics materials, engineered photonic structures, and nanophotonics. Authors can choose whether to offer free access to their articles. If so, IEEE will charge them a fee to recoup its publishing costs. Such papers will be identified in the journal's table of contents. ■

FOR MORE INFORMATION, visit <http://www.ieee.org/web/publications/rights/PublishingPrinciples.html>.

PRINCIPLES OF SCHOLARLY PUBLISHING

These principles provide a framework to follow for IEEE units wanting to develop publishing models that could lead to public access.

- **Society benefits** from the ability of scholarly publishers to launch, sustain, promote, and develop technical publications. Society also benefits from the commitment and experience that scholarly publishers bring to the challenge of archival preservation of electronic content to ensure the availability of published literature for future generations.

- **Society benefits** from an objective and intellectually free scholarly publishing environment unfettered by censorship or bias based on personal, commercial, or government agendas.

- **Research results** are enhanced by the quality-control system of peer review, which applies the knowledge of independent subject-matter experts to validate technical worthiness and scientific integrity and thus gain society's confidence in the research.

- **Copyright and intellectual property rights** of authors and publishers must be protected in any publishing activity, including those that involve government-mandated policies on access to government-sponsored research.

- **A value-added publishing process** such as IEEE's has operating costs that must be recouped. To perpetuate itself, then, scholarly publishing requires financial support from self-sustaining business models. However, it is recognized that no single business model will fit the needs of the various scholarly communities.

- **All engineers, scientists, and other scholarly authors** should have an equal opportunity to publish, regardless of their sources or levels of grant funding.

- **Government has a dual responsibility** for funding new research and ensuring that research results are vetted and widely disseminated by organizations with the experience, infrastructure, and independence to provide the public with affordable and reliable access.

- **Not-for-profit scholarly publishers** have an obligation to acquire and disseminate information for the benefit of the global public and to ensure that authors face no financial barriers to publishing their results.

- **Not-for-profit learned societies** have the unique and overarching goal of conducting their activities, including publishing, not for the benefit of any individual or group but rather to provide services that benefit the global public both directly and indirectly.

THIS MONTH'S QUESTION

Women Face Bias in Tech Fields



A recent study by the Center for Work-Life Policy, a nonprofit that researches women and work, concluded that women leave the science, engineering, and technology fields in disproportionate numbers because of gender bias. Although women enter the fields in high numbers—41 percent of employees are women—and 75 percent of them score well on performance reviews at the beginning of their careers, 52 percent later leave. Primary reasons include a “pervasive macho culture” in which women face strong prejudice, dismissive attitudes from male colleagues, and sexual harassment.

FROM YOUR EXPERIENCE, DO YOU AGREE WITH THE FINDINGS OF THIS STUDY?

MAIL: *The Institute*, IEEE Operations Center, 445 Hoes Lane, Piscataway, NJ 08855-1331 USA
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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 December issue of *The Institute* and may be edited for brevity. Suggestions for questions are welcome.

RESPONSES TO JUNE'S QUESTION

Who's to Blame—You Or Your ISP?

To curb piracy, the UK government is forcing Internet service providers to take responsibility for their clients' illegal downloads of music and movies. ISPs must apply antipiracy software voluntarily by April or, British officials say, they will impose sanctions. The ultimatum comes after years of pressure by media companies to target ISPs, rather than individuals, for illegal downloads. The service providers argue that they should serve merely as data relays, not monitors, for what passes over their networks.

Should ISPs, not their customers, be held responsible for illegal downloads?

Punish the Right People

The only ones who should be prosecuted are those who profit from downloads. After all, many consumers do it for enjoyment, not for profit. Those providing the tools used in alleged violations of copyright law should not be held accountable for the violation of copyrighted materials when the tools can also be used for downloading noncopyrighted materials.

BRIAN ANDERSON
Monument, Colo.

Don't Shoot the Messenger

Crimes are committed by individuals, and individuals alone are responsible for their actions. I suspect ISPs are being targeted because enforcement is easier, but that doesn't mean justice is served. The postal service is not to blame for mail fraud. Why should ISPs be held

responsible for the unethical behavior of some of their customers?

Piracy is a problem and should be fought. But laws should be enforceable and target the individuals actually committing the crime, with minimal impact on the rest of us.

MICHAEL POLAKOWSKI
Beavercreek, Ohio

ISPs Are Ill-Equipped

It makes no sense to hold ISPs responsible for illegal downloads. ISPs don't have the resources to determine whether a download is legal or not. The primary responsibility for illegal downloads lies with the content providers. Law enforcement agencies and ISPs should work together to shut down content providers that allow illegal downloading.

PHILLIP M. FELDMAN
Santa Barbara, Calif.

Blame the Uploaders

Both the individual and the ISPs are innocent. An ISP's role is simply to relay data. If it also monitors that data, then it infringes on people's rights. Who's to say ISPs won't start filtering certain political viewpoints? Conversely, the user can't be blamed—if free content is out there, why should users deny themselves? The people to blame are those who upload illegal content to the Internet in the first place. These individuals should be tracked down by law enforcement agencies. Also, stricter legislation against piracy can help discourage this practice.

SAQUIB SADIQ
Karachi, Pakistan

Shaky Legislation

Although music companies would welcome the additional help, what other content should the ISPs be responsible for? Should ISPs have to identify illegal transfers of other copyrighted information, such as research papers and images? And who would be responsible for enforcing the restrictions? Would the person trying to download the illegal document be penalized? Or would people simply not be allowed to complete the download and instead receive a message stating that their request had been denied due to copyright infringement? There will be plenty of ways to work around the ISPs' restrictions, unless

the source is penalized for illegally providing the information.

EUGENE MOE
Sheboygan, Wis.

No Deal

No government or company can ever ensure 100 percent compliance with any law, no matter the power it has. If you really want to obtain illegal material—whether drugs, weapons, or downloads—there will always be a way to get it. Giving up a civil right for any reason is ridiculous, and doing it for no gain is absurd.

DAVID STROUP
San Diego

LETTERS

Skip the Fluff

“Melding Mind and Machine” [June, p. 5] was disappointing. It provided no technical information concerning the current state of the art. It was no better than what I would expect to find in a story by the Associated Press. I certainly don't expect the detail of a journal article; but I do expect a link to some technical information. IEEE should never be associated with fluff.

JEFFREY ROCKEL
Pewaukee, Wis.

The goal of The Institute is to provide readers with a broad overview of IEEE's involvement in technologies through its societies, publications, and the work of its members. In-depth technical articles can be found in IEEE Spectrum and in the many other IEEE publications. To find the article referenced in the story, “Signal Processing Challenges for Neural Prostheses” [IEEE Signal Processing Magazine, January 2008], visit the IEEE Xplore digital library at <http://ieeexplore.ieee.org>. —Ed.

Correction

The Pinawa hydroelectric power plant is not located in Winnipeg, Man., Canada. It is situated about 110 kilometers northeast of Winnipeg, between the towns of Pinawa and Lac du Bonnet (IEEE *Around the World*, June, p. 3).

Volunteers: A Priceless Asset

Volunteering is at the very heart of IEEE's success. Perhaps as many as 40 000 volunteers actively contribute their time, expertise, and ingenuity to our organization. Without their efforts, IEEE would be far different and less effective. Their contributions are worth tens to hundreds of millions of dollars to IEEE, but their dedication is priceless.

That dedication is prominently manifest at the triennial IEEE Sections Congress being held in Quebec City from the 19th to the 22nd of this month. With the theme of Celebrating Volunteer Achievements Worldwide, this is a spectacular meeting of IEEE section leaders, representing a mix of cultures and technical interests from around the world. The delegates will interact, exchange ideas,

learn about IEEE and its plans, and bring forth recommendations and action items to help IEEE reach its Envisioned Future strategic goals.

I consider it to be good fortune that the congress takes place in 2008, my presidential year. The first Sections Congress was held in Boston in 1984, IEEE's centennial year, with 120 attendees, all delegates from their sections. This year more than 1100 attendees are expected, including more than 600 delegates from IEEE's 324 sections.

A highlight of the congress will be the IEEE Honors Ceremony. The presentation of the IEEE Medal of Honor and other IEEE medals and high-level awards at the ceremony recognizes exceptional contributions that have made a lasting impact on technology, society, and the engineering profession.

This is only the second time the ceremony has been held in conjunction with the Sections Congress. The Honors Ceremony is normally held during the June IEEE Board of Directors meeting, with about 300 attendees, the award recipients, and their guests. At the Sections Congress, a much broader segment of IEEE membership will be at the ceremony and have a chance to meet the recipients.

As luck would have it, the recipient of the Medal of Honor is Gordon Moore, whom I first met in about 1960 in his Fairchild days, before he helped found Intel Corp. Gordon was a chemist and achieved instant fame with his expounding of Moore's Law, but he was also a pioneer in the early days of integrated circuits.

A unique event at the Sections

Congress will be the kickoff of IEEE's 125th anniversary celebration. IEEE's beginnings date back to one of its predecessor societies, the American Institute of Electrical Engineers, founded in 1884 [see "IEEE to Mark 125th Anniversary," p. 4]. The other predecessor society, the Institute of Radio Engineers, was launched in 1912, and the two merged in 1963 to form IEEE. The anniversary slogan, 125 Years of Engineering the Future, perfectly reflects the position of IEEE—proud of our past achievements while also focusing on our future. President-Elect John Vig is leading the formal program to promote IEEE worldwide in 2009.

The Sections Congress will be an exciting, stimulating, and fascinating event. I look forward to attending, meeting dedicated IEEE volunteers from around the world, and listening to their comments and suggestions. The congress is a manifestation of the rich volunteer core that serves IEEE and the profession so well.

However, the Sections Congress is just one of many important activities in which IEEE volunteers participate. I urge you to investigate opportunities to become a volunteer at any and every level of IEEE. This will enable you to hone skills and develop contacts that will help your career. You will give back to your profession and help IEEE meet its mission of advancing technology for the benefit of humanity.

For more information on volunteering for IEEE, go to <http://www.ieee.org/web/volunteers/home>. I welcome your comments at terman.column@ieee.org.



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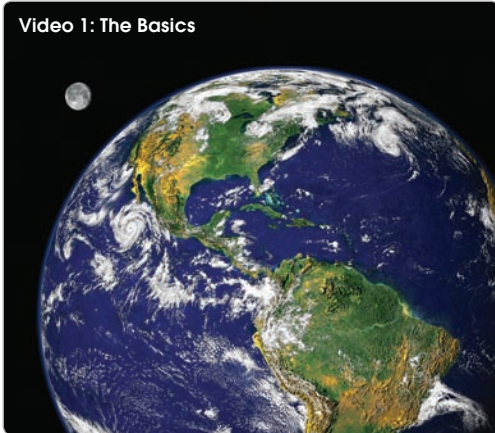
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Video 1: The Basics



Video 2: Applications



Video 3: Technology



IEEE.tv Series Focuses On Earth's Environment

BY MARILYN G. CATIS

The IEEE Committee on Earth Observation (ICEO) has launched several educational and public outreach programs this year to publicize the 73-nation Global Earth Observation System of Systems (GEOSS). One such program is a series of three videos on IEEE.tv from the Group on Earth Observation. They cover the GEOSS project, its applications, and the technology behind the Earth-monitoring network at <http://www.ieee.org/ieeetv>.

GEOSS BASICS The first of the 12- to 15-minute videos presents an overview of how the remote sensors collect and process environmental data. It's expected that more data will lead to more informed decisions on a whole host of critical topics involving environmental disasters, energy and water resources, climate, sustainable agriculture and desertification, ecosystems, and the oceans. The video explains how the GEOSS framework allows different data-gathering systems—some new, others quite old—to work together. Common data standards and data-sharing agreements among nations are, of course, key.

For its part, IEEE is leading the effort to develop interoperability standards through an International Standards and Interoperability Forum. The forum will support the interoperability requirements of GEOSS but will not dictate standards. Rather, it will foster cooperation among the many GEOSS participants to reach a consensus on standards for the program's components, which fall into four categories: observation (acquiring data), processing (converting data into useful information), storage, and dissemination. The group recently established the technological and procedural framework for carrying out the forum's objectives, and it expects its agenda to expand next year as systems are added to GEOSS.

SOLVING PROBLEMS The second video, which deals with applications, explores how remote sensing is used to document, analyze, and solve global problems. It details how Earth-observation systems are helping scientists understand such things as how the atmosphere works to produce rain. The video provides

insight into the challenges surrounding the Water for the World initiative, a project the ICEO took on this year. Water for the World is focused on creating pilot programs for making more water available in developing countries. The initiative's goal is to provide clean, safe drinking water in areas where there is not enough. Some 1.7 billion people—28 percent of the world's population—do not have access to clean drinking water. Information gained through the initiative “is absolutely critical to understanding water usage and the water supply of the future, particularly since this future is about to be influenced by climate change,” says Graeme Stephens, a professor of atmospheric science at Colorado State University, Fort Collins, who is featured in the video.

In particular, satellite data is expected to help improve agricultural productivity and help direct relief efforts during disasters. For example, the Global Positioning System and images from satellites helped coordinate relief efforts during the tsunamis of December 2004 and Hurricane Katrina. Images collected during the hurricane are now

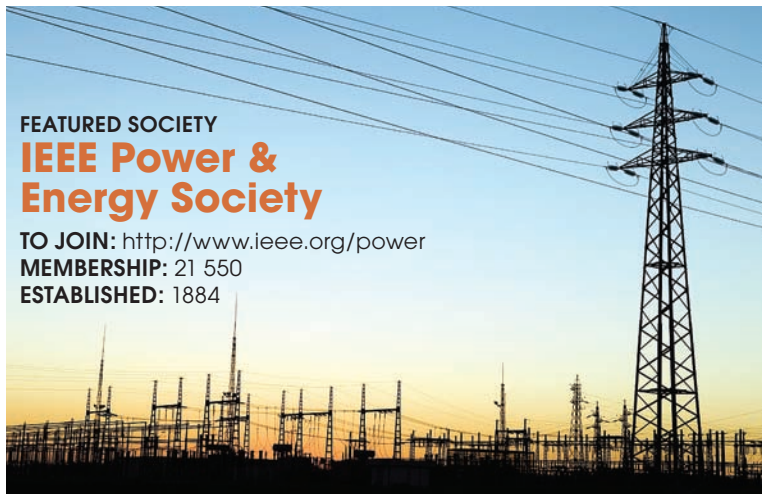
being used for ongoing reconstruction efforts.

The video also explores how earth observations can help planners decide where to build renewable energy resources.

EXPERTS WEIGH IN The third video, on technology, features interviews with 11 prominent scientists and engineers, who describe recent developments in remote sensing. They discuss microwave, optical, and infrared technologies and explain how passive and active remote sensing works. Also addressed are the advantages of both mechanical and electronic antennas in scanning Earth to track weather and air turbulence.

In one interview, Deborah Vane, manager for the CloudSat project at NASA's Jet Propulsion Laboratory, in Pasadena, Calif., discusses how a new experimental satellite relies on high-frequency radar to observe clouds from space and “see” rain as it's created.

“This is the very first space-borne cloud radar,” Vane says. “We are able to see inside and all the way through clouds, giving us a view unlike any we've had before.” ■



FEATURED SOCIETY
IEEE Power & Energy Society

TO JOIN: <http://www.ieee.org/power>
MEMBERSHIP: 21 550
ESTABLISHED: 1884

The IEEE Power Engineering Society's members voted in April to change the society's name to the IEEE Power & Energy Society. According to the society's president, Wanda Reder, the new name is more relevant to current member interests and aligns with global needs, is more inclusive of emerging technologies, and better reflects the society's mission, scope, and fields of interest. The IEEE's oldest society, the PES provides the world's largest forum for sharing the latest in technological developments in the electric power industry and for creating standards for the development and construction of equipment and systems.

Fields of Interest Research, development, construction, installation, and operation of systems for the generation, transmission, distribution, measurement, and control of electric energy.

Publications Three quarterly journals and the bimonthly *IEEE Power & Energy Magazine*.

Conferences Sponsors or cosponsors several conferences a year on topics including power systems protection and sustainable energy.

Awards Presents more than a dozen awards each year, including the Award for Excellence in Power Distribution Engineering and the IEEE PES Outstanding Engineer Award.



IEEE Aerospace and Electronic Systems Society

TO JOIN: <http://www.ieee-aess.org>
MEMBERSHIP: 4670
ESTABLISHED: 1973

Celebrating its 35th anniversary this year, the society focuses on the organization, design, development, and operation of complex systems used in mobile electric power and electronics systems, radar, sonar, and telemetry systems used in avionics, law enforcement, and the military.

The society sponsors several international conferences

annually, including AutoTestCon, the IEEE Aerospace Conference, and the IEEE Radar Conference.

It publishes the monthly *IEEE Aerospace and Electronic Systems Magazine* and the quarterly *IEEE Transactions on Aerospace and Electronic Systems*.

IEEE Communications Society

TO JOIN: <http://www.comsoc.org>
MEMBERSHIP: 38 740
ESTABLISHED: 1972

ComSoc recently launched a wireless communications engineering technologies certification program. Engineers with a bachelor's degree from an accredited institution and with at least three years of wireless engineering experience may take the exam. Administered at 500 sites in 75 countries, the exam comprises multiple-choice questions covering wireless

communications, including access technology, antennas, network management and security, propagation, RF engineering, and standards. The society is also developing a set of resources to help engineers prepare for the exam, including two practice exams and a book, *Wireless Engineering Body of Knowledge*, which provides information on areas the exam covers.

The society focuses on the transfer of voice, data, images, and video using computers,



information processors, and switched and unswitched networks.

ComSoc publishes four magazines, six journals, and three newsletters on topics such as network and service management and wireless communications. It also sponsors several international conferences, including the IEEE Global Communications Conference, held this year from 30 November to 4 December in New Orleans.

IEEE Engineering in Medicine and Biology Society

TO JOIN: <http://www.embs.org>
MEMBERSHIP: 7880
ESTABLISHED: 1978

The society launches a new annual journal in December—*Reviews in Biomedical Engineering*—that will cover advances in biomedical



engineering and explore ways to apply engineering to solve biomedical problems.

The society's interests cover health-care technology including bioinformatics,

biotechnology, clinical engineering, information technology, instrumentation and measurement, microtechnology and nanotechnology, radiology, and robots.

In addition to the new magazine, the society publishes seven journals as well as the bimonthly *IEEE Engineering in Medicine and Biology Magazine*, which deals with the latest in biomedical and clinical engineering.

The society holds an annual conference and cosponsors the annual International Symposium on Biomedical Imaging, held this year from 19 to 22 October in Scottsdale, Ariz.

IEEE Instrumentation and Measurement Society

TO JOIN: <http://www.ieee-ims.org>
MEMBERSHIP: 4360
ESTABLISHED: 1978

The society was formed 30 years ago to promote the development of electrical and electronic instrumentation to measure, monitor, and record electrical and physical phenomena. Areas of interest include analog and digital electronic instruments,



systems and standards for measuring and recording electrical quantities in the frequency domain (including dc), and instruments for automated control and analysis.

The society publishes two bimonthlies—*IEEE Transactions on Instrumentation and Measurement* and the *IEEE Instrumentation and Measurement Magazine*. It sponsors four annual awards including the Career Excellence Award, which recognizes a lifetime of meritorious achievement and outstanding technical contributions by an individual in the society's fields of interest.

The society sponsors more than a dozen conferences and workshops annually on topics ranging from human-computer interfaces to precision clock synchronization.



FEATURED CONFERENCE

IEEE Ultrasonics Symposium

Beijing, 2–5 November

Ultrasonics experts from around the world come together at this meeting to advance work in research, development, and applications. The symposium takes place at the Beijing International Convention Center, located in the complex where the 2008 Olympic Games were held in August.

Other topics include bulk acoustic wave sensors, clinical cancer imaging, droplet processing, thin-film and device characterization, and ultrasonic motors. The conference features courses in acoustic microscopy, medical photoacoustic imaging and sensing, and ultrasonic transducers. Jiqing Wang, a professor of acoustics at Tongji University in Shanghai, is scheduled to lecture on the acoustics of traditional Chinese theaters.

Organizers say a banquet on 4 November will include performances of traditional Chinese folk dances and music.

SPONSOR: IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society

VISIT: http://ewh.ieee.org/conf/ius_2008



IEEE International Conference on Sustainable Energy Technologies

Singapore
24–27 November

This first of a series of biennial conferences on sustainable energy brings together professionals from electric power companies, manufacturers, research institutes, and educational bodies to exchange ideas about renewable and alternate energy systems.

Topics include the economics

and management of electric energy markets, energy efficiency, energy storage, fuel cells, and solar photovoltaic, thermal, wind, and other energy systems.

SPONSORS: IEEE Industry Applications Society, IEEE Industrial Electronics Society, IEEE Power Electronics Society, IEEE Power & Energy Society, IEEE Singapore Section
VISIT: <http://www.icset2008.org>

IEEE International Symposium on IT in Medicine and Education

Xiamen, China
12–14 December

Topics include computer-aided teaching and campus networking, the ethical and social issues of using IT in education, health informatics education, medical image processing, plagiarism in



open and distance education, telemedicine and telesurgery, and the three-dimensional reconstruction of medical images.

The conference also presents papers on several special tracks, such as IT's application in traditional Chinese medicine and digital library organization.

SPONSOR: IEEE Beijing Section

VISIT: <http://itme.xmu.edu.cn>

IEEE International Electron Devices Meeting

San Francisco
15–17 December

For 54 years, this conference has been the world's main forum for examining the technology, design, manufacture, physics, and modeling of semiconductor and other electronic devices.



Topics include compound semiconductor materials, deep submicron CMOS transistors, micromachined devices, nanotechnology devices and architectures, and novel displays and imagers. IEEE Fellow Jim Plummer, a professor of electrical engineering at Stanford University, plans to speak during a luncheon on 16 December. His topic is "A Life in Semiconductors."

SPONSOR: IEEE Electron Devices Society

VISIT: <http://www.ieee.org/conference/iedm>

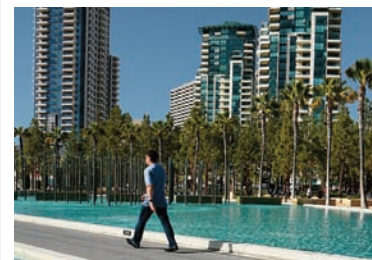
IEEE Radio and Wireless Symposium

San Diego
16–22 January

Part of IEEE Radio and Wireless Week, this symposium covers

analog adaptive, collaborative, and digital signal processing, high-power and efficient RF transmitters, signal generation, space-time processing, ultra-wideband technology, wireless security and RFID, and wireless system architecture.

The meeting is held in conjunction with the IEEE Power Amplifier Symposium and the IEEE Topical Meeting on Silicon Monolithic Circuits in RF Systems.



SPONSORS: IEEE Antennas and Propagation Society, IEEE Communications Society, IEEE Microwave Theory and Techniques Society

VISIT: <http://www.rawcon.org>

International Zurich Symposium on Electromagnetic Compatibility

Zurich
12–16 January

This 20th annual conference addresses issues in electromagnetic compatibility standards and the modeling of electromagnetic fields. Other topics include computational electromagnetics, signal integrity, impulse radar, neural networks, and shielding theory.



SPONSORS: Eidgenössische Technische University, Zurich, IEEE Electromagnetic Compatibility Society, IEEE Microwave Theory and Techniques Society, and the Laboratory for Electromagnetic Fields and Microwave Electronics.

VISIT: <http://www.emc-zurich.ch>

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FEATURED AUTHORS
Frobenius and Scott on RF Testing

Do you design cellphones? Then you'd better understand the tests you'll have to

perform to make sure your devices work properly. That's why IEEE Member Rex Frobenius (left) and Allan W. Scott wrote *RF Measurements for Cellular Phones and Wireless Data Systems*. Their book explains the various aspects of RF, focusing on how to use the equipment for testing cellphones and other wireless devices. It's aimed at those working in R&D and manufacturing, as well as those who market RF components and systems for cellphones, wireless LANs, and other RF communications gear.

Frobenius is vice president of engineering for Besser Associates, a specialist in RF training located in Mountain View, Calif. Scott is an instructor for the company and has been designing RF and microwave equipment for more than 35 years. Nine years ago, the two developed a course called RF Measurements for Cellphones. Their book is an outgrowth of that course.

"Our book is important now because the cellphone industry is experiencing a worldwide expansion," Scott says. "The fundamental measurement concepts we cover are useful for any RF or wireless application."

The book explores RF measurements on devices found in cellphone equipment and on digitally modulated signals.

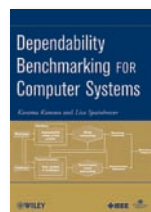
—Anna Bogdanowicz

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WILEY-IEEE COMPUTER SOCIETY PRESS

Dependability Benchmarking for Computer Systems

Edited by Karama Kanoun and Lisa Spainhower (July 2008, US \$95.95, 384 pp.)



Articles are written by experts who define benchmarks used for measuring the dependability of hardware-software systems and explain the concepts behind them. The benchmarks help to characterize a system's dependability and provide a mechanism for fairly comparing alternative systems. They are useful for guiding system development, evaluating systems for purchase, and helping researchers evaluate new system concepts. Included is research

from D Bench, a project supported by the European Union.

Practical Support for Lean Six Sigma Software Process Definition: Using IEEE Software Engineering Standards

By Susan K. Land, Douglas B. Smith, and John W. Walz (June 2008, \$89.95, 412 pp.)



Although well established in manufacturing, Lean Six Sigma has become the focus of software development organizations in only the past few years. This book provides concrete yet flexible methods for incorporating Lean Six Sigma into an organization's development processes. Included are document templates that developers can tailor to a wide variety of software development projects.

Software Maintenance Management: Evaluation and Continuous Improvement

By Alain April and Alain Abran (March 2008, \$65, 314 pp.)

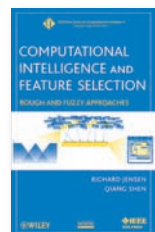


Software maintenance is of growing concern for organizations with mission-critical applications, yet the processes for maintaining software are not well developed. *Software Maintenance Management* argues that process-improvement models popular in software development also apply to software maintenance. The authors present a new way for capturing the uniqueness of software maintenance activities in a model-based process-improvement approach.

WILEY-IEEE PRESS

Computational Intelligence and Feature Selection: Rough and Fuzzy Approaches

By Richard Jensen and Qiang Shen (August 2008, \$110, 348 pp.)



Provides the background and fundamental ideas behind feature selection, with an emphasis on techniques based on rough and fuzzy sets and their combination. The book introduces set theory, fuzzy set theory, rough set theory, and fuzzy-rough set theory and illustrates the power and efficacy of feature selection in real-world applications.

Clustering

By Rui Xu and Don Wunsch (August 2008, \$110, 368 pp.)

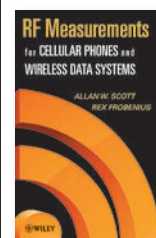


Written by two of the best-known experts in the field, *Clustering* is the only comprehensive text on the subject now available. It looks at the full range of clustering, providing enough detail to allow users to

select the method that best fits their applications. The authors try to make the subject clear for readers at different levels, including graduate students, computer scientists, and applied mathematicians.

RF Measurements for Cellular Phones and Wireless Data Systems

By Rex Frobenius and Allan W. Scott (June 2008, \$110, 528 pp.)



It is predicted that by 2010 all digital wireless communications equipment will have data transfer capabilities of more than 1 megabit per second. In anticipation of that milestone, this book presents what industry professionals need to know about the RF measurements and tests that must be made on the next generation of digital wireless communications equipment. The book reviews basic RF principles and terminology and describes RF measurement equipment, including signal generators, power and frequency meters, and vector network, spectrum, and vector signal analyzers.

Advanced Design Techniques and Realizations of Microwave and RF Filters

By Pierre Jarry and Jacques Beneat (June 2008, \$115, 376 pp.)



With the proliferation of radar, satellite, and mobile wireless systems, methods for designing microwave and RF filters are needed to satisfy the ever-increasing demand for accuracy, reliability, and shorter development time. Beginning with a brief review of topics such as scattering and chain matrices, and fundamental electromagnetic equations, the book goes into design techniques for microwave and RF filters operating across a frequency range from 1 gigahertz to 35 GHz.

Spotlight On Four Products

IEEE Std. 829-2008, released in August

The IEEE Standard for Software and System Test Documentation explains test processes used to analyze, demonstrate, inspect, validate, and verify software and software-based systems, hardware, and their interfaces. Tests described in the standard can be applied to systems being developed, maintained, or reused to determine whether products perform as designed and can be used as intended.

IEEE Std. 1594-2008, released in July

The IEEE Standard for Helically Applied Fiber Optic Cable Systems (Wrap Cable) for Use on Overhead Utility Lines deals with acceptance criteria, environmental considerations, mechanical, electrical, and optical performance, test requirements, and guidelines for packing, shipping, and installation. Cable system accessories are also covered.

IEEE Std. 2600-2008, released in July

The IEEE Standard for Information

Technology: Hardcopy Device and System Security defines requirements for selecting, installing, configuring, and using such items as printers, copiers, and multifunction machines and the computer systems that support them. It discusses various aspects of security, including authentication, authorization, device management, information security and integrity, physical security, and privacy. The standard identifies security risks and provides information for manufacturers and software developers about which security features to include.

IEEE Std. 1633-2008, released in July

The IEEE Recommended Practice on Software Reliability covers the many advances made since 1992 in software reliability modeling and prediction for distributed and networked systems. Practices cover the software life cycle, with guidelines for using software in specific situations also provided.

FOR MORE INFORMATION on these and other standards, visit the IEEE Standards Association Web site at <http://www.standards.ieee.org>.

CONTINUING EDUCATION

Education Program Adds Four Partners

Four new organizations of the IEEE Education Partners Program provide courses on such topics as software engineering, energy economics, power systems modeling, and Internet technology. Classes, seminars, and graduate-degree programs are available online, on campus, or on DVDs—all at a discount of up to 10 percent for IEEE members. The new partners and their offerings are:

EdistaLearning More than 45 e-learning courses on 13 topics including project and quality management, software engineering, and testing and estimation.

EDSA Micro Corp. On-campus courses in electrical distribution systems design and simulation. Topics include arc flash, power quality, power systems modeling, and protective-device coordination.

GE Energy On-campus courses in emerging power-generation technologies, energy economics and markets, and power system planning.

Pace University Online master's programs and individual courses in IT and software development and engineering, and graduate-level certificates in e-commerce and security and information assurance.

FOR MORE INFORMATION on these and other EPP partners, visit <http://www.ieee.org/partners>.

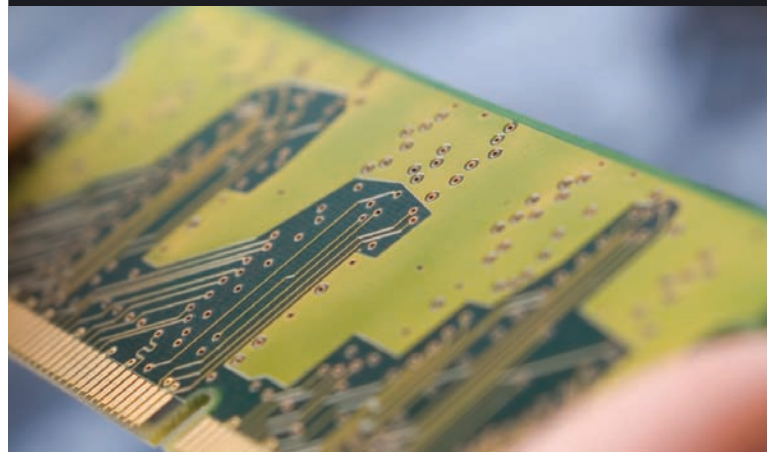
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— Jon Candelaria, Project Manager, Motorola



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PROFILE



ASAD ABIDI

Back to the Future

IEEE Fellow returns to Pakistan to open tech university

BY SUSAN KARLIN

As a high school senior, Asad Abidi found himself at a crossroads. Torn between physics and electrical engineering, he stood at the entrance of his school asking science teachers which they thought offered more exciting opportunities. Engineering was the overwhelming response, so that's what he went to university to study.

"It was the toss of a coin," says Abidi, who was born and raised in Pakistan and moved to England at 16. "But I loved engineering completely."

The coin has been paying dividends ever since. Some three decades later, Abidi, 52, has carved out an enviable career transforming the wireless communications industry, first as a Bell Labs researcher and then as an electrical engineering professor at the University of

California, Los Angeles (UCLA). Along the way, the IEEE Fellow garnered numerous accolades, including the 2008 IEEE Donald O. Pederson Award and election to the National Academy of Engineering, U.S. engineering's highest honor. So what does Abidi do for an encore? He goes back to his roots.

In August 2007, he left his UCLA post of 22 years to return to Pakistan for a three-year stint as the first dean of the new School of Science and Engineering (SSE) at the Lahore University of Management Sciences (LUMS). There he is overseeing the school's transition to what is hoped will be a world-class interdisciplinary facility that will introduce a culture of research and entrepreneurship to a new generation of engineering and science students. Some 8000 applicants are vying

for 200 slots in SSE's first class this fall, many of them students already accepted by the likes of Caltech, MIT, and Stanford but who lack money for tuition. The school is privately funded, so it avoids government interference.

SSE is part of a plan to transform Pakistan's economy by nurturing technological innovation by its citizens. LUMS, regarded as one of Asia's top 20 business schools, wanted to create a science and engineering program that did more than churn out graduates who, because of a lack of research facilities and guidance, were well trained in existing technologies but not in innovation, Abidi says.

CREATIVITY A MUST "The economy here is in very poor shape, and it's not enough to produce a new

generation of business leaders," Abidi says. "The country needs people to create new products and technologies—which it can't do without a research culture." Collaboration with the business school would prepare the engineering students to turn new technology to commercial use. In the past, students wanting a research career have had to leave the country.

Abidi earned a bachelor's degree from Imperial College London and master's and doctoral degrees from the University of California, Berkeley, all in electrical engineering. While in college, Abidi chanced upon IEEE through its publications, becoming a student member in 1974. He served on several IEEE committees, and he helped establish the Solid-State Circuits Society and edited its *IEEE Journal of Solid-State Circuits*.

"IEEE has such a strong international presence," he says. "There are three chapters in Lahore alone, and I've been to IEEE seminars in places as far-flung as Bangalore and Brazil."

Graduating in 1981, he worked in the Advanced LSI Development Laboratory at Bell Laboratories in Murray Hill, N.J., before joining the UCLA faculty in 1985. He spent 1989 as a visiting faculty researcher at Hewlett-Packard Laboratories in Palo Alto, Calif.

At UCLA, Abidi and his colleagues pioneered the study of and research in the field of integrated circuits and systems. His research focused on developing circuits in complementary metal-oxide-semiconductor (CMOS) technology, used to fabricate microprocessors and digital signal processors for most of today's wireless communications. Without such circuits, "the wireless industry would have taken much longer to develop," Abidi says. By 2007, about the time he began wondering how next to apply his talents, he got the offer to lead SSE (<http://sse.lums.edu.pk>).

"I asked myself if what I was doing was a complete fulfillment of my life. Could I contribute in another way?" he says. "What better way to do it than to return to the country of my birth—which is still so needy—and continue my work shaping a new generation of engineers." ■



Rainer Spiegel

Balancing Act

B lame *E.T.* and James Bond for his hobby. The Steven Spielberg movie turned a 12-year-old Rainer Spiegel on to the BMX bikes featured in its final chase scene, while *Never Say Never Again* had him aspiring to do motorcycle tricks.

"I was too young to ride a motorcycle, but I had seen people perform similar stunts on a BMX bike," says Spiegel, a former lecturer in computer science at Goldsmiths, University of London. He is now a medical student at Ludwig-Maximilians University in Munich. Freestyle BMX (bicycle motocross) involves performance and balancing tricks on specially designed bicycles.

Eager to do his own stunts, he asked his parents for a BMX bike. "As a child, I broke my

elbow on a conventional bicycle, so my parents were worried, but I convinced them," he says.

At 36, this IEEE student member is still hooked. He spent years developing a repertoire of tricks, entering his first competition at 16. Later, he participated in three BMX freestyle world championships and other international contests, at times capturing second, third, and ninth place. He has been featured in magazines and videos.

Spiegel's not sure if he or a biker from Philadelphia was the first to do a "rolling undertaker" (performing a back wheelie with the front wheel in the air while moving the body underneath the front wheel from one side to the

other). But he says he's pretty sure he was the first to do the grasshopper-into-decade combo (spinning 180 degrees while hopping from a front wheelie to the frame and moving around the bike) and the pedal-to-elbow glide combo (hopping from the pedals to a front wheelie while catching the seat with the elbow).

Spiegel's studies tie into cycling. His Ph.D. thesis was on human sequence, sensory-motor learning, and computational modeling. And his M.D. thesis is about posturographic measurement computa-

tional modeling, which assesses patients' equilibrium and various therapies to treat vertigo, pharmaceutically and through body positioning.

"Performing tricks on a bike requires sequential learning," he says, "like keeping my balance after whirling in circles!" —Susan Karlin

PASSION
Freestyle
BMX biking
OCCUPATION
Medical student
HOMETOWN
Munich

Francesca Maradei

Dancing Queen

For as long as Francesca Maradei can remember, she couldn't stop moving to music. Her parents took note, enrolling her in ballet classes when she was 6 at the Isabella Sisca International Dance Center in Castrovillari, her hometown in southern Italy. For the next 10 years, Maradei spent eight hours a week in ballet class completing the school curriculum and getting certified to teach ballet and dance professionally.

"Ballet is a very strict discipline. You have to practice regularly to keep your body well trained enough to master the techniques," the IEEE senior member says. "At the end of each school year, we

would perform in a professional theater. My favorite role was the Lilac Fairy from *Sleeping Beauty*. It was the first and last time I was a soloist."

Maradei was also a star student at a science-focused high school. By 1987, she was at a crossroads, holding a ballet degree and graduating from that high school with honors.

"It was time to make a decision concerning my future," she says. "Dance had become very important to me, but I had never considered the possibility of making ballet my profession." In the end, her scientific bent led her to the electrical engineering department of Sapienza University, in Rome, where she is now an

associate professor focusing on computational electromagnetics and electromagnetic compatibility.

"My parents weren't so happy about my choice because, in their opinion, engineering was too difficult and not suitable for a girl," she says. "But they were paying for my studies, and I wanted to show them that my choice was right. That's why I gave up ballet and focused on engineering."

She began taking dance classes again in 1997—this time for fun, not competition. She's trying out other dance forms, she says. Next up are Caribbean dance and the Argentine tango.

"The most appealing thing is the way I feel while dancing," she says. "When I follow the rhythm, I have no space for real-world thoughts." —S.K.



PASSION
Ballet
OCCUPATION
Associate professor
HOMETOWN
Rome

If you have an interesting hobby you'd like to share, such as sculpting, mountain climbing, or playing in a band or orchestra, e-mail the editors at institute@ieee.org.



IEEE Smooths Student Path To World of Work

BY ANNA BOGDANOWICZ

With all the tough homework, along with little career counseling, being an engineering student isn't easy. IEEE can't make all the difficulties disappear, but it can help, thanks to a trio of benefits introduced for student members. You now get a boatload of software, career advice and, when you graduate, help with managing your transition to working engineer.

SOFTWARE SPECIAL A partnership with Microsoft gives student and graduate student members more than US \$2000 worth of software free.

About one week after you join or renew, IEEE will e-mail you a link and instructions for downloading any—or all—of more than 90 Microsoft software packages, including the company's latest operating system in its Windows Vista Business edition, the Expression Web design tool, and Project 2007 for project management. Other freebies include Visio 2007 and Windows Server 2003.

The Microsoft offer grew from a partnership formed last year with the IEEE Computer Society that offered the software to the society's members. After seeing the popularity of the offer, Microsoft extended it to all IEEE student members.

CAREER TIPS As graduation approaches, you are likely to have many questions about moving into the world of work, including what to include on a résumé, how to negotiate your starting salary, and how to land that dream job. *IEEE Potentials*—the student member magazine—can help answer such questions with its increased coverage of career-related topics. The July/August issue unveiled a new column, called “My First Job,” in which IEEE members reflect on their careers and the lessons they've learned along the way.

“*Potentials* is very interested in IEEE members' perspectives so we can give our student readers insight about how to approach their internships, first jobs, and careers,” says Member Suzanne Rivoire, editor in chief of the publication.

For the inaugural column, IEEE Fellow Karen Panetta, chair of the IEEE Women in Engineering Committee and an EE professor at Tufts University, in Medford, Mass., talked about the value of teams. “The most important thing I learned in my first year on the job was how important a good team is in developing successful engineering projects,” she writes. “I also learned that individuals with the best grades in college didn't necessarily make the most successful engineers.”

The May/June issue was devoted to career-oriented articles. “Looking to the Future,” by managing editor Craig Causer, offered advice on how to ask for the “right” salary. The article included a survey of the median salaries of professionals in various engineering fields and tips to help negotiate the salary you think you deserve. The issue also featured articles on the skills needed to climb the management ladder and how to become expert at troubleshooting problems quickly.

NETWORKING Taking the big step from student to professional is a lot easier if you have a network of colleagues to help you along. That's why continuing to belong to IEEE after you graduate is so important, says IEEE Member Megha Joshi, GOLD (Graduates of the Last Decade) representative to the IEEE Student Activities Committee.

For example, the Mentoring Connection (<http://www.ieee.org/mentoring>), an online service, can connect young professionals with seasoned volunteer mentors who can guide them through the challenges they face as working engineers. And IEEE memberNet (<http://www.ieee.org/memberNet>)—an online social network similar to Facebook—can connect you with members who may, for example, share your technical interests, have the same alma mater, or belong to the same technical society.

To explain the working world to student members and introduce them to networking, this month IEEE launched the Student Transition & Elevation Partnership (STEP) for sections, societies, and GOLD affinity groups. The organizations plan to hold workshops and events with professional engineers for graduating student members. One such event is a reception for the new grads that features talks by prominent engineers about their careers. The idea is to introduce students to a network of engineers and IEEE volunteers ready to offer career advice and help in finding jobs. Also planned are information sessions about the benefits of being an IEEE member.

“STEP fulfills student members' needs for career guidance and networking” and is a way for IEEE to grow its membership, says Joshi, who oversees the program. And of course, IEEE offers other benefits including discounts on technical conferences and access to the IEEE Xplore digital library (<http://ieeexplore.ieee.org>).

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RECOGNITIONS



MEMBER
CHARLES HOLLAND

has been awarded the 2008 *Government Computer News* Technology Leadership Award. The semimonthly *GCN* focuses on information technology, security, and news for federal, state, and local government in the United States. Holland was cited for his influence on the direction of government high-performance computing.

He is deputy director of the Defense Advanced Research Projects Agency information processing and techniques office and manager of its high-productivity computing systems program. His office oversees the development of command and control systems, automated language translation, sensors and processing, and cognitive systems.

Holland earned bachelor's and master's degrees in 1968 and 1969 in applied mathematics from Georgia Tech. He earned a Ph.D. in 1972 in applied mathematics from Brown University, in Providence, R.I.



FELLOW
KRISTINA M. JOHNSON

received the John Fritz Medal from the American Association of Engineering Societies. The first woman to receive the award, she joins the company of Alexander Graham Bell and Thomas A. Edison. Johnson was recognized for her expertise in optics, optoelectronic switching, and display technology.

One of the highest awards in the engineering profession, the John Fritz Medal is presented annually for scientific or industrial achievement. It was established in 1902 to commemorate Fritz, an engineer and mathematician specializing in partial differential equations.

Johnson has been provost and senior vice president of academic affairs at Johns Hopkins University in Baltimore since last September. She cofounded the Colorado Advanced Technology Institute for Excellence in Optoelectronics, in Boulder, and is director emeritus of the Optoelectronics Computing Systems Center at the University of Colorado, also in Boulder.

She earned bachelor's and master's degrees in 1981 and a doctoral degree in 1984, all in electrical engineering, from Stanford University.



SENIOR MEMBER
MARK E. RUSSELL

has been named vice president of engineering, technology, and mission assurance at Raytheon Co., a defense contractor headquartered in Waltham, Mass.

Russell now oversees 45 000 employees working on more than 8000 projects in engineering and technology research.

Previously, he was vice president of engineering for Raytheon's Integrated Defense Systems, where his responsibilities included supervising development and production of semiconductor products.

He holds patents for microwave and millimeter wave components, high-range-resolution radar applications, and missile seekers.

Russell is on the board of directors of the National Action Council for Minorities in Engineering, an organization that works to increase the number of minorities in engineering and other disciplines involving math and science. In 2001, the University of Massachusetts in Lowell inducted Russell into its Francis Academy of Distinguished Engineers.

He earned a bachelor's degree in electrical engineering in 1983 from the University of Massachusetts.

IN MEMORIAM

THOMAS SUTTLE
Former Managing Director,
IEEE-USA

AGE: 59 DIED: 26 April



Thomas Suttle was managing director of IEEE-USA from 1995 until he retired in 2004. He joined the organization in 1977 as staff

director of professional activities.

During his tenure as staff director, Suttle oversaw numerous IEEE-USA milestones, including the launch of IEEE-USA's online job listing service in 1995 and the passage of U.S. pension reform legislation in 2001.

He was an Air Force intelligence officer from 1971 to 1973, based at the U.S. Air Force Academy, in Colorado Springs, Colo.

Suttle earned a bachelor's degree in political science in 1971 from Sewanee: The University of the South, in Tennessee. He earned a master's degree in international studies in 1975 from Johns Hopkins University in Washington D.C.

BRIAN M. O'CONNELL
Connecticut Section Chair

MEMBER GRADE: Senior Member
AGE: 47 DIED: 21 May



Brian M. O'Connell, a professor of computer ethics, jurisprudence, programming, and robotics in the departments of computer science and

philosophy at Central Connecticut State University, in New Britain, died of cancer.

Before joining the university, O'Connell practiced constitutional law from 1987 to 1992 as an associate attorney for the law firm Slitt & Gerace, P.C., in Hartford, Conn.

When he died, O'Connell was the IEEE Connecticut Section chair, a position he had held since 2006. He also served this year as the IEEE Computer Society's ombudsman. O'Connell also held the society's highest grade of membership, that of Golden Core Member. From 2004 to 2005, he was president of the IEEE Society on Social Implications of Technology.

O'Connell earned a bachelor's

degree in 1983 in philosophy and psychology from Trinity College, in Hartford, and a law degree in 1987 from the University of Connecticut School of Law, also in Hartford.

RANDY PAUSCH
Computer Science Professor

MEMBER GRADE:
Associate Member
AGE: 47 DIED: 25 July



Randy Pausch, a professor of computer science at Carnegie Mellon University, Pittsburgh, was best known for his last lecture, "Really Achieving Your Childhood Dreams," which he gave in September after being diagnosed with pancreatic cancer and discovering he had a few months to live. His talk featured advice to students on how to achieve their goals and was videotaped and viewed on the Internet by millions.

He began his career in 1988 as an assistant professor of computer science at the University of Virginia, Charlottesville. In 1995 he was

creative director of Walt Disney's Imagineering Virtual Reality Studio, in Glendale, Calif., where he worked on interactive amusement park attractions. He joined Carnegie Mellon in 1997 as an associate professor of computer science, human-computer interaction, and design. Pausch cofounded the school's Entertainment Technology Center, which offers a master's degree program that trains artists, engineers, and computer scientists to work together to develop entertainment technology. He also developed Alice, a computer-programming application that lets users create 3-D computer animations. Pausch was a member of the IEEE Computer Society.

After his talk became so popular, he coauthored a book, *The Last Lecture* (Hyperion, 2007), which became a bestseller. He was one of ABC News' three 2007 "Persons of the Year," and *Time* magazine named him one of its 100 most influential people in the world.

He received a bachelor's degree in computer science in 1982 from Brown University, Providence, R.I. He earned a Ph.D., also in computer science, in 1988 from Carnegie Mellon.

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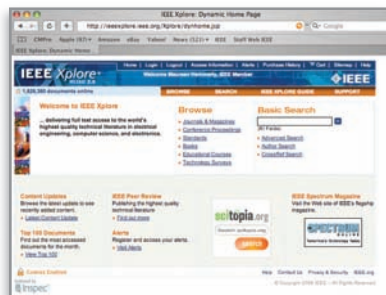
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