the institute

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[1] U.S. Department of Health and Human Services, National Clearinghouse for Long-Term Care Information, October 2008, www.longtermcare.gov.
[2] Genworth 2009 Cost of Care Survey, April 2009, www.genworth.com/content/genworth/us/en/products/long_term_care/long_term_care/cost_of_care.html.

BRIEFINGS

IEEE AROUND THE WORLD

REGION 9 — Latin America

- **Panama Section** establishes IEEE Engineering in Medicine and Biology Society chapter.
- Student branch at the **National University of Colombia at Bogotá** forms chapters of IEEE Circuits and Systems and IEEE Electron Devices societies.
- Student branch at **Pilot University of Colombia, Bogotá**, establishes WIE affinity group.
- Student branch at the **University of the Andes, Colombia**, forms IEEE Signal Processing Society chapter.
- Student branch at **Federico Villarreal National University, Lima, Peru**, establishes WIE affinity group.
- Student branch at the **University of Colima, Mexico**, establishes WIE affinity group.
- Student branches formed in Brazil at the **Federal University of Campina Grande, Paraíba**, and the **Pontifical Catholic University of Minas Gerais**.

REGION 1 — Northeastern United States

- 50th anniversary, **Green Mountain (Vt.)** and **Mid-Hudson (N.Y.)** sections.
- **Long Island (N.Y.) Section** establishes Life Members (LM) affinity group.

REGION 2 — Eastern United States

- **Pittsburgh Section** establishes joint chapter of IEEE Components, Packaging, and Manufacturing Technology and IEEE Electron Devices societies.
- **Bloomsburg (Pa.) University** forms student branch and chapter of IEEE Industrial Electronics Society.
- **Lehigh Valley (Pa.) Section** establishes IEEE Computer Society chapter.
- **Cincinnati Section** establishes LM affinity group.

REGION 3 — Southeastern United States

- **Florida West Coast Section** establishes IEEE Robotics & Automation Society chapter.

REGION 4 — Central United States

- 100th anniversary, **Milwaukee Section**.
- 25th anniversary, **Missouri Slope (N.D.) Section**.

REGION 5 — Southwestern United States

- **Central Texas Section** establishes LM affinity group.
- Student branch formed at **Missouri University of Science and Technology, Rolla**.

REGION 6 — Western United States

- 50th anniversary, **Las Vegas Section**.
- **San Fernando Valley (Calif.) Section** establishes IEEE Consumer Electronics Society chapter.
- **Orange County (Calif.) Section** establishes IEEE Solid-State Circuits Society chapter.
- **Richland (Wash.) Section** establishes IEEE Nuclear and Plasma Sciences Society chapter.
- Student branch at the **University of California, Los Angeles**, forms IEEE Engineering in Medicine and Biology Society chapter.

- **Albuquerque Section** establishes Women in Engineering (WIE) affinity group.

REGION 7 — Canada

- 50th anniversary, **Kitchener-Waterloo (Ont.) Section**.
- **Kitchener-Waterloo Section** establishes IEEE Photonics Society chapter.
- 25th anniversary, **North Saskatchewan** and **Petersborough (Ont.)** sections.
- **Toronto Section** establishes IEEE Nuclear and Plasma Sciences Society chapter.
- Student branch at the **University of British Columbia, Abbotsford**, forms IEEE Engineering in Medicine and Biology Society chapter.
- **Vancouver Section** establishes WIE affinity group.

REGION 8 — Europe, Middle East, and Africa

- 50th anniversary, **Switzerland Section**.
- **Morocco Section** forms joint chapter of IEEE Computer and Communications societies.
- **United Kingdom and Republic of Ireland Section** establishes chapters of IEEE Society on Social Implications of Technology and IEEE Dielectrics and Electrical Insulation Society.
- **Libya Section** establishes IEEE Power & Energy Society chapter.
- **Spain Section** establishes IEEE Systems, Man, and Cybernetics Society chapter.
- **Austria Section** establishes IEEE Systems, Man, and Cybernetics Society chapter.
- **Germany Section** establishes IEEE Consumer Electronics Society chapter.
- **Italy Section** establishes IEEE Nanotechnology Council chapter.
- **Izmir University of Economics, Turkey**, establishes student branch and WIE affinity group.
- Student branch at the **Petroleum Institute, Abu Dhabi, United Arab Emirates**, establishes WIE affinity group.
- Student branch at the **Modern Science and Arts University, 6 October City, Egypt**, establishes WIE affinity group.
- Student branch formed at **Jubail Industrial College, Ash Sharqiyah, Saudi Arabia**.
- Student branch formed at **German Jordanian University, Amman, Jordan**.
- Student branch formed at **University of Split, Croatia**.
- Student branch formed at **Fayoum University, Egypt**.

REGION 10 — Asia and Pacific

- 25th anniversary, **Kharagpur (India), Malaysia, South Australia**, and **Queensland (Australia)** sections.
- **Tainan (Taiwan) Section** establishes chapters of IEEE Systems, Man, and Cybernetics and IEEE Information Theory societies.
- **Harbin (China) Section** establishes IEEE Control Systems Society chapter.
- **New Zealand South Section** forms joint chapter of IEEE Power & Energy and IEEE Power Electronics societies.
- WIE student branch affinity groups formed in Pakistan at **NFC Institute of Engineering and Fertilizer Research, Faisalabad**, and **Pakistan Navy Engineering College, Karachi**.
- Student branches formed in India at **SSK College of Engineering and Technology, Coimbatore; Chadalawada Ramanamma Engineering College, Tirupati; Acropolis Institute of Technology and Research, Indore**; and **Prathyusha Institute of Technology and Management, Chennai**.

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

MARCH

1 1960: The Haloid Photographic Co., now Xerox Corp., ships the **first commercial photocopy machine**, the Model 914.

4 1906: **Robert von Lieben** of Vienna, Austria, applies for a patent on a "cathode-ray relay," an early electron-tube amplifier.

18 1965: Soviet cosmonaut **Aleksei Leonov** goes for the first space walk, on a Voskhod 2 flight.

18–21 **Region 3** meeting in Charlotte, N.C.

20 **Region 1** meeting in Newark, N.J.

20 1886: An IEEE Milestone, **the first commercial AC power plant and distribution system** in the United States, goes into service in Great Barrington, Mass.

22 1895: First public demonstration by Auguste and Louis Lumière of their **Cinématographe**, a motion picture projector, in Paris.

27 1845: Birth date of **Wilhelm Conrad Röntgen**, discoverer of X-rays and winner of the 1901 Nobel Prize in Physics.

APRIL

1 1976: **Steve Jobs** and **Steve Wozniak** found Apple Computer.

3 1973: Motorola project manager **Martin Cooper** makes the first phone call with a portable handheld phone.

9 1919: Birth date of **John Presper Eckert Jr.**, one of the designers of the ENIAC, EDVAC, and UNIVAC I computers.

10 1989: Intel introduces the **486 microprocessor chip.**
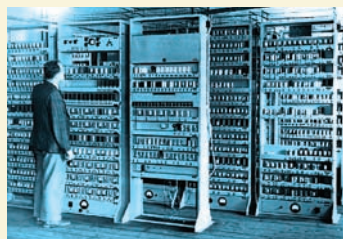
17–18 **Region 5** meeting in Dallas.

25 1874: Birth date of radio pioneer **Guglielmo Marconi**.

30 to 2 May: **Region 7** meeting in Calgary, Alta., Canada.

MAY

1 1947: The **first U.S. radar for commercial or private aircraft** is demonstrated on a Trans World Airlines plane.

2 1880: The **Columbia** becomes the first U.S. steamship to use electric lights.

6 1949: The first **practical stored-program computer, the EDSAC**, runs its first program at the Cambridge University Mathematical Laboratory.

7 1958: The first implantable **cardiac pacemaker** is placed in a dog.

8–9 **Region 8** meeting in Riga, Latvia.

14 1973: The United States launches **Skylab**, its first space station.

19 1971: The Soviet Union launches **Mars 2**, the first spacecraft whose descent module crash-landed on Mars.

Historical events provided by the IEEE History Center. **IEEE events** indicated in RED.

MOSHE KAM

Kam Wins Race for President-Elect

IEEE FELLOW MOSHE Kam is the 2010 president-elect, having received 15 690 votes in the 2009 IEEE election. The runner-up, Senior Member Joseph V. Lillie, garnered 14 903 votes, and Fellow J. Roberto Boisson de Marca received 12 704.

Kam begins his term as IEEE president on 1 January 2011, succeeding 2010 president Pedro Ray.

Kam is department head and professor of electrical and computer engineering at Drexel University, in Philadelphia, and serves as director of the university's Center of Academic Excellence in Information Assurance Education. He has been an active IEEE volunteer for more than 20 years, including service as vice president, IEEE Educational Activities, from 2005 to 2007. He was instrumental in developing TryEngineering.org, a Web site that promotes engineering, technology, and computing education to preuniversity students. Kam ran in the election for 2009 president-elect, coming in second.

For all the election results, see "And the Winners Are…" [p. 16].

IEEE Medal of Honor Goes to Viterbi

IEEE LIFE FELLOW Andrew J. Viterbi is the recipient of the 2010 IEEE Medal of Honor for his "seminal contributions to communications technology and theory."

While a professor at the University of California at Los Angeles in 1967, Viterbi developed a breakthrough in wireless technology that separated voice and data information from background noise. The system based on that algorithm, which now bears his name, is used in all four international standards for 3G digital cellular communications.

In 1985, Viterbi cofounded Qualcomm, a wireless telecommunications R&D company in San Diego, which grew to become the largest fabless chip supplier in the world. There he helped develop code division multiple access technology. CDMA applies spread spectrum to cellphones, resulting in a signal with a broader bandwidth.

Today he is president of the Viterbi Group, an equity investment fund in San Diego that he established in 2000. The fund advises and invests in emerging technology companies in wireless communications; network infrastructure; and image, optical, and signal processing.

ANDREW J. VITERBI

Viterbi is to receive the award on 26 June at the annual IEEE Honors Ceremony in Montreal.

The Medal of Honor is sponsored by the IEEE Frank A. Cowan Fund and the IEEE Foundation.

Two to Vie for 2011 President-Elect

THE IEEE BOARD of Directors has nominated Gordon W. Day and Joseph V. Lillie as candidates for 2011 IEEE president-elect. The two men, chosen by the board in November, will face off in the annual election later this year. The winner serves as 2012 IEEE president.

Day, a Life Fellow and the 2009 IEEE-USA president, is retired. He was a researcher and manager at the National Institute of Standards and Technology, in Boulder, Colo., for 33 years, until 2003. While there, his research focused on optoelectronics, including fundamental physical

GORDON W. DAY

measurements, standards for optical fiber, and the development of new concepts in instrumentation. In 1994 he founded and became the first chief of the NIST Optoelectronics Division. After leaving NIST, he served as a science adviser to Senator Jay Rockefeller (D-W. Va.) on an IEEE-USA Congressional Fellowship and later as the director of government relations for the Optoelectronics Industry Development Association. He also worked as a consultant, specializing in optoelectronics technology and science policy. Day has held various IEEE positions, including president of the IEEE Photonics Society (2000).

Lillie, a senior member, has 37 years of experience in telecommunications engineering and management. He held several positions at BellSouth Telecommunications facilities in Louisiana from 1973 to 2002, including design engineer, planner, district support manager, engineering manager, and planning manager. When he retired in 2002 from BellSouth, he was a member of the Louisiana BellSouth state staff, pro-
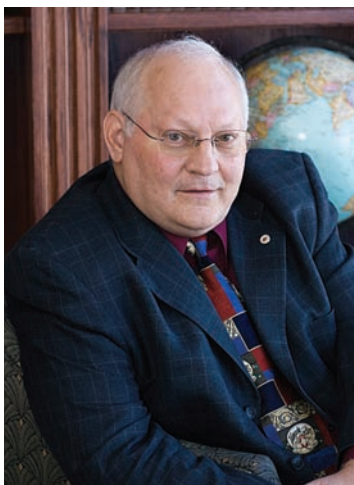
JOSEPH V. LILLIE

viding engineering and construction support. In 2003 he joined NorthStar Communications Group, in Birmingham, Ala., as director of corporate quality, and in 2005 he returned to BellSouth (now AT&T) to work on restoration projects following Hurricane Katrina. He continues to provide engineering support to AT&T in Louisiana on a part-time basis. He has held various IEEE positions, including 2008 and 2009 vice president, Member and Geographic Activities, and director of the IEEE Foundation. Lillie was the runner-up in the election for 2010 IEEE president-elect.

Record-Breaking Membership

IEEE SET ITS all-time record for membership in 2009, ending the year with 397 001 members. This represents an increase of 14 601 members, or 2.6 percent compared with 2008. Student membership totaled 58 914, an increase of 4826, or 9 percent, over 2008. Graduate student membership, which grew in all 10 regions, showed the most growth, totaling 38 261 members, or 23 percent more than the year before.

Five Named to Board of Directors

THE IEEE ASSEMBLY in November elected five officers to the IEEE Board of Directors. The new members, who began serving one-year terms on 1 January, are Tariq S. Durrani, vice president, Educational Activities; Jon G. Rokne, vice president, Publication Services and Products; Barry L. Shoop, vice president, Member and Geographic Activities; David G. Green, secretary; and Peter W. Staecker, treasurer.

The five join 28 colleagues on the board.

CORRECTION: The first name of the researcher at Bell Telephone Laboratories in Murray Hill, N.J., who contributed to the invention of the transistor was incorrect in "Honoring the Trailblazing Transistor" [December, p. 9]. His name was Gerald L. Pearson.

Tornado Trackers

IEEE members work to improve the science behind predicting tornadoes BY KATHY KOWALENKO

TORNADOES ARE nature's most violent storms, capable of quickly wreaking devastation and death. Most developed countries have radar to detect tornado formation, but scientists still don't understand all the factors that cause the storms. Because they pop up and dissipate so quickly, predicting where and when a bad one will hit more than 13 minutes ahead of time has not been possible.

To improve forecasting and increase warning times, the largest-ever tornado-measurement program, called the Verification of the Origins of Rotation in Tornadoes Experiment–2 (VORTEX2), is being conducted in the United States, which has more tornadoes than any other country—about 1200 per year. Under the right conditions, the storms form almost anywhere. They have turned up in Africa, Asia, Australia, Europe, and South America.

VORTEX2, launched last year, is designed to measure tornadoes' characteristics during their formation and life cycle. More than 100 scientists and students from 16 U.S. universities were deployed in 40 vehicles outfitted with mobile radar systems, weather instruments, and weather balloons and their launchers. They headed for Tornado Alley, which lies in the Central Plains, roughly from Texas to the Dakotas. It's the most active area for the storms, which surface from May to October.

The teams were on the road last year during the most active period, 10 May to 15 June, and hope to head out again this year around the same time.

Scientists first began researching the tornado life cycle in the mid-1990s, during the original VORTEX study. The results enabled the U.S. National Weather Service to provide severe-weather warnings with 13 minutes of average lead time instead of 5 and reduced the false-alarm rate to about 65 percent, a 10 percent drop. The National Science Foundation and the National Oceanic and Atmospheric Administration are funding VORTEX2.

THE IEEE TEAM

Several IEEE members are on the VORTEX2 team, including Senior Member Stephen Frasier and Graduate Student Member Vijay Venkatesh, both from the University of Massachusetts, Amherst, and Member Peisang Tsai, from the National Center for Atmospheric Research, in Boulder, Colo.

Frasier, an electrical and computer engineering professor, is director of the university's Microwave Remote Sensing Laboratory. Venkatesh is an EE grad student who works in the lab, and Tsai was a research fellow at the lab until July.

"The lab's bread and butter is designing, building, and operating radar systems and analyzing their data," Frasier says. The UMass laboratory has been collaborating with other meteorological organizations since 1993 to study tornadoes and other severe storms. Researchers there built two mobile polarimetric Doppler weather radar systems: a 9.4-gigahertz X-band microwave radar and a 95-GHz W-band millimeter-wave radar.

The two Doppler systems send into a storm differently polarized signals that reflect off water droplets and debris and are then analyzed. The W-band radar offers the finest resolution of any mobile Doppler radar system in the country because it produces a very narrow beam (0.18 degrees wide). At a 10-kilometer range, the spatial resolution is roughly 30 meters, about five times as fine as most other radars, Frasier says.

A LOOK INSIDE

The truck-mounted Doppler radars "see" inside the storms and determine what's going on in terms of wind speed, wind shear, raindrop density, and other conditions. They map the wind field from the very lowest to the very highest tornado levels and document the structure of multiple, sub-tornado-scale vortices, believed to cause much of the local damage.

"We can deduce tornado properties by looking at the two different polarizations, similar to looking through the lenses of polarized sunglasses," Frasier says. "The polarization helps us discriminate among rain, hail, and debris picked up off the ground."

The radar signature is so distinctive that computers can be programmed to recognize it, electronically shouting "Tornado!" so warnings that are more timely and precise can be issued.

Last May, the group drove the lab's pair of radar-equipped trucks the 2600 km from Massachusetts to meet up with the rest of the VORTEX2 team at the University of Oklahoma School of Meteorology, in Norman, the country's leading severe storm research center. They then set out to get their samples. "Last year's trip was a great educational experience, because it brought together teams from different disciplines," Venkatesh says. "It was a privilege to be involved."

Although chasing storms may look scary, Tsai says it's quite safe: "You're chasing with the most knowledgeable meteorologists, who know the safe side of the storm to be on. The biggest concern is driving safely."

The data collected is analyzed by researchers and graduate students at the University of Oklahoma. It's too early for preliminary findings to emerge from last year's work, because most of the data is still being examined. "The data will be used to determine the life cycle characteristics of tornadoes so that we better understand how they form, why they form, and how they evolve," Frasier says. "Ultimately, the goal is to do a better job of predicting when they're going to happen, to help save lives and mitigate damage."

At press time, the UMass group was awaiting word on funding for this year's twister hunt. If the funding comes through, the team plans to test out a new solid-state version of its X-band radar—it relies on a solid-state power amplifier in place of the magnetron tube used last year. ∎

Looking at the Gender Gap

BY ANNA BOGDANOWICZ

ALTHOUGH OUTREACH efforts to bring more women into engineering are abundant, a large gender gap still exists. Men continue to outnumber women in engineering fields around the world, with women making up roughly 10 percent of engineers, according to the 2009 Global Women in Engineering survey by the UK Resource Centre for Women in Science, Engineering, and Technology.

That percentage has remained relatively constant for the past few years. The survey asked engineers about the gender gap, and 79 percent of respondents agreed that women are underrepresented in engineering, though 38 percent said the gap doesn't matter.

Why do women continue to remain underrepresented? Does it really matter? And what can be done to close the gap? *The Institute* asked four IEEE members with experience on the issue to weigh in.

IEEE Fellow Eve Riskin is a professor of electrical engineering and an associate dean of academic affairs at the University of Washington's College of Engineering, in Seattle.

Ramalatha Marimuthu, an IEEE senior member, is head of the electronics and communication engineering department at the Anna University Karpaga Vinayaga College of Engineering and Technology, in Chennai, India.

IEEE Fellow Alice Parker is a professor of electrical engineering at the University of Southern California, in Los Angeles. And IEEE Fellow Karen Panetta chaired the Women in Engineering (WIE) Committee in 2009 and is a professor of electrical and computer engineering at Tufts University, in Medford, Mass.

WHY THE GAP?
Contributing heavily to the gender gap are unappealing stereotypes of engineers and a difficult balancing act with work and family obligations, the four IEEE members agree.

Women are attracted to careers that help society, and the idea that engineering is a purely technical field of no benefit to humanity pushes them away, says Riskin. "They aren't seeing the connection of how engineers can change the world," she says.

Parker agrees. "I believe many women aren't attracted to engineering because the traditional approaches to the field lack immersion in its social benefits," she says.

Certain engineering fields, such as electrical and mechanical engineering, exhibit an even wider gender gap because of a negative stigma, according to Panetta.

"What are electrical and mechanical engineers best known for by the general public? As stiffs with no personality and no social life," she says. "Who wants to pursue a career having that stigma? That's why the chemical and biomedical engineering fields are by far the most popular for women, who also understand the social mission of these fields is to help individuals by using technology to cure diseases or develop assistive technologies."

Balancing family and the heavy workload of engineering is a problem for women because "taking care of family has always been considered the woman's responsibility," Marimuthu says. "When a woman passionately wants to pursue a career, she typically doesn't receive enough support from her family."

She notes, too, that although women enter other demanding fields such as medicine and law in high numbers, those jobs often offer them greater flexibility than engineering does. "Careers like law or medicine give women more opportunities to work part-time to balance family demands," she says. "But engineers won't find many openings for part-time jobs."

Does it matter whether women enter engineering fields? Riskin says the answer is in the numbers. "If you reduce the pool of engineers by not including more women, you've probably ruled out some talented people," she says. "Mathematically, if you're optimizing over a set, the larger the set, the better the solution."

Parker says more progress would be made in areas of benefit to humanity if women entered engineering in higher numbers. "I'm seeing an increased focus on solving socially relevant problems with engineering, coming from both men and women," she says. "I think that's wonderful, and if bringing more women into the field moves engineering even further in this direction, that would be a very good thing."

MARKETING PLAN
To attract more women to engineering, the four IEEE members say it's important to reach out to them while they're still young and dispel negative stereotypes.

In part to show girls that engineering is an attractive career choice, Panetta started the Nerd Girls program at Tufts in 1996. About 14 engineering undergrads each year work on socially conscious projects such as environmental cleanup, green energy, and improving mobility for the disabled [see Member Profile, *The Institute*, December 2008, p. 18].

"Nerd Girls attacks the negative stereotypes of female engineers and shows youngsters how normal, well-rounded young women like them can change the world through science and engineering, even if they're not the best at math and science," she says.

Marimuthu, who in 2006 formed the IEEE Madras (Chennai) Section's WIE group, reaches out to girls in rural villages to show them how engineers can make a difference. She started the Sangamam Project: Transferring Technology to Rural Areas. Marimuthu enlists her school's IEEE student branch to visit rural villages and teach girls and young women about engineering through presentations, contests, and hands-on projects. "Science and technology competitions and projects are successful at attracting more girls to the engineering field," she says.

Reaching out to girls is also the strategy behind Riskin's outreach project, the University of Washington Women's Initiative. Female engineering students try to dispel stereotypes by making presentations to girls in middle and high schools, showing them how engineering is relevant to people's lives. Riskin's students also use hands-on projects to show that engineering can be fun.

"Students in our outreach program say that if you want to help a person, become a doctor," Riskin says. "But if you want to save the world, become an engineer. If women understood that, more would become engineers."

Parker emphasizes that it's essential to connect with prospective female engineers when they're young. Wait too long and it might be too late.

"It's important to reach them in middle school because in high school, attitudes and preferences about career choices are already becoming entrenched, and it becomes more difficult to change their minds," she says. ∎

FOR MORE INFORMATION on the IEEE WIE program, visit http://www.ieee.org/women.

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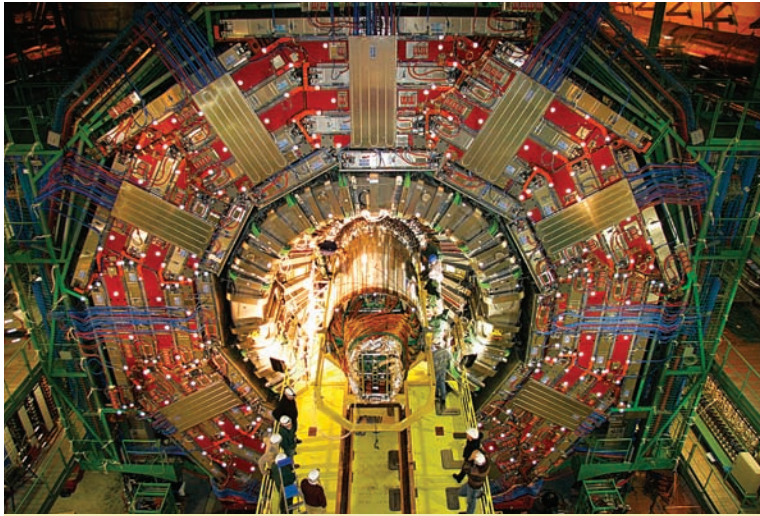- Earn Continuing Education Units (CEUs) and Professional Development Hours (PDHs)

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THIS MONTH'S QUESTION:
When Particles Collide

The Large Hadron Collider was turned back on in November after breaking down in September 2008, and it quickly recorded its first proton-proton collision. The LHC was developed to search for new particles and properties of nature by colliding two counter-rotating proton beams. Supporters say the collider could help scientists answer some of the most fundamental physics questions and may even explain how the world began. But critics believe building the US $10 billion machine is a waste of time and money. They also think it might even be dangerous because it could create tiny black holes where the particles smash together, although physicists have refuted that idea. Other critics say the laws of nature will prevent the collider from making any breakthroughs.

Do you think the LHC is a worthwhile scientific endeavor? Will it help answer important questions about the nature of our universe?

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 June issue of The Institute *and may be edited for brevity. Suggestions for questions are welcome.*
MAIL: *The Institute, IEEE Operations Center, 445 Hoes Lane, Piscataway, NJ 08854-4141 USA* **FAX:** *+1 732 562 1746* **E-MAIL:** *institute@ieee.org*

RESPONSES TO DECEMBER'S QUESTION
The Exclusivity Dilemma

The U.S. Federal Communications Commission is investigating whether exclusive contracts between cellphone makers and carriers are helpful or harmful to innovation. One such example is the arrangement making AT&T the exclusive carrier for Apple's iPhone in the United States. Many iPhone users complain about AT&T's service but love the iPhone and won't switch to another carrier. In France and other countries, however, the iPhone can be used with a number of providers. Critics of exclusive contracts argue they inhibit innovation and are unfair to consumers. But some wireless carriers say such deals promote innovation by inspiring cellphone makers to develop imaginative products.

Do you think exclusive cellphone contracts inhibit or promote innovation? Are they fair to consumers?

Exclusivity Serves No One

There are several reasons why exclusivity contracts are unfair to consumers and should be banned. First, such contracts divert technology companies' resources. Rather than focusing on real innovation, they instead work on finding ways to duplicate a new feature without infringing on a competitor's patent or trademark. As a result, there are fewer innovations and higher costs for the company. However, this is not the most serious problem with such contracts.

The contracts are unfair to consumers because they tie them to a product or a service. This was the issue that led to the breakup of the original AT&T years ago. The company used its natural monopoly of local service to tie customers to their telephones and their long-distance service.

Another way in which the contracts are unfair is that the list price of the innovative phones is inflated because they cannot be purchased elsewhere.

Finally, there are gaps in the service coverage of all service providers, and consumers should be able to select from the services available in the areas where they spend most of their phone time.

ALEX SCHNEIDER
Addison, Ill.

Monopolies Are Unfair

The consumer should be able to use a particular cellular device on any mobile phone network. Exclusive contracts are a monopoly, and I am shocked that the U.S. government has not stepped up to prohibit these cartels.

JOE GOLDSTEIN
Waitsfield, Vt.

Openness Needed

If the spirit of free and open-source initiatives is to spread further, we should not allow such selfishness as exclusive cellphone contracts to be imposed on consumers. I see no logical reason why people should be forced to use the service provider that comes bundled with the phone they buy. Such a business strategy mocks consumer rights. Institutions and industries that pioneer technological advancements should have responsibility for the advancement of innovation, and that should be given more priority than financial gains.

SHARATH P. SATHEESH
Kerala, India

Generation Gap

First, I want to applaud AT&T for having the foresight to allow Apple free rein in the creation of the iPhone—which I understand other carriers would not allow. That, of course, was in exchange for exclusivity rights. However, it is now past time to allow the iPhone technology to evolve further with other carriers, as well as to push AT&T to catch up in the 3G-to-4G evolution.

JOSEPH T. CIOLETTI
Pittsburgh

Caveman Contracts

Exclusive contracts reduce the need for competition and slow the pace of innovation so that providers can limit their capital investment without losing business to others. Compared with the rest of the world, the United States is in the Stone Age.

JANE E. NORDHOLT
Los Alamos, Calif.

Faulty Assertions

It's clear that the United States is far behind much of the world in the cost and use of cellular technology. This regrettable fact is driven by restrictive marketing arrangements; the assignment of wireless coverage areas to specific carriers, which restricts competition and service availability; and questionable billing practices for phone calls and text messages.

The argument that exclusive marketing arrangements between wireless providers and cellphone manufacturers somehow encourage technology development is completely bogus. It makes no sense that shrinking the size of the cellphone marketing pool would encourage manufacturers to spend their money to develop a better product.

RESAL A. CRAVEN
Kingman, Ariz.

Inspiration for Hackers

The main innovation I see that came from the iPhone's nasty closed policy is how to jailbreak it. Here, Apple smacks of monopoly, a stench familiar to its competitor Microsoft.

JONATHAN SCOTT
Hamilton, New Zealand

MICHAEL HOCH/CERN

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www.sfiprogram.org

What's in a Tagline?

IEEE HAS ADOPTED the tagline "Advancing Technology for Humanity," a memorable phrase that summarizes IEEE's essence and reinforces an audience's identity with the IEEE "brand." It recently debuted on the IEEE Web site and in several other select places. In time, you will see it on IEEE print and electronic materials.

I like the new tagline because it is a reflection of our organization's culture and personality. It also reflects what we are all about: advancing technology and benefiting humanity.

As people come to associate these words with IEEE, it will help in our efforts to create greater awareness of our organization, promote the IEEE brand, and tell the world about the contributions of members in engineering and other technology areas. IEEE intends to make the message of the tagline a key component of its brand identity.

I was a member of the Board of Directors' first Public Visibility Ad Hoc Committee, led by 2007 IEEE President Leah Jamieson. The committee established a formal path to increase the visibility of IEEE, its members, and the profession. In 2008, the board approved a program that includes positioning members as thought leaders and implementing a long-term media campaign. The program also includes guidelines for such things as the use of the IEEE name, the IEEE Master Brand, the colors associated with the organization, and the typefaces used to communicate our messages.

All have been developed to visually and intellectually convey the powerful ideas that we bring to every member and customer. Now in its second year, the program also seeks to position IEEE as the voice of the profession. Current efforts are directed at preuniversity and university students, members, and other technology professionals in 10 countries: Brazil, Canada, China, Germany, India, Japan, Mexico, South Korea, the United Kingdom, and the United States.

In addition to increasing awareness and enhancing the image of IEEE among these groups, the Public Visibility Committee determined it was important to strengthen our brand with more consistent messages across IEEE and around the world. To that end, the tagline was chosen last year after extensive research among the targeted audiences in all 10 countries.

"Advancing Technology for Humanity" reflects IEEE's core purpose, or mission, which is "to foster technological innovation and excellence for the benefit of humanity." This statement came more than two years ago from the development of the IEEE Envisioned Future, which lists "service to humanity" as the first

> "Advancing Technology for Humanity" reflects IEEE's core purpose, which is "to foster technological innovation and excellence for the benefit of humanity"

of eight core values. Since then we have increased efforts toward achieving our strategic vision that, in part, calls for IEEE to be "universally recognized for the contributions of technology and of technical professionals in improving global conditions."

BRANDING IS IMPORTANT
When the Board of Directors adopted the IEEE Master Brand (the diamond shape or "kite" with the letters *I-E-E-E* to its right) some 10 years ago, we estimated that the IEEE brand could then be worth more than US $1 billion. On balance sheets, that value is often referred to as "good will." It is used to reflect the portion of the book value of a business not directly attributable to its assets and liabilities. With our increasing public visibility in key global markets, coupled with our 125-year history and worldwide reputation, imagine our value today!

Although a brand may have a monetary value, it is much more than that, especially in the case of IEEE. It encompasses the entire experience an individual has with an organization. Our name, the IEEE Master Brand, the corporate positioning, the tagline, and the look and feel of various communications materials are among the many elements that make up our brand identity. All work together to increase recognition of IEEE.

WHAT'S NEXT?
IEEE will continue to make strides through its public visibility program. But if we want to continue to grow membership and increase our influence with businesses and governments worldwide, we must all support efforts to strengthen our brand identity. I encourage you to get involved by becoming more familiar with the way we are positioning IEEE by visiting http://www.ieee.org/go/brand. Read the IEEE positioning statement. Review the short explanations of IEEE—our "elevator speeches"—and adapt them to your own style so you can respond easily the next time someone asks you "What is IEEE?"

And, if you are one of the thousands of members who serve in a volunteer role, I encourage you to follow the IEEE Visual Identity Guidelines when you communicate about your activities, including the use of the tagline. That will help us build a more consistent image around the world. And lastly, I hope that you will join me in taking pride in being part of our great organization, which is advancing technology for humanity.

Pedro Ray
IEEE President and CEO

BENEFITS

PRODUCTS & SERVICES

IEEE Xplore Packages Tailored to Your Interests

BY KATHY KOWALENKO

WITH THE IEEE Xplore digital library at more than 2.5 million documents and growing, there's a lot of material to wade through. That's why IEEE offers 13 subscription options tailored to a variety of research areas. Here are 10 of them:

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The IEEE Communications Library offers access to eight core publications on telecommunications, including *IEEE Communications Magazine, IEEE Network, IEEE Transactions on Communications*, and *IEEE Journal on Selected Areas in Communications*. It also includes proceedings from the IEEE Global Communications Conference and the IEEE International Conference on Communications. Plus, in the course of a year you can get 1000 downloads of IEEE journals and conference proceedings.
http://www.ieee.org/go/ communicationslibrary

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http://www.computer.org/library

For companies, the IEEE Computing Library provides unlimited access to all IEEE computing journals and magazines. It includes 1000 document downloads from other IEEE periodicals as well as conference proceedings.
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The AIP/AVS Applied Physics Library offers access to five of the world's leading research journals from the American Institute of Physics and AVS (formerly the American Vacuum Society). The library holds more than 250 000 articles from *Applied Physics Letters*, the *Journal of Applied Physics*, and the *Review of Scientific Instruments*, all from AIP; and the *Journal of Vacuum Science and Technology A: Vacuum, Surfaces and Films* and the *Journal of Vacuum Science and Technology B: Microelectronics and Nanometer Structures*, both from AVS.
http://www.ieee.org/go/ appliedphysics

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If you need articles or conference proceedings on energy conversion, high-voltage and power systems, power transmission, reliability, solar power, or wind power, you can find them and more in the IEEE Power & Energy Library. The collection has more than 75 000 documents, with some going back to 1988, plus select content dating to 1893.
http://www.ieee.org/go/ powerlibrary

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The IEEE Standards Online subscription offers access to all 2800 IEEE standards, including draft and archived versions. It's also possible to subscribe to more targeted collections of standards on, for example, software engineering, information technology, or telecommunications.

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JAN ZOGRAPHOS/ISTOCKPHOTO

IEEE World Congress on Computational Intelligence

Barcelona, 18–23 July

The congress comprises three conferences: the International Joint Conference on Neural Networks, the IEEE International Conference on Fuzzy Systems, and the IEEE Congress on Evolutionary Computation. Topics include data mining, self-organization with information theoretic learning, and evolutionary computation for risk assessment and management. **SPONSORS:** IEEE Computational Intelligence Society, the International Neural Network Society, the Evolutionary Programming Society, and the Institution of Engineering and Technology **VISIT:** http://www.wcci2010.org

IEEE International Microwave Symposium
Anaheim, Calif.
23–28 May

The focus is on radio frequency and microwave theory and techniques, with an emphasis on electronic components and design, and micro- and nanotechnologies. Seminars, tutorials, and short courses for experts and newcomers to the field feature presentations by industry leaders covering recent developments in fabrication, instrumentation, computer-aided design, and deployment. **SPONSORS:** IEEE Microwave Theory and Techniques Society and the International Microwave Symposium Steering Committee **VISIT:** http://www.ims2010.org

IEEE International Symposium on Circuits and Systems
Paris
30 May–2 June

The symposium focuses on theory, design, and implementation of circuits and systems. Topics include nano devices, circuit fabrics, switching speeds, energy efficiency, and reliability. Analog signal processes, biomedical circuits and systems, cellular neural networks, and array computing are on the agenda as well. **SPONSORS:** IEEE Circuits and Systems Society and the Institut Supérieur d'Electronique de Paris **VISIT:** http://www.iscas2010.org

IEEE International Workshop on Signal Processing Advances in Wireless Communications
Marrakech, Morocco
20–23 June

Topics include mobile systems, wireless sensor networks, and signal recovery. Smart antennas, multiple-input and multiple-output systems, space-time coding, signal separation, and interference rejection are also covered. **SPONSORS:** IEEE Signal Processing Society and the European Association for Signal Processing **VISIT:** http://www.spawc2010.org

Mathukumalli Vidyasagar

Sidestepping Side Effects

An IEEE Fellow takes on expensive
drug development methods

BY SUSAN KARLIN

A WELL-KNOWN researcher before age 30 and one of the youngest IEEE Fellows when he was 35, Mathukumalli Vidyasagar has spent the last 20 years working on turning his homeland, India, into a global engineering center.

The university professor left Canada for India in 1989 to focus on cutting-edge artificial intelligence, robotics, and industrial software. Now he's in the United States to take on another challenge: overhauling costly drug development methods through early prediction of potential side effects.

In September he joined the mechanical engineering department of the University of Texas at Dallas as a holder of a Cecil and Ida Green Chair in Systems Biology Science. He also holds a joint appointment in the five-month-old biomedical engineering program at UT Dallas, a joint venture with the University of Texas Southwestern Medical Center at Dallas and the University of Texas at Arlington. Vidyasagar is conducting research into the interaction between computation and biology. He developed an interest in the topic when his daughter began studying cellular and molecular pathology at the University of Wisconsin, his alma mater.

Vidyasagar, 62, wants to come up with a set of mathematical models for how the majority of human beings are likely to react to a drug and how that drug might be altered to reduce side effects. Such a system could save hundreds of millions of dollars in development costs and reduce the side effects of new drugs. But to come up with such models, Vidyasagar first needs to determine what constitutes average physiology and how physiology varies from person to person.

"Advances in biological experimentation in the past two to three years have made it possible to get huge amounts of really good raw data, which we can turn into engineering models that can predict how certain populations will respond to various drugs before engaging in expensive clinical trials," he says. "The vast majority of potential drugs cause too many unwanted side effects, but toxicity is not constant across people. The first step is to create a mathematical model of the average human and the variation across human beings from a cross section of people. We need to create models at various levels: cells, organs, and the whole body."

One problem is that new drugs can perform well in animals but not in humans and most side effects tend to show up in the final steps of the drug development cycle, during human trials. The later the failure, the more costly it is to the pharmaceutical companies. Not only might they have to start over again, but they eventually pass on any extra costs through higher prices. Phase I trials, when healthy volunteers get an experimental drug, can run US $3 million to $5 million. Phase II, during which the drug is administered to patients with the targeted illness, costs $30 million to $50 million. Phase III trials, which determine the drug's long-term toxicity, can run as high as $300 million.

"Why do humans sometimes react so differently from animals to certain drugs? The mathematical model we're working on would let us see, before any trials, whether it's necessary to tweak drug molecules in such a way that humans won't get negative side effects," Vidyasagar says.

Designing drugs to the maximum extent possible in a computer will be the next big research trend, he predicts. The cost of determining a person's genome sequence is expected to fall from $60 000 to $5000 in the next year or two, encouraging correlations between an individual's genetic makeup and responses to specific drugs.

WHIZ KID

An academic prodigy, Vidyasagar enrolled in the University of Missouri at age 13 in 1961, the year after his family moved from Tirupati, a small town in southeast India, to Columbia, Mo., when his father landed a job as a math professor at the university. The teen started in mechanical engineering but switched to electrical engineering after realizing he enjoyed tinkering with circuits. He transferred to the University of Wisconsin in 1964, graduating with a bachelor's degree in 1965, a master's in 1967, and a Ph.D. in 1969 at age 21.

For the next 20 years, he taught electrical engineering at Marquette University, in Milwaukee; Concordia University, in Montreal; and the University of Waterloo, Ont., Canada, before returning to India in 1989. There he served as director of the Ministry of Defence's Centre for Artificial Intelligence and Robotics, in Bangalore. He went on to become executive vice president of Tata Consultancy Services, in Hyderabad, developing an industrial R&D lab focused on computational biology, qualitative finance, and e-security, before accepting the UT Dallas position.

"We'll never be able to design new drugs completely by computer, but in 5 or 10 years we expect to be able to reduce the amount of trial and error involved in cutting down on side effects by 90 percent," he says. ∎

MATT NAGER

Celia Desmond

Hello, Dolly!

CELIA DESMOND can thank a casual comment from her husband 12 years ago for what has become her passion today. He told her about a local course on making porcelain dolls. She plunged in, and today, the IEEE senior member has created some 50 dolls, in both modern and antique styles, and is shopping a book on dollmaking techniques to publishers.

Desmond is founder of World Class Telecommunications, in Toronto. Her hobby has her making molds of the dolls' porcelain heads and limbs, painting the faces, and sewing their outfits. To keep her skills sharp, she attends classes taught by master dollmakers.

Modern and antique dolls are quite different. Modern ones can be painted however you like, but an antique needs to look like a doll from a specific period and manufacturer—each had its own style. Such a doll must re-create the exact look and style of how the face was drawn, how the mold was cast, and how the clothing was sewn, Desmond explains. "There's a rigid set of rules to follow," she says. "If you just copy it, it won't come out right. You have to put something of yourself in it, too."

There's also a significant difference in the amount of labor. A modern doll takes Desmond about 25 hours, but an antique replica can take her more than 100. And that's not counting all the time spent drying the paint and firing the doll parts in the kiln in her home workshop. Desmond creates castings of a doll's head and limbs (bodies are usually of leather, cloth, or a composition material) by pouring ceramic into a mold, then uses a surgeon's knife and special tools to delicately cut and sand sockets for glass eyes. The piece is then fired at about 675 °C to harden it enough for a thorough smoothing and painting, then fired again at about 1200 °C to turn it into porcelain.

For painting, Desmond follows technique sheets—photos of the original antique doll from its manufacturer and period, with instructions on details like the number of eyelashes. Next comes making the doll's clothing. This includes making the pattern, sewing, beading, and embroidering.

Dollmaking, like engineering, involves painstakingly meticulous work and a steady hand with delicate material, Desmond says. "In both, you need to know a lot of very specific information to do a good job."

—Susan Karlin

PASSION Making porcelain dolls
PROFESSION Telecom management consultant
HOMETOWN Toronto

Michael Lightner

Renaissance Man

IEEE FELLOW Michael Lightner's journey to Carnegie Hall took a lot more than just practice. It took musical and professional soul-searching, as he moved forward in his electrical engineering career.

Lightner, the 2006 IEEE president and chair of the electrical, computer, and energy engineering department at the University of Colorado at Boulder, performs in nearly half a dozen concerts a year as an early music woodwind player. He plays Renaissance and baroque music on replicas of the antique recorders and flutes of those periods.

These instruments are harder to play than their modern descendants because they have fewer keys and require more complex fingerings and breath direction. In a modern equal-tempered musical scale, the 12 notes in an octave are equally spaced. Not so for the notes in an octave as played on a baroque wind instrument. "Playing fast passages on early instruments can be difficult but also leads to a nuanced sound, which is one of the reasons I got into 17th- and 18th-century music," Lightner says.

Lightner performs with various ensembles, including the Baroque Chamber Orchestra of Colorado and a duo with his wife.

His interest in playing early woodwinds didn't develop until grad school. While at the University of Florida in Gainesville, he spent the summer at IBM's Thomas J. Watson Research Center, in Yorktown Heights, N.Y., working with IEEE Fellow Gary Hachtel, who in his free time played baroque recorder, as well as piano. Captivated, Lightner took baroque recorder lessons and, back in Florida, signed up for music classes. He even dropped out of his Ph.D. program for a year to study early music full-time. (He completed his Ph.D. in EE at Carnegie Mellon University, in Pittsburgh, in 1979.)

It was in 1988, while on sabbatical at Bell Laboratories in Murray Hill, N.J., and studying in the evenings at Mannes College, the New School for Music, in New York City, that Lightner achieved the musician's Holy Grail: He played at Carnegie Hall as a member of the school's recorder ensemble, in a Christmas program. "Even with a lot of people onstage I still felt nervous, but it was a thrilling experience," he says.

Music has also helped his career. "Performing has made me more comfortable speaking in front of a classroom or at IEEE meetings." —S.K.

PASSION Performing early music
PROFESSION EE professor
HOMETOWN Boulder, Colo.

If you have an interesting hobby you'd like to share, e-mail the editors: institute@ieee.org.

OF NOTE

2010 ANNUAL ELECTION

Election Countdown

ON 1 MAY, the IEEE Board of Directors will announce the candidates to be placed on the 2010 ballot. They will include candidates for IEEE president-elect, nominated by the IEEE Board of Directors. Others will be nominees for delegate-elect/director-elect positions up for election this year submitted by their respective regional and divisional nominating committees. The ballot will also include nominees for members-at-large of the IEEE Standards Association Board of Governors; vice president–elect for IEEE Technical Activities; and IEEE-USA president-elect and IEEE-USA member-at-large. The Board of Directors is also responsible for placing proposed constitutional amendments on the ballot.

Members who are not nominated but want to run for office may do so by submitting a completed petition in a letter to the Board of Directors, to be received at IEEE by 15 April 2010.

For members to be eligible for placement on the ballot, petitions must be accompanied by the necessary number of valid voting members' signatures. Prospective candidates must meet other requirements as well.

DEADLINES AT A GLANCE

15 MARCH
- IEEE Divisional nominating committees submit candidates for the office of divisional delegate-elect/director-elect, as applicable.
- IEEE Regional nominating committees submit candidates for the offices of regional delegate-elect/director-elect, as applicable.
- IEEE Standards Association submits candidates for the offices of IEEE Standards Association Board of Governors members-at-large.
- IEEE Technical Activities submits candidates for the office of IEEE Technical Activities vice president–elect.
- IEEE-USA submits candidates for the offices of IEEE-USA president-elect and IEEE-USA member-at-large.

15 APRIL
- Deadline for drafts of petitions to be submitted to the Board of Directors.

1 MAY
- Board of Directors submits to the voting membership a list of nominees for IEEE president-elect; delegate-elect/director-elect, as applicable; and other positions to be elected by voting members for the coming term.
- Board of Directors announces whether it intends to put forward any constitutional amendments.
- IEEE Corporate Activities must receive initial campaign statements from all nominated annual election candidates.

11 JUNE
- Petitions for constitutional amendments must be received by noon EDT USA/16:00 UTC.
- Petition nominations for candidates to be elected by the membership must be received by noon EDT USA/16:00 UTC.

- Initial statements by principal initiators and opponents of constitutional amendments must be received.
- Corporate Activities must receive initial campaign statements from individuals to be nominated by petition.

28 JUNE
- Corporate Activities mails initial statements by proponents of proposed constitutional amendments to opponents and opponents' initial statements to proponents.

5 JULY
- Deadline for rebuttal statements from initiators and opponents of proposed constitutional amendments.

1 AUGUST
- IEEE annual election ballots are sent to all voting members on record as of 30 June.

1 OCTOBER
- Last day for receipt of ballots from voting members (by noon CDT USA/17:00 UTC).

8 OCTOBER
- Last day for ballots to be tallied by IEEE Tellers Committee.

13 OCTOBER
- Last day for announcement of vote tally to Board of Directors by IEEE Tellers Committee.

21 NOVEMBER
- Board of Directors acts to accept report of IEEE Tellers Committee. Annual election results are made official.

UP FOR ELECTION IN 2010

Chosen by all voting members:
- IEEE president-elect

Chosen by members in Regions 1–6:
- IEEE-USA president-elect
- IEEE-USA member-at-large

Chosen by members of the IEEE Standards Association:
- IEEE Standards Association Board of Governors members-at-large

Chosen by members of the respective technical divisions:
- IEEE Technical Activities vice president–elect
- IEEE Division I delegate-elect/director-elect
- IEEE Division III delegate-elect/director-elect
- IEEE Division V delegate-elect/director-elect
- IEEE Division VII delegate-elect/director-elect
- IEEE Division IX delegate-elect/director-elect

Chosen by members of the respective regions:
- IEEE Region 2 delegate-elect/director-elect
- IEEE Region 4 delegate-elect/director-elect
- IEEE Region 6 delegate-elect/director-elect
- IEEE Region 8 delegate-elect/director-elect
- IEEE Region 10 delegate-elect/director-elect

FOR MORE INFORMATION on election procedures, contact Carrie Loh, IEEE Corporate Activities, at +1 732 562 3934, e-mail: c.loh@ieee.org.

2009 ELECTION TALLY

And the Winners Are…

The IEEE Tellers Committee tally of valid 2009 election ballots, approved in November by the IEEE Board of Directors, is as follows:

IEEE PRESIDENT-ELECT, 2010
Moshe Kam	15 690
Joseph V. Lillie	14 903
J. Roberto Boisson de Marca	12 704

DIVISION DELEGATE-ELECT/DIRECTOR-ELECT, 2010
Division II
J. Keith Nelson	1 407
Caio A. Ferreira	1 346
Brian C. Wadell	1 028

Division IV
Peter N. Clout	2 354
Elya B. Joffe	1 523

Division VI
Jeffrey M. Voas	1 034
Gerard H. "Gus" Gaynor	852

Division VIII
Susan K. "Kathy" Land	4 565
James W. Moore	1 710

Division X
Vincenzo Piuri	2 412
Daniel S. Yeung	2 195

REGION DELEGATE-ELECT/DIRECTOR-ELECT, 2010–2011
Region 1
Peter Alan Eckstein	2 538
Albert J. Reinhart	2 011

Region 3
David G. Green	2 178
Eric S. Ackerman	1 474

Region 5
James A. Jefferies	1 812
Richard A. Painter	1 434

Region 7
Keith B. Brown	686
Maike Luiken	630
Marcelo O. Mota	337

Region 9
Gustavo A. Giannattasio	893
Norberto M. Lerendegui	742

STANDARDS ASSOCIATION PRESIDENT-ELECT, 2010
Steve M. Mills	716
S. Mark Halpin	682

STANDARDS ASSOCIATION BOARD OF GOVERNORS MEMBER-AT-LARGE, 2010–2011
M. "Mark" Epstein	719
Stanley L. Moyer	661

STANDARDS ASSOCIATION BOARD OF GOVERNORS MEMBER-AT-LARGE, 2010–2011
T. W. "Ted" Olsen	891
Andrew L. Drozd	506

TECHNICAL ACTIVITIES VICE PRESIDENT–ELECT, 2010
Donna L. Hudson	16 377
Thomas G. Habetler	8 977

IEEE-USA PRESIDENT-ELECT, 2010
Ronald G. Jensen	14 154
James M. Howard	9 963

IEEE-USA MEMBER-AT-LARGE, 2010–2011
Winnfort J. Myles	15 358
Mauro G. Togneri	8 627

The 44 355 returned ballots represented a little more than 15 percent of 292 687 ballots mailed.

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2. Cryptography
3. Error Control Coding
4. Portable Communications
5. Wireless Communications
6. Land Transportation

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RECOMMENDED MEMBERSHIPS:

1. IEEE Industry Applications Society Membership
2. IEEE Aerospace and Electronic Systems

IEEE News

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- IEEE Life Fellow Leslie Geddes Awarded National Medal of Technology
- Trial of IEEE Spectrum Digital Delivery Debuts with July Issue
- IEEE UCE/Spam Filtering Service Policy to Change from "Opt-In" to "Opt-Out"

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IEEE

Introducing the Class of 2010

The Institute salutes the 309 IEEE senior members from around the world who have each been named an IEEE Fellow for 2010. They join an elite group of more than 6000 IEEE Fellows who have contributed to the advancement or application of engineering, science, and technology.

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Tinku Acharya
Charu Aggarwal
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Eitan Altman
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 Balasubramaniam
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Polina Bayvel
Alberto Bemporad
Shmuel "Sam"
 Ben-Yaakov
Dawant M. Benoit
Samuel Paul Benz
Theodore William
 Berger
Jennifer T. Bernhard
Joseph Ernest Berthold
Dieter H. Bimberg
E. Grady Booch
Athman Bouguettaya
James Edward Bowen
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FOR MORE INFORMATION about the IEEE Fellow program or to nominate someone, visit http://www.ieee.org/fellow.

Seeking Nominees for 2011 Leaders

IEEE is looking for people with the skill, passion, and perspective to serve in 2011 as IEEE officers or on committees of the IEEE Board of Directors. The IEEE Nominations and Appointments Committee is seeking nominees for the following:

IEEE President-Elect

IEEE Officers
- vice president, Educational Activities
- vice president, Publication Services and Products
- secretary
- treasurer

IEEE Standing Committees
- Awards Board
- Employee Benefits and Compensation
- Ethics and Member Conduct
- Governance
- Fellow
- History
- Nominations and Appointments
- Tellers
- Women in Engineering

DEADLINES
Submit nominations for the standing committee chairs, as well as for a student member of the IEEE Women in Engineering Committee, by 1 March. You have until 1 July to submit nominations for standing committee members, IEEE officers, and IEEE president-elect.

ELIGIBILITY
Each position has eligibility requirements and specific qualifications on which the Nominations and Appointments Committee evaluates candidates.

WHO CAN NOMINATE?
Anyone may submit a nomination; you need not be an IEEE member. Self-nominations are encouraged. An IEEE organizational unit may submit recommendations provided that its governing body, or the body's designee, has endorsed the nominee.

HOW TO NOMINATE
Review the eligibility requirements and qualifications for the positions, and then complete the form.

SELF-NOMINATIONS
Include your name, desired position or positions, qualifications, list of accomplishments, and biography. Use the template provided on the nomination form.

PEER NOMINATIONS
Include the nominee's name and recommended positions, as well as a brief explanation of why the person's qualifications make him or her a good candidate.

A person may be nominated for more than one position. Nominators do not need to contact their nominees before submitting the form. The N&A Committee will contact eligible nominees to ascertain their willingness to serve and, if necessary, to obtain more information.

THE PROCESS
The N&A Committee is responsible for making recommendations for IEEE officers to the IEEE Assembly, which then elects the officers. The committee also makes recommendations to the IEEE Board of Directors for IEEE president-elect and chairs and members of standing committees. The board does the final ratification of appointments. The board also recommends the candidates for president-elect to be included on the IEEE annual election ballot, with IEEE's voting membership choosing the president-elect.

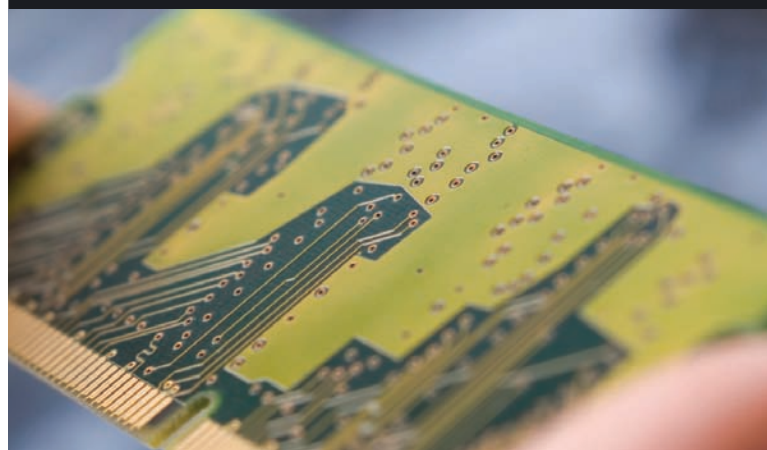*—Lewis Terman, chair, 2010 IEEE Nominations and Appointments Committee*

FOR MORE INFORMATION about the positions, including qualifications, estimates of the time each requires during the term of office, and a nomination form, visit http://www.ieee.org/web/aboutus/nominations/guidelines.html.

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