The President's Perspective

In May of this year I traveled to Louisville, KY, USA, for the Intel International Science and Engineering Fair (ISEF). There I met with students, parents, counselors, and volunteer judges and reviewed some of the projects submitted by the students. At the end of the event, I had the privilege of presenting the *IEEE Presidents' Scholarship* during the Special Awards Ceremony to James J. Jefferson, a fine young man whom I believe has a great future (see picture below).

EMERSON PUGH (left), IEEE Foundation President, presents James J. Jefferson (right), an 18 year old from Winona, Minnesota, USA, with the *IEEE Presidents' Scholarship* for his winning project, "Automatic packet reporting system (APRS): building a large scale geospatial database". Sponsored by the IEEE Foundation, this US$10,000 scholarship is the largest single award given by an organization in the Special Awards Ceremony at ISEF.

I was energized by the excitement, enthusiasm, motivation, intellect and innovations of the hundreds of students who worked so hard to participate in this pre-college celebration of science. Young people with a love for math, science, and technology were everywhere I looked. But I also know that there are many millions of children throughout the world who still need someone or something to spark that love.

Sparking that love is one of the objectives of the IEEE Foundation. Through our grant-making program, the IEEE Foundation works to support programs that will have a far-reaching impact on the improvement of pre-college education in math, science, and technology.

In this issue of the *Focus*, you will read about just a few of the programs that the IEEE Foundation has selected to support. Please reflect on which activities you like most (or least) and let us know how you believe we could improve our efforts. You may reach me by email at supportieee@ieee.org with your comments and suggestions.

Best Regards,
Emerson Pugh
President, IEEE Foundation

IEEE Presidents' Scholarship: A Judge's Perspective

By: **Rachel Wilson**, A *2002 IEEE Presidents' Scholarship* Judge

What's so special about the Intel International Science and Engineering Fair (ISEF)? Why should I spend a few days away from the office to interview and review hundreds of projects for *the IEEE Presidents' Scholarship?* Why would I want to subject myself to this physically grueling and mentally exhausting task? The answer is simply… the kids.

The high school students competing at ISEF spend hours upon hours working, testing, and theorizing how to transform a science project into a scholarship opportunity. Some of these young scientists have wonderful teachers and parents behind them while others beg to have this opportunity announced over their high school intercom. Some are guided by the best minds in engineering and science; while others scrape together ideas hoping one will work. Some have patents pending, while others wonder where their projects flopped. They are all gathered under one roof ready to show off their dedication and hard work to anyone who will stop and share a moment.

Over the course of two days, a group of judges from the IEEE Lexington and Louisville Sections narrowed hundreds of projects down to one to pick the winner of the *2002 IEEE Presidents' Scholarship*. The judges spent hours reviewing every electrical engineering related project, deciding which 30 or so were worthy of an interview, and continued until we narrowed it down to one. We considered many factors in a project such as scientific process, data collection, proper conclusions, improvements, applications, support from a research lab and/or teachers, professionalism, and direction furthering the project.

The interviews are tough for both the students and the judges. These students have kept up their schoolwork and extra-curricular activities in addition to putting together their project. They are simply bursting to tell you why their project is the best. For the judges, it can be difficult persevering throughout an entire day battling tired feet, projects running together, and draining energy.

Though the judging itself is hard work, there are rewarding moments. For me, the most memorable moments are during the Awards Ceremony. You can feel the excitement level as the kids wait to be called. I remember last year when Mirangela Lisanti, the *2001 IEEE Presidents' Scholarship winner*, breathlessly exclaimed to her parents "I won!" And this year, James Jefferson (see front cover for photo) literally bounced on stage bursting with excitement. Michael Jordan does not even get that much air.

As a judge, this science fair is fertile ground to encourage all these young minds to chase their dreams. Although some walk away with accolades and others will try again next year, our words will linger in all their minds. As professionals, it is our duty to seize every opportunity to encourage these youngsters in every way.

A GROUP photo of *2002 IEEE Presidents' Scholarship* judges from the IEEE Lexington and Louisville Sections after a long and vigorous day of judging. Rachel Wilson is not pictured, as she is behind the camera.

IEEE recognized and celebrated the following individuals during

⇨ **1ST ROW LEFT TO RIGHT:** Rick Tsai, *IEEE Corporate Innovation Recognition – Taiwan Semiconductor Manufacturing Company, Ltd.*, Michael S. Adler, IEEE President-Elect, Herbert Kroemer, *IEEE Medal of Honor*, Raymond D. Findlay, IEEE President, Edward Hammer, *IEEE Edison Medal*, Hideaki Yasukawa, *IEEE Corporate Innovation Recognition – Seiko Epson Corporation*

2ND ROW LEFT TO RIGHT: Richard Gowen, *Eta Kappa Nu*, Fumio Arakawa on behalf of Sakae Yamamura, *IEEE Lamme Medal*, Ashok Sinha on behalf of James C. Morgan, *IEEE Honorary Membership*, Tsuneo Nakahara, *IEEE Alexander Graham Bell Medal*, Robert T.H. Alden, *IEEE Haraden Pratt Award*, Yoshio Nishi, *IEEE Robert N. Noyce Medal*

3RD ROW LEFT TO RIGHT: James W. Cooley, *IEEE Jack S. Kilby Signal Processing Medal*, Raymond Bingham, *IEEE Corporate Innovation Recognition – Cadence Design Systems*, Inc., Dan Elias on behalf of his father Peter Elias, *IEEE Richard W. Hamming Medal*, Bradford W. Parkinson, *IEEE Simon Ramo Medal*, David K. Barton, *IEEE Dennis J. Picard Medal for Radar Technologies and Applications*, Robert W. Lucky, *IEEE Richard M. Emberson Award*, Petar V. Kokotovic, *IEEE James H. Mulligan, Jr. Education Medal*, Thomas E. Everhart, *IEEE Founders Medal*

1st IEEE Region 10 Student Congress "Building the Bridge"

By: **Darrel Chong Sau Foong**, Chairman of the 1st IEEE Region 10 Student Congress & 2001/2002 Chairman, IEEE Student Branch at National University of Singapore

Six months of effort reaped a lifetime of returns.

The 1st IEEE Region 10 Student Congress was the best thing that had ever happened to the student leaders in Asia Pacific. All delegates came to Singapore with anticipation. All of them left for home satisfied and motivated. Everyone was praising the event with their thumbs up as they enjoyed every moment of the Congress.

The Congress began with an opening ceremony with Dr. Wallace Read, IEEE Foundation Member-at-Large, as our Guest of Honor and Professor Teck Seng Low, IEEE Region 10 Director, as our Keynote Speaker. The 50 plus delegates from eight different countries were captivated by their well-delivered speeches.

Delegates benefited bountifully from the presentation session. The session took six hours. What amazed us was the group-break-out session when all delegates spontaneously went into a series of discussion and sharing that lasted for more than an hour! It was late but their spirits were high. The scene was encouraging telling the organizers that our efforts were all worth it.

During the strategic planning session, delegates were assigned into small groups to discuss outstanding issues pertaining to IEEE student branches. After which, a spokesperson from each group presented their ideas. Through the session, many queries and suggestions were raised. It was a time when the IEEE fire was kindled in them.

Besides IEEE and leadership training workshops, there were team-building games led by local students, which knitted the delegates closer together. In just two days, the barriers were down and the delegates were communicating freely despite the wide range of cultures and languages. The Congress ended with a formal dinner held at the National University of Singapore.

At the end of the event, not only one, but a number of delegates came forward to request to organize the next IEEE Region 10 Student Congress. This showed the amount of passion within them and the willingness to sacrifice for a good cause. What a change we were seeing! As my committee toiled day and night to put up the Congress, we benefited more than we had given. The common response from my committee members was, "The Congress was great and it changed my perspectives of IEEE".

This Congress has impacted the next generation of IEEE Region 10 leaders. The value it brought was tremendous. We hope that this event will continue – ensuring networking as part of every IEEE student members' experience.
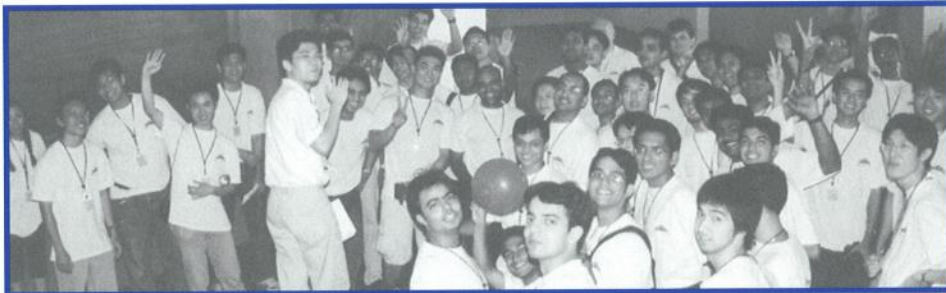
STUDENT delegates at the 1st IEEE Region 10 Student Congress learning to work as a team during a team-building game.

2001 Honor Roll of Donors Corrections

The following information was erroneously listed in the 2001 Honor Roll of Donors. The IEEE Development Office makes every effort to ensure the accuracy of the listings, however mistakes do sometimes occur.

The corrections are as follows:

- Robert V. Hugo
  was mistakenly listed as deceased.

We thank you for helping us to succeed in our mission and we apologize for any inconvenience.

# the 2002 IEEE Honors Ceremony for their involvement in the *Power of*

⇨ **HERBERT KROEMER** (center) received the *2002 IEEE Medal of Honor* for his pioneering work in heterostructure-based transistors and light-emitting devices. Kroemer's work led to the design of semiconductor lasers and high-performance transistors, such as those used in satellite links, mobile phones, CD players and the fiber optics that make up the Internet. The IEEE Foundation sponsors the *IEEE Medal of Honor*. (L to R) IEEE President Raymond D. Findlay, Dr. Kroemer, IEEE Foundation President Emerson W. Pugh.
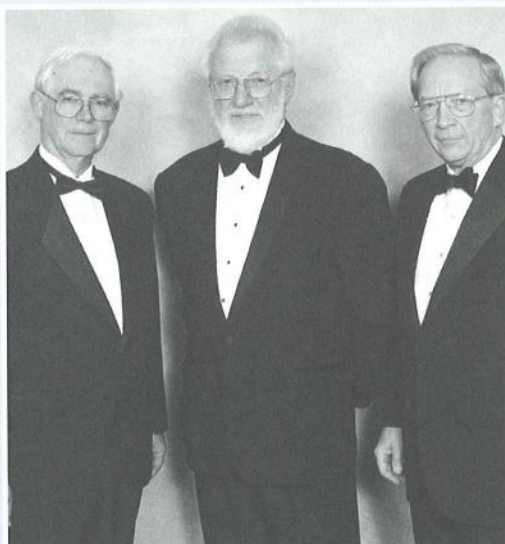
⇨ **DR. KROEMER** takes a moment away from the celebration to pose next to the cover of the June 2002 issue of *IEEE Spectrum*, which featured his story.
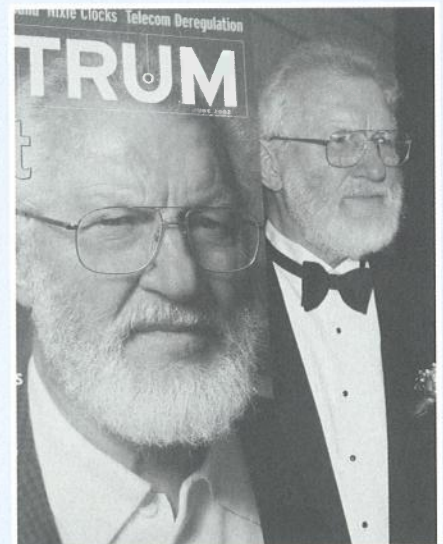
Growing and Expanding: *The IEEE Virtual Museum*

By: **Kim Breitfelder**, IEEE History Center staff

Since its debut in February 2002, the *IEEE Virtual Museum (VM)* has grown and expanded. Feedback from educators, one of the primary target groups of the project, has been very enthusiastic. Equally gratifying is the positive response from IEEE members, many of whom expressed the feeling that it is "high time" that the IEEE launched a project that recognized the importance of its own history and shared that history with a young audience.

June saw the debut of several post-launch additions, images to the (right). Like all *VM* materials, these additions explain to a pre-college audience how different technologies worked, how they were developed, and the impact they had on the people who used them.

For the remainder of the year, the *VM* staff is focusing on launching two more exhibits and developing a "Teacher's Lounge." The first exhibit, funded by the IEEE Life Members Committee, examines the contributions women have made to engineering and explores their changing involvement in the fields of electrical and information technologies. The second, funded by the IEEE Microwave Theory and Techniques Society, focuses on the varied uses and applications of microwaves. The involvement of MTT marks a milestone, as it is the first IEEE society to chronicle its history through the *VM*. The "Teacher's Lounge" will hold instructional materials to be used

by educators to enhance the *VM* experience and increase their students' understanding of the material.

Looking ahead, our wish list for future additions to the *VM* includes exhibits covering such topics as robotics and automation, aerospace, the Web, biomedical engineering, avionics, the personal computer, and cryptography.

> **The IEEE History Center is grateful to all of those who support this important project to stimulate students...**

As always, the IEEE Foundation remains a staunch partner in the continued success of the *IEEE Virtual Museum*. The IEEE History Center is grateful to all of those who support this important project to stimulate students, ages 13 and up, and their educators to explore the global social impact of electrical and information sciences and technologies, and to demonstrate how relevant engineers are to society. If you are interested in helping us to grow and expand the *IEEE Virtual Museum*, please contact the IEEE Development Office by telephone at +1 732 562 3915 or by electronic mail at supportieee@ieee.org.
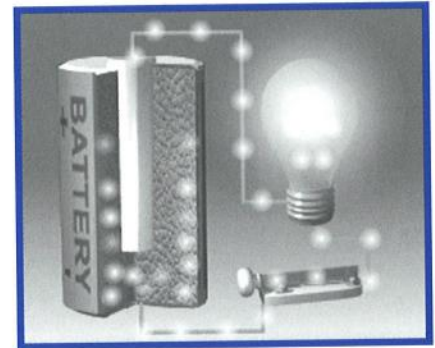
Thanks to the generosity of Mr. Lawrence Crooks, this improved and enhanced "Inside the Flashlight Battery" animation can be found on the Battery Technology Page in the exhibit *Socket to Me!: How Electricity Came to Be*.
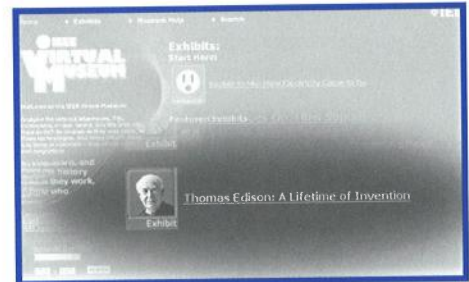

Thomas Edison: A Lifetime of Invention, funded by the Charles Edison Fund, focuses on the personal and professional life of Thomas Edison. *A Lifetime of Invention* explores both the highlights and missteps of Edison's career and reexamines his most famous innovations while shedding light on his lesser-known achievements.

Progress through their professional and academic contributions.

⇨ **IEEE PRESIDENT RAYMOND D. FINDLAY** (left) along with IEEE President-Elect Mike Adler (right) present Thomas E. Everhart with the *2002 IEEE Founders Medal* for contributions in scanning electron microscopy and for leadership in academia, service to engineering organizations, and advisor to the nation and industry. The *IEEE Founders Medal* is sponsored by the IEEE Foundation.

⇨ **RAYMOND AND DONNA FINDLAY** (left) with Robert T. H. Alden (right) winner of the *2002 IEEE Haraden Pratt Award* during the pre-reception of the 2002 IEEE Honors Ceremony. Dr. Alden received the Award for outstanding and sustained leadership in many areas of the IEEE especially in the use of electronic communications. Sponsored by the IEEE Foundation, the Award is presented for outstanding service to the Institute.
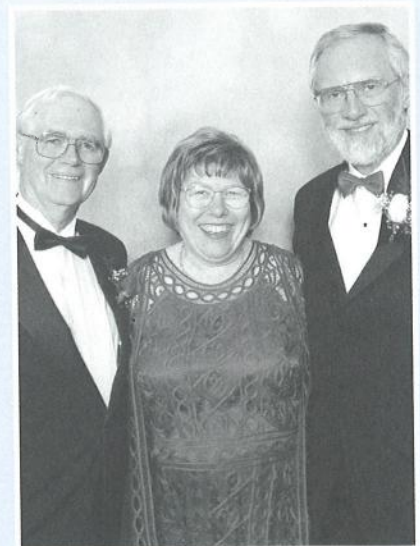
Back to Class — An Estate Planning Quiz

Although it may have been years since you last took an exam, we invite you to try your hand at this quiz. The results may be helpful and enlightening as you consider your long-range estate and financial plans. Your answers may serve to focus attention on areas of your plans that need improvement. Your advisors can help you tailor a plan that best fits your needs.

THE QUIZ

Answer each statement true or false, then turn to the end of the quiz and total your score.

Anything you cannot answer due to incomplete estate planning should be answered false. If something does not apply to your situation, answer true.

True False

☐ ☐ 1. I have a will.

☐ ☐ 2. I have not moved to a different state since last reviewing my will and other estate plans.

☐ ☐ 3. My marital status has not changed since my last review.

☐ ☐ 4. I have suggested a guardian for my minor children or other dependents, if necessary.

☐ ☐ 5. Children or grandchildren have not been born since my plans were last reviewed.

☐ ☐ 6. I am certain all my property will ultimately go to the persons I want to receive it, in the amounts I desire.

☐ ☐ 7. My spouse and/or children would need no assistance in managing property left to them.

☐ ☐ 8. No significant increases or decreases in wealth have occurred since my last review.

☐ ☐ 9. I have neither given away nor sold property that is left to heirs in my will or other plans.

☐ ☐ 10. Special friends have been provided for in my will.

☐ ☐ 11. Adequate provisions have been made for transferring business interests I may own.

☐ ☐ 12. There is no one I wish to provide with temporary help (e.g., education of children or grandchildren).

☐ ☐ 13. I am satisfied with the charitable gifts included in my plans.

☐ ☐ 14. I am aware of the amount I may leave tax free under current federal and state law.

☐ ☐ 15. I know the approximate amount of estate taxes that will be due at my death.

☐ ☐ 16. My estate plan specifies which heirs should be responsible for paying estate taxes or if that responsibility should be shared equally.

☐ ☐ 17. I am confident that the life insurance coverage I have is both necessary and adequate for the support of loved ones, payment of taxes (if applicable), and other estate settlement expenses.

☐ ☐ 18. I know my will may not determine who receives my life insurance and retirement plan assets.

☐ ☐ 19. The person I have chosen to handle my estate settlement is still willing and able to serve.

☐ ☐ 20. Joint ownership arrangements have been made where appropriate.

☐ ☐ 21. I am aware that professional advisors quote fees upon request.

☐ ☐ 22. I am aware that my spouse will not receive all of my property unless I have a will or other estate plans in place.

☐ ☐ 23. My financial records are up to date and readily accessible.

☐ ☐ 24. I have discussed my estate plan with those close to me.

☐ ☐ 25. My loved ones know who has assisted me in my estate planning.

HOW DID YOU DO?

Each false answer is worth:

1.	10 points	10.	3 points	18.	3 points
2.	2 points	11.	6 points	19.	2 points
3.	8 points	12.	4 points	20.	4 points
4.	5 points	13.	4 points	21.	2 points
5.	5 points	14.	5 points	22.	8 points
6.	5 points	15.	3 points	23.	3 points
7.	4 points	16.	5 points	24.	3 points
8.	4 points	17.	3 points	25.	2 points
9.	4 points				

IF THE VALUES OF YOUR FALSE ANSWERS TOTAL:

0-15: You are unusually prudent in your financial affairs. Congratulations!

16-30: You are above average as a manager of personal finances and estate planning. Review your plans to be sure they still reflect your wishes.

31-50: You are about average, in that you need to seriously reconsider your estate plan. Take time now to review or begin your estate plan with professional help.

Over 50: Your loved ones will probably experience significant difficulties, delays, and expense in settling your estate. Act now for their sake.

THE NEXT STEP

For additional information on will and estate planning, please call or write. Remember to consult professional advisors when making specific plans.

Neither the author, the publisher, nor this organization is engaged in rendering legal or tax advisory service. For advice and assistance in specific cases, the services of an attorney should be obtained. The purpose of this publication is to provide accurate and authoritative information of a general character only. Watch for tax revisions. State laws govern wills, trusts, and charitable gifts made in a contractual agreement. Advice from legal counsel should be sought when considering these types of gifts.
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Estate Planning and the IEEE Foundation

Providing for loved ones and fulfilling your philanthropic goals does not have to be an "either/or" proposition. Careful planning will ensure that your loved ones will be provided for when you are gone, that your property will be distributed as you wish, and that the charities that have a special meaning for you will be supported beyond your lifetime.

By remembering the IEEE or the IEEE Foundation in your estate plans, you push the Institute to work that much harder to expand and improve educational and technological opportunities for engineering, because estate gifts provide the present and future financial energy needed to shape the engineering profession. In addition, you will become a member of the deferred giving donor recognition group the *Goldsmith League*. Named for Alfred N. Goldsmith and his wife Gertrude (Maude) as a special tribute for their estate gift that seeded the IEEE Foundation's ability to invest in worthy project that impact the profession, the *Goldsmith League* honors those who have left, or shared their intention to leave, a legacy gift to the IEEE or the IEEE Foundation.

Please consider including the IEEE or the IEEE Foundation in your estate plans. To request additional information or to hold a confidential discussion of giving opportunities to the IEEE and the IEEE Foundation, please contact the IEEE Development by telephone at +1 732 562 3915 or by electronic mailing at supportieee@ieee.org.

A Hands-On Introduction to Engineering

By **Mark D. Conner**, Ph.D.

In June of 2000, the IEEE Alabama Section received a grant from the IEEE Foundation to help launch the *Pilot Pre-Engineering Program*. Working through the local high school, Homewood High School, Homewood, Alabama, two 11th and 12th grade pre-engineering courses were developed to provide students with a hands-on introduction to the field of engineering.

During the 2000-2001 school year, the first course, an open-ended course, entitled "Research & Design" was offered. The objective of this course is to teach students the engineering design process through a variety of group and individual design projects with a secondary focus on technical writing and speaking skills. Of the 12 seniors who took this course, approximately half went onto engineering or engineering-related fields of study.

The second course entitled "Digital Systems & Communication" was developed utilizing the Infinity Project (www.infinity-project.org), and initially offered during the 2001-2002 school year. This general course emphasizes the connections between basic math and science principles and digital technology. Specific topics include how analog signals are sampled to create digital signals; understanding the creation, storage, and manipulation of digital sounds and images; encoding and encrypting digital information; communications

> *...at least half are leaning toward a career in engineering as a result of taking the course.*

systems; computer networking; data compression; and digital filtering. Of the 20 students who took this course, 14 of them plan to take the "Research & Design" course during the 2002-2003 school year and of that group at least half are leaning toward a career in engineering as a result of taking the course.

In addition to opening student's eyes to the wonderful world of engineering, these two courses have prompted partnerships to be established between the pre-engineering program and representatives from local universities and industry. The partners provide mentors for the students, ensure that the design projects have clear links to the "real world", and familiarize the students with local engineering programs and employers in an effort to help prepare them for the engineering profession.

Beginning with the 2002-2003 school year, the goal is to use these courses as a two-course sequence, where students will take the more-structured "Digital Systems" course as juniors and then the open-ended "Research & Design" course as seniors. The next step includes expanding beyond the pilot phase of the project to multiply the impact by sharing the courses with others through a website, participation at the 2002 IEEE Section Congress and the 2003 PACE Conference.