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IEEE

MONITORING *the* ENVIRONMENT

A new tool helps scientists obtain better data for better decisions PAGE 6

REGION NEWS

REGION 1 NORTHEASTERN UNITED STATES

■ Student branch at **Columbia University** forms Women in Engineering (WIE) affinity group.
■ **Boston Section** forms IEEE Consumer Electronics Society chapter.

REGION 2 EASTERN UNITED STATES

■ Student branch formed at **DeVry University Online, based in Piscataway, N.J.**
■ **Philadelphia Section** forms WIE affinity group.

REGION 3 SOUTHEASTERN UNITED STATES

■ Student branch formed at **Bethune-Cookman University, Daytona, Fla.**

REGION 4 CENTRAL UNITED STATES

■ **Cedar Rapids (Iowa) Section** forms IEEE Power & Energy Society chapter.
■ **West Michigan Section** establishes IEEE Electromagnetic Compatibility Society chapter.
■ **Southeastern Michigan Section** forms Life Members (LM) affinity group.
■ Student branch at **Purdue University, West Lafayette, Ind.,** forms IEEE Electron Devices Society chapter.

REGION 5 SOUTHWESTERN UNITED STATES

■ **Galveston Bay (Texas) Section** forms Consultants Network affinity group and LM affinity group.
■ Student branch at **University of Texas, El Paso,** forms IEEE Computer Society chapter.
■ **Pikes Peak (Colo.) Section** forms joint chapter of IEEE Electromagnetic Compatibility and IEEE Microwave Theory and Techniques societies.

REGION 6 WESTERN UNITED STATES

■ **Oregon Section** and **Utah Section** form IEEE Solid-State Circuits Society chapters.

REGION 7 CANADA

■ **Vancouver Section** forms IEEE Oceanic Engineering Society chapter.

REGION 8 EUROPE, MIDDLE EAST, AND AFRICA

■ **Slovenia Section** forms LM affinity group.
■ **Hungary Section** establishes LM affinity group.
■ **Romania Section** establishes IEEE Industry Applications Society chapter.
■ Student branch at **Instituto Superior Técnico Lisboa, Portugal,** forms WIE affinity group.
■ Student branch established at **Riga Technical University, Latvia.**
■ Student branch formed at **University of Essex, Colchester, United Kingdom.**
■ **Greece Section** establishes LM affinity group.
■ **Italy Section** forms IEEE Signal Processing Society chapter.
■ **Iraq Section** forms WIE affinity group.
■ Student branch formed at **Abu Dhabi Women's College, United Arab Emirates.**
■ Student branch formed at **Higher School of Communication of Tunis, Ariana, Tunisia.**
■ **Kenya Section** forms IEEE Computer Society chapter.
■ Student branch formed at **Methodist University College, Accra, Ghana.**

REGION 9 LATIN AMERICA

■ **Uruguay Section** forms IEEE Circuits and Systems Society chapter.
■ Student branch formed at **Servicio Nacional de Aprendizaje Antioquia, Medellín, Colombia.**
■ Student branch formed at **Fundación CIDCA, Villavicencio, Colombia.**
■ **Argentina Section** establishes WIE affinity group.
■ Student branch at **Pontificia Universidad Católica de Chile, Santiago,** establishes IEEE Circuits and Systems Society chapter.
■ Student branches in Mexico at **Instituto Tecnológico de Minatitlan, Universidad Autónoma de Guadalajara,** and **Universidad Iberoamericana** form IEEE Computer Society chapters.
■ Student branch formed at **Universidad Politécnica del Centro, Villahermosa, Mexico.**
■ **Queretaro (Mexico) Section** forms IEEE Computational Intelligence Society chapter.
■ Student branch at **Universidad Nacional Autónoma de Honduras, Tegucigalpa,** forms WIE affinity group.

REGION 10 ASIA AND PACIFIC

■ **Nanjing (China) Section** forms IEEE Consumer Electronics Society chapter.
■ **Harbin (China) Section** forms IEEE Systems, Man, and Cybernetics Society chapter.
■ Student branches established in India at **Sri Jayaram Engineering College Cuddalore, St. Joseph College of Engineering, Indian Institute of Space Science and Technology, Kalasalingam Institute of Technology, KIT College of Engineering, Priyadarshini Institute of Engineering & Technology, College of Engineering Attingal, Advanced Institute of Technology and Management, Hyderabad Institute of Technology and Management,** and **LNM Institute of Information Technology.**
■ Student branch at **Oxford College of Engineering, Bangalore, India,** forms WIE affinity group.
■ Student branch at **Jeppiaar Engineering College, Chennai, India,** establishes WIE affinity group.
■ Student branches formed in Pakistan at **Iqra University, Karachi**, and **Quaid-e-Awam University of Engineering, Science & Technology, Nawabshah.**
■ Student branch at **University of Peradeniya, Sri Lanka,** forms WIE affinity group.
■ Student branch formed at **Electric Power University, Hanoi, Vietnam.**
■ **Fukuoka (Japan) Section** forms IEEE Photonics Society chapter.

SEND US YOUR NEWS

We publish announcements of new groups once they've been approved by IEEE Member and Geographic Activities. To send us local news, like student branch events and competitions, WIE or preuniversity outreach efforts, or other IEEE group activities, use our form on the Region News page at http://theinstitute.ieee.org/region-news.

COVER: TIM FLACH/GETTY IMAGES; THIS PAGE: ISTOCKPHOTO

Online

Available 5 March at theinstitute.ieee.org

MEDAL OF HONOR
Read about this year's winner, John L. Hennessey.

BOOKS
A sample of e-books available for free to all IEEE members.

NEWS

Staecker Is IEEE President-Elect

LIFE FELLOW Peter W. Staecker was elected 2012 IEEE president-elect and begins serving as IEEE president on 1 January 2013. He received 21 406 votes. His opponent, Fellow Roger Pollard, who died on 3 December after a brief illness, had garnered 17 341 votes.

Staecker retired after a 26-year career in microwave design. In 1972, he joined MIT Lincoln Laboratory, in Lexington, Mass., where he designed microwave devices and circuits and developed measurement techniques for their application to satellite communications. He left in 1986

Peter W. Staecker

to join M/A-COM in Burlington, Mass., to develop microwave and millimeter-wave technology, retiring as director of R&D in 1998.

Vice president of IEEE Technical Activities in 2007, Staecker served as vice president and president of the IEEE Microwave Theory and Techniques Society in 1992 and 1993 and director of IEEE Division IV in 2001 and 2002. He was IEEE treasurer in 2009 and 2010 and a member of several IEEE committees. He currently chairs the Individual Benefits and Services Committee.

—Amanda Davis

Two Nominated for 2013 President-Elect

THE IEEE BOARD of Directors has nominated IEEE Fellows J. Roberto Boisson de Marca and Tariq S. Durrani as candidates for 2013 IEEE president-elect. The two men, chosen by the board in November, are set to face off in the annual election this year.

The winner of the election will serve as 2014 IEEE president.

De Marca has been a faculty member since 1978 at Catholic University of Rio de Janeiro, where he has held several leadership positions, including associate academic vice president. He is the founding president of the Brazilian Telecommunications Society and a member of both the Brazilian National Academy of Sciences and the National Academy of Engineering.

De Marca is chair of the IEEE Future Directions Committee. From 2008 to 2010 he was chair of IEEE's Humanitarian Technology Challenge program committee. De Marca was the 2008 vice president of IEEE Technical Activities, the 2006 IEEE secretary, and the 2000 president of the IEEE Communications Society. He was also a candidate for IEEE president-elect in the 2009 election.

Durrani is a research professor in the electronic and electrical engineering department at the University of Strathclyde, in Glasgow. He joined the university as a lecturer in 1976, and from 1990 to 1994 he headed its electronic and electrical engineering department. He was also deputy principal of the university from 2000 to 2006. Durrani is a Fellow of the United Kingdom's Royal Academy of Engineering and the Royal Society of Edinburgh.

In 2010 and 2011 he was vice president of IEEE Educational Activities. Durrani served as president of the IEEE Engineering Management Society in 2006 and 2007 and was vice chair of IEEE Technical Activities for Region 8 in 2003 and 2004. He was president of the IEEE Signal Processing Society from 1994 to 1995. Durrani was founding chair of the IEEE Periodicals Review Committee in 1998 and 1999.

—A. D.

CALENDAR

March

3–4 Region 10 meeting in Kolkata, India.

5 1827: Birth date of **Alessandro Volta**, inventor of the chemical battery, introduced as the voltaic pile.

15 1892: Inventor **Jesse W. Reno** patents the escalator.

16–18 Region 3 meeting in Orlando, Fla.

25 1928: Birth date of astronaut **Jim Lovell**, commander of NASA's Apollo 13 mission.

31–1 April: Region 8 meeting in Berlin.

April

1 1976: Steve Jobs and Steve Wozniak found **Apple Computer Co.**, which would revolutionize personal computing and mobile devices.

9 1919: Birth date of **John Presper Eckert**, codesigner of the ENIAC, EDVAC, and UNIVAC computers.

11–14 Region 9 meeting in Mexico City.

16 1956: Admiral Corp. sells the **first solar-powered radio**.

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

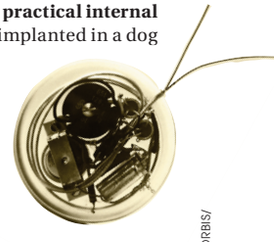
21–22 Region 5 meeting in Tulsa, Okla.

27–29 Region 7 meeting in Montreal.

May

1 1947: The **first U.S. radar for commercial and private aircraft** is demonstrated aboard a Trans World Airlines plane in Culver City, Calif.

7 1958: The **first practical internal pacemaker** is implanted in a dog by IEEE Life Fellow Wilson Greatbatch and colleagues at a Veterans Administration hospital in Buffalo, N.Y.



9 1850: Birth date of **Edward Weston**, cofounder of Weston Electric Light Co., a maker of arc light systems. In 1883 Weston would help illuminate New York's Brooklyn Bridge.

11 1997: **Deep Blue**, an IBM computer, beats world chess champion Garry Kasparov in a match.

19 1971: The Soviet Union launches **Mars 2**, the first spacecraft to be crash-landed on Mars.

23 1908: Birth date of **John Bardeen**, the only person to receive two Nobel prizes in physics—one in 1956 for helping invent the transistor, the other in 1973 for contributions to the BCS (Bardeen, Cooper, and Schrieffer) theory of conventional superconductivity.

25 1961: **U.S. President John F. Kennedy** challenges Congress to send a man to the moon by the end of the decade.

Historical events provided by the IEEE History Center. IEEE events indicated in red.

NEWS: JOSH RITCHIE. CALENDAR (CLOCKWISE FROM TOP RIGHT): CHRIS PRITCHARD/ISTOCKPHOTO; GETTY IMAGES; BETTMANN/CORBIS/AP PHOTO; WHITE HOUSE PRESS OFFICE; TOPICAL PRESS AGENCY/GETTY IMAGES; ISTOCKPHOTO; SSPL/GETTY IMAGES; NASA

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IEEE Educational Activities

IEEE offers a wealth of learning resources to working technology professionals, professors, teachers and students.

Pre-University Education

- Teacher-In-Service Program
- EPICS in IEEE
- Portals
  - TryEngineering
  - TryNano
  - **TryComputing (Coming in 2012)**

University Education

- Global Accreditation
- Accreditation.org
- Real World Engineering Project
- Technical English Program
- Standards Education

Continuing Education

- IEEE eLearning Library
- IEEE Continuing Education Providers Program
- **iTunes U - New**
- Continuing Education Units
- Professional Certification
- **English for Technical Professionals (Coming 2012)**
- Humanitarian Technology Webinar Series

IEEE Educational Activities Board Awards

11 major awards honor individuals and companies for major contributions to engineering and technical education

IEEE-ETA KAPPA NU (IEEE-HKN)

The official honor society of IEEE, recognizing scholarship and academic excellence

Discover more: www.ieee.org/education

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Advancing Technology for Humanity

GANDEE VASAN/GETTY IMAGES

TECH TOPIC

New Tool to Help Monitor the Environment

Better data for better decisions

BY **KATHY KOWALENKO**

TOO MUCH DATA coming from too many sources that use too many different computer systems can be downright confusing. That's happening with the numerous programs observing events that affect the Earth's health. The complex programs—developed by governments and organizations involved in environmental research—capture all sorts of data along with the geographic coordinates of the places where each measurement is made. These coordinates are then used to map the data. This may sound simple enough, but it's not.

The reason is that not everyone uses the same coordinate system, and maps cannot simultaneously display data with mixed coordinates. But this is just one of the problems faced by research groups, which are usually happy to share the information they collect to advance the development of knowledge. Each group may also use its own native language, scientific terms, and technical protocols, as well as those geographic coordinates. The result: It may take weeks to sift through conflicting information to build a model that simulates a drought, for example.

The Global Earth Observation System of Systems (GEOSS) is being developed to overcome such incompatibilities. This Earth-monitoring network brings together data gathered by thousands of sensors, buoys, weather stations, and satellites on conditions across the land, water, and atmosphere. GEOSS is supported by all the major industrialized nations and many scientific organizations, including IEEE through its Committee on Earth Observation.

The European Commission is one of the leading players in the development of GEOSS and supports it through several research projects. One such project is EuroGEOSS, which allows scientists and funding agencies to access information from a variety of shared infrastructures without having to install special software or learn new applications—and to do it via the Web.

"The EuroGEOSS program will change the paradigm of how information is treated and shared," says IEEE Fellow Jay Pearlman, former chair of the IEEE Committee on Earth Observation. "What used to take weeks to model will now be done in hours using tools and data accessed through the Web. For example, if you are part of a group working in Europe and must travel to Africa, you don't have to bring all your files with you. You simply go to the Web in Africa and carry out the same processes as you would in Europe."

Organizations making use of EuroGEOSS developments include the Global Biodiversity Information Facility Secretariat, NASA, and the United Nations Food and Agricultural Organization.

DATA BROKERS

EuroGEOSS builds on the achievements of the Infrastructure for Spatial Information in Europe (INSPIRE), a European directive providing the legal framework, technical guidelines, and specifications for shared data infrastructures that deal with environmental issues. The legislation requires all 27 nations of the European Union to "ensure that the spatial data infrastructures of the member states are compatible and usable in a community and transboundary context."

Established in 2009, EuroGEOSS will lift INSPIRE to the next level of data sharing, according to Max Craglia, technical coordinator of EuroGEOSS and a senior scientist in the unit of the European Commission's Joint Research Centre that is responsible for INSPIRE's technical development.

To share the information across disciplines, software languages, and infrastructures, EuroGEOSS uses a so-called brokering approach. The broker is a software component that mediates between different systems and makes it possible for them to work together without either having to adopt the standards or specifications of the other, Craglia explains. It works like computer-based language translators but has much broader capabilities, Pearlman adds.

The brokering approach is composed of five parts. The discovery broker searches across multiple shared infrastructures based on key words, time, and geography. The semantic broker translates nomenclature based on concepts that are related to each other but may come from different science or engineering disciplines, for example. The Web 2.0 broker searches across social networks for resources.

The access broker allows the user to retrieve information, and it can convert data sets so the results have the same coordinate reference systems, which are used to locate geographic entities and time-reference information. And the publishing broker publishes and documents new data sets that might be products or analyses.

"EuroGEOSS recognized that the diversity of scientific and technology practices across the research communities made it impossible to impose a single solution for interoperability," Craglia says. "With our brokering approach,

users and data providers are not asked to implement any specific interoperability technology but to continue using their own tools and publish their results according to their own standards.

"We are trying to create an environment in which scientists in different specialties can collaborate with a shared perspective to address different chunks of the same environmental problem," he continues. "By making the process more open and available on the Web, potentially millions of people can use it and understand the science better."

Says Pearlman, "EuroGEOSS is not seen as a global repository since it does not store data. Its benefits are in its ability to access global, national, and even local data repositories from many disciplines and bring them together in a coherent way for government, professional, and citizen users. The repositories themselves indicate the coordinates they use. With the broker taking on the burden of translating the data, we are not asking anyone to do extra work."

An international collaboration created the EuroGEOSS brokers. More than 20 partners helped develop them, including Italy's National Research Council, the European Union's Joint Research Centre, France's Bureau de Recherches Géologiques et Minières, the Universitat Jaume I in Spain, and the University of Nottingham, England.

The Italian National Research Council, which is the main partner behind the development of the broker, has committed resources to sustain its development until 2015. The institutional commitment makes it possible to include the brokering framework in the GEOSS common infrastructure.

OTHER AREAS

EuroGEOSS has zeroed in on linking forestry, drought, and biodiversity systems. "By focusing on specific areas, EuroGEOSS can create a template with linkages across multiple systems and enable them to work together as one—not only in accessing data but also in providing models, forecasts, and possible scenarios," Craglia says. "And once these templates are complete, it will be possible to apply their models to other areas." This is already happening, for example, in the areas of weather, ocean ecosystems, and water runoff in the GEOWOW project that was launched last September for a three-year period.

"One of the challenges facing humanity in the 21st century," Pearlman says, "is the ability to understand complex relationships between environment and society and to communicate these complexities to the public and decision makers, who will be able to make better decisions because information will be more comprehensive and accurate." ■

For more information, watch the IEEE.tv program "GEOSS for Biodiversity: A Demonstration of the GEOSS Common Infrastructure Capabilities" at https://ieeetv.ieee.org.

NASA; PROCEEDINGS OF THE IEEE

With EuroGEOSS, scientists can access information from anywhere via the Internet to model, for example, changing environmental conditions such as variations in the water color of these lakes in the Rift Valley of Central Africa.

TECH HISTORY

Proceedings of the IEEE Celebrates a Century

Special editorial features and centennial events are under way

BY ANIA MONACO

BACK IN 1912, when radio and wireless communications were in their infancy, it would have been hard to imagine the smartphones, high-definition televisions, biomedical advances, and other developments we take for granted today. Those inventions were made possible by breakthroughs during the past 100 years, and one publication—*Proceedings of the IEEE*—has been there for all of them. The journal, which has documented technology's progress with seminal papers, is celebrating its own milestone this year: a century of publishing.

The journal's 100th volume is being commemorated through a variety of editorial features and events including a special centennial issue in May, monthly postings of classic *Proceedings* papers, a competition for predicting future technical innovations, and a Washington, D.C., forum featuring global visionaries.

Even though much has evolved in technology since the first *Proceedings* issue was published in January 1913, Managing Editor Jim Calder says one thing has remained the same: "Our philosophy. We strive to make *Proceedings* accessible to all members but also to appeal to specialists. Some people call *Proceedings* a mini textbook because when you move on to a new job and must learn about a new field, you can read the publication and learn what's going on. But many people read it just to be well informed."

A LOOK BACK

Proceedings' prehistory can be traced to 1909, when it was known as the *Proceedings of the Wireless Institute*. That New York–based society was for people interested in the new field of wireless engineering. Six issues, edited by radio pioneers Greenleaf Pickard and Alfred N. Goldsmith, were published in 1909.

On 13 May 1912, the Wireless Institute merged with the Boston-based Society of Wireless Telegraph Engineers to become the Institute of Radio Engineers (IRE). Wanting to publish their journal for the new society, Pickard and Goldsmith released the first issue of *Proceedings of the IRE* in January 1913. Goldsmith continued as editor, and Pickard served as president of the IRE that year.

The *Proceedings of the IRE* became the society's flagship publication, showcasing papers submitted by its members around the world. The monthly's discriminating paper selection and thorough peer-review process made it stand out among other scientific journals of the time.

When the IRE merged with the American Institute of Electrical Engineers in 1963 to form IEEE, it was renamed *Proceedings of the IEEE*. Today it is the most highly cited general-interest journal in electrical and computer engineering.

THIRTEEN ISSUES

This year, 13 *Proceedings* issues are planned, including the special centennial issue on 13 May. That one will cover the past, present, and future of 20 technical areas selected by the editorial board, Calder says. Included will be articles on a variety of subjects, including wireless communications, space science and exploration, engineering education, consumer electronics, emerging materials science, medical devices, flexible electronics, optical devices, and the search for extraterrestrial life. The issue will include predictions for the future of the technologies discussed as far out as 2112.

Each of the other 12 issues is devoted to a selected topic. In addition, each will include an article from the IEEE History Center highlighting *Proceedings*' coverage over the past 100 years. January's topic was cyberphysical systems and their application to aerospace, automotive, energy, and medical technologies and other areas. Cyberphysical systems use a combination of computational and physical elements.

In February the focus was on sustainable massive energy storage. This month's issue explores cognitive and behavioral aspects of human decision making in interactions with smart machines.

Topics in the other issues are:

- Audiovisual communications frontiers
- Marine energy generation and energy policies
- Antennas in wireless communications
- The evolution of optical networking
- Beyond HDTV: UHDTV and digital cinema
- Quality-of-life technologies such as wearable health-care devices
- Remote sensing of natural disasters, including early warning systems
- Memristor technology
- Large-scale electromagnetic computation
- Web-scale multimedia processing and applications

INFLUENTIAL WRITERS

As part of the centennial celebration, papers from such pioneers as Guglielmo Marconi, Lee de Forest, and Claude Shannon have been posted on the *Proceedings* website, http://www.ieee.org/proceedings, and more are to be added each month through December.

The classic papers include "The Genesis of the IRE" [Alfred Goldsmith, May 1952], which covers the society's formation in 1912. "The ENIAC" [John G. Brainerd, February 1948] describes the development of the first general-purpose electronic computer in 1946. Also available are Marconi's "Radio Telegraphy" [August 1922], Edwin H. Armstrong's "Some Recent Developments in the Audion Receiver" [September 1915], Karl G. Jansky's "Electrical Disturbances Apparently of Extraterrestrial Origin" [October 1933], and William Shockley's "Transistor Electronics: Imperfections, Unipolar and Analog Transistors" [November 1952].

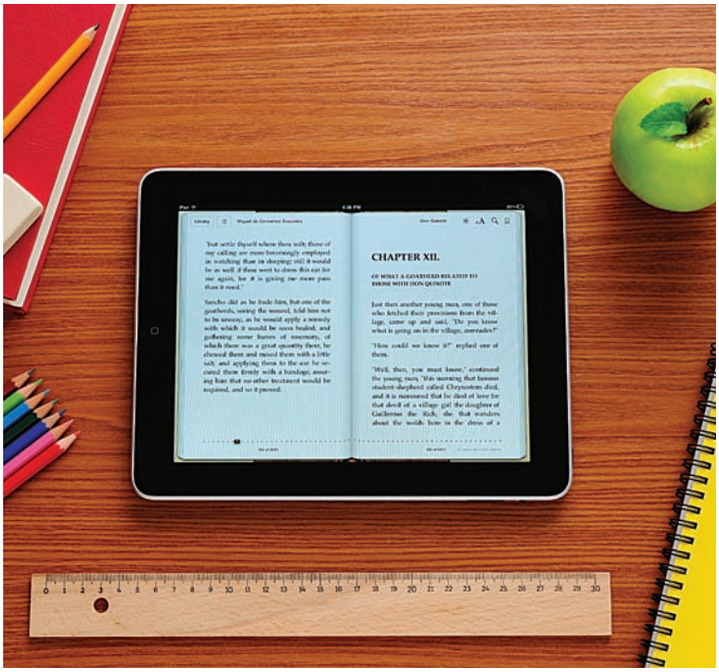
FUTURE COMPETITION

Can you imagine a technical innovation likely to pop up during the next 100 years? Then consider entering the Future Technology Predictions competition. Contestants are asked to write a 1500-word description of a technical development they expect to see, as well as a road map of how current technologies are likely to evolve into the proposed innovation. The *Proceedings*' editorial board plans to offer cash honoraria to those who submit the best ideas. Winners will be asked to submit videos in which they describe their ideas, and the results will be posted on the IEEE website. For more information on the competition, visit http://www.ieee.org/proceedings.

A centennial forum is scheduled to be held in Washington, D.C., on 27 and 28 September, featuring notable professionals in health care, energy, and other fields.

What will the future bring for *Proceedings*? Although it might be difficult to predict which new technologies will emerge in the coming years, Calder says one thing is certain: *Proceedings* will be there to cover them. "*Proceedings of the IEEE* has staying power," he says. "Even in a world of specialization, we continue to publish useful information for all IEEE members."

To help celebrate *Proceedings*' centennial year, *The Institute* is publishing monthly articles highlighting technologies from this year's 13 issues. You can find them each month on the Tech Topic page (http://theinstitute.ieee.org/technology-focus/technology-topic). We also plan to report during the year on the centennial competition, the forum, and other anniversary events—so stay tuned. ■



YUNUS ARAKON/ISTOCKPHOTO

QUESTION OF THE MONTH

Are Printed Textbooks Disappearing?

A recent *PC World* article reported that an increasing number of preuniversity schools are using iPads in the classroom. Teachers interviewed said the tablet computers are especially helpful for students with special needs. Although they are still in the minority, some teachers use iPads to introduce or enrich textbooks' content. And Apple recently launched a new e-book app store specifically for textbooks. The article quotes college students as saying that they've stopped using printed books: They buy e-textbooks instead and save money.

Will tablet computers completely replace printed textbooks in the classroom? Why or why not?

Respond to this question by commenting online at http://theinstitute.ieee.org/opinions/question. A selection of responses will appear in the June issue of The Institute *and may be edited for space. Suggestions for questions can be sent to institute@ieee.org.*

RESPONSES TO DECEMBER'S QUESTION

No Violent Video Games for Minors?

The U.S. Supreme Court recently struck down a California law banning the sale or rental of violent video games to minors. The court ruled that the law violated free-speech rights and that government did not have the power to "restrict the ideas to which children may be exposed." The judges noted that children might encounter violence in many other forms of entertainment, including books and television. A violent video game has been defined by the law as one that depicts "killing, maiming, dismembering, or sexually assaulting an image of a human being."

Do you agree with the Supreme Court's decision? Should governments have the authority to prevent minors from buying violent video games?

The following responses were selected from comments that appear at http://theinstitute.ieee.org/opinions/question/no-violent-video-games-for-minors.

READ THE LABEL

I agree with the Supreme Court's decision. It is the parents' responsibility—not the government's job—to regulate what kinds of games and entertainment a minor can and can't buy. The government should require manufacturers to label the games as is done with movie ratings, and then it's up to the parents to decide whether their child is mature enough to handle the content.

Len

PROTECT THE CHILDREN

When minors are threatened by the psychological damage and destruction caused by violent games, we cannot dismiss our responsibility to protect and shield them from these side effects. The government needs to step up to the plate in this matter and take an active role in protecting our children.

Doug Hannah

START AT HOME

Legislation won't work. Many young people will find a way around the law to purchase and play the games. Instead, parents should speak with their children about violence. Teaching them about morality and ethics at home will always surpass such education elsewhere. If your children know the difference between what they see in media and what is moral in real life, they will become great people and make a great contribution to society.

Germán

SAFETY OVER PROFITS

Minors need to be protected, but not all parents are willing or able to protect their children from harmful materials. There is evidence that many minors involved in brutal crimes regularly played violent video games and often copied certain aspects of the games in real life. A government that fails to protect its citizens can rightfully be blamed for sacrificing essential human values to ensure profits for the gaming industry.

Jochen G. Kaeppel

PARENTS KNOW BEST

I don't want the government telling me how to raise my child. If I deem a video game to be too violent for my daughter, then I—not the state—will prohibit her from playing the game. I appreciate the ratings, but banning the games entirely could lead to other restrictions, supposedly for the good of society, but that ultimately serve some special interest. In my house, we don't have violent games by choice—not by law.

Rick C.

DANGER TO YOUNG MINDS

Governments should have the authority to prevent minors from buying violent video games, just as they should have the authority to prevent minors from driving, getting married, or skipping school. Children are not mature enough to make certain decisions, and there are plenty of studies that show the bad effects of violent images on their developing minds and personalities.

Peter

CORRECTION

An item in "Region News" [September 2011, p. 3] reporting that the IEEE Toronto Section recently formed an IEEE Systems, Man, and Cybernetics Society chapter was incorrect. The section formed a chapter of the IEEE Systems Council.

PRESIDENT'S COLUMN

A Flatter World

THEODORE VON KÁRMÁN, the early 20th-century mathematician, mechanical engineer, and aerospace pioneer, described the work of engineers as creating a world that never before existed. That's not hyperbole.

Think back over the history of the 20th century.

Start with electricity, which began to reach homes and businesses at the beginning of the century. Electric lights replaced kerosene lamps. Refrigerators replaced iceboxes. Electric pumps brought better and safer water supplies. Washing machines, electric irons, sewing machines, vacuum cleaners, and other labor-saving products appeared. Electricity made life easier, safer, and more pleasant.

Then think about how the limits of time and distance diminished with advances in transportation—advances that made it possible for people and things to move quickly around the globe.

Think about how communications technologies—telephones, data communications, radio and television—increased the velocity of information to the fundamental limit, while expanding our access to knowledge, education and entertainment, building businesses and communities, and improving safety and security.

Think about how computers process vast amounts of information and control complex systems and how microprocessors are now ubiquitous, present in even the most mundane products.

And think about health care. Recognize that most diagnostic procedures are enabled by electronics; that drugs and other therapies are developed using electronic instrumentation and computers; and that advanced prostheses are electronic and mechanical marvels.

Those are just parts of the story of technology in the 20th century, but they are enough to claim that in most parts of the world, quality of life in the last century was defined by the creativity and ingenuity of engineers.

I often share these thoughts with engineering students. I tell them that as their predecessors shaped the 20th century, they will shape the 21st century. And I ask them what they will do with that responsibility.

Few students seem to have thought about their role in this larger sense, but they're ready to do so. When pressed, they speak about opportunities in energy and the environment, in health technologies, and in the continuing convergence of computing and communications. Indeed, these fields are ripe with needs and opportunities, and I share with the students my hope that the vision and creativity of 21st-century engineers will be as revolutionary as those of the 20th century.

But then I remind them of the unfinished business of my generation, that the extraordinary benefits of technology are not yet universal.

More than half a century after electricity, clean water, modern sanitation, airports, and fast highways reached the last corners of developed countries, these things are still rare in many parts of the world. Twenty percent of the world's population—1.4 billion people—do not have electricity in their homes. The numbers for clean water and modern sanitation are similar or worse. In these respects, and in income and other aspects of quality of life—with apologies to Thomas Friedman—the world is *not* flat. [1]

We are the profession that can make the world flatter. Data on telephone penetration in developing countries shows that it can be done. The number of landlines in developing countries never rose above about 12 percent of the population. But in just the past decade, the number of cellphone subscriptions across the developing world has risen from 8 percent of the population to 80 percent; in some countries the growth is even more dramatic. It's happening because high-tech businesses saw opportunities, and it can happen with other technologies.

And we need to do more than just help developing countries play catch-up. As technologists, we understand that innovation is the path to prosperity—everywhere. So, while we address the overdue challenges of universal access to technology, let us also help build long-term capacity to innovate—everywhere.

Countries, companies, and universities can develop fertile environments for innovation, but innovation comes from people—talented, well-educated, and creative people. At IEEE, it is our purpose and our opportunity to support the global high-tech workforce. We should work harder to attract young people to our profession and support the schools and universities that educate them. And we must continue to improve the tools and resources we provide to help technologists thrive throughout their careers.

As members of the largest and most global organization of applied technologists, we have a responsibility to be advocates for technology and for technologists. And we need to live up to our motto, "Advancing Technology for Humanity."

While we address the challenges of universal access to technology, let us also help build capacity to innovate—everywhere

Gordon W. Day
IEEE President and CEO

[1] *Friedman is a* New York Times *columnist and author of* The World Is Flat, *in which he argues that globalization has "flattened" the world.*

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PRODUCTS AND SERVICES

IEEE Xplore Expands With New Content

Collections added from other technical organizations

BY KATHY KOWALENKO

ADAM RADOSAVLJEVIC/ISTOCKPHOTO

IEEE XPLORE HIT a major milestone last year when the number of documents in the digital library's repository topped 3 million. It had taken five years for the library to go from 1 million to 2 million documents in 2009, but it took less than half that time to reach the 3 million mark. The content includes articles from 154 journals and more than 3400 technical standards, 400 e-books, 200 educational courses, and 1300 conference proceedings (an increase last year of more than 50 proceedings). And the growth rate is expected to speed up this year as organizations around the world opt to add their papers and journals to the collection.

NEW PARTNERSHIPS

Two of China's prestigious technology organizations plan to include their English-language journals this year in IEEE Xplore: *Tsinghua Science and Technology Journal*, published by Tsinghua University of Beijing, and the *Journal of Systems Engineering and Electronics*, from the Beijing Institute of Aerospace Information. *Tsinghua Science* presents new achievements, especially in computer and electronics engineering. In addition to current issues, IEEE Xplore is getting an archive of more than 1800 articles from this journal, some going back to 1996.

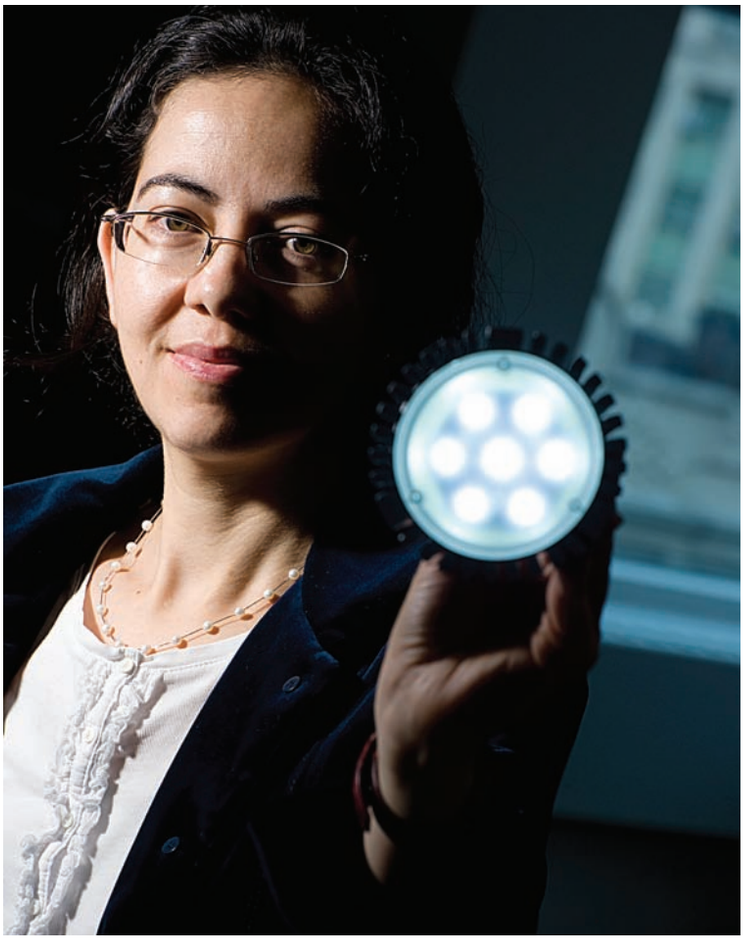
The *Journal of Systems Engineering and Electronics* deals with trends in science and technology and the theoretical and practical aspects of research in the field. It also will contribute an archive of more than 1800 articles dating back to 1990 to IEEE Xplore. The two journals will be sold as separate subscriptions.

IET AND VDE

Thanks to a partnership with the U.K.'s Institution of Engineering and Technology, IEEE Xplore will include the new journal *IET Networks*. To be published quarterly in its first year, *IET Networks* covers fundamental developments and advances. Topics include network architecture and technologies; design and planning; software analysis and simulation; and network security, operation, and management.

And continuing this year is a partnership forged in 2011 with the German Electrical Engineering Society (VDE), offering digital library subscribers access to more than 3100 English-language papers from more than 20 of VDE's annual conferences. Topics covered include computing systems, optical communications, power systems, and RFID technologies.

For more information, visit http://ieeexplore.ieee.org



BOSTON UNIVERSITY

PROFILE

Hatice Altug: Diagnosing Disease

Portable biosensor detects viruses

BY AMANDA DAVIS

WHEN IT COMES to fighting off disease, early detection is key. But the technology for diagnosing some diseases can be expensive and unwieldy, and the process can be time-consuming.

That's where IEEE Member Hatice Altug and her research team at Boston University come in. They are working to develop a portable biosensor that eventually will help diagnose common human ailments such as food poisoning or swine flu faster and more easily.

An assistant professor of electrical and computer engineering at the school, Altug was recently recognized by U.S. president Barack Obama for her work on the sensor. In 2011, she was one of the recipients of the Presidential Early Career Award for Science and Engineers, an honor bestowed by the federal government on science and engineering professionals in the initial stages of their careers. She was cited for "advancing the frontiers of proteomics [the study of proteins] to enable the discovery of protein biomarkers for detection of disease, drugs, and environmental monitoring, and for innovative educational and outreach activities that have helped students at all levels."

The 33-year-old Altug received her Ph.D. in applied sciences from Stanford University in 2006, after getting her bachelor's degree in physics in 2000 from Bilkent University, in Ankara, Turkey.

IN THE LIGHT

To diagnose a patient's illness, doctors often take a sample of bodily fluid, send it to a laboratory, and wait for a technician's analysis. Altug and her team aim to streamline the process with their handheld sensor, which can detect viruses in less than 30 minutes.

Their device relies on a sensor chip consisting of a gold film about 100 nanometers thick, supported on a thin piece of glass. On the film are arrays of nanoapertures—holes measuring about 300 nm across—that transmit light. A charge-coupled device (CCD) at the other side of the holes detects the light sent through the film and monitors changes in the light's properties, including its resonant frequency.

To test their sensor, Altug and her team placed immobilized antibodies specific to the Ebola virus, a fatal virus that causes hemorrhagic fever, on the sensor's surface. The researchers then added a serum containing a safer, genetically modified version of the Ebola virus.

In general, the antibodies captured the virus in the sample, which is indicated by a shift in the resonant frequency of the light. This signals to the operator that a certain type of virus is present, based on the type of antibody used. The entire process has taken less than a half hour.

"We've also used our prototype to detect vaccinia, a surrogate virus of smallpox," she says. "Now we are starting to use it to detect other viruses, like the flu."

Altug has worked on the sensor since 2007, when she joined Boston University and helped form the Laboratory of Integrated Nanophotonics and Biosensing Systems. The device has received attention from such organizations as the U.S. National Institutes of Health, which has given Altug and her collaborators at Boston University a US $4.8 million grant to develop it for commercial use. The group plans to work during the next five years to make the sensor more accurate and less expensive to manufacture.

Altug also garnered recognition last year from several associations and publications. For example, she received the IEEE Photonics Society's Young Investigator Award for her contributions to the sensor. She was named one of the *Popular Science* Brilliant 10 [October], and her work was featured in a *Lab on a Chip Journal* cover article [Royal Society of Chemistry, November].

EARLY EXPOSURE

Altug also dedicates a lot of her time to mentoring current and prospective engineering students, as well as their instructors. Since 2007 she has taught a seminar on nanophotonics and nanofabrication as part of Boston University's Upward Bound Math Science program. The program provides on-campus housing and intensive classes during the summer to low-income high school students.

Altug helped introduce the first engineering course for high schoolers in BU's Summer Challenge program in 2009. This program offers short but intensive courses to help students learn more about fields they plan to study in college.

She also works with preuniversity science teachers to incorporate nanotechnology and photonics into hands-on projects for their students. She says she wants to give students a taste of what attracted her originally to engineering: a penchant for building useful tools and gadgets.

"I realized early on that I could apply my creativity in a practical way if I studied physics and engineering," she says.

Developing health-care technology was particularly appealing because of its potential impact on society, she continues: "Our work can reduce the cost of diagnosing disease or even play a role in finding a cure for some. That is what motivates and inspires me." ■

Announcing IEEE Spark

IEEE Educational Activities Board announces the launch of IEEE Spark, an online publication designed to inspire students ages 14-18 to learn more about engineering, technology, and computing.

Visit us online: http://spark.ieee.org

IEEE

PART-TIME PASSIONS

Al Dunlop

Stoked on Steamboats

PASSION
Captaining a steamboat

JOB
Circuit design consultant

HOMETOWN
Fort Ann, N.Y.

SINCE BUILDING his 7-meter-long steamboat *Aurora Borealis* 15 years ago, IEEE Fellow Al Dunlop spends his free time logging about 800 kilometers a year along the lakes, canals, and other waterways around upstate New York, New England, and Ontario, Canada.

"It's very calming," Dunlop says of his voyages, during which his boat chugs along at a steady 8 km per hour. "All you hear is the purr of the engine, and you're moving slowly enough so you can see things. All the heat goes up the stack, so the temperature on deck is not as hot as people might think.

"It's pleasant and relaxing, now that I understand what all the sounds from the boiler and engine mean."

Dunlop, a circuit-design specialist at Crossbow Consulting in Pilot Knob, N.Y., began building boats in high school. By grad school, he had more than a dozen fiberglass, Kevlar, and nylon kayaks, plus four cedar rowing skiffs. But steam engines had always intrigued him. "In high school, I had a small steam engine, and I was captivated by it," he says. "You'd boil water, energy would be created out of the boiling water, and a wheel would go around."

While at Bell Labs in Murray Hill, N.J., in 1991, Dunlop took evening machine shop and electrical- and gas-welding classes to build a steam engine and boiler. He built the engine from a kit and then smoothed, flattened, and cut its many metal parts. "You have to make the piston, cut the pockets for bearings, and bore the cylinder—things a person with a Ph.D. doesn't typically do," he says. "I'd get to work with my hands in the evening and create physical things instead of theoretical concepts. And I learned practical things I would never learn in a high-powered research facility."

By 1997, Dunlop was ready to test his creation in the water. "I was so busy watching the engine and all the mechanical things—Was the water level high enough? Did I have a fire? Was the engine lubricated?—that a friend onboard kept telling me, 'Look where you're going!'"

Dunlop soon got the hang of it. "My favorite time to go out is just before sunset, and stay until after dusk," he says. "That's when the water is calmest, and I can enjoy the wonderful beauty and serenity of the lake." —*Susan Karlin*

Hossein Hakim

Ambassador of Tango

PASSION
Argentine tango

JOB
Professor, electrical and computer engineering

HOMETOWN
Holden, Mass.

IN THE SUMMER of 2003, IEEE Member Hossein Hakim embarked on a two-week summer vacation to Argentina to learn Spanish. What he brought back was an obsession with the tango that not only transformed his life but also those of his engineering students.

Hakim was transfixed in Argentina by the dancers performing to tango music in the streets. It impressed him enough that he took tango lessons and hit the local dance clubs. Returning home to Holden, he began trekking to nearby Boston for tango classes three times a week.

"My wife thought I'd gone crazy," Hakim says, laughing. "I was never much of a dancer. But before I knew it, I was feeling the joy and passion of the tango.

"It's the most technical of all the couples dances. You learn a series of steps initially, but then the sequence is up to you. Each new step emerges from the previous one, linked to what you feel in the music. None of the other dances are like that. The music is melodic and complex, and you can express a range of emotions: happiness, sadness, jealousy, and love."

Six months after his Boston lessons began, he was organizing dance events at Worcester Polytechnic Institute, where he's a professor of electrical and computer engineering. Initially, only a half dozen students showed up. But Hakim started teaching Sunday afternoon tango classes, which caught on among WPI's mostly engineering students.

Today some 400 students participate, and student government funding of US $40 000 per year has made possible a program of ballroom dance competitions, social dances, and classes that teach salsa, merengue, cha-cha, swing, and other dances. Hakim, the program adviser, also teaches a professional-level tango class for credit.

He has since returned three times to Buenos Aires for more intensive tango training: eight hours a day for a month at a time. He also has attended tango workshops in Italy, the Netherlands, and Berlin (home to some of the world's best tango dancers), as well as tango festivals around the United States.

Hakim says that tango at WPI has become an effective social icebreaker: "It has been a transforming experience for the engineering students who spend a lot more time reading books than socializing. It's about unspoken communication with your partner, so every small move of the body conveys something. Traditionally, the man defines the next step of the choreography through movement, but in its moves the dance is really intended to make the woman shine." —*S.K.*

TOP: KENT LACEY; BOTTOM: PATRICK O'CONNOR

PHILIPPE HUGUEN/GETTY IMAGES

ELECTION

2012 Election Countdown

ON 1 MAY, the IEEE Board of Directors is scheduled to announce the candidates to be placed on this year's ballot. The list will include candidates for IEEE president-elect, who are nominated by the IEEE Board of Directors, as well as nominations for delegate-elect/director-elect positions up for election, which are submitted by their respective divisional and regional nominating committees.

Also on the ballot will be nominees for members-at-large of the IEEE Standards Association board of governors; vice president–elect, IEEE Technical Activities; and president-elect and member-at-large, IEEE-USA. The IEEE Board of Directors is also responsible for placing proposed constitutional amendments on the ballot.

IEEE members who are not nominated but want to run for office may do so by submitting a petition draft to the IEEE Board of Directors, to be received at the IEEE Operations Center by 15 April. Petitions must be accompanied by the necessary number of valid voting members' signatures, and prospective candidates must meet other requirements.

UP FOR ELECTION IN 2012

Chosen by all voting members

- IEEE president-elect

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

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

DEADLINES AT A GLANCE

15 March
Organizational units submit slates of candidates to the IEEE Board of Directors for inclusion on the annual election ballot.

15 April
Deadline for petition drafts from individual voting members who wish to circulate a petition.

1 May
The IEEE 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. The board also announces whether it intends to put forward any constitutional amendments.

8 June
Petition nominations for candidates to be placed on the ballot must be received (by noon EDT USA/16:00 UTC).

15 August
IEEE annual election ballots are sent to all voting members on record as of 30 June.

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

—Carrie Loh

The 2011 Winners Are...

HERE IS THE IEEE Tellers Committee's tally of votes from valid ballots counted in the 2011 annual election and approved in November by the IEEE Board of Directors:

President-Elect, 2012

Peter W. Staecker	21 406
Roger D. Pollard	17 038

IEEE Division Delegate-Elect/ Director-Elect, 2012

Division II

Jerry L. Hudgins	1607
Alessandro M. Ferrero	1035
Linos J. Jacovides	792

Division IV

Józef W. Modelski	1468
Barry S. Perlman	1354
Ronald J. Marhefka	1108

Division VI

Bogdan (Dan) M. Wilamowski	986
D. (Dennis) R. Hoffman	588
Gene F. Hoffnagle	568

Division VIII

Roger U. Fujii	2942
Rangachar Kasturi	2523

Division X

Stephen Yurkovich	2383
Daniel S. Yeung	2138

IEEE Region Delegate-Elect/ Director-Elect, 2012–2013

Region 1

Vincent P. Socci	2653
Ali Abedi	1296

Region 3

Mary Ellen Randall	1541
Eric S. Ackerman	807
Percy F. "Butch" Shadwell	769

Region 5

J. Derald Morgan	1422
Steve E. Watkins	1215

Region 7

Amir G. Aghdam	608
John Grefford	538
Adam Skorek	469

Region 9

Norberto M. Lerendegui	747
Teófilo J. Ramos	589

IEEE Standards Association President-Elect 2012

Karen Bartleson	776
Philip C. Wennblom	442

IEEE Standards Association Board of Governors Member-at-Large, 2012–2013

Robert S. Fish	581
Paul J. Hearty	400
Anil Gupta	224

IEEE Standards Association Board of Governors Member-at-Large, 2012–2013

Herbert S. Bennett	696
Jim Hughes	512

IEEE Technical Activities Vice President–Elect, 2012

Robert E. Hebner Jr.	12 331
John T. Barr IV	10 974

IEEE-USA President-Elect, 2012

Marc T. Apter	10 822
Nita K. Patel	9664

IEEE-USA Member-at-Large, 2012–2013

Thomas E. Tierney	10 388
Dennis J. Ray	9948

—Amanda Davis

For more information, visit the IEEE annual election home page, http://www.ieee.org/elections, or contact corp-election@ieee.org.

Introducing the 2012 Fellows

The Institute *salutes these 329 IEEE senior members from around the world who have been named IEEE Fellows for 2012. 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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Oscar Chi-Lim Au
Ahmad Bahai
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Venkataramanan Balakrishnan
Pierre Baldi
Kaustav Banerjee
Sergio Barbarossa
Mauro Barni
Farhat Nadeem Beg
David Theodore Blaauw
Thierry Blu
Aldo Boglietti
Jozsef Bokor
Martin Bossert
Raouf Boutaba
Christoph Brunner
Alan Burns
Giorgio Carlo Buttazzo
Kenneth L. Calvert
Eduardo F. Camacho
Marco C. Campi
Zeynep Celik-Butler
Chaitali Chakrabarti
Naehyuck Chang
Jocelyn Chanussot
I-Ming Chen
Jyh-Cheng Chen
Yen-Kuang Chen
Roger Shu Kwan Cheng
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John N. Chiasson
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Chris Chu
Ronnie F. Chu
Kara Clark
Luigi Colombo
Dorin I. Comaniciu
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Mario di Bernardo
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CALL FOR NOMINATIONS

IEEE Leaders Sought for 2013

Volunteers needed to serve on committees or as corporate officers

VOLUNTEERS ARE KEY to the smooth functioning of IEEE. Only through dedicated individuals volunteering their time and expertise can IEEE fulfill its core purpose of fostering technological innovation and excellence for the benefit of humanity.

The IEEE Nominations and Appointments Committee is looking for people with the skill, passion, and perspective to serve in 2013 as IEEE corporate officers or on committees of the IEEE Board of Directors. The committee seeks nominees for the following:

IEEE President-Elect

IEEE Corporate 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
- Fellow
- Governance
- History
- Nominations and Appointments
- Public Visibility
- Tellers

DEADLINES

Members must submit nominations for standing committee chairs by 1 March. The deadline for submitting nominations for IEEE president-elect, corporate officers, and standing committee members is 1 July.

ELIGIBILITY

Each position has eligibility and qualifications requirements with which the N&A 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 endorses the nominee.

HOW TO NOMINATE

Review the eligibility requirements and qualifications for the positions, then complete the online form by visiting http://www.ieee.org/about/corporate/nominations/nomination_form.html. Incomplete nomination forms will not be considered.

PEER NOMINATIONS

Include the nominee's name and recommended positions, as well as brief explanations of the person's qualifications and accomplishments specific to the positions.

Individuals 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.

SELF-NOMINATIONS

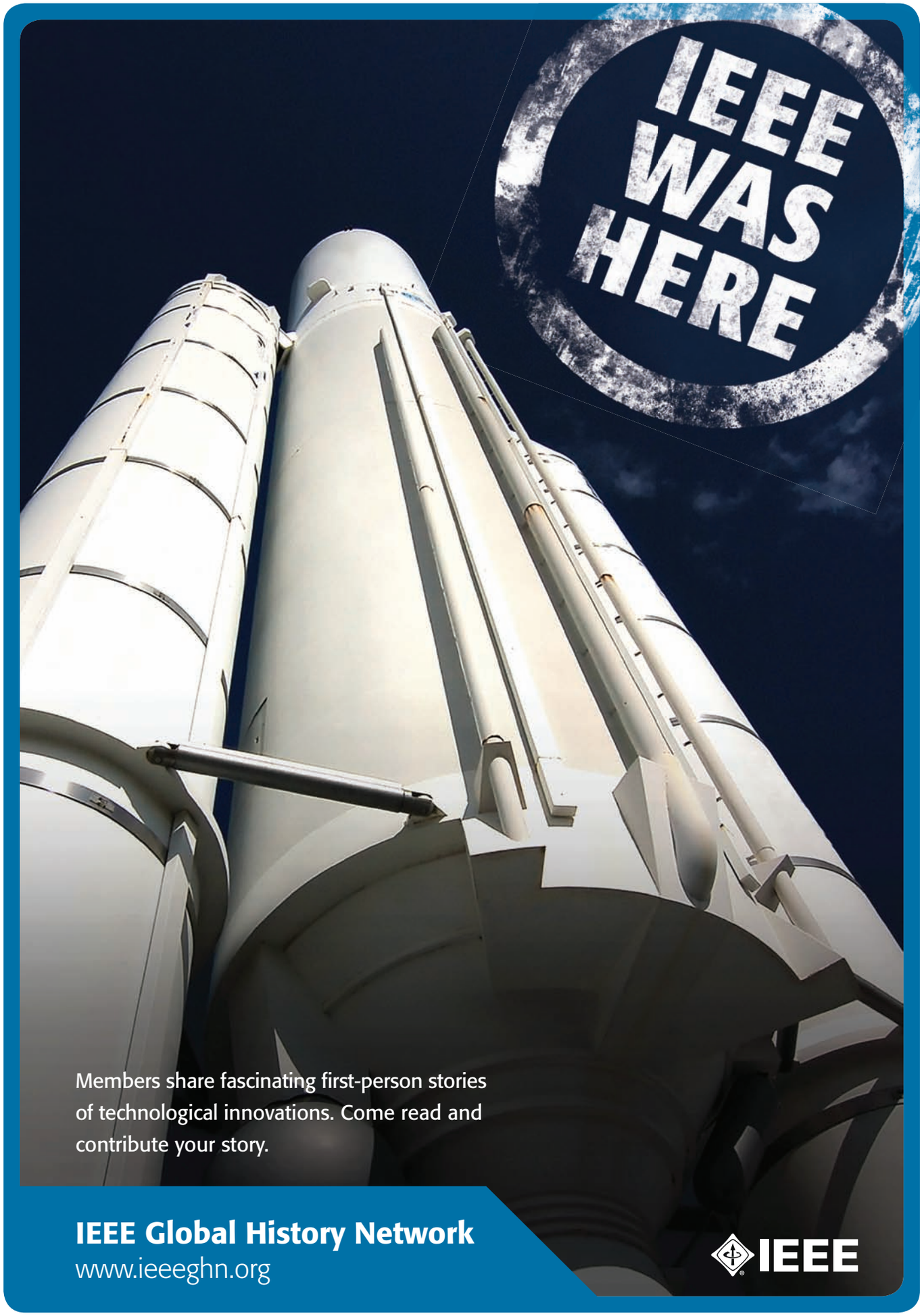
If you nominate yourself, include a photograph, the desired position or positions, the qualifications and accomplishments that are specific to the desired position, and a biography, along with your name. Use the template provided on the nomination form.

THE PROCESS

The N&A Committee makes recommendations for IEEE corporate 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, as well as for the chairs and members of standing committees. The board then must ratify the recommendations. The board also recommends the candidates for president-elect to be placed on the IEEE annual election ballot, with IEEE's voting membership choosing the president-elect.

—Pedro A. Ray, Chair
2012 IEEE Nominations and Appointments Committee

For more information about the positions, including qualifications and estimates of the time required by each position during the term of office, read the Guidelines for Nominating Candidates at http://www.ieee.org/web/aboutus/nominations/guidelines.html.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