

(Left): Isidore Kerszenbaum served as an IEEE-USA Congressional Fellow on the professional staff of the U.S. House of Representatives' International Relations Committee.

(Right): IEEE-USA's Ron Hira provided expert testimony in support of legislation to strengthen U.S. security against computer attacks. The bill subsequently was signed into law.



SERVING SOCIETY

Global Portals Support Worldwide Standards

Worldwide participation in standards development took a major step forward last year with the launch of the IEEE Standards Global Portal Network. Three geographic Web portals now provide a real-time, interactive forum where professionals interested in standards development can obtain information and participate in the process. StandardsAsia™, StandardsAmericas™ and StandardsEurope™ also broaden access to technical standards created by the IEEE Standards Association (IEEE-SA) and other global standards development organizations.

Each site offers in-depth resources for professionals interested in technical standards, especially those for information technology, telecommunications, and power and energy. These sites also serve the IEEE-SA volunteers who help to create standards, as well as members, customers, and international organizations such as the International Electrotechnical Commission, International Organization for Standardization, and International Telecommunications Union. Regular features include standards-related finance and economic news; profiles on individual members, customers and partners; links to international standards organizations; and access to approved standards.



IEEE Standards Association Partners with IEC

Global standards benefit both industry and society by removing technical barriers to trade, and in 2002 the IEEE Standards Association (IEEE-SA) continued to emphasize, strategies that help to advance globalization. A distinctive, dual-logo agreement between the IEEE and the International Electrotechnical Commission (IEC) is expected to further enhance global technical standards and increase recognition of the IEEE's major contributions to this effort. Under the agreement, the IEC will evaluate new IEEE electronics, power generation, computer, and other standards for international adoption. Those approved will be published as IEC/IEEE dual-logo international standards.



IEEE-SA also launched several high-profile standards activities in such areas as rechargeable PC laptop batteries, nanotechnology, organic electronics, and a "black box" for motor vehicles. A new, online standards-development tool designed for easy, intuitive use is enabling the more than 400 working groups developing these and other IEEE standards to expedite their efforts.

Washington, D.C., Decision Makers Hear IEEE-USA's Voice

IEEE-USA's voice was heard in connection with an important judicial decision when the U.S. Supreme Court substantially adopted the IEEE unit's "foreseeable bar" standard on the scope of certain patent rights. Ruling unanimously in the *Festo Corporation v. Shoketsu Kinzoku Kogyo Kabushiki Co. Ltd.* patent case, the Supreme Court dismissed the "absolute bar" standard championed by the opposing sides and adopted by the lower court. In its *amicus curiae* brief, IEEE-USA argued

02 highlights

OCTOBER

Record 584 delegates attend IEEE Sections Congress in Washington, D.C.

IEEE and IEC sign agreement to enhance standards globalization

NOVEMBER

Arthur W. Winston becomes 2003 IEEE President-elect

DECEMBER

IEEE Xplore® hosting transfers to Data Center in New Jersey, USA

StandardsAmericas geographic Web portal debuts



The six U.S. pennies and one nickel represent the process used to manufacture the CMOS 7S chip. Six layers of copper and one of tungsten are in the tiny chip, which helps to power a broad array of products. Courtesy of International Business Machines Corporation. Unauthorized use not permitted.



Emerson Pugh (left), IEEE Foundation president, presented James Jefferson with the US\$10,000 IEEE Presidents' Scholarship at the 2002 Intel Science Fair.

that those holding an amended patent give up protection under the so-called doctrine of equivalents for equivalent subject matter that was foreseeable by persons familiar with the associated technology. According to legal experts, the Supreme Court's decision potentially could affect 90 percent of all current patents.

Also during 2002, IEEE-USA leaders provided expert testimony on two Senate bills designed to provide a coordinated technology response in case of a major emergency and to strengthen U.S. security against computer attacks. Speaking in support of the proposed cyber-security bill, Ron Hira, chair of the 2002 IEEE-USA Research and Development Policy Committee, cited the need for systematic research to "help the profession codify lessons learned, develop a common language and advance the practice of cyber security." The bill subsequently was signed into law.

IEEE Virtual Museum = Solid Success!

Imagine a museum that never closes its doors, encourages children to explore to their hearts' content, and relies on the expertise of respected historians and technologists for an ever-expanding roster of exhibits. That is the IEEE Virtual Museum, www.ieee.org/museum, launched last year for youngsters ages 10 to 18, their parents and teachers. Visitors of all ages can explore a range of online exhibits. Each offers an in-depth look at the technologies engineers have created over the centuries, as well as key individuals involved, milestones in the development of these technologies, their historical context and social significance. Expert historians and technologists – most of them IEEE members – develop the material for museum exhibits.

Currently, visitors can learn about the history of electricity; how sounds are recorded and played; and the use of microwaves in radar, satellites and global-positioning systems. Other exhibits depict women's contributions to technology and Thomas Edison's role in engineering history. In its first year

of operation, the IEEE Virtual Museum was recognized for its quality and educational value by two respected U.S. educational organizations – the National Science Teachers Association and the National Science Digital Library Report for Math, Engineering and Technology.

Tangled Traffic Smooths Road to IEEE Presidents' Scholarship

An innovative approach to solving vehicular traffic congestion helped James J. Jefferson of Winona, Minnesota, USA, win the US\$10,000 IEEE Presidents' Scholarship. Jefferson, who was 18 at the time, received the award at the 2002 Intel International Science and Engineering Fair in Louisville, Kentucky, USA. After first creating his own software for a large-scale geospatial database from the entire traffic data stream for the Los Angeles freeway system, he designed and built techniques that could be used to reroute emergency or hazardous-material vehicles around heavy traffic and improve highway design. His efforts also could help to reduce the cost of a cellular telephone infrastructure. Jefferson now is studying at Iowa State University, Ames, Iowa, USA, and is continuing with his project – investigating neural networks to detect traffic jams and other highway anomalies.

The IEEE Foundation sponsors the Presidents' Scholarship.



"Every sentence I utter must be understood not as an affirmation, but as a question."

Niels Henrik David Bohr
1922 Nobel Prize in Physics

This concept "life recorder" lets its wearer collect and share real-time images, sounds and messages in his or her own personal portal.
Courtesy of Motorola, Inc.



MEMBERSHIP DEVELOPMENT

2002 Membership Sets Sixth Consecutive Record

At year's end, IEEE membership reached a new record high of 382,483. This was 1.4 percent over the 2001 total of 377,342 – and the sixth consecutive year of membership growth for the IEEE.

The increase is especially noteworthy because of the continued weakness of the global economy, which also affected the growth of IEEE Society memberships last year. Of the 37 IEEE Societies, only five recorded increases – led by the IEEE Geoscience and Remote Sensing Society and the IEEE Computer Society, which respectively enjoyed 8.5 and 8.1 percent growth rates.

Membership in Asia and the Far East (Region 10) grew by 10.4 percent. If this pace continues in 2003, the region could become the largest geographic sector of IEEE membership. The only larger IEEE region at year-end 2002 was the Western United States (Region 6), which had 65,939 members and a 0.4 percent growth rate. At year's end, non-U.S. members constituted 145,237 or 38 percent of the total organization – a slight increase over the previous year. If this growth trend continues, 50 percent of the total IEEE membership is expected to be located outside the U.S. by about 2011.

The number of female IEEE members also increased last year, and paralleled the recent growth in non-U.S. categories. Although still underrepresented in the overall organization, women now constitute 8.4 percent of the total IEEE membership. Some 10.6 percent of IEEE members outside the U.S. are women, compared to 7.1 percent in the U.S.

IEEE Senior Members: A New High

A record 1,832 IEEE members were elevated to the Senior Member category last year. Besides setting a new high for the number of members accepted for this prestigious category in one year, the elevations also exceeded the IEEE's 2002 goal by almost five percent.

Senior Member is the highest professional grade for which an IEEE member may apply. The candidate must have been professionally active for at least 10 years and have shown significant performance for at least five years.

Student Membership Continues Growth

For the seventh consecutive year, IEEE student membership increased again in 2002, with a record 72,328 members in this category. The growth was greatest in non-U.S. regions, reflecting one of the major recent trends in IEEE membership. Some 60.4 percent of student members now are outside the U.S.

Regions with the greatest student growth were Asia and the Far East (Region 10) with 33.5 percent, Southwestern U.S. (Region 5) with 12.2 percent, Northeastern U.S. (Region 1) with 11.9 percent, and Southern U.S. (Region 3) with 11.4 percent. The average percentage of student-membership growth in the six U.S. IEEE regions last year was 9.8 percent, while student membership outside the U.S. increased by 10.3 percent.

OPERATIONS

Going East: IEEE Xplore® Moves to Data Center in New Jersey, USA

The tens of thousands of members and other researchers who access IEEE online publications every day using IEEE Xplore® never noticed it – but in late 2002, they began enjoying the benefits of a nine-month effort to transfer the organization's online information delivery platform from its previous hosting site in Denver, Colorado, USA, to the IEEE Data Center in Piscataway, New Jersey.

While the rerouting of Internet traffic in mid-December 2002 was transparent to everyone who retrieves IEEE journals, magazines, standards and other technical information through IEEE Xplore®, the advantages were immediate. At the same time, the new IEEE Member Digital Library – the first of several new products and services – began operation. The updated platform architecture ensures greater power and flexibility, permitting content to expand and keep pace with researchers' technical information needs. The move to New Jersey also enables the organization to manage its operating costs more efficiently by using its internal infrastructure. The IEEE Data Center is located at the IEEE Operations Center, where interdisciplinary teams representing information technology, publishing and customer service provide ongoing support for IEEE Xplore® and the many users who visit the site.

New Records Set for IEEE Systems, Usage

As growing numbers of members and other users seek to satisfy their technical information needs, they are turning increasingly to the IEEE. As a result, the organization's systems and usage continued to set new records throughout 2002. For example, although the IEEE consolidated the number of servers it maintains from 140 to 136 last year, 14 more were added when IEEE Xplore® was transferred to the Data Center in New Jersey, USA. At the same time, the number of members with IEEE email aliases grew more than 23 percent – to 88,900 from 72,000. Web accounts, which enable members and customers to quickly access IEEE products and services, soared to 369,000 last year. This was a 27 percent increase over the 291,000 in 2001.

Various improvements were made to the IEEE Web site, including navigational tools for easier, more convenient use, and new features that call attention to both upcoming conferences and technical articles available through IEEE Xplore®. The number of IEEE Web pages increased to 66,000. This was 2,000 more than in 2001 but still less than the 68,000 in 2000 when efforts to streamline the site began.



The IEEE Data Center in Piscataway, New Jersey, USA, is providing new levels of reliable computing and communications services. In late 2002, the Data Center became the hosting site for IEEE Xplore®, the organization's online information-delivery platform.

AWARDS, FELLOWS AND HONORS

Herbert Kroemer Receives IEEE's Highest Honor

2002 IEEE President Raymond D. Findlay (left in photo) presented the IEEE Medal of Honor at the annual Honors Ceremony to Herbert Kroemer of the University of California, Santa Barbara. Also an IEEE Fellow, Kroemer was recognized for his contributions to high-frequency transistors and hot-electron devices, especially heterostructure devices from heterostructure bipolar transistors to lasers, and their molecular beam epitaxy technology. In 2000, he received the Nobel Prize in Physics.

In addition to the Medal of Honor, President Findlay also presented 11 other Medals, one IEEE Honorary Membership, two Service Awards and three Corporate Recognitions at the Honors Ceremony in Toronto.



IEEE Medal of Honor

Herbert Kroemer
University of California, Santa Barbara
Sponsor: IEEE Foundation

IEEE Alexander Graham Bell Medal

Tsuneo Nakahara
Sumitomo Electric Industries, Ltd.
Sponsor: Lucent Technologies

IEEE Edison Medal

Edward E. Hammer (retired)
General Electric Company
Sponsor: Edison Medal Fund

IEEE James H. Mulligan, Jr. Education Medal

Petar V. Kokotovic
University of California, Santa Barbara
Sponsor: IEEE Foundation

IEEE Founders Medal

Thomas E. Everhart (president emeritus)
California Institute of Technology
at Pasadena
Sponsor: IEEE Foundation

IEEE Richard W. Hamming Medal

Peter Elias (deceased)
Massachusetts Institute of Technology
Sponsor: AT&T Labs

IEEE Jack S. Kilby Signal Processing Medal

James W. Cooley
University of Rhode Island
Sponsor: Texas Instruments

IEEE Lamme Medal

Sakae Yamamura (professor emeritus)
University of Tokyo
Sponsor: Lamme Medal Fund

IEEE Robert N. Noyce Medal

Yoshio Nishi
Texas Instruments
Sponsor: Intel Foundation

IEEE Dennis J. Picard Medal for Radar Technologies and Applications

David K. Barton
ANRO Engineering, Inc.
Sponsor: Raytheon Company

IEEE Simon Ramo Medal

Bradford W. Parkinson
Stanford University
Sponsor: TRW Foundation

IEEE John von Neumann Medal

Ole-Johan Dahl
Kristen Nygaard
Norwegian Computing Center
Sponsor: IBM Corporation

IEEE Honorary Membership

James C. Morgan
Applied Materials
Sponsor: IEEE

IEEE Richard M. Emberson Award

Robert W. Lucky
Telcordia Technologies
Sponsor: IEEE Technical Activities Board

IEEE Haraden Pratt Award

Robert T.H. Alden (professor emeritus)
McMaster University
Sponsor: IEEE Foundation

IEEE Corporate Innovation Recognition

Cadence Design Systems, Inc.
Seiko Epson Corporation
Taiwan Semiconductor Manufacturing
Company, Ltd.
Sponsor: IEEE

Fellow

2002 Class of IEEE Fellows

In 2002, 259 IEEE Senior Members were elected to IEEE Fellow. This distinction – the highest membership grade any IEEE member can achieve – is awarded each year to no more than 0.1 percent of the voting membership as of 31 December of the preceding year.

More than 80 years ago, the two predecessor societies of the IEEE began the Fellow tradition to recognize the exceptional professional achievements of their members. Since the IEEE's formation in 1963, the Board of Directors has conferred this honor upon individuals with extraordinary records of accomplishment in IEEE fields of interest. These achievements have contributed significantly to the advancement of engineering, science and technology.



"If I have been able to see farther than others, it was because I stood on the shoulders of giants."

Sir Isaac Newton
Mathematician

(Top): IEEE Fellow Arun N. Netravali was among those honored with the 2002 U.S. National Medal of Technology and presented by President George W. Bush. It is the nation's highest honor for achievement in technology. Netravali is a former president of Bell Labs and currently is Lucent Technologies' chief scientist. He was recognized for his pioneering contributions in the field of digital technology.

(Bottom): IEEE Fellow Eli Fromm (second from right) was the first recipient of the National Academy of Engineering's Bernard M. Gordon Prize for Innovation in Engineering and Technology Education. To be presented bi-annually, the prize includes a US\$500,000 cash award and is sponsored by IEEE Life Fellow Bernard Gordon (second from left). George M.C. Fisher (left) is NAE Council chairman, and William A. Wulf (right) is NAE president. Fromm is director of The Center for Educational Research at Drexel University.



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