

# the institute

## FEELS REAL

A glove developed by Immersion Corp. uses haptics to let its wearers feel the weight of virtual objects.



# HAPTICS TAKES HOLD

A new IEEE journal will give readers a better feel for the field of haptics. **P. 6**

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## PART-TIME PASSIONS

Some members have intriguing pastimes, such as championship diving and polar racing. **P. 15**

## Making a World Of Difference

Engineers solve all sorts of problems, including how to make everyday life better for those less fortunate. Read about the solutions a few IEEE members have come up with. **P. 7**

## PROFILE

### SUSIE WEE: PICTURE-PERFECT DIGITAL IMAGES

See why *Computerworld* magazine included Wee on its "40 Under 40" list of next-generation IT innovators. **P. 14**

## online

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### NEW BOARD MEMBERS

Learn who the new members of the IEEE Board of Directors are.

### STUDENTS' CORNER

Check out some of the IEEE scholarships for student members.

### MEMBERSHIP STATS

Year-end statistics.

# Are Your Investments Covered?

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## IEEE AROUND THE WORLD

**REGION 4: Central United States**

- 100th anniversary, Fort Wayne (Ind.) Section.
- 50th anniversary, Northeastern Wisconsin Section.
- Queen of Peace High School in Burbank, Ill., receives US\$7320 from the IEEE Foundation to support the Infinity Project, a yearlong program that encourages students to pursue careers in engineering and technology.

**REGION 7: Canada**

- 50th anniversary, Quebec Section.

**REGION 1: Northeastern United States**

- Boston Section forms Women in Engineering affinity group.
- New York Section forms Electron Devices Society/Solid-State Circuits Society joint chapter.

**REGION 2: Eastern United States**

- Cincinnati Section forms Engineering in Medicine and Biology Society chapter.
- Philadelphia Section forms Graduates of the Last Decade affinity group.

**REGION 8: Europe, Middle East, and Africa**

- Student branch formed at the National Institute of Telecommunications in Evry, France.
- Greece Section forms GOLD affinity group.

**REGION 10: Asia and the Pacific**

- 25th anniversary, Victoria (Australia) and Kerala (India) sections.
- Student branches formed at North South University in Banani, Dhaka, Bangladesh; at Harbin Institute of Technology in China; in India at the College of Engineering, Kalloppara, and Sant Samarth Engineering College, Andhra Pradesh; and in Korea at Ewha Women's University and Hongik University, Seoul.
- WIE student branch affinity group formed at the Dr. Mahalingam College of Engineering and Technology, Tamil Nadu, India.
- The University of Western Australia, in Crawley, gets \$33 924 from the IEEE Foundation to support a science outreach program to primary and secondary schools in Western Australia.

**REGION 5: Southwestern United States**

- 75th anniversary, New Orleans Section.
- Denver Section forms WIE affinity group.

**REGION 3: Southeastern United States and Jamaica**

- Elizabeth City (N.C.) State University forms student branch.
- University of Central Florida, Orlando, forms WIE student branch affinity group.

**REGION 6: Western United States**

- 50th anniversary, Alaska Section.
- 25th anniversary, Northern Nevada Section.
- Phoenix Section forms Life Member affinity group.

**REGION 9: Latin America**

- 50th anniversary, Colombia Section.
- Student branches formed in Colombia at the University of the Savannah and the National University, Bogotá; and in Mexico at the School of Superior Computing at the National Polytechnic Institute, Mexico City.
- WIE student branch affinity group formed at the Technical University of Loja, Ecuador.
- Bahia (Brazil) Section forms GOLD affinity group.

**REGION 10 (continued)**

- The IEEE Education Society's Hong Kong Chapter receives \$5000 from the IEEE Foundation to fund a collaborative preuniversity project between the Chinese University of Hong Kong Tung Wah Group of Hospitals Community College and Xian Union College, China.
- The IEEE forms the IEEE China Council.

**LEGEND**

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

Send your region or section news to [institute@ieee.org](mailto:institute@ieee.org).

### The Votes Are In

IEEE Fellow John Vig is the 2008 President-Elect, having received 17 805 votes in the annual IEEE election. Senior Member Pedro Ray came in second, with 13 626 votes; Senior Member Marc Apter received 11 068 votes.

Vig begins his term as IEEE President on 1 January 2009, succeeding 2008 President Lewis Terman. Vig retired in 2000 after 36 years of service as an electronics engineer leading R&D programs at the U.S. Army Communications and



JOHN VIG

Electronics Research, Development, and Engineering Center, in Fort Monmouth, N.J. He is a consultant to Systems Planning Corp., in Colts Neck, N.J., which produces electronics and computer software for U.S. government agencies.

Vig was a member of the IEEE Board of Directors in 2002, 2003, and 2005 and has held numerous volunteer positions within the institute. He was founding president of the IEEE Sensors Council.

### IEEE's Position: Four Years Is a Good Start

The IEEE will recommend that the traditional four-year degree, such as a Bachelor of Science or of Engineering in the United States, remain the first professional degree in engineering. This position, taken by the IEEE Board of Directors at its November 2007 meeting, is in response to requests from several organizations and IEEE units that the IEEE take an official stance on what the first degree should be.

One proposal was to require a bachelor-level degree plus 30 semester credits. Another was to require

a Master of Science or Engineering degree.

While the IEEE does not believe in a "mandatory, across-the-board requirement" for more schooling following a traditional four-year degree, it holds that "continuing education should be an integral part of the career plans of most, if not all, engineers." Moreover, the Board stated that "studies beyond the traditional four-year degree and...higher degrees such as Master of Science and Doctor of Philosophy/Doctor of Science are appropriate and, in many cases,

necessary for engineers whose career path requires research."

"For many other engineers," the Board said, "higher education in areas such as business, economics, and law is equally essential."

The Board's decision was based in part on feedback it received from members in response to the article "What Should Be the First Professional Degree in Engineer-



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IEEE membership must be maintained without a break in service to continue using the insurance policy.



## IEEE AROUND THE WORLD

ing?" [*The Institute*, September, p. 10]. The Board also asked several IEEE groups and other organizations to weigh in, including the Committee on Engineering Accreditation Activities and the Committee on Technology Accreditation Activities. A majority agreed that the first degree should remain the traditional four-year degree (five years with a co-op

program), according to Moshe Kam, the 2007 vice president of Educational Activities.

Reasons cited included not wanting to increase barriers to admission to the profession and the apparent lack of demand from employers or the public that engineers have graduate degrees when entering the workforce.

## Two Vie for President-Elect

The IEEE Board of Directors has nominated Moshe Kam and Pedro Ray as candidates for 2009 IEEE President-Elect. The two men, chosen at the Board's November meeting, will face off during the next annual election.

The winner serves as 2010 IEEE President, succeeding 2009 President John Vig.

Kam, an IEEE Fellow, is head of the electrical and computer engineering department at Drexel University, in Philadelphia. He has taught and conducted research in detection, estimation, robotics, and control at Drexel since 1986, the year

he joined the university. He founded Drexel's Data Fusion Laboratory, and he was the IEEE's vice president of Educational Activities from 2005 to 2007.

Ray, a senior member, is president of Ray Engineers, one of the largest design firms in Puerto Rico. He is also owner and president of various corporations dedicated to the development of commercial and residential real estate. Ray, who finished second in last year's election, was vice president of Regional Activities (now known as Member and Geographic Activities) in 2006 and 2007.



MOSHE KAM



PEDRO RAY

## IEEE Medal of Honor Goes to Moore



GORDON E. MOORE

IEEE Life Fellow Gordon E. Moore is the recipient of the 2008 IEEE Medal of Honor for "pioneering technical roles in integrated-circuit processing, and leadership in the development of MOS memory, the microprocessor computer, and the semiconductor industry."

Moore cofounded Fairchild Semiconductor Corp. in 1957, in Mountain View, Calif., where he perfected the production of silicon planar epitaxial transistors, which became the salient process for manufacturing silicon ICs.

In 1968 he went on to cofound Intel Corp., which became the world's largest semiconductor and memory technology company. In 1975 he became president and chief executive officer. He was president until 1979 and remained CEO until 1987. He now serves as chairman emeritus.

Three years before Moore helped found Intel, he predicted that the transistor density of integrated circuits would double every year for the next decade. Soon known as Moore's Law, his prediction proved to be remarkably accurate far beyond that decade.

Moore is scheduled to receive the IEEE Medal of Honor, sponsored by the IEEE Foundation, on 20 September at the IEEE Honors Ceremony in Quebec City. The award consists of a gold medal, a bronze replica, a certificate, and a cash honorarium.

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# CALENDAR

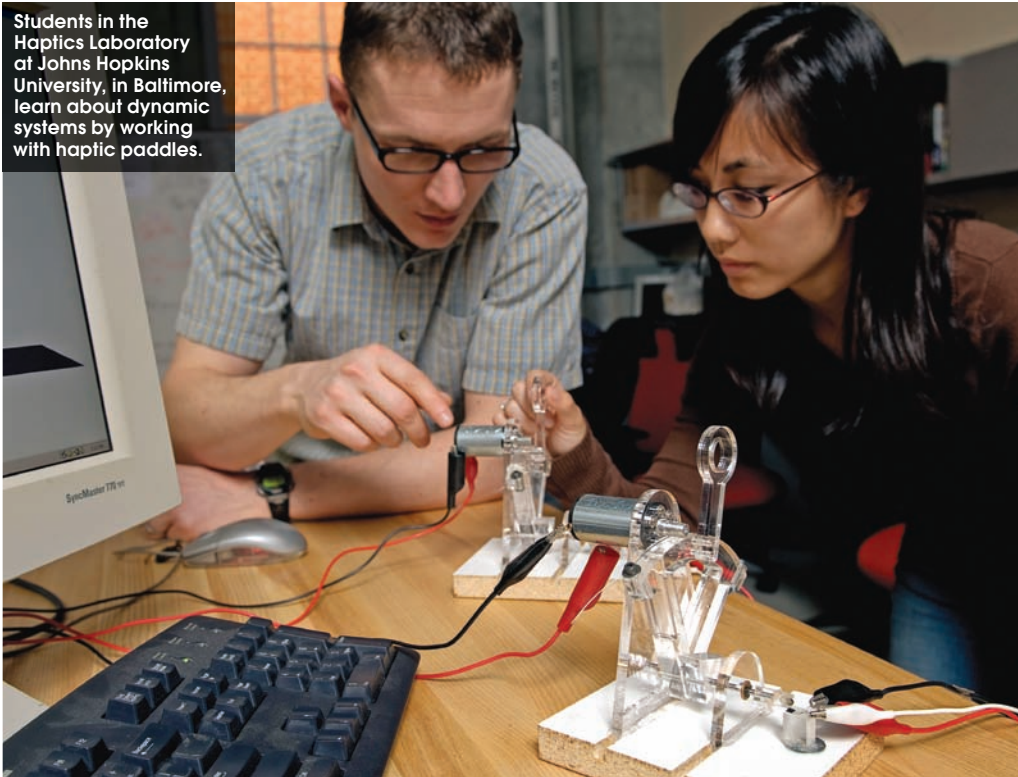
SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<h1>March</h1>						
2 1-2 March: <b>Region 2 meeting</b> in Harrisburg, Pa.		4	5	6	7	8 
	17 1958: The United States launches the <b>Vanguard 1</b> . It is the oldest satellite still orbiting Earth.	18		13	20	21
23	24	25 1928: Birth date of <b>Jim Lovell</b> , commander of the Apollo 13 moon mission.		27 27-29 March: <b>Region 9 meeting</b> in Punta del Este, Uruguay.	28	29
<h1>April</h1>						
6	7 1913: The U.S. Navy commissions the <b>U.S.S. Jupiter</b> , its first surface ship to be propelled by electric motors.	1 1976: Steve Jobs and Steve Wozniak launch <b>Apple Computer Co.</b>	2 	3 1973: Inventor <b>Martin Cooper</b> places the first call from a portable handheld telephone, in New York City.	4	4-6 April: <b>Region 3 meeting</b> in Huntsville, Ala., home of the U.S. Space and Rocket Center.
13		15 1892: Thomson-Houston Electric Co. merges with Edison General Electric Co. to form <b>General Electric Co.</b>	17	19	19	19 <b>Region 5 committee meeting</b> in Kansas City, Mo.
20		22	23	24 24-27 April: <b>Region 8 meeting</b> in St. Julian's, Malta.	26	26 1986: The world's worst nuclear accident occurs at the <b>Chernobyl nuclear power plant</b> , near Kiev, Ukraine.
27 1791: Birth date of <b>Samuel F.B. Morse</b> , inventor of the electric telegraph.		29	30			
<h1>May</h1>						
4 			7	8		2 2-4 May: <b>Region 7 meeting</b> in Niagara Falls, Ont., Canada.
11	19 1971: The Soviet Union launches <b>Mars 2</b> , which becomes the first spacecraft to crash-land on Mars.	20 1913: Birth date of <b>Hewlett-Packard</b> cofounder William R. Hewlett.		15	23 1908: Birth date of <b>John Bardeen</b> , who invented the transistor and helped conceive the theory of superconductivity.	24
25 1961: U.S. President <b>John F. Kennedy</b> challenges Congress to fund sending a man to the moon by the end of the decade.	26	27		30		31

Historical events provided by the IEEE History Center

IEEE events indicated in RED

## TECHNOLOGY

Students in the Haptics Laboratory at Johns Hopkins University, in Baltimore, learn about dynamic systems by working with haptic paddles.



# Haptics Takes Hold

BY MICHAEL J. RIEZENMAN

**P**icture this: in a horrible accident, a farmer in a remote area of northern Manitoba, Canada, has his arm torn off by a hay baler. Immediate surgery is needed if he is not to lose the arm. His local hospital is equipped to handle the procedure, but its surgeons don't have experience in reattaching limbs.

A qualified surgeon is available at a hospital in Chicago. Without even needing to scrub up, she steps into the hospital's remote surgery suite, takes hold of the controls, and performs the operation via a robot that the surgeons in Manitoba have set up. The doctor in Chicago doesn't merely consult on the surgery, she actually performs it.

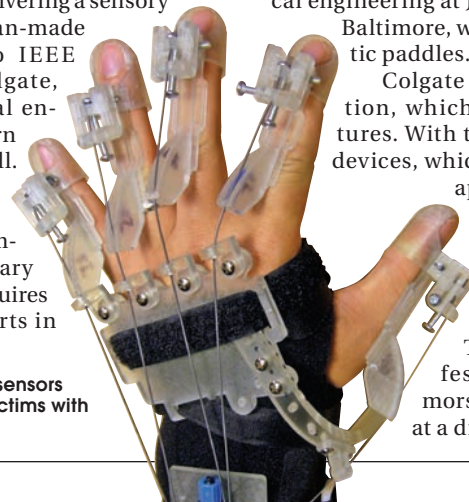
The controls in her suite allow her to manipulate the remote robot. But just as important, they also provide her with tactile feedback so that what she holds in her hand feels just like the scalpel or other instrument she would use in a real operating room. If the robot-controlled scalpel strikes bone, the device she holds suddenly becomes harder to push, as would a real scalpel. Depending on the angle at which it strikes the bone, it may even twist in her grip.

Far-fetched? Not so. Remote surgery has not

yet been performed on human beings, but it is possible and will in all probability become a reality within our lifetime.

The key to accomplishing the feat lies in the rapidly growing field of haptics, which studies sensing and manipulating objects and environments through touch. The goal is to build devices that do for the sense of touch what television and radio do for the senses of vision and hearing—provide ways for delivering a sensory experience through a man-made device—according to IEEE Member J. Edward Colgate, professor of mechanical engineering at Northwestern University in Evanston, Ill. Haptics has been around for about two decades, but progress has been hampered by its interdisciplinary nature, Colgate says. It requires the cooperation of experts in

An exoskeletal device with sensors uses haptics to aid stroke victims with an impaired hand.



such diverse areas as neurology, applied psychology, robotics, human-computer interaction, control systems engineering, and communications.

**NEW PUBLICATION** To foster the growth of the field, the IEEE is introducing a new journal, *Transactions on Haptics*, cosponsored by the IEEE Computer, Robotics and Automation, and Consumer Electronics societies. The journal covers the gamut of work in haptics, from fundamental research on human tactile perception to the latest commercial applications. The first issue is expected in September, and it will come out quarterly thereafter, according to Colgate, the editor in chief.

Haptics is not a new field for the IEEE. In 2002, the Symposium on Haptic Interfaces for Virtual Environments and Teleoperator Systems (popularly known as the Haptics Symposium) became part of the IEEE Virtual Reality Conference. The next Haptics Symposium takes place on 13 and 14 March in Reno, Nev.

Haptics applications aren't just a dream; some are already in use. Motorola's Razr 2 cell-phones use vibrating haptic feedback in conjunction with their touch-screen displays and side buttons. Video games use haptic feedback—to transmit the "feel of the road" through the steering wheels of virtual vehicles, for example. Several car models have a haptic knob on their radio that operates smoothly when acting as a volume control but feels as though it is clicking into place when functioning as a tuning knob.

More than 10 years ago, a team at the Biomimetics and Dextrous Manipulation Laboratory at Stanford University developed a haptic paddle to help mechanical engineering students understand the behavior of dynamic systems by letting them feel the vibration, damped oscillations, and other movements described by the equations they were studying. The approach succeeded. "It was evident the students were understanding the concepts [encapsulated by the equations] for the first time," says IEEE Member Allison Okamura, who was then at Stanford but is now a professor of mechanical engineering at Johns Hopkins University, in Baltimore, where she has refined the haptic paddles.

Colgate is working on variable friction, which allows the sensing of textures. With the addition of Peltier-effect devices, which change temperature with applied voltage, temperature sensation can be added. A goal of his work is to develop systems that present shape and texture information to multiple bare fingertips. That could help medical professionals learn to detect tumors via palpation, or even do so at a distance. ■

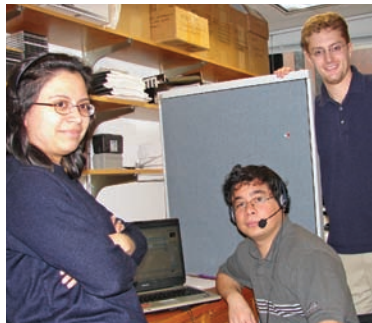
# Making a World Of Difference

BY ANNA BOGDANOWICZ

Applying technology to solve global problems has always been an IEEE goal. Now the institute is placing such problems in even sharper focus with a new joint IEEE–United Nations Foundation enterprise: the Humanitarian Technology Challenge.

The goal is to develop technological solutions to “some of the greatest challenges facing humanity today, in particular public health care and disaster relief,” says IEEE Fellow Roberto de Marca, vice president of Technical Activities, the area overseeing work on the HTC. The IEEE and the UN Foundation are surveying dozens of nongovernmental organizations (NGOs) to identify the greatest challenges. What they learn will be presented at a conference this year. From there, various groups composed of IEEE volunteers expert in different technologies are to work with the NGOs to develop solutions and implementation plans.

In the meantime, IEEE members



TOP: Student members of the research group working on low-cost medical diagnostic and treatment devices for Peru. BOTTOM: Julian Bass (left) with the teachers he instructs in IT and communications technology in Ethiopia.

have been taking on humanitarian challenges on their own. Andreas Birk, for example, is working on robots that assess the scene of a disaster to make sure it's safe for rescuers to enter. Such robots aren't new; they were used after the Chernobyl accident, for example, but Birk is working to improve them.

An electrical engineering and computer science professor at Jacobs University, in Bremen, Germany, Birk heads a team of researchers working on rescue robots that can traverse difficult terrain while outfitted with cameras, body-heat and motion detectors, and gas sensors. They also have sensors to navigate autonomously and map their environment. Having the robots go in first can be a lifesaver, according to Birk. “So many first responders tell me they've known colleagues who have been severely injured or even killed while merely assessing a disaster,” he says.

When Mahmud Wasfi, a communications systems consultant in Iraq, heard that the government of Iraq's Kurdistan region was going to build a fiber-optic network in August, he volunteered to design it. Because Wasfi has designed and implemented more than 30 communication projects for the Iraqi government, Kurdistan's ministry of electricity accepted his offer and named him the project designer. The network connects three towns, serving universities, schools, hospitals, and private homes. Eventually it is expected to cover all of Kurdistan.

One of Andreas Birk's search-and-rescue robots supports a fire brigade during a rescue drill at the 2006 Rescue Robots Field Test, in Bremen, Germany.



Wasfi had personal reasons for taking on the job. While working on other projects, he met many villagers who were “so welcoming that I felt obligated to serve others there,” he says.

**GLOBAL TEACHERS** Julian Bass has been a training manager of a software company and an associate professor of computer science at several universities in the United Kingdom. But then he decided he “wanted to do something a bit more worthwhile than my usual job.” So he signed up with Voluntary Service Overseas, an international organization that sends people around the world to teach others professional skills. VSO dispatched Bass to the new Debre Birhan University, in Ethiopia, where he teaches information and communications technology to members of the faculty. He also helped set up a computer lab at the school and is responsible for maintaining its computer infrastructure.

Suhail Ahmad of Rawalpindi, Pakistan, is also helping in the classroom. The systems design engineer for the Pakistan Air Force volunteers as a consultant to tech companies. In one project, he designed software that trains undergrads in image-processing techniques. The company he designed the software for is selling it to universities at a low cost, he says.

**HELPING THE SICK** Ahmad also has volunteered to refurbish old X-ray machines by adding digital features. “The impact of my work may be minimal compared to society's problems, but at least I'm being more than just another bystander,” he says.

A group of students from the University of Rochester, in New York, Papat Catholic University of Peru, in Lima, and the University of Illinois at Urbana-Champaign have set their sights on improving health care in Peru. The students, led by three IEEE graduate student members originally from Peru—Fanny Casado, Benjamin Castaneda, and Roberto Lavarello—are developing low-cost methods of diagnosing and treating tuberculosis and tropical diseases such as leishmaniasis, a skin disease caused by parasites that leads to lesions. For diagnosing early-stage tuberculosis, the group is developing machine-learning techniques to analyze images of a patient's sputum. The group also plans to build imaging hardware that processes images of skin lesions to help doctors evaluate how well medications for leishmaniasis are working. ■

More examples of community outreach can be found at <http://www.ieee.org/theinstitute>.

RESPONSES TO DECEMBER'S QUESTION

## Wikipedia: Fact or Fiction?

A Caltech graduate student has developed a search tool that can trace who makes entries in Wikipedia, the online encyclopedia that lets anyone edit content on everything from Paris Hilton to the history of electricity. The Web site has become a popular one-stop research source, but there's a debate about its information. Entries have been found to be inaccurate; at least one person discovered that his biography contained false, defamatory information. And the new search tool revealed that many companies delete negative, though factual, information about themselves.

HOW MUCH DO YOU TRUST WIKIPEDIA'S CONTENT?

### Researchers Beware

Wikipedia is so variable that it cannot be trusted as a research source. I would berate any student who considered it a worthwhile source on its own. It can be useful with corroborating sources, but then why bother with it when those other sites can be used instead? Let the researcher beware if we continue to accept Wikipedia as the source of misinformation that it is.

**KEN TAYLOR**  
Auckland, New Zealand

### Depends on the Subject

I've been using Wikipedia for about three years and have seen significant improvement in that time. While I agree that for critical uses you would want a resource that's less subject to random edits, I usually find it's not hard to distinguish high-quality Wikipedia articles from less credible ones.

Articles on engineering subjects are usually in great need of improvement since they are often long, poorly organized, and overspecialized.

**BILL SHYMANSKI**  
Winnipeg, Man., Canada

### Far From Fiction

Wikipedia is a convenient and valuable tool. I trust it more than I trust *The New York Times* or scientific papers written by academics. But like everything else created by humans, it has errors and contains the biases of those who write or edit the articles. However, Wikipedia has something that no paper publication has: the ability to be corrected by its readers. Don't sell it short, and don't call it fiction.

**KENNETH HOFFMANN**  
New York, N.Y.

### Proceed With Caution

I am a university professor, and I know that a lot of students use Wikipedia. I always advise them to use it as a starting point and to certify the information from other valid sources.

**SCOTT LINFOOT**  
Leicester, England

### Quality Control Lacking

I am a professor of electrical engineering at South Dakota State University, in Brookings. After a student wrote a term paper with information I knew to be inaccurate, I found that the information had come from Wikipedia. I have since prohibited students from using the site for any papers in my classes. It's unfortunate, because I like the concept behind Wikipedia, but the quality control mechanisms do not seem to be working.

**MICHAEL ROPP**  
Brookings, S.D.

### A Good Learning Tool

I always view information on Wikipedia with skepticism, but I rarely find errors. One instance in which Wikipedia was correct while many of the textbooks I consulted were wrong was in stating the difference between a latch and a flip-flop: a latch is transparent, while a flip-flop is edge-triggered. It has been frustrating trying to teach the distinction to my students because of the ambiguity in most textbooks. I refer my students regularly to definitions in Wikipedia.

**DON MAYER**  
El Segundo, Calif.

### Cut It Some Slack

Wikipedia may not be a professional encyclopedia, but it has good features. Most online encyclopedias are

available only to paid subscribers. Wikipedia is accessible to everyone and contains much more information than any other encyclopedia. It may have inaccuracies, but because it has many readers errors can be quickly identified and corrected. Most information on Wikipedia is reliable enough to give a general idea of what a subject is about.

**HUO CHEN**  
Stony Brook, N.Y.

ble revisions" extension that would require edits to be checked by reputable editors before they go live. Wikipedia is evolving, and problems, once found, are quickly corrected. If it isn't reputable now, it certainly is on the road to becoming so.

**ANDREW WHITWORTH**  
Philadelphia

*IEEE Member Whitworth is a member of Wikibooks, a project that, along with Wikipedia, is funded by the Wikimedia Foundation. —Ed.*

### It's Getting There

Finding and fixing false or incomplete information is the cornerstone of Wikipedia. The Wikimedia Foundation, the nonprofit that operates the Web site, has started an initiative to counteract some of the complaints about inaccuracy. Veropedia, an Internet encyclopedia within Wikipedia, has experts proofread Wikipedia articles, and it posts read-only versions of accurate articles. The Mediawiki software developers are preparing a "sta-

### Corrections

The IEEE Leuven Student Branch, in Belgium, received a US \$1000 grant from the IEEE Foundation, not \$25 000 (IEEE Around the World, December, p. 3).

The inventor of the lead-acid storage battery was Gaston Planté, not Ernst Werner von Siemens (Calendar, December, p. 4).

THIS MONTH'S QUESTION

## Do You Need Quiet Time?



To be more productive, a group of engineers and managers at Intel Corp. has adopted a "quiet time" to eliminate office distractions. On Tuesday mornings they turn off their e-mail, forward calls to voice mail, decline all meetings, and hang a Do Not Disturb sign on their doors. Some say distractions such as a steady barrage of e-mail and phone calls hinder the ability to focus on work that requires creativity and analysis. But others argue that it's vital to respond promptly so co-workers can get the answers they need.

### WOULD YOU WANT YOUR EMPLOYER TO ADOPT A QUIET TIME LIKE INTEL'S?

**MAIL:** *The Institute*, IEEE Operations Center, 445 Hoes Lane, Piscataway, NJ 08855-1331 USA  
**FAX:** +1 732 562 1746 **E-MAIL:** institute@ieee.org

**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.



# For the Benefit of Society

One of my major areas of focus this year is the application of engineering, science, and technology to societal problems. This is something the IEEE must be concerned about, and it's part of the recently adopted IEEE Envisioned Future strategy platform, which recognizes that by addressing societal issues, the IEEE can affect global prosperity and the quality of life (see "New Initiative Looks Far Into the Future," December, p. 6). It is an area of great opportunity.

Historically, the IEEE and the technical community have focused primarily on advancing technology and applying it to the development of products. The focus of Envisioned Future is not on technology but on the critical needs of society. Any list of major problems during the next 50 years would include generating and conserving energy, eliminating pollution, ensuring safe drinking water and a safe global food supply, protecting the environment, improving education, elim-

inating poverty and disease, and addressing climate change. Solving these problems will require multiple technologies and cross-disciplinary approaches with which the IEEE is very familiar.

Given the IEEE's technical scope and global presence, our societies, sections, chapters, and members have a tremendous opportunity to contribute. In fact, our members are already involved in a number of such projects.

For example, the IEEE Committee on Earth Observation has since 2005 been involved in the International Group on Earth Observations and its effort to create a Global Earth Observation System of Systems. Through GEOS, data obtained from all sources will be used to help create accurate models of Earth's environments. Understanding what is happening will enable informed decisions that should reduce the impact of natural disasters, promote better health, improve weather forecasting, and protect natural resources for the sustainability of society.

Another effort is the IEEE partnership with the United Nations Foundation, through which members will help solve problems in such areas as health care and disaster response, mitigation, and recovery.

Of course, other organizations have been applying technology to address such issues. Two examples of nonprofit organizations with which I am familiar are at MIT and the University of California at Berkeley.

At MIT, the D-Lab and Edgerton Center are leaders in creating elegantly simple technical solutions for developing countries to such problems as food refrigeration, water testing and quality, and avoiding deforestation by turning waste materials into cooking fuel. Students from the university are accomplishing much by working at the local level in areas including

Africa, Central America, and India.

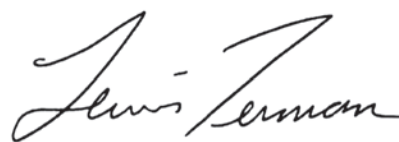
UC Berkeley's Center for Information Technology Research in the Interest of Science has been using information technology to solve problems in health care, energy, the environment, and transportation. The effort involves hundreds of faculty and thousands of students, many of whom are IEEE members.

Individual IEEE members around the world are also involved in solving societal issues, often at the local level. A related story in this issue describes how IEEE members working in Ethiopia, Germany, Kurdistan, Pakistan, and Peru are applying their technical expertise in a variety of projects with significant societal impact [see "Making a World of Difference," p. 7]. The projects involve mentoring teachers, search-and-rescue robots, a fiber-optic network, and low-cost medical technology.

These are just a few examples of what members can do, and I am encouraging members everywhere to identify opportunities where they and their sections, societies and technical councils, chapters, and student branches can become involved and make a difference. IEEE organizations can get help in launching programs to address pressing societal issues through the IEEE New Initiatives Seed Grant Process. Funding for seed projects can be as much as US \$25 000. Learn more at <http://www.ieee.org/web/aboutus/initiatives/sgp.html>.

For the IEEE to help solve these problems requires sharing best practices and carefully coordinating what we do so that our financial and human resources are used effectively. This is a bold new direction for the IEEE and one of the most important challenges for our organization in the 21st century.

I welcome your comments at [terman.column@ieee.org](mailto:terman.column@ieee.org).



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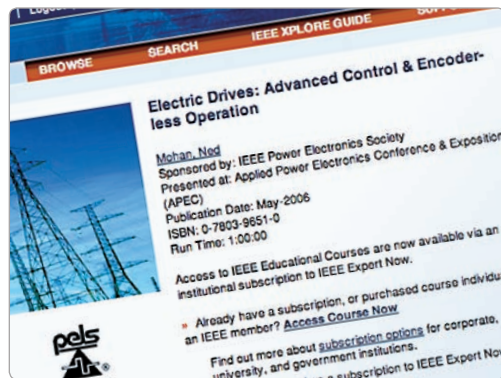
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The IEEE Xplore digital library offers new resources and better search tools **BY JOHN R. PLATT**



### ONLINE TUTORIALS

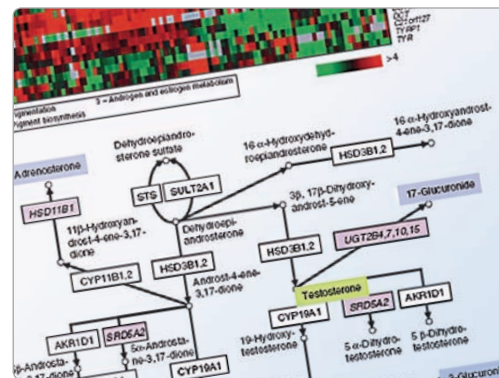
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More than 70 tutorials are now available through IEEE Xplore. Originally presented at IEEE conferences and meetings, the one-hour courses cover a broad variety of topics, including artificial intelligence, computer engineering, lasers and optics, microwave theory and techniques, and vehicular technology. There also are courses on professional development and management.

Included with the tutorials are course notes, which are PDF files that contain full-text transcripts of the audio portion of the course. They also include definitions of all terms, an index, a course summary and outline, and a biography of the instructor. Lists of complementary courses and other resources on the topic are also provided.

Each course is worth 0.3 of a continuing-education unit. A certificate of completion is e-mailed to students after they complete the tutorial and pass an assessment test. Courses are self-paced, and they must be completed in 30 days. Members' price for each tutorial is US \$69.95.

Companies wishing to offer the courses to their employees can subscribe to the entire catalog of courses.



### TECHNOLOGY SURVEYS AND APPLICATION NOTES

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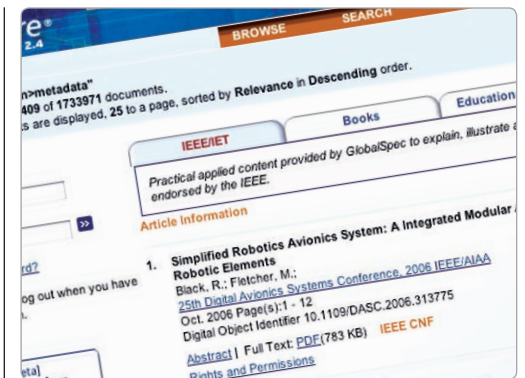
<http://ieeexplore.ieee.org> (application notes)

Two new resources are available in IEEE Xplore on a trial basis, offering practical information about specific technologies.

Technology surveys are overviews assembled by experts of previously published IEEE articles in particular fields. Included with each survey are links to the most relevant articles in IEEE Xplore. So far, two surveys have been posted—on CAD algorithms and DNA microarrays. Links to the surveys can be found in the digital library's Browse pull-down menu.

Application notes, well-known for explaining or promoting a company's technology or product, often contain useful information. Although the notes are not created or endorsed by the IEEE, the institute has partnered with GlobalSpec, a technology search engine and information resource, to provide access to more than 1 million of them.

To find application notes, search on your topic in IEEE Xplore. Links to notes are displayed alongside other search results, under their own heading, to set them apart from IEEE content. Links are also provided for members to give feedback on the usefulness of the material and whether the IEEE should continue to include it in IEEE Xplore.



### STREAMLINED SEARCHING

<http://ieeexplore.ieee.org>

IEEE Xplore has enhanced how it displays results for the basic search option. Results used to be displayed as one long list. Now tabs at the top of the search results screen divide the content into four categories: IEEE and IET journals, conferences, and standards; books from IEEE Press and IEEE Computer Society Press; educational courses; and application notes. To speed up the search, the most popular types of content are displayed first. Search results for other information, such as books or application notes, are displayed only on request.

In addition, finding a "known item" from an IEEE publication is now much easier. A new search page allows you to conduct targeted searches when you already know what article you are looking for. You can search the digital library and get an exact match using common criteria, such as a document's title; volume and issue number; and page numbers.

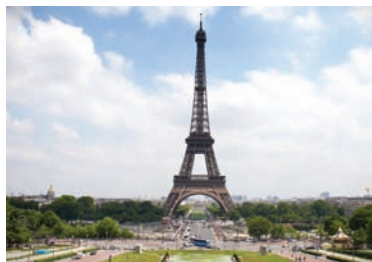
Finally, tips to locate works by a specific author have been added to the author-search screen, helping you home in on writers whose names might have several variations, say T.P. Smith and Thomas P. Smith.

FEATURED CONFERENCE



**IEEE World Congress on Computational Intelligence**  
**Hong Kong, 1–6 June**

This conference features three simultaneous events: the IEEE Congress on Evolutionary Computation (CEC), the IEEE International Conference on Fuzzy Systems (FUZZ-IEEE), and the International Joint Conference on Neural Networks (IJCNN). CEC covers such topics as artificial immune systems and evolutionary robotics. FUZZ-IEEE takes on all things fuzzy: logic, set theory, and pattern recognition. Computational, brain imaging, and swarm intelligence are some of the topics featured at IJCNN. **SPONSORS:** IEEE Computational Intelligence Society, Evolutionary Program Society, International Neural Network Society, and the Institution of Engineering and Technology **VISIT:** <http://www.wcci2008.org>



**IEEE International Symposium on Biomedical Imaging**  
**Paris 12–17 May**

Facilitating interaction among researchers in medical and biological imaging is the primary aim of this annual conference. Papers offer contributions to the algorithmic, mathematical, and computational aspects of biomedical imaging—from nano- to macroscale. Topics include image formation and reconstruction, computational and statistical image processing and analysis, dynamic imaging, image quality assessment, and physical, biological, and

statistical modeling. Molecular, cellular, anatomical, and functional imaging modalities and applications are also explored and discussed. **SPONSORS:** IEEE Engineering in Medicine and Biology Society, IEEE Signal Processing Society **VISIT:** <http://www.biomedicalimaging.org>



**IEEE Radar Conference**  
**Rome 26–30 May**

The first IEEE Radar Conference to be held outside the United States explores new avenues and methods of radar signal processing.

The conference covers all aspects of radar systems for civil, security, and defense applications. Topics include radar early warning, sonar, antenna and component technology, radar signal and data processing, air-traffic-control radar, weather radar, merchant marine radar, and radar simulation.

The event also features lectures by four keynote speakers: *Aviation Week and Space Technology's* 2006 Person of the Year, Pier Francesco Guarguaglini, chief executive officer of Finmeccanica; Marina Grossi, CEO of Selex Sistemi Integrati; Merrill I. Skolnik, former superintendent of the radar division at the Naval Research Laboratory in Washington, D.C.; and Hugh Griffiths, IEEE Radar System Panel chair. **SPONSOR:** IEEE Aerospace and Electronic Systems Society **VISIT:** <http://www.radarcon2008.org>



**IEEE/IFIP International Conference on Dependable Systems and Networks**  
**Anchorage 24–27 June**

This annual conference addresses ways to protect computers and networks from attacks, accidental faults, design errors, and unexpected operating conditions. Two symposia—the Dependable Computing and Communications Symposium and the Performance and Dependability Symposium—are scheduled, along with workshops, tutorials, a student forum, and demonstrations of tools and technologies.

Special discounts and excursions will be offered to attendees' family members. **SPONSORS:** IEEE Computer Society, International Federation for Information Processing **VISIT:** <http://www.dsn.org>



**IEEE International Symposium on Information Theory**  
**Toronto 6–11 July**

Topics include coding theory and practice; communication theory; cryptography and data security; detection and estimation; information theory and its application to statistics and networks; pattern recognition and learning; quantum information theory; Shannon theory, and source coding. **SPONSOR:** IEEE Information Theory Society **VISIT:** <http://www.isit2008.org>



**IEEE International Geoscience and Remote Sensing Symposium**  
**Boston 7–11 July**

This year's theme is Geoscience and Remote Sensing: The Next Generation. The conference addresses the challenges of mapping, measuring, and monitoring Earth's environment, including the human impact on the planet. Topics include land use and land cover change; ocean biology and water quality; numerical weather prediction and data assimilation; data mining techniques; human health and landscape epidemiology; and pollution and contamination. **SPONSORS:** IEEE Geoscience and Remote Sensing Society, Japanese Aerospace Exploration Agency, NASA, Rochester Institute of Technology, Tufts University **VISIT:** <http://www.igarss08.org>

—compiled by Amanda Davis



**FEATURED AUTHOR**  
**Arya Behzad**  
**On Bridging**  
**The Design Gap**

Textbooks have typically treated wireless LAN system design and radio design as separate topics. But many recent improvements in wireless LAN systems—such as greater reliability at lower cost—are partly due to better radio design, says IEEE Senior Member Arya Behzad.

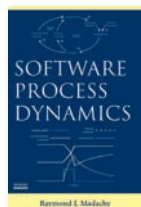
So he combined the two types of design in his new book, *Wireless LAN Radios: System Definition to Transistor Design*. With it he hopes to “bridge the gap between circuit and system design.”

The book describes the various IEEE 802.11 wireless standards and their impact on radio design. It also examines the different types of radio architecture and their effect on the cost of wireless systems. Anyone studying or working in wireless LAN design, communication theory, or radio design could benefit from the book, says Behzad, director of engineering in the mobile and wireless business unit of Broadcom Corp., in San Diego, and a Broadcom Distinguished Engineer.

The idea for the book came after he taught a course on WLAN radio design at an IEEE International Solid-State Circuits Conference in San Francisco. It was so popular that several people suggested he write a book and elaborate on the topics he discussed.

—Anna Bogdanowicz

Here is a selection of new books from Wiley-IEEE Press. Members receive a 15 percent discount by using the promotional code INSA2 when ordering from <http://www.wiley.com/IEEE>.



**Software Process Dynamics**  
 By Raymond J. Madachy  
 (January 2008,  
 US \$84.95, 601 pp.)

The title of this book refers to an important method for modeling the complex and interacting effects of software development. This introduction to the subject shows readers how to find better information about interrelated technical and social factors so as to improve the software development process.

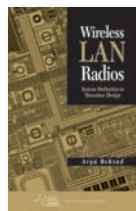


**Modern Heuristic Optimization Techniques: Theory and Applications to Power Systems**  
 Edited by Kwang Y. Lee and Mohamed A. El-Sharkawi  
 (February 2008, \$99.95, 616 pp.)

This book offers a comprehensive general overview of the wide

range of modern heuristic optimization techniques. These are trial-and-error methods of problem solving used when an algorithmic approach is impractical. The authors provide a wealth of information for practicing engineers.

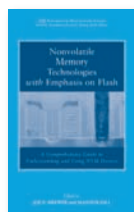
Topics include the fundamentals of evolutionary computation, genetic algorithms, evolutionary programming and strategies, and an overview of power system applications.



**Wireless LAN Radios: System Definition to Transistor Design**  
 By Arya Behzad  
 (December 2007,  
 \$79.95, 241 pp.)

It is becoming more and more important for LAN system and circuit designers to have a better grasp of WLAN applications applied to the design of next-generation radios. Behzad covers theory in this high-level overview while also emphasizing the

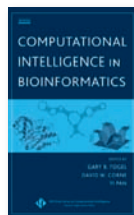
practical aspects of radio design for wireless LAN systems.



**Nonvolatile Memory Technologies With Emphasis on Flash: A Comprehensive Guide to Understanding and Using NVM Devices**

Edited by Joseph E. Brewer and Manzur Gill  
 (January 2008,  
 \$135, 759 pp.)

This authoritative reference guide for nonvolatile-memory users covers all variations of flash technology, including memory chips, and binary cell and multilevel cell technology. Topics include basic device structures and related process technologies, principles of operation, circuit design, overall design trade-offs, device testing, reliability, and applications.



**Computational Intelligence in Bioinformatics**

Edited by Gary B. Fogel, David W. Corne, and Yi Pan  
 (December 2007,  
 \$79.95, 355 pp.)

An introduction to computational intelligence methods and applications, this book highlights the importance of such methods for a diverse range of bioinformatics problems, and it highlights some of the field’s recent successes.



**VLSI Circuit Design Methodology Demystified: A Conceptual Taxonomy**

By Liming Xiu  
 (November 2007,  
 \$69.95, 202 pp.)

Because of its complexity and fast-changing nature, VLSI circuit design is not widely taught in universities or even well understood by many engineers. Written by an industry expert, this book aims to change that by featuring questions and answers about VLSI circuit design. It relies on up-to-date, real-world design examples to demonstrate how to diagnose and attack common problems in a practical way.

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## Spotlight On Three Products

### IEEE Std. 602-2007, released in October 2007

From the IEEE Standards Color Book series, the *IEEE White Book* is a revision of IEEE Std. 602-1996, Recommended Practice for Electric Systems in Health Care Facilities.

The new book describes ways to operate equipment to protect people and property from electrical failures. It presents ideas on how to lay out electrical systems to take advantage of their inherent flexibility while meeting requirements for proper electrical installation.

### 2008 National Electrical Code (NFPA 70), released in September 2007

NFPA 70, from the National Fire Protection Association, establishes provisions for electrical wiring and equipment in all types of buildings. This softbound edition is useful for electrical contractors, engineers, electricians, fire service professionals, safety officials, inspectors, and architects.

Its revisions of the earlier code are based on new technologies and industry needs and include the latest regulations for electrical installations in residential,

commercial, and industrial buildings. Revisions include specifications for electrical security in buildings that house operations critical to power systems, stipulations for outlets to run onboard electrical systems in electrified truck parking spaces, ways to reduce work-related hazards, and new guidelines for tamper-resistant electrical outlets.

### IEEE Std. 1450.3-2007, released in September 2007

The Standard for Extensions to Standard Test Interface Language (STIL) for Tester Target Specification details how to transfer tester-independent programs to specific automatic test systems. Although native STIL (IEEE Std. 1450-1999) data are tester-independent, the details can help users understand the process for specifying how STIL programs and patterns are mapped onto tester resources. The standard also covers tester resource constraints, known as tester rules checking.

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

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Four new IEEE Expert Now courses dealing with soft or technical skills are available.

### Stuff You Don't Learn in Engineering School, Part 2: Communicating Effectively and Part 3: Management Skills

*By Carl Selinger* Based on Selinger's 2004 book, these courses deal with nontechnical soft skills needed to succeed, such as giving speeches, setting priorities, and handling stress.

### Biometrics: Solutions for Security and Authentication

*By Kostas Plataniotis* Discusses face, gait, and electrocardiogram-based biometrics and how such measurements of physical characteristics are being used to pick a person out of a crowd.

### Space-Time Adaptive Processing for Radar

*By Michael Picciolo and Scott Goldstein* Focuses on state-of-the-art techniques for overcoming the limitations of the processing, which helps radar systems detect targets in clutter.

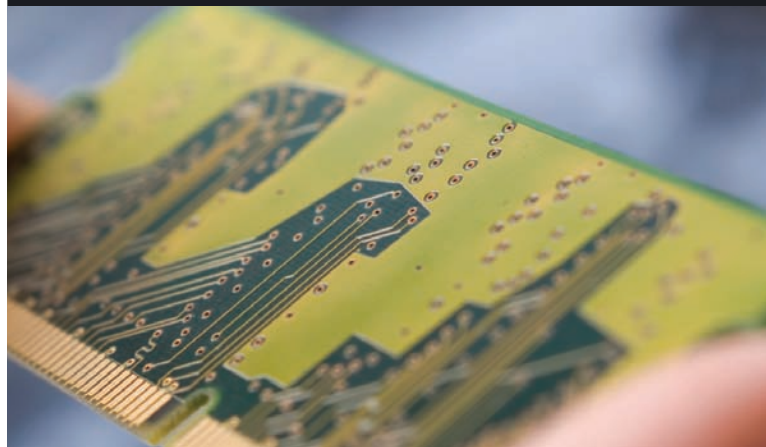
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— Jon Candelaria, Project Manager, Motorola



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## PROFILE

## SUSIE WEE

Picture-Perfect  
Digital Images

One of "40 under 40" to watch

BY KATHY KOWALENKO

The next time you send pictures from your digital camera to your friends, download a movie on your computer, or watch a TV program in high definition, you can thank Susie J. Wee. This IEEE member had a hand in making those technologies possible, and she did all of it before she turned 35. That's why *Computerworld* magazine put her on its 2007 "40 Under 40" list of IT innovators—which honors 40 rising stars younger than 40. Wee is now 38. The magazine says her work in imaging has made her one of the "people to watch" in coming years. Her research has been published in 50 journals, and she holds 25 patents, with more than 25 pending. She's also the associate editor of *IEEE Transactions on Circuits and Systems for Video Technology*.

Wee has been developing ways to compress video images and send them over computer networks since her grad-school days at MIT, where she researched signal processing and image processing. She spent 10 years at the school, earning her bachelor's, master's, and Ph.D. degrees in electrical engineering in 1990, 1991, and 1996, respectively. While still a grad student, Wee was part of the university's development team working on the HDTV system.

She joined Hewlett-Packard in Palo Alto, Calif., as a researcher in 1996 and worked on ways to send compressed video over computer networks so the images could be shared and viewed on various devices.

"It was an analog world in 1996, when VCR tapes were still popular and DVDs were just starting to be used," she says. "Industry didn't realize that everything was going to be digitized, so it was an analog-

versus-digital battle." But at HP, Wee and her colleagues believed that digital compression would soon be easy to accomplish "because computers were going to be able to compress and decompress images."

To make that possible, Wee helped develop compressed domain processing algorithms, which take compressed digital video streams and process them into another compressed stream that can then be sent wirelessly or over broadband. That work led to HP's OpenCall Media Platform, a commercial video streaming approach for mobile networks that allows videos to be edited, viewed on different-sized screens, and accessed by mobile devices such as cellphones and PDAs.

Wee, who was promoted to a management position in 2000, has kept her hand in research. "I wanted to innovate on my own, just to keep the technical side of my brain going, but on something that wouldn't interfere with the work of the researchers who reported to me," she says.

That next innovation ended up as the standard for the security of JPEG 2000 images, known as JPSEC. Wee was the standard's coeditor, which is what she is best known for. The scalable image-coding standard, finalized in April, keeps JPEGs secure and compressed as they travel around a network.

"People thought it was impossible to transcode media while keeping it secure so that the content creator could encrypt it and decrypt it as it goes around the network," she says. "The size couldn't be changed unless the owner gave the network operator the encryption key, but that's not secure in an end-to-end way, because someone could steal the content."



So she and IEEE Fellow John Apostolopoulos developed scalable coding that uses different encryption keys for high-, medium-, and low-resolution images. The scalability changes the images for different devices and different networks but preserves security.

Wee continued to climb the management ladder, becoming director of HP Labs Mobile and Media Systems in 2005. Her group is working on a line of products to improve a user's experience with video. They include the Halo high-end video conferencing system and Conversa, which integrates video from mobile devices with video on the Internet.

What drives this young innovator? Making a contribution and having an impact on the technical community and society, she says.

"It's one thing to write papers, but it's another thing to make sure your inventions have impact," she says. "It's also important to get more

people connected and able to communicate with each other around the world. And not just for those who already have computers but for people who are not so connected."

**ICE HOCKEY, TOO** Wee, born in Batavia, N.Y., finds time to have fun. She has been playing ice hockey since her days at MIT, where she was on the women's varsity team. Nowadays, she gets out on the ice three nights a week at a local rink, in an adult recreational league and as a member of the Fog City Sirens women's team, which plays in regional and national competitions.

What do ice hockey and invention have in common? It's all about working with others toward a common goal, Wee explains. "Teamwork is very important to me, and that's what I like about this sport," she says. "It's a dynamic, fast-paced game where you depend on others to win." ■

# Margaret Cheney

World Champion Diver

For IEEE Member Margaret Cheney, jumping off a diving board, doing twists in mid-air, and cleaving through water 3 meters below with a tiny splash is more than just a hobby—it's about physics, fun, and fearlessness.

"Although diving was scary at first, there's a wonderful feeling of energy flow—the energy transferring from my body to the diving board and from the board back to me," says Cheney, who has been diving competitively since high school. "When the timing is just right, it feels like magic—like flying."

Cheney, a national and world champion diver, has been making a splash since her first diving lesson in

high school in East Lansing, Mich.

"I picked it up quickly," she says. She first learned simpler dives, such as a standard forward and backward jump, and then picked up the more complex somersaults and multiple midair twists.

In college, Cheney's coach kicked her training up a notch. He was a diver, a gymnast, and a world trampoline champion, which was helpful because "trampoline is closely related to diving," Cheney says. She began adding more twists and somersaults to her dives.

To nail some of the more complicated—and dangerous—jumps, Cheney sometimes wore a spotting rig, a belt that's attached to ropes and a pulley. The coach controls the ropes to keep the diver from crashing into the water when attempting an unfamiliar move, Cheney explains.

She competed on the university, regional, and national levels throughout college, but she quit after graduating to focus on a teaching career at Rensselaer Polytechnic Institute, in Troy, N.Y., where she teaches math and radar imaging.

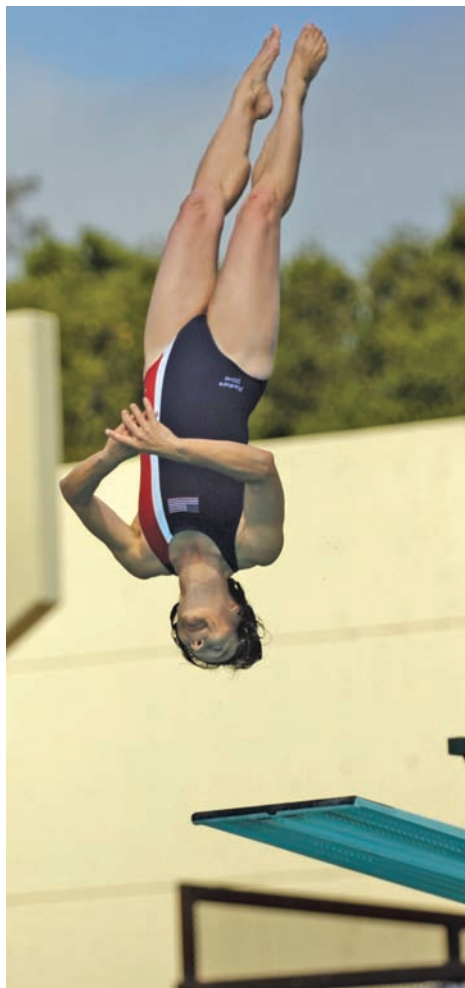
But the passion never left, and in 1997 Cheney got back in the water. "Diving was something I wanted to have in my life again," she says. She found a coach near her home in Troy, brushed up on her skills, and took fourth place in the 3-meter competition at the 1998 national diving championships. She also won the 1-meter event in the women's 50–54 age group at the 2005 nationals. Last August she won the gold medal in the 3-meter competition for women in the same group at the FINA Masters World Diving Championship, in Stanford, Calif.

—Anna Bogdanowicz

**PASSION**  
Diving

**JOB**  
Math professor

**HOME**  
Troy, N.Y.



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: [institute@ieee.org](mailto:institute@ieee.org).



## Ian Hunter

On Top of the World

As he stood in the middle of the Canadian Arctic, the bitter cold stinging his face after weeks of racing on skis toward the North Pole, Ian Hunter began to question his newfound passion: polar racing.

"What am I doing here?" I asked myself and even promised myself I would never go anywhere cold again," Hunter, 41, says of his first race—the 2007 Polar Challenge, a 580-kilometer team race from Resolute Bay, Canada, to the magnetic North Pole.

The race had teams of three racing on foot and skiing together toward the pole and then going 32 km more to the finish line at Isachsen Base. But even when conditions got very tough, the IEEE senior member didn't quit. Instead, his team—which must cross the finish line together—wound up placing third among nine teams.

Hunter is a senior design engineer for Scottish Power Energy Networks in Bellshill, Scotland. He got involved with polar racing after coming across the Polar Challenge Web site in 2005. Reading the description hooked him, and he immediately signed up, he says.

He trained for 18 months by lifting weights, running, and hiking. Three months before the race, he and more than two dozen other competitors from around the world attended a weeklong training

course in the Austrian Alps. There they got acclimated to the Arctic's minus 40°C temperature, honed cross-country skiing techniques, and boned up on survival skills, including how to navigate with a compass toward the North Pole and how to prevent hypothermia.

The race, divided into three sections, started in April and had Hunter's team crossing bumpy sea ice and rolling hills while hauling sleds of food and supplies. Each day started at 6 a.m., with breaks every three hours to rest and eat. The team also called the race organizers at Resolute Bay twice a day to let them know how they

were doing. After about 13 hours of racing, Hunter and his teammates would stop for the night.

"Once we were all in the tents, we would eat, drink, write in our journals, and have some good laughs," Hunter says.

At the end of each section, the teams would stop at checkpoints to rest, have their food supplies restocked, and get checked over by doctors. The team reached the finish line in 16 days.

As difficult as the race was, Hunter says the biggest challenge was fitting back into the everyday routine. "Life in the polar regions is so simple—no noise, no long-term stress," he says. "You become in tune with your body, and your mind is uncluttered."

That's why he's already planning his next polar race, this time to the South Pole in 2009.

"My eyes are back on the poles," he says.

—A.B.

**PASSION**  
Polar racing

**JOB**  
Transformer specialist

**HOME**  
Hamilton, Scotland

## RECOGNITIONS



### MEMBER JUAN F. ARRATIA

received a 2006 Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring from the National Science Foundation (NSF). The recipients were announced by the White House only last November. They were cited

for their outstanding work as mentors of pre-university, undergraduate, or graduate students, particularly those from minority groups that are underrepresented in the fields of science, technology, engineering, and mathematics.

Arratia is director and principal investigator for the Model Institutions for Excellence project at Metropolitan University in San Juan, Puerto Rico. The project, funded by the NSF and NASA, is designed to encourage minority students to pursue careers in science and engineering.

Arratia received a bachelor's degree in electrical engineering in 1973 from the State Technical University in Santiago, Chile. He earned a master's in electrical engineering in 1979 from Louisiana Tech University, in Ruston, and a Ph.D. in electrical engineering in 1985 from Washington University, in St. Louis.



### ASSOCIATE MEMBER OSAMA ELJABIRI

was named 2007 New Jersey Professor of the Year by the Carnegie Foundation for the Advancement of Teaching and the Council for Advancement and Support of Education, both in Washington, D.C. The award is given annually to

a college professor in each of the 50 states, the District of Columbia, Guam, Puerto Rico, and the U.S. Virgin Islands, for dedication in teaching undergraduate students.

Eljabiri is a senior university lecturer at the New Jersey Institute of Technology, in Newark. He is the founder of and a teacher in the computer science capstone program at NJIT's College of Computing Sciences, a senior-year requirement in which teams of students design and implement software products and other computing services for clients in such fields as education, entertainment, and finance.

He received a master's degree in banking and financial systems in 1999 from the Arab Academy for Financial Sciences, in Amman, Jordan, and another master's, in information systems, in 2001 from NJIT.



### LIFE FELLOW HISHAM KHATIB

received the World Energy Council's 2007 Global Energy Award, the council's highest honor, in November.

The award is presented every three years to a person who has contributed substantially to the understanding of the global energy sector, has supported the World Energy Council, and has made significant contributions to his or her company or organization, community, or country. The WEC is an alliance of energy companies, governments, and other parties from more than 90 countries that says it promotes "the sustainable supply and use of energy."

Khatib, chairman of Jordan's Electricity Regulatory Commission, is a member of the World Federation of Scientists, an association that promotes collaboration among scientists and researchers from around the globe.

He received a bachelor's degree in engineering from Cairo University and a master of science degree from the University of Birmingham, in England. He earned a Ph.D. in electrical engineering and a bachelor's degree in economics from the University of London.

## IN MEMORIAM

### TADAHIRO SEKIMOTO

Former president of NEC

MEMBER GRADE: Life Fellow

AGE: 80

DIED: 11 November



Tadahiro Sekimoto made significant contributions to the field of communications during his 50 years at NEC Corp.

He joined NEC in 1948 at the company's Central Research Laboratories, in Kawasaki, Japan, where he designed pulse-code modulation equipment. He became head of research in 1965. Sekimoto then accepted a two-year assignment at the Communications Satellite Corp., a telecommunications company in Washington, D.C., where he researched digital transmission technologies for satellite communications. In 1967 he returned to NEC to manage the Central Research Laboratories and was named president of the company in 1980. He served as chairman from 1994 until he retired in 1998.

Sekimoto received the 2004 IEEE Medal of Honor for his "pioneering contributions to digital satellite communications, promotion of

information technology R&D, and corporate leadership in computers and communications."

He also received the 1996 IEEE Alexander Graham Bell Award for pioneering contributions to digital satellite communications and "industry leadership in developing digital communications."

He earned a bachelor's degree in physics and a Ph.D. in engineering from the University of Tokyo in 1948 and 1962, respectively.

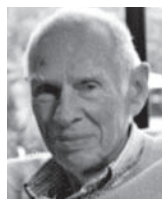
### DAVID H. SHEPARD

Pioneer in voice-recognition systems

MEMBER GRADE: Life Senior Member

AGE: 84

DIED: 24 November



David H. Shepard invented the first devices for optical character recognition and interactive voice response. The latter uses speech recognition to give telephone callers access to computer-stored data.

He served in the U.S. Army during World War II as a cryptanalyst of Japanese code. Later, he broke other codes for the Armed Forces Security

Agency, a predecessor of the U.S. National Security Agency. During that time, Shepard and colleague Harvey Cook Jr. invented the Gismo, a machine that could recognize letters of the alphabet produced by a typewriter. In 1952 Shepard and William Lawless Jr. founded Intelligent Machines Research Corp., in Arlington, Va., to manufacture the machines. Later, IBM licensed and manufactured the Gismo, and Shepard used the royalties to make what is widely believed to be the first character-sensing machine ever sold. It was used to read and interpret credit cards.

In 1964, he invented the "conversation machine," which allowed telephone callers to access data stored in a computer by saying "yes" or "no." He also created the Farrington B numeric font, which is still used on credit cards. Shepard went on to found several other companies, including Cognitronics Corp. of Danbury, Conn., now a leading manufacturer of voice information systems.

Shepard received a bachelor's degree in electrical engineering from Cornell University, Ithaca, N.Y., and a master's in mathematics from the University of Michigan, Ann Arbor.

### JAMES J. VASSELEU

Former IEEE Region 10 director

MEMBER GRADE: Life Senior Member

AGE: 84

DIED: 30 November



James J. Vasseleu was Region 10 (Asia-Pacific) director from 1977 to 1978. He also founded the IEEE Australia Section in 1972 and was its chair until 1974.

Vasseleu began his career as an electrical systems design engineer for Crompton Parkinson, an electrical equipment company in England. He then became a sales manager for Federal Pacific Electric Co., a manufacturer of electrical parts in Newark, N.J. Next he was an electrical engineering director at Fowell, Mansfield, Jarvis & Maclurcan in Sydney, Australia. Later he joined Leighton Irwin Proprietary, an architectural services and supply company, also in Sydney, where he was a senior electrical engineer.

Vasseleu received a bachelor's degree in engineering, a higher trade certificate, and a management certificate from Sydney Technical College (now Sydney Institute).



## 2008 IEEE ANNUAL ELECTION

### Who's on the Ballot

On 1 May, the IEEE Board of Directors will announce the candidates to be placed on the 2008 ballot.

The list will include candidates for IEEE President-Elect, selected by the IEEE Board of Directors. Others will be nominees for Director and Director-Elect positions up for election this year; these are submitted by the respective regional and divisional nominating committees. The ballot will also include the nominees for Members-at-Large of the Standards Association Board of Governors; Vice President-Elect, 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 headquarters by 15 April 2008.

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

- Regional nominating committees submit candidates for the offices of regional Delegate-Elect/Director-Elect, as applicable.
- Divisional nominating committees submit candidates for the office of divisional Delegate-Elect/Director-Elect, as applicable.
- Standards Association submits candidates for the offices of Standards Association Board of Governors Members-at-Large, as applicable.
- Technical Activities submits candidates for the office of 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 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 if it intends to put forward any constitutional amendments.
- IEEE Corporate Activities must receive initial campaign statements from all nominated annual election candidates.

##### 13 JUNE

- Petitions for constitutional amendments must be received by noon EDT USA/16:00 GMT.

- Petition nominations for candidates to be elected by the membership must be received by noon EDT USA/16:00 GMT.
- 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.

##### 23 JUNE

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

##### 7 JULY

- Deadline for rebuttal statements from initiators and opponents on proposed constitutional amendments.

##### 1 AUGUST

- IEEE annual election ballots are sent to all voting members.

##### 1 OCTOBER

- Last day for ballots, by noon CDT USA/17:00 GMT, to be received from voting members.

##### 8 OCTOBER

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

##### 13 OCTOBER

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

##### 16 NOVEMBER

- IEEE Board of Directors acts to accept

- report of Tellers Committee.
- Annual election results are made official.

#### UP FOR ELECTION IN 2008

##### 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:

- Technical Activities Vice President-Elect.
- Delegate-Elect/Director-Elect, Division I (one-year term).
- Delegate-Elect/Director-Elect, Division III (one-year term).
- Delegate-Elect/Director-Elect, Division V (one-year term).
- Delegate-Elect/Director-Elect, Division VII (one-year term).
- Delegate-Elect/Director-Elect, Division IX (one-year term).

##### Chosen by members of the respective regions:

- Delegate-Elect/Director-Elect, Region 2 (two-year term).
- Delegate-Elect/Director-Elect, Region 4 (two-year term).
- Delegate-Elect/Director-Elect, Region 6 (two-year term).
- Delegate-Elect/Director-Elect, Region 8 (two-year term).
- Delegate-Elect/Director-Elect, Region 10 (two-year term).

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

## 2007 ELECTION TALLY

### And the Winners Are...

The IEEE Tellers Committee tally of votes from valid 2007 election ballots approved last November by the IEEE Board of Directors is as follows:

#### PRESIDENT-ELECT, 2008

John Vig	17 805
Pedro A. Ray	13 626
Marc T. Apter	11 068

#### DIVISION DELEGATE-ELECT/ DIRECTOR-ELECT, 2008

<b>Division II</b>	
Robert E. Hebner Jr.	1887
Caio A. Ferreira	1810
<b>Division IV</b>	
Roger W. Sudbury	2251
Ronald J. Marhefka	1657
<b>Division VI</b>	

Mark I. Montrose	1382
Jeffrey M. Voas	1114
<b>Division VIII</b>	
Stephen L. Diamond	2563
Michael R. Williams	2367
Oscar N. Garcia	1756
<b>Division X</b>	
Richard A. Volz	2533
Thomas F. Wiener	1661

#### REGION DELEGATE-ELECT/ DIRECTOR-ELECT

<b>Region 8, 2008</b>	
Józef W. Modelski	6896

Jaafar M. Al-Ibrahim	1989
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#### Region 1, 2008-2009

Charles P. Rubenstein	2745
Babak D. Beheshti	1877

#### Region 3, 2008-2009

Clarence L. "Lee" Stogner	1457
Eric S. Ackerman	1316
Donald W. Hill	798

#### Region 5, 2008-2009

Sandra L. "Candy" Robinson	1702
Stuart A. Long	793
Donald G. Dunn	672

#### Region 7, 2008-2009

O.P. "Om" Malik	674
Hilmi M. Turanli	544
Robert L. Anderson	517
<b>Region 9, 2008-2009</b>	
Tania L. Quiel	636
Gustavo A. Giannattasio	399
Enrique S. Draier	366

#### STANDARDS ASSOCIATION PRESIDENT-ELECT, 2008

W.C. "Chuck" Adams	782
Forrest D. "Don" Wright	700

#### STANDARDS ASSOC. BOARD OF GOVERNORS MEMBER-AT- LARGE, 2008-2009

Steve M. Mills	938
Lester F. "Les" Eastwood	566

#### STANDARDS ASSOC. BOARD OF GOVERNORS MEMBER-AT- LARGE, 2008-2009

T.W. "Ted" Olsen	890
Richard H. Hulett	611

#### TECHNICAL ACTIVITIES, VICE PRESIDENT-ELECT, 2008

Harold L. Flescher	14 132
Robert C. "Bob" Rassa	11 344

#### IEEE-USA PRESIDENT-ELECT, 2008

Gordon W. Day	13 556
Gregg L. Vaughn	10 498

#### IEEE-USA MEMBER-AT-LARGE, 2008-2009

Gary L. Blank	12 215
Jean M. Eason	11 709

The 43 916 returned ballots represented 15.63 percent of 281 045 ballots mailed.

# Nominations Are Now in Order

BY MICHAEL R. LIGHTNER

It's nominating time again, and the IEEE is looking for more than a few members with the qualifications, leadership skills, and commitment to volunteer as IEEE officers or to serve on committees of the IEEE Board of Directors. The IEEE Nominations & Appointments Committee seeks recommendations for the following:

## IEEE President-Elect

### ASSEMBLY-ELECTED OFFICERS

- Vice President, Educational Activities
- Vice President, Publication Services and Products
- IEEE Secretary
- IEEE Treasurer

### IEEE STANDING COMMITTEES

- Audit
- Awards Board

- Conferences (chair only)
- Employee Benefits
- Ethics and Member Conduct
- Fellow
- History
- Individual Benefits and Services
- Information Technology Strategy
- Infrastructure Oversight
- Nominations and Appointments
- Strategic Planning
- Tellers
- Women in Engineering

**DEADLINES** The deadline for submitting nominations for standing committee chairs, as well as for a student member of the IEEE Women in Engineering Committee, is 1 May. You have until 1 June to submit nominations for standing committee members and IEEE Assembly-elected officers. The Assembly consists of 23 delegates, which includes the IEEE President, the President-Elect, the Past President, the 10 Region Delegates, and the 10 Division Delegates.

Each position has job requirements and specific qualifications on which the N&A Committee evaluates potential candidates. These requirements are available on the N&A Web site, at <http://www.ieee.org/web/aboutus/nominations/guidelines.html>. General qualifications for volunteers are competence, experience, and a willingness and ability to take on the tasks of the position. Candidates also should have the time in which to participate, along with enthusiasm, communication skills, and the ability to cooperate with others in achieving the objectives of the committee or board they serve.

Nominations can be made online at <http://www.ieee.org/web/aboutus/nominations/nomform3d.html> or by

e-mail to [nominations@ieee.org](mailto:nominations@ieee.org). Nominations should include the nominee's name, recommended position, the nominee's talents and qualifications for the position, and a biography (for which a template is provided online).

**THE PROCESS** The N&A Committee is responsible for making recommendations for positions elected by the IEEE Assembly. The committee also makes recommendations for chairs and members of standing committees to the IEEE Board of Directors, typically at its June or November meeting. The Board makes the final decision on appointments. The N&A's recommendations for IEEE officers are provided to the IEEE Assembly, with the exception of the IEEE President-Elect, which is provided to the Board at its November meeting. The Assembly is responsible for the election of IEEE officers. Successful candidates are notified following either election or appointment.

*Lightner is the 2008 IEEE Nominations & Appointments Committee chair.*

**MORE INFORMATION** on these positions is at <http://www.ieee.org/web/aboutus/nominations/guidelines.html>.

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# The 2008 Class Of IEEE Fellows

The Institute salutes the 295 senior members from around the world who have been named IEEE Fellow for 2008. They join the elite group of Fellows, who have contributed to the advancement or application of engineering, science, and technology.

Ishfaq Ahmad  
Venkataramana Ajarapu  
Ali Akansu  
Akintunde Akinwande  
Naofal Al Dahir  
Rajeev Alur  
Abeer Alwan  
Daniel Amey  
Kenji Anami  
W. Cleon Anderson  
John Apostolopoulos  
Ikuo Awai  
Victor (Paramvir) Bahl  
Bassam Bamieh  
Alexander Barg  
Mourad Barkat  
John Bay  
Bernd Becker  
Andrew Blake  
Vladimir Blasko  
Peter Blood  
Amir Boag  
Colombo Bolognesi  
Jean-Charles Bolomey  
John Booske  
Gunilla Borgfors  
Ronald Brachman  
Joe Brewer  
Emery Brown  
Timothy Brunner  
Ann Bryce  
Michael Bushnell  
Kenneth Cadien  
Stephen Campbell  
Jose Capmany  
Manuel Castro  
Manuel Catedra  
Tianyou Chai  
Krishnendu Chakrabarty  
H. Chan  
Jie Chang  
Milton Chang  
Roy Chantrell  
Pane Chao  
Jian Chen  
Peter Chen  
Zhi Ning Chen  
Fan-Tien Cheng  
Vladimir Cherkassky  
Simon Cherry  
Dah Ming Chiu  
George Chiu  
Jen-Yao Chung  
Pau-Choo Chung

Diane Cook  
Peter Corke  
Pamela Cosman  
Jerome Cuomo  
Jagdish Das  
Curt Davis  
Peter de Maagt  
Carlos Diaz  
Sudhir Dixit  
Frank Doyle  
Timothy Driscoll  
Geir Dullerud  
Nikil Dutt  
Ruth Dyer  
Paul Ebert  
Yuguang Fang  
Jay Farrell  
Roy Featherstone  
Gary Fedder  
Martin Fejer  
Dimitar Filev  
Raymond Filler  
Michael Fu  
Cynthia Furse  
Robert Galloway, Jr.  
Daniel Gamota  
Aura Ganz  
Matthew Ganz  
Guang Gao  
Robert Gao  
Paolo Gargini  
Patrick Gelsinger  
Ornan (Ori) Gerstel  
Spartak Gevorgian  
D.V. Giri  
Avraham Gover  
Charles Gross  
Michael Gschwind  
Ling Guan  
Fernando Guarin  
Rajiv Gupta  
Dong Ha  
Fred Hadaegh  
Kazuo Hagimoto  
Naomi Halas  
Hiroki Hamada  
Vincent Harris  
Jerry Hausner  
Robert Hawley  
Vincent Hayward  
Jinliang He  
Joao Hespanha  
Gregg Higashi  
Alex Hills  
Benjamin Hobbs  
Bertrand Hochwald

Lothar Hoeff  
Steven Holland  
Tomlinson Holman  
Mingwei Hong  
Harold Hosack  
Jennifer Hou\*  
Thomas Howell  
Judy Hoyt  
Diana Huffaker  
Patrick Iannone  
Eishi Ibe  
Michael Ingram  
Takeshi Inoue  
Janet Jackel  
Ravi Jain  
Shesha Jayaram  
Christian Jensen  
Michael Jensen  
Zhong-Ping Jiang  
Joel Johnson  
William Joines  
Ray Jones  
Christian Jutten  
Hisao Kameda  
Wei Kang  
Raphael Kastner  
Akihiko Kasukawa  
Bogdan Kasztenny  
Walter Kellermann  
James Kenney  
Ming-Dou Ker  
Amarpal Khanna  
Reinhard Knoechel  
Ilya Kolmanovsky  
Janusz Konrad  
Fumio Koyama  
Hamid Krim  
Keiichi Kubota  
Rakesh Kumar  
Phillip Laplante  
Yue-Ying Lau  
Gianluca Lazzi  
Ju-Jang Lee  
Robert Lee  
Shi-Wei Lee  
Yong Lee  
Jane Lehr  
Thomas Lewellen  
Erping Li  
Pai-Chi Li  
Zexiang Li  
Jorg Liebeherr  
Nam Ling  
Wayne Litzenberger  
Jia-Ming Liu  
David Long

Philippe Loubaton  
Steven Low  
Chan-Nan Lu  
Jian-yu Lu  
Benoit Macq  
Vahid Madani  
Vijay Madiseti  
Alex Malozemoff  
Sorin Marcovici  
Roger Mark  
Kenneth Martin  
Rui da Silva Martins  
Didier Massonnet  
Roy Maxion  
Muriel Medard  
William Melvin  
Max Meng  
Bruno Meyer  
Peter Mikhalevsky  
Samiha Mourad  
Michal Mrozowski  
Hiroaki Muraoka  
Radhakrishnan Nagarajan  
Klara Nahrstedt  
Chandrasekhar Narayanaswami  
Sani Nassif  
Bram Nauta  
Dragan Nestic  
Susumu Noda  
David Notkin  
Oyekunle Olukotun  
Levent Onural  
Andrew Packard  
Dhabaleswar Panda  
Karen Panetta  
Donggun Park  
Marco Parvis  
John Patrick  
Jay Pearlman  
Fernando Pereira  
Leslie Pereira  
Radia Perlman  
Alexander Petroianu  
Athina Petropulu  
George Ponchak  
Hans (Teddy) Puttgen

Sanguthevar Rajasekaran  
Raghu Ramakrishnan  
Chandrasekhara Rao  
Nageswara Rao  
Richard Redl  
Markku Renfors  
Ronny Ronen  
Massimo Rudan  
Debanjan Saha  
Yvon Savaria  
John Schmalzel  
Waymond Scott, Jr.  
Dongkai Shangguan  
David Shaver  
Kenneth Shepard  
Han-Ping Shieh  
Noriyuki Shimizu  
Mohammad Shokrollahi  
Jyuo-Min Shyu  
Jennie Si  
Roland Siegwart  
Michael Simpson  
Keyue Smedley  
Rene Smeets  
Yong-Hua Song  
Rajan Srinivasan  
Mani Srivastava  
Ivan Stojmenovic  
Scott Sudhoff  
Ananthram Swami  
Peter Tarjan  
Stewart Taylor  
Jean-Michel Tesseron  
Alfredo Testa  
Sergios Theodoridis  
Charles Therrien  
James Thompson  
Gregory Timp  
Thomas Tobin  
Hamid Toliyat  
Sergei Tretjakov  
Anand Tripathi

Hsing-Huang Tseng  
Lalita Udpa  
Daisuke Ueda  
Hiromi Ueda  
Paul Van den Hof  
Eric VanStryland  
Paulo Verissimo  
Ramanarayanan Viswanathan  
Ann Von Lehmen  
Chi-Hsu Wang  
Chong-Kuang Wang  
Laung-Terng Wang  
Wen-June Wang  
Xiaodong Wang  
William Webb  
David Welch  
Bruce Wheeler  
Jacob White  
John Wikswo  
Charles Wilker  
Kevin Wise  
Gene Wolf  
Bin Wu  
Ja-Ling Wu  
Guanghan Xu  
Shanjia Xu  
Narahari Yadati  
En-hui Yang  
Kaoru Yano  
Yutaka Yasuda  
Rajendra Yavatkar  
Hoi-Jun Yoo  
Jeffrey Young  
Paul Kit-Lai Yu  
Xinghuo Yu  
Alexander Zelinsky  
Jinyun Zhang  
Bin Zhao  
Jian-Gang (Jimmy) Zhu  
Weihua Zhuang  
Abdelhak Zoubir

\*Hou died 2 December

FOR MORE INFORMATION about the IEEE Fellow program or to nominate someone, visit <http://www.ieee.org/fellow>.

