

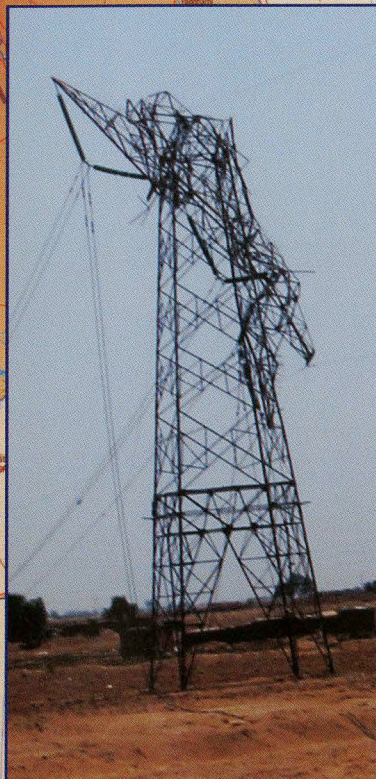
THE BRIDGE

vol 99, no. 1 / winter 2003

of Eta Kappa Nu

RESTORING POWER IN BAGHDAD

Electrical Engineers face the challenges of restoring Iraq's antiquated and war-torn electrical power infrastructure



Also:

- Amar Bose, J. Fred Bucy, and Andrew Sage inducted as Eminent Members
- Kappa Sigma Chapter Installed at Boston University
 - Robert Dennard wins Karapetoff Award
 - Noel Schulz Named Outstanding Teacher
 - OYEE, OECES, and OCAA Award Winners
 - Alan Lefkow receives DSA
 - Vannevar Bush - EE Pioneer



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Eta Kappa Nu was founded at the University of Illinois, at Urbana, on October 28, 1904, by Maurice L. Carr, to encourage excellence in education for the benefit of the public by: Marking in a fitting manner those who have conferred honor upon engineering education by distinguished scholarship, activities, leadership, and exemplary character as students in electrical or computer engineering, or by their attainments in the field of electrical or computer engineering; Providing educational and financial support to said students; and Fostering educational excellence in engineering colleges.

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ON THE COVER

The damaged 400 kV transmission lines were only a few of the monumental tasks that electrical engineers faced as they tried to restore electric power across Iraq after Operation Iraqi Freedom. Inset photo: Tom Sawyer. Raw data for the background map before digital enhancement was from Central Intelligence Agency, courtesy of the General Libraries, the University of Texas-Austin.

FROM THE BRIDGE

Welcome Aboard to our new Assistant Editor

It is with great pleasure that I can announce an important change in our Bridge staff beginning this issue. We have created a new Assistant Editor position to help manage the content and production of each issue as we strive to continuously improve the magazine. I have asked Patricia Irwin, IN '87, to step into this new role beginning with this issue. Patricia has been working on our Bridge team for the past year as our Industry Spotlight department editor and as the Career Focus department editor, and now steps up into this new role of assistant editor for the magazine as a whole. Patricia has over 7 years of experience in engineering journalism. Most recently she was editor-in-chief for Electrical World magazine, and is currently a freelance technical writer for several publications. I am excited to have Patricia join our Bridge team in this new capacity and look forward to many interesting Bridge issues to come. Welcome aboard Patricia!

—RAS, Ω '82

Thanks Ron. I am delighted to be part of the Bridge team and look forward to working with everyone to make the Bridge a stellar example of society publications. One of the things I want to do is focus on significant world events that impact HKN members. The war in Iraq is one example. In this issue, we interview a young engineer whose name, coincidentally, is Second Lieutenant Alex Young. Not long graduated, he is presently stationed in Iraq and was, for a few months, running an important power plant in Baghdad. We also interviewed a reporter from Engineer-News Record who was an embedded journalist in Iraq covering the power and infrastructure repairs. We are constantly looking for hot topics to cover (expect to see something on the August 2003 Blackout in a future issue). So, if you know of a story that we should cover, please let Ron or me know. We would love to hear from you!

—PAI, IN '87

HKN CALENDAR

EVENTS

HKN Spring Awards Banquet, OYEE, Karapetoff, DSA Awards, and new Eminent Member Recognition will be presented May 3, 2004, New Brunswick, NJ, 6:00-10:00 p.m. Reception and Dinner tickets \$85-individual, \$850-corporate Table. Contact HKN HQ for reservations.

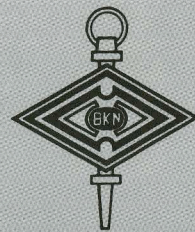
HKN 2004 National Student Leadership Conference, October 22-24, 2004, at University of Illinois Campus, Urbana, IL. Mark your calendars now. Conference info will be sent to chapters.

HKN Centennial Celebration Banquet, Join us to celebrate HKN's 100th birthday. All members and alumni are invited. October 23, 2004, 5:00-10:00 p.m. Urbana, IL, Reception and Banquet.

NOMINATIONS DUE

C. Holmes MacDonald Outstanding Teaching Award (OTA) nomination forms are due February 15, 2004. Nominees must be 35 or under at the time of the award.

Zerby/Koerner Outstanding Electrical/Computer Engineering Student (OECES) nomination forms are due April 2, 2004. Info has been emailed to chapter advisors.



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The Electrical and Computer Engineering Honor Society

Founded October 28, 1904

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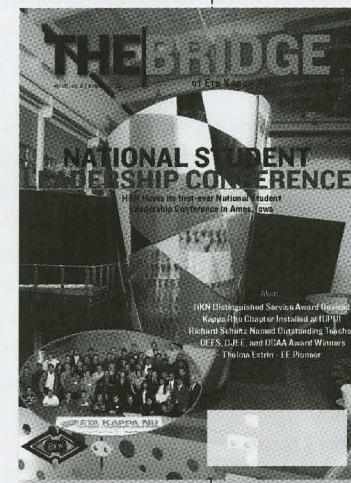
Larry Dwon, Chair

All board members and committee chairs can be reached through the HKN Headquarters Office

FEEDBACK

Thanks for the great article covering the National Student Leadership Conference that we held here at Iowa State. The conference was attended by many chapters who benefited tremendously from the sharing of ideas and activities during the event. I was proud to see the Nu chapter from Iowa State undertake this endeavor. The students and committees put in countless hours of work organizing the conference and interfacing with the chapters and invited speakers.

I only wish that the article could have mentioned some of these efforts and in particular the efforts of the chapter president, Curt Melchert, who put forth a tremendous effort in guiding the chapter to make sure all aspects of the conference were covered. On the scene Curt was the Master of Ceremonies for the conference, but behind the scenes, he coordinated much of the effort to make this conference the success that it was. I am happy to report that the national HKN Board of Directors recently issued a formal Certificate of Appreciation to Curt for all of his efforts with this conference. I hope that this conference is the first of



many successful conferences to come in the future. I was happy to have been able to play a part in getting this national Student Leadership Conference program started.

—Jim Melsa, N '60
Dean, College of Engineering
Iowa State University

I wanted to let you know that I enjoyed reading your last issue of *The Bridge* and catching up on many of the activities that HKN is now doing. I was inducted back in 1979, at Kansas State University, but had let my initial subscription to *The Bridge* expire after the first few years. At the suggestion of some friends, I recently reactivated my membership and took out a life subscription to the magazine. The last issue, Summer '03, was my first issue in over 20 years.

This Bridge magazine looks nothing like the Bridge magazine I remember from the past! I was impressed with the many new activities that the organization is now doing like the National Student Leadership Conference. I only wish we could have had this conference when I was a student member. The opportunity

to exchange ideas and activities between chapters at a forum such as this is invaluable.

Being an amateur radio operator, I particularly noticed the article about the Iota Nu chapter starting up their own low power FM radio station. With the recent relaxation of FCC rules allowing such low power FM broadcast stations, this is an excellent opportunity for HKN members to apply the basics of radio propagation and equipment, as well as becoming familiar with the myriad of non-engineering issues involved in operating such a station, including copyright issues, licensing, fund-raising, staffing and scheduling, etc.

—Chris McHarg, WD9DQX, BK '81

Many thanks for the recent issue containing one of my cartoons. I'm always pleased to be a part of *The Bridge*.

Sincerely,

—Sidney Harris, Cartoonist

Letters to the editor are encouraged and welcome. Readers are invited to comment about material published in *THE BRIDGE* and on matters of general interest to the members of HKN. All material and comments received are presumed to have been submitted for publication unless otherwise noted and may be edited as needed. Feedback and letters can be addressed to the editor at HKN Headquarters, P.O. Box 3535, Lisle, IL 60532 or to spanke@hkn.org

Centennial Update

A Century of Honoring Excellence in Electrical and Computer Engineering

Eta Kappa Nu turns 100 years old this year! Founded on October 28, 1904, HKN will celebrate its centennial next Fall. The Centennial committee has been finalizing plans for the entire centennial year which runs from July 1, 2004 until June 30, 2005. The highlight will be the centennial banquet, held on Saturday, October 23, 2004 at the University of Illi-

nois, where the organization was founded. All members and alumni are invited. Chapters are encouraged to attend the Centennial Student Leadership Conference on October 22-24, also at U of I. Mark your calendars now! The centennial committee is also finalizing plans for several other centennial projects that you will read about in upcoming issues.

Can You Help?

Eta Kappa Nu is looking for several alumni to join our Bridge staff and contribute their talents to HKN. The following volunteer positions are currently open:

- Homework Department Editor
- Humor (Short Circuits) Editor
- Advertising Sales Rep
- Feature Article Writers

If you have experience in any of the above areas or a desire to learn new skills or would like to be part of our Bridge staff, please contact the editor to discuss the positions.

Packet Switch Still Packs a Punch

You don't have to be in the electronics biz to know that the telecommunications industry hit the rocks about three years ago. Riding high on the dot-com boom, companies everywhere wanted a piece of the exploding telecom market. But like the sudden extinction of the dinosaurs, dozens of competitive local exchange carriers (CLECs) abruptly went out of business, leaving the old regional Bell operating companies (RBOCs, or phone companies) still standing.

Before the market went sour, the RBOCs were fighting the development of voice over internet protocol (VOIP) because it threatened their traditional and deeply embedded circuit-switched networks. But now as the business is beginning to show a heart-beat again, the RBOCs have taken a new interest in VOIP because the Federal Communications Commission (FCC) issued a ruling saying that though the RBOCs were required to lease their circuit switches to the CLECs at wholesale rates, they're not required to share any packet switches they have. So you may soon be getting a sales pitch from your phone company for VOIP service.

This bodes well for internet-savvy EEs who will be looking for work in the next couple of years. Your phone may be as close as your keyboard.

Wireless is More

In our never-ending search for good news in the electronics industry, we found this: the wireless local area network (WLAN) business is one that keeps growing while other industry segments have stalled.

Strategy Analytics, a business-planning consulting firm, reports that the wireless LAN GaAs IC market is expected to see 139 percent growth in 2003 and a compound annual average growth rate of 21 percent through to 2008. Not bad. "Harmonization of worldwide 5GHz WLAN operation, and...dual-band systems incorporating 802.11a/g combo devices, will provide the momentum," Asif Anwar, a senior analyst, said in a statement. "The power amplifier, in particular, will be a bright spot."

If you're looking ahead to your career (and who among us isn't?), it will be good to know what's happening in the WLAN business. So stay plugged in to wireless - or is that an oxymoron.



*Fiddlesticks!
All my experience,
ready to answer
questions, and I
run out of ink!*

ASK THE PROFESSOR

As he searches for truth, or at least something that looks like it, technical guru and wise guy Professor R. F. Detecta is often asked questions. He replies to them, whether or not he knows the answer. Let's check his latest attempt: —TB

Dear Professor:

My friends and I spend a lot of time in the lab, tinkering with breadboards and loose components that are available. Recently we stumbled on a circuit that performs a function that we haven't seen before. The more we played with it, the more we realized that we might be on to something here that we could sell. I don't want to describe it until we're ready to publish something about it, but the question that occurred to us was that maybe we should patent it first and then publish it. What do you think?

--- Dreaming of Big Bucks

Dear Dreamer,

So you can't describe it, eh? I know, I know - you could tell me, but then you'd have to kill me. I don't want to take that chance, so I won't ask any more about it.

Deciding whether to publish it or patent it depends on how and when you'd like to make some money. You can apply for a patent, which means hiring a patent attorney, drafting the patent application, paying big fees (to the lawyer and to the Patent Office), and corresponding with a patent examiner for a couple of years to discuss revisions. Then if your patent is granted, it'll take another year or so to be issued, after which you'll be obligated to pay periodic maintenance fees to the patent office for the 17-20 years the patent is valid. After it is granted, you could sell patent rights or prohibit others from marketing your invention. Alternatively, you could publish a description of your great discovery at a technical conference and start selling it to investors so you can start making money now. Remember that holding a patent is an expense - it doesn't do you any good unless you're actually selling it to somebody.

Maybe you can have a patent application in the works while you're selling it (then you can say "Patent Pending," which always thought was cool). Just remember that patents take years to be issued, which might be longer than the next generation of technology. The big bucks might pass you by before your patent certificate is framed. Just keep the ideas flowing, and whether or not big bucks happen, keep dreaming.



Advice from the Field: Power Engineer in Iraq

by Patricia Irwin, IN '87

Name: 2LT Alexander Young

Position: Platoon Leader, 94th Engineer Battalion

Contact info: ayoung2@alumni.upenn.edu

Background: In 2002, Young graduated from the University of Pennsylvania with a BSE degree in Electrical Engineering. Having completed four years in the Reserve Officer Training Corps during college, Young was commissioned into the Army. He then attended a five-month, Engineer Officer Basic Course. Shortly after finishing that program, he was assigned to post in Germany, then went to Kuwait, and then to Baghdad in Iraq.

Description of current job: Young is a Platoon Leader assigned to a Combat Heavy Company in Baghdad. He is in charge of 31 soldiers whose job is to assess, plan, and execute various missions to improve buildings in Baghdad (primarily, project management to provide power to buildings). He is now in charge of operating three electric power plants in Baghdad.

What is the best advice you ever received?

The best advice I received was to focus on the bigger picture. Project management is just as important as the small details of design, and if one gets too tied up with these details--to the point where the overall picture is ignored--then the product will inevitably fail. An engineer is more than a knowledge base; he is a planner, designer, and a team player that has to work with others to create the best product possible.

What was the most surprising thing learned after graduation?

Having knowledge is great, but it takes much more to be a successful engineer. I have met several electrical engineers here in Iraq. They legitimately have a strong knowledge of engineering, yet they are reduced to painstaking work to get running water into their towns and villages. They have university level educations, and yet, because of circumstances, they still have to worry about the basic necessities such as water and food.

What advice would you give engineering students preparing for a career?

My advice is to be prepared for anything. Engineering fields are so varied that it is impossible to know exactly what type of work you will be doing in your career, no matter how concrete you may think your engineering path is. The great part about being

an engineer is the ability to work on so many different and new projects that directly affect the way we live and work.

What predictions can you make about the future of electrical engineering?

Access to higher education in the engineering field is available in more and more places around the world and the effects of that will be seen everywhere. Drawing engineers from a much larger population will improve both product design and achievement in all engineering fields. Witnessing the number of smart and educated people in a third world environment just shows that once these areas begin to get funding and a true governmental structure, the bar for electrical engineers will be significantly raised.

People often picture engineers working in an office or on a plant floor. How have working locations and conditions varied in your career?

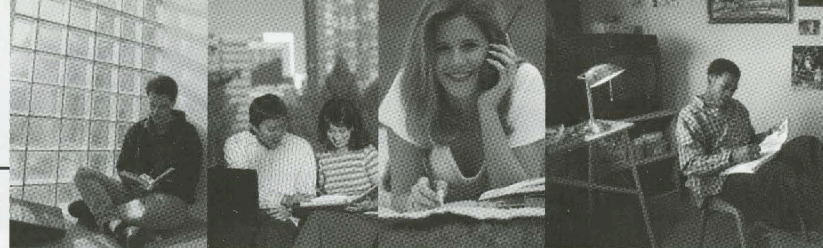
The working conditions I have experienced in a combat environment have been unique and probably much different than what any typical engineer would experience. Although the conditions are extremely primitive, the same principles and foundations of electrical engineering still apply and are expected on a daily basis. The electrical engineer is expected to have all the knowledge and is expected to perform under any and all conditions.

Have you gained any insights into the importance of electrical engineering to the people who rely on it?

Electrical engineering comes down to improving the quality of people's lives. Whether this is in the form of technological advancements or just the basic necessities of life such as electricity, electrical engineering can be seen in all facets of life. Working in an underdeveloped environment highlights the need for technology and how much of an impact it has on everything that we do.

What else would you like young engineers to know?

As an engineer, the sky is the limit. An engineer is extremely well-rounded; much more than most people realize. Being a soldier as well as an engineer, I have realized that skills used as an engineer, translate into proficiency in many other areas. Even if you plan to pursue a different career path after leaving engineering, the skills you learn as an engineer will assist you in anything that you choose to do, and in any direction that life leads you.



Theta Chi Designs Member Plaque to List All Members

The chapter project was to design a large handmade plaque with room to bear the names of all Eta Kappa Nu members that have come before us as well as those that will come after us. This one project was seen as a way to not only increase Theta Chi's exposure, but to also honor every member who has earned membership in Theta Chi chapter of Eta Kappa Nu - even members yet to come. The plaque itself

is actually finished and all that remains is to have the names engraved on brass plates and then to attach the plates to the plaque. After completion, the plaque will be prominently displayed in the Engineering Building for all students to see.

We also accomplished the design, acquisition, and prominent display of a large flag bearing the logo of Eta Kappa Nu as well as the logo of the Theta Chi Chapter. It is currently displayed in the Engineering building of the University near the front doors.

—Submitted by Christian Tickle
President, Theta Chi Chapter

Welcome Back Delta Tau

Under the supervision of Dr. Mohammad Madani, the University of Louisiana at Lafayette Electrical Engineering department resurrected Delta Tau Chapter of Eta Kappa Nu after 10 years of dormancy. Thirty-four of the University's top Electrical Engineering students were inducted into membership during its Spring initiation held on April 29.

The chapter's first activity since reactivating included a Fall carwash at Checkers which resulted in a profit of \$214. The chapter also partook in a team-building exercise that involved repainting the sidewalk in front of Madison Hall (the Engineering Building on Campus). The painting proudly displays the HKN shield and motto.

— Submitted by Delta Tau Chapter

Zeta Pi Climbs to New Heights

The first project we undertook was a tutoring program for Electrical Engineering courses. Upon approval, we obtained a tutoring room to initiate our tutoring program. We organized a drive to encourage all active Eta Kappa Nu scholars to participate in this new program. Our motivation and goal is to increase the performance and knowledge of all Electrical & Computer Engineering students.

Our program began last Fall with 11 tutors. They showed a burning desire to volunteer and willingly provided us with their schedules and courses that they wished to tutor. We posted schedules on our chapter website and notified all the ECE students about our exciting tutoring program.

Our initial tutoring place was in an engineering trailer, but the location was not suitable for group discussions. Since the location was uncomfortable for some tutors and students, we managed to obtain a tutoring room in the undergraduate library. We also asked our tutors to keep an attendance list. Tutors are not required to complete the student's homework because this would not benefit the students. The tutors may help the students with practice exams. For the entire Fall-Spring period, our tutors have provided over 170 hours of tutoring sessions. We are proud of our tutoring program.

We also took the task of revamping some of the materials covered in our Introduction to Electronics Circuits Laboratory. There were mistakes in the manual such as incorrect circuit diagrams, spelling errors, and other incorrect electrical jargon. The errors and mistakes confused many students and kept them from understanding the engineering concept and hands-on approach. We conducted numerous experiments and compared the results obtained and provided conclusions and corrections to the laboratory assistant. We successfully made all the necessary changes and additions to the manual for the coming Fall. We hope this will remove any further confusion or doubts about the manual.

We also organized a rock climbing event. It was held at Niagara Climbing Center. All members were given instructions and safety guidelines by professional personnel. Everyone enjoyed this refreshing and stimulating workout as final exams drew closer. It was a wonderful event for members who seek to relieve some stress and tension from course workloads and exam deadlines.

— Submitted by Zeta Pi Chapter

The *BRIDGE* Correspondents from all collegiate HKN chapters are encouraged to submit short write-ups and photos from noteworthy HKN chapter activities and accomplishments.

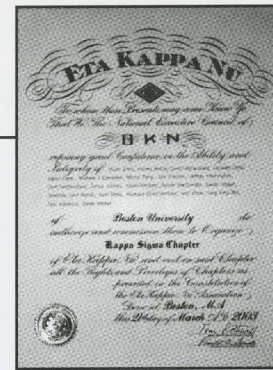
Kappa Sigma Chapter Installed at Boston University

Eta Kappa Nu installed its newest chapter at Boston University on March 21, 2003. Kappa Sigma is the 209th chapter to be installed since the founding of the organization. This was the result of hard work and dedicated effort by the club's charter members and faculty advisor, Dr. Min-Chang Lee, and the support given by the ECE Department and School of Engineering.

Executive Director Ron Spanke traveled from the HKN National Headquarters in Illinois to officially install the new chapter and present them with their chapter charter and signature book. Eta Kappa Nu national Vice President Eric Herz also attended and welcomed the new chapter. Twenty-one of the top electrical and computer engineering students received the honor of being the charter members. They include: Brian Alfon, Ashley Beecy, Suneil Berajawala, Saurabh Calla, Albert Conti, Michael Corcoran, Weina Feng, Ian Frazier, Jeffrey

Harrington, Scott Hendrickson, Trevor Johnson, Jason Kimball, Daniel MacDonald, Jason Nagel, Amanda Parish, Keni Patel, Richard Schloss, Neil Shah, Ying Ying Tan, Earl Valencia, and Derek Walker.

The new charter members and guests enjoyed hors d'oeuvres and refreshments after the installation and a chance to meet with the visiting officials from national headquarters.



HKN's newest chapter, Kappa Sigma, is installed at Boston University by Executive Director Spanke (far left). Front row guests seated L-R are faculty advisor Min-Chang Lee, HKN National Vice President Eric Herz, Department Chair Bahaa Saleh, and Dean David Campbell.

Outstanding Chapter Activities Awards

University of California-Berkeley named winner for 2001-2002

College chapters do more than induct new members every year. Most, if not all, active chapters serve their fellow students, department, school, and community in many ways. For some chapters their level of service to others is very significant. It is the role of the Chapter Activities Award program to recognize these college chapters for their outstanding programs or activities.

For the school year 2001-2002, eight chapters were recognized for their outstanding programs. Mu Chapter (University

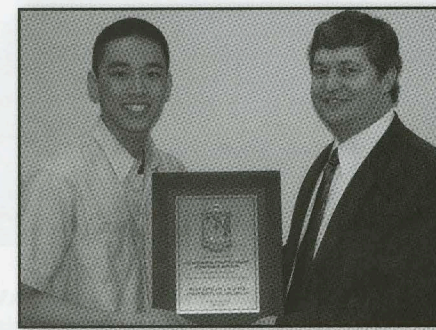
of California-Berkeley) topped the list as National Winner. This marks the first year that Mu chapter has ever captured the winning position. Mu chapter had received the Honorable Mention in the competition for the past two years and this year they built upon their previous successes to move up to the National Winner position.

Honorable Mentions went to Beta Chapter (Purdue Univ), Beta Epsilon Chapter (Univ of Michigan), and Gamma Theta Chapter (Univ of Missouri-Rolla). Their programs share strong common themes of service to their fellow students and to their surrounding communities.

In addition to these recipients, there were four Certificate of Merit winners: Gamma Iota Chapter (Univ of Kansas), Gammi Xi chapter (Univ of Maryland at College Park), Delta Omega Chapter (Univ of Hawaii at Manoa), and Theta Chi Chapter (Univ of Colorado at Colorado Springs).

In order for chapters to receive an Outstanding Chapter award, chapters submit an annual chapter report of their activities at the end of the academic year. The reports are usually written by the chapter in the summer and submitted to the award committee in the fall. The reports are reviewed and judged and the winners announced in the spring.

The Outstanding Chapter Activities Award program has been an ongoing staple of Eta Kappa Nu since 1932. There can be any number of Honorable Mention or Certificate of Merit awards each year. For this reason, all chapters are encouraged to submit an annual chapter report that is worthy of their year's accomplishments. Only in this manner can outstanding chapters receive the recognition they deserve.



Beta Epsilon Chapter President, Jethro Law, is presented the OCAA Honorable Mention Plaque for 2001-2002 by Professor Richard Brown.

RESTORING POWER TO BAGHDAD

by Patricia Irwin, PE, IN '87

Typically, electrical engineering is seen as a 'safe' profession—not in anyway as dangerous as, say, law enforcement. But, both American and Iraqi electrical engineers are risking their lives to improve conditions in Iraq.

It has been almost a year since Tom Sawyer, Associate Editor, Engineering News Record (a publication of the McGraw Hill Company, NYC, NY) spent 50 days as an embedded journalist in Iraq. Nevertheless, his first-hand account of events in Spring 2003, illustrate what it means to be a truly dedicated engineer.

Sawyer left for the mid-east in March 2003 and spent most of his time in the Iraqi desert and in Baghdad. He traveled with the 130th Engineer Brigade, part of the Army 5th Corps.

"All of the engineers are part of the Corps of Engineers, but the Corps of Engineers has a civil side and a military side. I was with the military side; they are called combat engineers. (The civilian side was also there, working on the infrastructure.)

Typically, the army advances and pacifies areas, which are then turned over to the civilian side of the Corps.

The combat engineers stay on the front line and the two groups have their own separate command structure.

But it never really worked out that way in Iraq. "The fighting never really stopped behind the front line; it just changed character. So the military engineers wound up continuing their operation."

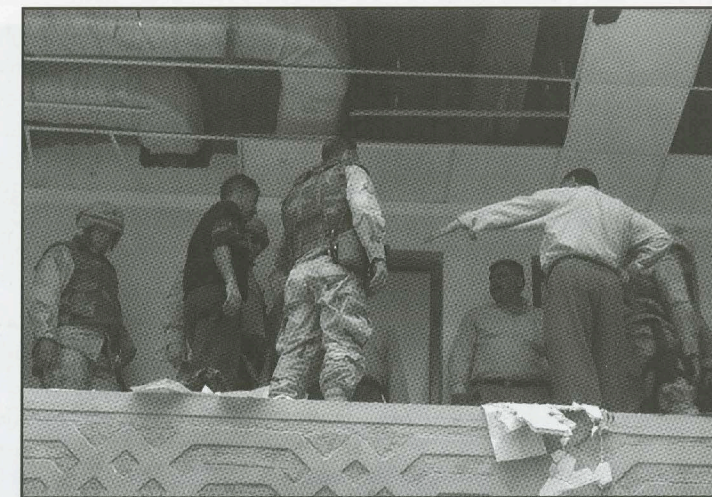
The combat engineer's main job is to make sure the army can move. "Anybody who is moving convoys or troops has to



Above: Boxes of ammo and artillery shells scattered around the substation in eastern Baghdad. Left: 400 kV transmission tower is in need of a little repair before this transmission segment can be brought back on line.

Left: The Ad Dawrah power plant in Southern Baghdad sustained minor damage from artillery shrapnel. Only one of the four boilers was operational because of the poor pre-war condition of the plant.

Right: Consulting with Iraqi engineers at the National Grid Center. The center had been totally looted and maliciously destroyed, making repair a challenge.



have a way to get to where they are going. The engineers make sure the bridges are intact and any fortification that is blocking the way is knocked down. They also make sure that minefields are cleared and that any demolition charges are deactivated. So the combat engineers do some pretty hazardous stuff and there are usually some of them traveling with the very lead elements of the infantry or the armored tanks groups, because they need engineers right up there at the front."

"On April 12th, I was interviewing some engineers with the 3rd Infantry Division in a field camp. That day, the

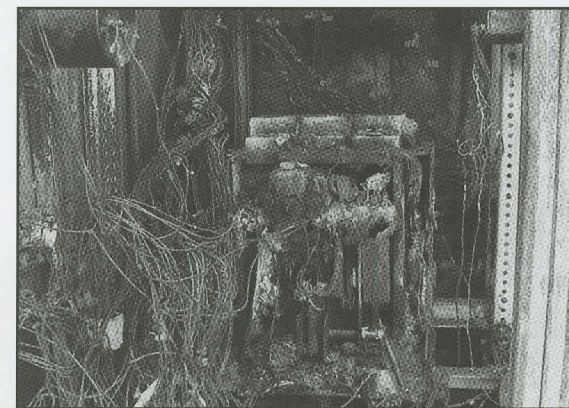
The Iraqi engineers and the people who ran the plants really did want to get their equipment running again and took great risks to do so

up and wanted to see what they could do to help restore power in Baghdad. They were taking a great risk coming in like that."

With Sawyer listening in, Colonel Peabody and his staff met with the

Iraqi engineers. "The army had information that was accurate in terms of 'there is something there,' but not in terms of assessing what is there, how critical it is, and what is its condition. So, Peabody was asking questions about how the system functioned and how it had been managed and who controlled it."

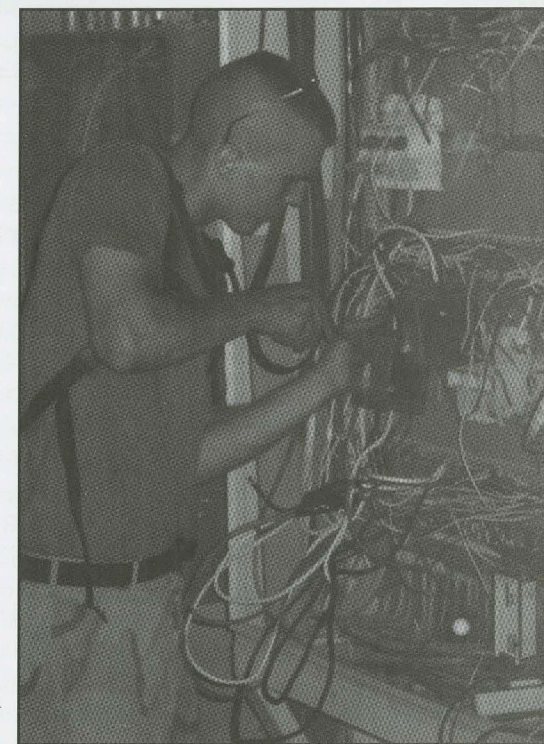
Using maps as a common reference, the group of Americans and Iraqis tried to get a handle on the power situation, but there was a problem. "One of the things we noticed pretty quickly was that the Iraqi engineers knew about their facility and they not only didn't know about other facilities, but they wouldn't even make an



Did Not Survive.

sergeants and platoon commanders were deciding whom to recommend for medals. Three engineers from the Division had been killed in the few days prior to my visit," says Sawyer.

On the 13th, Sawyer returned to Baghdad in the convoy of Colonel William Peabody, Commander of the 3rd



educated guess about them. If it wasn't their responsibility, they essentially seemed to pretend it did not exist. I think that is the kind of thinking that they had been trained to do."

After some discussion, everyone agreed to meet on the following day at Ad Dawrah power plant in Southern Baghdad.

"At dawn the next morning, we set out in a convoy that included a couple of tanks, a couple of Bradleys, about ten humvees, a crane, a front-end loader, and a dump truck. The idea, according to Peabody, was to show that we had come to repair and rebuild, and if anything needed to be done, we would tackle it right then." General Hawkins, who was responsible for getting the critical infrastructure in Baghdad



Team effort at the power plant trying to bring one of the generators back on-line.

working again, joined the convoy and chaired the meeting at the power plant.

"The power plant had suffered minor shrapnel damage, apparently caused by falling artillery shells. There were a few broken insulators and a punctured oil pipeline, but none of it was very serious. The bigger issue was the condition of the plant itself. It had four large boilers and they were in miserable condition. I think only one of them was functioning and only at 60% of its capacity."

"From what I understand the power in Baghdad was irregular. Better in some neighborhoods, worse in others. The rumor among the Iraqis was that Saddam used the load-balancing center to reward areas that supported him with better service."

After meeting at the power plant, it was decided that the convoy would continue (the Iraqi's joining the convoy in their own vehicles) to Baghdad South Power Plant, a substation in Eastern Baghdad and then to the National Distribution Center, which was the load balancing center for the country.

"[But,] we didn't stop at Baghdad South. We found out later that the manager of the plant had been told he would be

killed if he participated and he was afraid to let us near the plant."

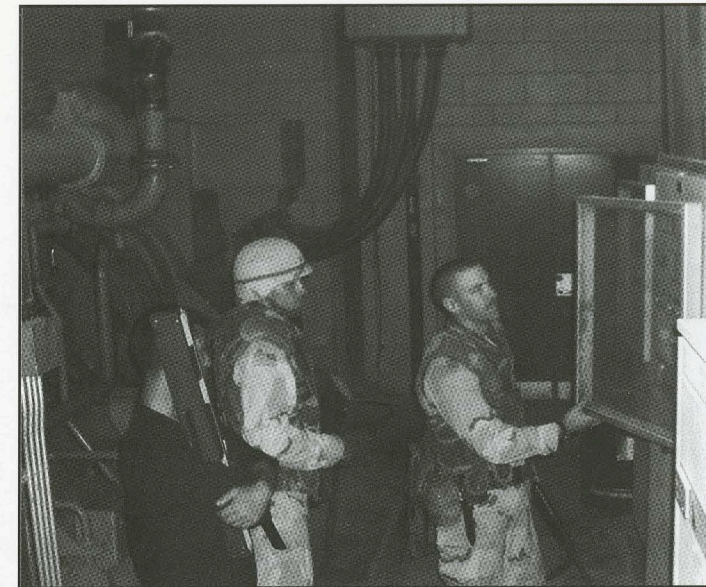
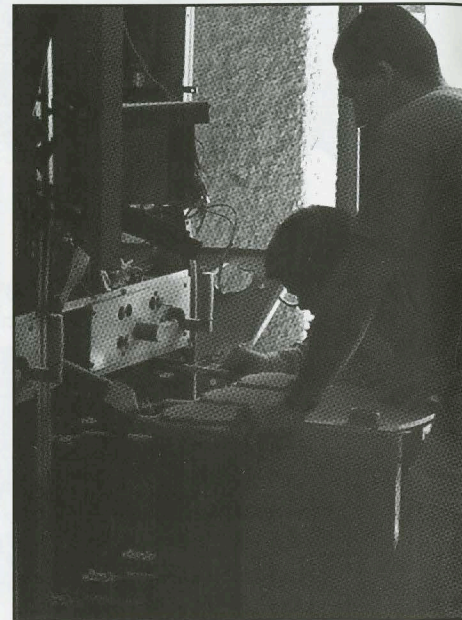
"We did go to one of the substations, which had, I think, ten gas-fired generating units. This was fairly typical. Because the power was so erratic, the Iraqis had to have robust backup capabilities. They had generators pretty much everywhere: substations, water plants, sewer plants, etc."

As soon as the convoy arrived at the substation, the Iraqis pulled the soldiers over to show them a big pile of munitions just outside the fence and asked if they could do something about it. "From about 10 feet out there were between 500 and 1000 shells (mostly artillery) in piles and heaps and some just scattered around on the ground. But it wasn't really a serious issue as far as the soldiers were concerned and the substation itself seemed to be fine."

(Sawyer explained that piles of munitions were scattered everywhere throughout Iraq, so seeing shells outside a substation fence was nothing surprising. At one point, Sawyer actually went to a munitions re-supply area out in the desert, below Karbala. "It was a 56 square mile compound surrounded by a fence. Fifty-six square miles—we checked it on a map. Inside, everywhere you looked, were bunkers, like Quonset Huts. It was a major military ammunition dump and re-supply area to which troops would come to get artillery shells or mines or whatever.")

Things were not fine at the last stop. The National Grid Center had been totally looted and maliciously destroyed. "It wasn't simply a matter of stealing things, it was breaking and tearing things up as much as possible—even to the extent of pulling down ceiling tiles and breaking test equipment."

Following those first few days, electrical service has improved in Baghdad, although periodic attacks on infrastructure still cause problems.



Assessing the generator at the hospital.

"The Iraqi engineers and the people who ran the plants really did want to get their equipment running again and took great risks to do so. They have to live in that society and there are people there who would kill any American and kill anybody who helped them. The ones who stepped forward to help were very brave and I think were motivated, to a large extent, because they had hopes for their country."

"The other thing that you have to appreciate about the Iraqi engineers was, yeah, their plants were run down and dilapidated and held together with wire and tape. But, the things that they needed to fix



One of the Brigade's power line service trucks being put to good use removing Saddam's name from the Baghdad Airport.

them had been denied them for the last 10, 11, 12 years, by either Saddam (and his siphoning off of funds) or perhaps by import prohibitions and restrictions. And actually, it was rather incredible that they were able to keep that place running for that long as they did. You have to give them a lot of credit for ingenuity, perseverance and especially, dedication to their jobs."

Life as an embedded journalist

HKNU Bridge worked with Tom Sawyer, an embedded journalist in Iraq during the preparation of this article. As an aside, we asked Tom about life and conditions he faced as an embedded journalist.

In Iraq, journalists taking part in the program first went to Kuwait where the Army issued each person press credentials, a gas mask, and a chemical/biological/nuclear weapons protective suit. The Army also offered Anthrax and Smallpox vaccinations.

"[To be an embedded journalist, there were] no requirements, other than a recognized publishing history, but you had to sign a lot of papers saying that you weren't going to hold the military responsible for what might happen to you. We were discouraged from wearing military surplus gear because they didn't want us to look like soldiers. But we were supposed to bring our own protective gear and of course I did. I borrowed a bullet-proof vest from my wife's cousin who is a police officer and bought a helmet at a surplus store."

In Kuwait, the journalists lived in large barrack-style tents and ate in a mess hall. From there the journalists dispersed via bus to staging camps.

Sawyer's unit, the 130th Engineer Brigade, had helped incoming units find separately shipped equipment and moved it to pre-invasion staging areas near the border. The 130th also helped set in place the operators and equipment that would be needed to breach the border when the invasion was ready to launch.

Once embedded with the 130th Engineering Brigade, Sawyer spent almost all his time with the troops and had little contact with other journalists or the Iraqi people. "The soldiers received me wonderfully. This surprised me because, after all, these people spend their lives training for this kind of duty and I just dropped in when the curtain was ready to go up."

"It was funny. I didn't associate much with reporters. There were 200,000 or 180,000 soldiers there and the reporters were scattered among them. I saw a lot of Iraqi people lining the roads, waving, giving thumbs-up signs and begging for water and MREs, but I really didn't have much direct contact with them either."

Life for an embedded journalist is the same as the soldiers. Living conditions in the desert were not the most comfortable. Food, for the most part was just MREs. Sawyer describes the environment (heat, sand, wind) as "nasty" and ironically noted that he was there during the cooler part of the year.

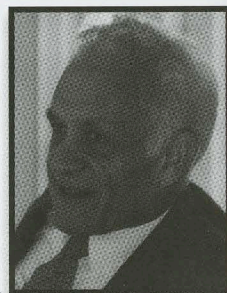
For the most part, Sawyer accompanied the Command Sergeant Major. "His job was to travel around and communicate with the troops in the field, find out what they were doing, what their problems were, and if their officers treated them fairly and squarely. So, we rode around quite a bit. And, whenever we traveled, we'd sleep in the open, by the vehicle."

It seems that journalists are dedicated, too.

NEW HKN EMINENT Members Named

by Jutta Willmann

Eta Kappa Nu established the rank of Eminent Member in 1950 as the society's highest membership classification. It is conferred upon those select few whose contributions and attainments in the field of electrical and computer engineering have resulted in significant benefits to humankind. Three such individuals have recently been named to this rank by the Eta Kappa Nu National Board of Directors. Amar Bose, J. Fred Bucy, and Andrew Sage were inducted as Eminent Members at the HKN Spring Awards Ceremony on April 29, 2002 in Princeton, New Jersey. Each of the newly inducted Eminent Members shared insights and reflections at their induction ceremonies, some of which have been reprinted here.



AMAR G. BOSE is founder and CEO of the Bose Corporation, prominent in the field of audio entertainment. He has been a professor of electrical engineering at MIT since 1964. A graduate of MIT, (Sc.D.; S.M.; S.B.), Bose began researching physical acoustics and psychoacoustics there in 1956. He holds numerous patents in the fields of acoustics, electronics, nonlinear systems

and communication theory. These led to the formation of Bose Corporation in 1964 which entered the consumer hi-fi and automobile sound markets. A prolific author, he also co-authored an important textbook on loudspeaker design.

Living in both the corporate and the academic worlds, Bose is convinced colleges could do a better job of educating students. Today, Bose thinks the profession still prizes tenure over student learning. In 1966 he ran an experiment at MIT involving 300 students, 35 teachers and open-book quizzes with no time limits. He determined students could rise much higher than expected. Around 1990 he met the teacher depicted in the movie *Stand and Deliver*. "I can honestly say the high school juniors in this teacher's classroom had a more complete understanding of calculus than MIT sophomores." A believer in students' enormous potential, Bose says, "the idea is to learn how to think, not to memorize formulas...The thought process is the result of learn-

ing. I've fired many directors of marketing over the years at Bose...The idea isn't to just 'push in a direction'-the idea is to learn from what does and doesn't work and adjust accordingly."

Bose is an IEEE Fellow, earned the Baker Memorial Award for Outstanding Teacher at MIT, and the Western Electric Fund Award for Outstanding Performance in Teaching and Research by the American Society for Engineering Education. He is an elected member of the National Academy of Engineering, American Academy of Arts and Sciences (1999), and the Radio Hall of Fame (2000).



J. FRED BUCY first worked as a sharecropper, but went to school to find something better, culminating in a 32-year career with Texas Instruments (TI). He ultimately served as President and CEO before retiring in 1985. Bucy, with a minor in geology, joined TI as a research engineer in 1953 because they were working in instrumentation and testing in the geophysical areas of the

oil industry. Bucy designed an amplifier and became a leading developer of semiconductor electronics and the early development of solid-state systems for oil exploration. Next, he led the petroleum engineering department that analyzed the informa-

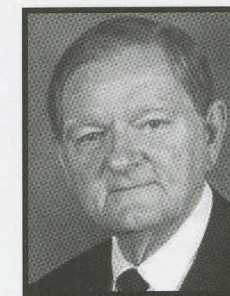


Amar Bose, J. Fred Bucy, and Andrew Sage are inducted as HKN's newest Eminent Members and display their Eminent Member certificates after the induction ceremony.

tion from sound waves in the earth. Then he headed TI's military business, followed by its semiconductor products, where reliability was key. One of his engineers told him they could create a laser-guided bomb for \$100K. Although Bucy felt it would never work, he provided the funding (and not a penny more). Created in 30 days, the bomb worked and was used in Vietnam.

Active in engineering education, Bucy chaired a National Research Council panel on ways to strengthen math teaching at universities. He has served on boards and advisory committees for Texas Tech University, Texas College and University System, the U.S. government, and is a trustee of the Southwest Research Institute. An IEEE Fellow, he sat on the IEEE editorial board of *The Institute*. Bucy is a member of the National Academy of Engineering and the Navy League.

"What the world pays for is the ability to see and solve real problems," said Bucy, citing the example of the Lake Maracaibo oilrig. "We were pumping a lot of oil and gas (100,000 gals) out of a single well. This was thought impossible at the time, but the engineers working on the project came to me and said they could do it. This required advances in a number of the systems used in the big oilrigs at the time. The progress revolutionized the oil industry...The enthusiastic and creative engineers worked out the solutions and my role was to believe in them and create an environment where they could do their work."



ANDREW P. SAGE is a professor at George Mason University and was the first Dean of its School of Information Technology and Engineering where he strived to create an engineering school that produces students who focus on system engineering excellence. Sage received his MSEE from MIT where he researched digital computers, the new tools of the day. His Ph.D. was in

optical imaging, communications, and control theory from Purdue in 1960. Hired first as Associate Professor of EE at the University of Arizona, he went on to the University of Florida (1964-67) to work on a government-sponsored closed video broadcasting system for distance learning. At Southern Methodist University (1967-74) he set up a major distance-learning program and served as Director of the Information and Control Sciences Center and Chair of the EE Department.

While at the University of Virginia (1974-84) he was the Lawrence R. Quarles Professor of Engineering Science and Systems Engineering and wrote several textbooks. *Optimal Systems Control* served 25 years as a pedagogical work in control systems engineering. In 1999 he co-edited *Handbook of Systems Engineering and Management*, and co-authored the undergraduate work *Introduction to Systems Engineering* (2000).

Sage was editor of *IEEE Systems, Man, and Cybernetics Transactions* for 27 years, and also edited for *IEEE Spectrum*. A past IEEE President, Sage is an IEEE Fellow and has received the IEEE Simon Ramo Medal (2000), the IEEE Third Millennium Medal (2000), and the ASEE Terman Award. Citing a Buddhist text he believes illustrates a great truth he's experienced in his own life, Sage explained there is only a minimal difference between work and play-a master can't tell the difference. Sage focuses on excellence in both work and play. "Quality and concurrency are the key to success," he said.



Don Christiansen, chair of the HKN Eminent Members committee, introduces Bose, Bucy, and Sage during the Eminent Member Induction Ceremony in Princeton, NJ.

OUTSTANDING Young Electrical Engineer AWARDS



Teresa L. Olson

Winner of 2001 Eta Kappa Nu OYEE Award

BY VIRTUE OF HER OUTSTANDING TECHNICAL CONTRIBUTIONS TO IMAGE PROCESSING TECHNIQUES FOR DEFENSE AND MEDICAL APPLICATIONS, FOR FOSTERING INTEREST IN ENGINEERING AMONG YOUTH, AND FOR HER ACCOMPLISHMENTS AS AN ARTIST.

Eta Kappa Nu held its spring awards banquet on April 29, 2002 in Princeton, NJ to honor the 2001 Outstanding Young Electrical Engineer recipients, the 2002 Karapetoff Technical Achievement award recipient, and the induction of several new eminent members.

Teresa Olson was previously named as honorable mention in the 2000 OYEE awards. Dr. Olson is currently a Senior Staff Engineer at Lockheed Martin Missile and Fire Control in Orlando. After her Ph.D., Olson became a Faculty Research Associate at the Pennsylvania State University Applied Research Laboratory working on sonar detection and classification until she accepted a Senior Engineer position with Lockheed Martin in April 1997.

Dr. Olson has had two promotions and currently manages a team of engineers concentrating on automatic target recognition, multi-sensor fusion, and tracker algorithm development. In addition, she is the Program Manager for a DARPA sponsored contract. She has worked on such diverse applications as registration techniques for LANDSAT imagery,

global change detection using wavelet transforms, microcalcification detection in mammograms, electroencephalograph (EEG) classification, image and signal-based noise rejection, and more. Her work has resulted in two filed patents and ten disclosures. She has published over 30 papers. In 2000, Dr. Olson was a recipient of the Lockheed Martin Apex Award recognition for her extremely significant individual technical contribution to the company.

In addition to her technical work, Dr. Olson has participated in Lockheed Martin's Strategic Talent Pool program, a program designed to assist in the next generation of corporate leadership. She has also spent time teaching an in-house course on MATLAB as part of the continuing education series. Outside the company, she mentored female students in an effort to encourage them to pursue mathematics, science, or engineering careers.

Olson was born in Stanford, Kentucky in 1967. She received her B.S. in Engineering as Magna Cum Laude from Wright State University, Dayton, Ohio in 1989 and her Ph.D. in Electrical Engineering from the Pennsylvania State University with a grade point average of 4.0/4.0 in 1994. She received a teaching fellowship from PSU to be a graduate Teaching Assistant in 1989. While serving as a teaching assistant, she was presented with the university's Graduate Student Award for Excellence in Teaching.

In her leisure time, Teresa pursues her interest in art. She is an accomplished artist in charcoal and pencil drawings, and has captured prizes in locally judged art contests. She is an amateur digital photographer and applies image-processing technology to the restoration of old photographs. As a professional volunteer, she has served as session chair for SPIE's Wavelet Application Session, and she has served as a reviewer for a variety of journals including *IEEE Transactions on Image Processing, Signal Processing, and Biomedical Engineering*.

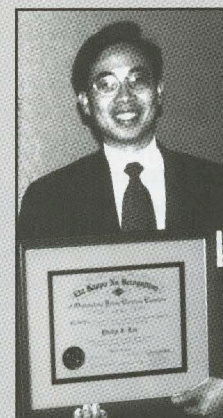


HKN President Jim Melsa presents the Outstanding Young Electrical Engineer Award to Teresa Olson.

OYEE Honorable Mention

Phillip J. Lin, *By virtue of his contributions to optical switching technology and for service to his church and community.*

Dr. Lin received his B.S. in Physics from California Institute of Technology in 1989 and his S.M. and Ph.D. degrees in Electrical Engineering and Computer Science from MIT in 1991 and 1996 respectively, with his research work concentrating on all optical networking.



Dr. Lin joined Tellabs in 1996 working on optical crossconnects, looking for a practical, cost-effective telephone company solution for the introduction of optical switching in existing equipment. He has played a key role in Tellabs' work in crossconnect architectures and switching technologies, optical network architecture development, network design and optimization, and wireless communication systems. His contributions resulted in eleven published papers, eight patents, and numerous Tellabs recognitions. Other significant contributions include co-development of the Cambridge office of the Tellabs Research Center, a collaborative effort with the MIT's Laboratory for Information and Decision Systems (LIDS). Since 1999, he has served as editor for lightwave communications in *IEEE Communications Magazine*, encouraging authors for both tutorial and research papers to contribute excellent papers regularly.

He is an active member of the Boston Chinese Evangelical Church. He has been a music worship leader for many years, served on conference committees, including chair of the annual spiritual renewal conference; served as Sunday School teacher for toddlers, second grade, and adults; and tutored English-as-a-Second-Language program for new immigrants.

Phillip is married and the father of a four-year-old. He enjoys recreational tennis, softball and volleyball. His hobbies include puzzles, chess, and video games.

2001 OYEE Finalists:

Sheila S. Hemami
Lih Y. Lin
Karen Nan Miu

The OYEE Award

As evidenced by their past records and future promise, the OYEE recognition shall be given annually to young electrical and computer engineering graduates for meritorious service in the interest of their fellow men.

Started in 1936, the Eta Kappa Nu OYEE recognition was created to "emphasize among electrical engineers that their service to mankind is manifested not only by achievements in purely technical pursuits but in a variety of other ways. It holds that an education based upon the acquisition of technical knowledge and the development of the logical methods of thinking should fit the engineer to achieve substantial success in many lines of endeavor."

Since 1936, 66 young engineers who are less than 36 years old have received the award and 137 engineers have received honorable mentions. The award is given on the basis not only of what success the young electrical engineers have had in their vocation, but also what they did to broaden themselves culturally and what they have done for others.

Many past recipients have gone on to make profound impacts on our society and many are some of America's leading electrical engineering teachers and administrators. A review of what these engineers have accomplished since graduation is astonishing.

You can assist Eta Kappa Nu in discovering the most outstanding recognition candidates by nominating worthy young engineers of your company or acquaintance. Nomination forms can be obtained from HKN headquarters.

OYEE AWARD JURY

Ralph W. Wyndrum, Jr.
David G. Daut
John Henderson
Stanley Ozga, Jr.

OUTSTANDING Electrical Engineering Student AWARDS



Shadab Naeem Mozaffar
Winner of 2002
Eta Kappa Nu OES Award

Eta Kappa Nu held its Fall Awards Luncheon on September 26, 2002 in Anaheim, California to honor the 2002 Alton B. Zerby and Carl T. Koerner Outstanding Electrical Engineering Student award recipients and the induction of new Eminent Members. Shadab Naeem Mozaffar was selected as the winner of the 2002 OES award. In addition, Joshua Stanton Petko was named as OES Honorable Mentions, and two individuals were identified as OES finalists. HKN President Tom Rothwell presented the OES award at the awards luncheon.

SHADAB NAEEM MOZAFFAR graduated with a GPA of 3.9/4.0 for his BS in Electrical Engineering and Computer Science from the University of Kansas. He was nominated by the Gamma Iota Chapter of Eta Kappa Nu. He is a member of IEEE, and was honored with membership in Golden Key and Tau Beta Pi as well as Eta Kappa Nu.

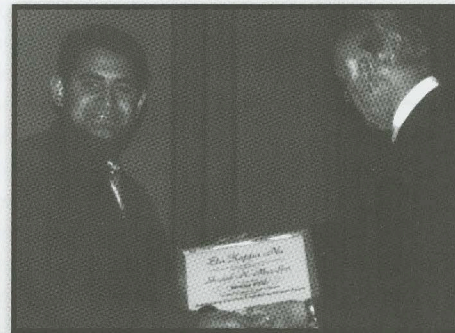
As President of the Gamma Iota HKN chapter, he suggested and organized a joint HKN-IEEE project at the KU Engineering Expo, with displays and demonstrations of the use of electrical phenomena in real life to high school students. At the Expo

banquet, he accepted the First Place trophy on behalf of the Electrical Engineering and Computer Science Department.

Among other activities for his school, he organized a tutoring program for lower division students and students with low income and/or learning disabilities. Shadab led the HKN project of assembling members' resumes that are offered to company recruiters at the annual Career Fair. He administered the annual Harry Talley Excellence in Teaching Award and the student-faculty volleyball challenge.

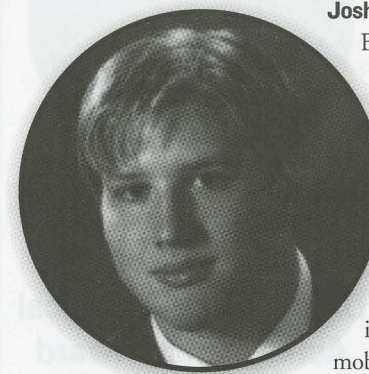
Shadab, as a participant in the EECS Department's undergraduate honors research program, was assigned the task to develop DSP code techniques to interpret the data from EEG (Electroencephalogram) instruments for diagnosing epilepsy. He wrote a paper on this work.

As an intern at Motorola, he wrote assembly code for the StarCore Signal Processor and he installed and tested a baseband regression test system for debugging releases of DSP code. Shadab is an active chess player, and is a member of the Shawnee Cricket Club of Kansas.



Shadab Mozaffar receives the OES award plaque from President Rothwell.

OES Honorable Mention



Joshua Stanton Petko graduated with a GPA of 3.76/4.0 for his BS in Electrical Engineering from the Pennsylvania State University. He was nominated by the Epsilon Chapter of Eta Kappa Nu. He is a member of IEEE, Schreyers Honors College, and was honored with membership in HKN, where he served as Secretary.

Josh was active in the Air Force ROTC for three semesters, where he assisted the Flight Commander as Adjutant and participated in detachment activities. At school, he worked in the Lab as a research assistant and as a teaching intern. There he tested various TFT (Thin-Film) devices for mobility and threshold voltage, assisted in the construction of a clean room, and gathered scientific articles for graduate students.

Josh wrote an invited paper "Dense 3-D Fractal Tree Structures as Miniature End-Loaded Dipole Antennas" for presentation at the 2002 IEEE AP-S International Symposium in San Antonio, Texas. He has won numerous awards including an Undergraduate Honors Fellowship and a full fellowship to continue his graduate studies at PSU.

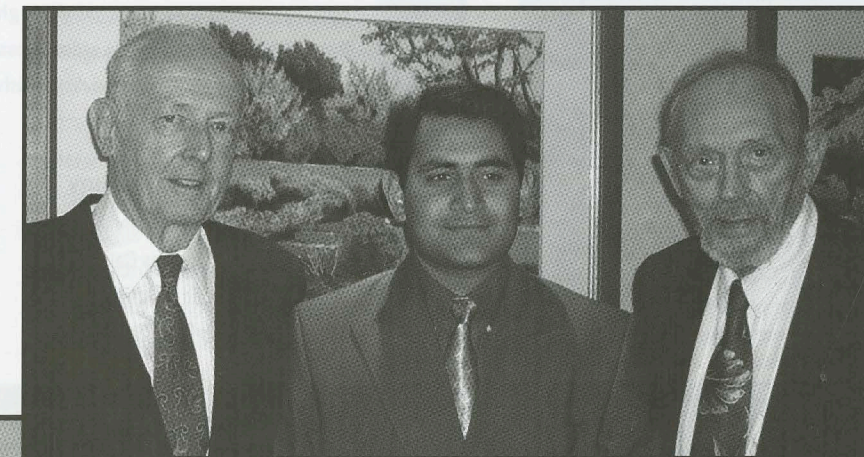
He has helped with the EECS open house, tutored elementary school children, and volunteered in the Emergency Room at the Community Hospital. Josh enjoys scuba diving, strength training, and exercise in general.

2002 OES Finalists:

William F. Krekeler, University of Missouri, Rolla
Matthew R. Schraeder, Gannon University

The Award Jury for the 2002 OES awards included James L. Melsa, HKN President 2001-2002; Gene M. Amdahl, HKN Eminent Member; Thelma Estrin, HKN Eminent Member; Donald O. Pederson, HKN Eminent Member; and Robert W. Lucky, HKN Eminent Member.

HKN President Tom Rothwell, left, and OES Awards Committee Chair Marcus Dodson, right, congratulate Mozaffar at the Fall HKN Awards Luncheon in Anaheim.



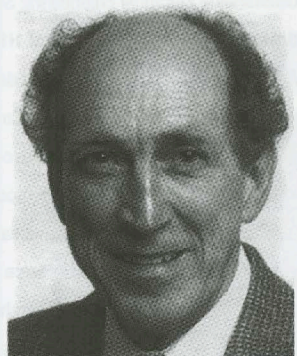
The Outstanding EE Student Award

The Alton B. Zerby and Carl T. Koerner Outstanding Electrical Engineering Student Award is one of several HKN Awards and Recognition Programs dedicated to advancing Electrical and Computer Engineering educational excellence. The OES Award Program recognizes and marks selected students each year who typify the best balance of scholarship, service activity, leadership, and character. This award encourages educational excellence by: Honoring annually the outstanding EE student by providing recognition of accomplishments in this field; Recognizing the outstanding EE student's school; and Motivating EE students to earn membership in HKN.

Inaugurated in 1965 as the Outstanding EE Student Award Program of HKN, it has become a traditional means of providing recognition to deserving EE students. In 1975, the name was changed to "The Alton B. Zerby Outstanding EE Student Award" to honor and perpetuate the memory of Mr. Zerby, a long-time leader and Executive Secretary of HKN. In 1993, the name was further changed to include Carl T. Koerner, to honor and perpetuate the memory of Mr. Koerner, who had a life-long dedication to HKN, including serving as President and recipient of the HKN Distinguished Service Award.

The OES award is administered by the Los Angeles Area HKN Alumni Chapter. The award winner's travel and expenses are covered by financial support from the Alton B. Zerby Memorial Fund. An honorarium for the winner is made possible by the Carl T. Koerner Memorial Fund, established in 1978 by his widow Edie Koerner and friends.

2002 VLADIMIR KARAPETOFF AWARD



Robert H. Dennard

2002 Winner

For the invention of the one-transistor DRAM cell

Robert H. Dennard is the winner of the Vladimir Karapetoff Award for Career Technical Achievement for the year 2002. The award was presented at the HKN Spring Awards banquet on April 29, 2002 in Princeton, NJ. The chair of the Karapetoff Award committee Donald Christensen introduced the award and Eta Kappa Nu national president Jim Melsa conferred the award upon Dr. Dennard. In the response from Dr. Dennard, he shared insights about his career and about the events leading up to his invention.

Dr. Dennard receives this major award of Eta Kappa Nu for the invention of the one-transistor DRAM cell. It resulted in the incorporation of inexpensive high-density memory in a vast variety of products available to industry and the consumer. It is used in almost all of today's computers.

A native Texan, Dennard earned his BSEE and MSEE degrees from Southern Methodist University in 1954 and 1956. Immediately upon receiving his Ph.D. from Carnegie Institute of Technology in 1958, he joined IBM in Yorktown Heights where he studied new devices and circuits for logic and memory applications and developed advanced data communication technologies. In 1963 he joined the staff of the IBM Research Center. There he concentrated on microelectronics research and development. His primary innovations have been in MOSFETs (Metal-Oxide-Semiconductor Field-Effect Transistors), and their applications in digital integrated circuits. He obtained the basic patent on the dynamic RAM memory cell, and played a key role in developing the concept of MOSFET scaling, the principles of which are now commonly called the "scaling laws."

He was appointed an IBM Fellow in 1979. He has authored numerous papers on advances in CMOS technology and on the challenges of scaling it to extremely small dimensions. Today he works on extending scaling toward its fundamental limits and on energy-efficient computing.

Dennard was elected an IEEE Fellow "for advances in the state of the art of MOSFET devices and circuits." He is a member of the National Academy of Engineering and the American Philosophical Society. He was awarded the National Medal of Technology in 1988 and in 1977 was inducted into the National Inventors Hall of Fame.

He also received the Industrial Research Institute's Achievement Award and the Harvey Prize from the Technion-Israel Institute of Technology. In 2001, he was awarded the IEEE Edison Medal.

A resident of New Rochelle, N.Y., Dr. Dennard is a tenor in the Westchester Choral Society. He and his wife, Jane Bridges, are active in Scottish country dancing.



Robert H. Dennard (right) receives award from President Jim Melsa



The Vladimir Karapetoff Outstanding Technical Achievement Award

This major Eta Kappa Nu award for career technical achievement is made annually to an electrical engineering practitioner who has distinguished him/herself through an invention, a development, or a discovery in the field of electrotechnology which resulted in significant benefits to human-kind.

The award is named for the late Vladimir Karapetoff, a distinguished scientist, electrical engineer, musician, and prominent member of Eta Kappa Nu. Dr. Karapetoff was born in St. Petersburg, Russia, in 1876 and emigrated to the U. S. in 1902, becoming a naturalized citizen in 1909. He joined the engineering faculty of Cornell University in 1904, and remained there until retirement in 1939. In addition to his engineering and teaching accomplishments, Dr. Karapetoff was a musician and musical inventor, and received an honorary Doctor of Music degree from the New York College of Music.

The award was established by the HKN Board of Directors in 1992. The fund to support the award was initiated through a bequest from Dr. Karapetoff's widow, Rosalie M. (Cobb) Karapetoff, herself a distinguished chemical engineer.

2002 AWARD JURY

Edward Bertnolli
J. Thomas Cain
Donald L. Schilling
Merlin G. Smith

2002 OUTSTANDING TEACHER AWARD

NOEL N. SCHULZ is the winner of the C. Holmes MacDonald Outstanding Teaching Award for the year 2002. She was previously named the Honorable Mention for this award for 2001. Dr. Schulz has been Associate Professor of Electrical Engineering at Mississippi State University since 2001. From 1995 to 2001, Dr. Schulz served on the electrical engineering faculty at Michigan Technological University.

Schulz received her B.S.E.E in 1988 and M.S.E.E. in 1990 from Virginia Polytechnic Institute and State University (Virginia Tech) and her Ph.D. in EE from the University of Minnesota in 1995 along with a minor in computer science.

In 1995, she joined the Department of Electrical and Computer Engineering at Michigan Tech and was named EE professor of the year in 1998. She won the Dow Outstanding New Engineering Faculty Award, for the North Midwest Region from ASEE in 1999 and has received a National Science Foundation Career Award from 1998-2002. She is an IEEE Senior Member and has served as an IEEE ABET Evaluator from 2001-present. Dr. Schulz has over 45 publications, has authored 8 technical

reports or book chapters, and has presented over 75 conference presentations.

Noel has established and maintained a vital research program in power systems engineering. Her programs have received both federal and industrial support of nearly one million dollars. She is an active member of the IEEE Power Engineering Society, where she serves on the administrative committee and serves as chair of the Power Engineering Career Promotion subcommittee. She has been active in ASEE, where she has been an officer in the New Engineering Educators Division since 1996.

Dr. Schulz has been widely recognized for her achievements in education. She has regularly gone beyond standard methods of classroom presentation by incorporating active learning methods into her courses, requiring students to complete extensive writing projects and professional poster presentations and case studies assisting undergraduate students in learning the complex subject of blackout restoration for power engineering systems.

Noel has been very active in the promotion of diversity and the encouragement of



recruitment and retention of female faculty and students to campus. She created the Women In Science and Engineering (WISE) program at Michigan Tech and served as coordinator from 1998-2001. She created the Women in Electrical Engineering Program that works to provide a supportive learning and work environment for women students and faculty in EE. She has organized Take Our Daughter to Work Day and summer programs for women and minorities.

Honorable Mention for the 2002 C. Holmes MacDonald Outstanding Teaching Award was awarded to Dr. Daryl G. Beetner at the University of Missouri-Rolla.

The C. Holmes MacDonald Outstanding Teacher Award

The Outstanding Teacher Award was established to recognize excellence in teaching of Electrical and Computer Engineering Students and to improve Faculty-Student-Alumni relations. The award was conceived by the Philadelphia Alumni Chapter and was first presented for the 1972 academic year.

Originally titled the Distinguished Young E.E. Teacher Award, the name of the award was later changed to recognize Dr. C. Holmes MacDonald after his death in 1975, whose many contributions to Eta Kappa Nu included serving as Chair of the National Activities Board, as National Director, finance committee and financial counselor, HKN representative to the Association of College Honor Societies, and his instrumental work in helping to establish the HKN Outstanding Teacher Award program.

The award recognizes the central and crucial role of college professors in educating and motivating future engineers and is presented annually to out-

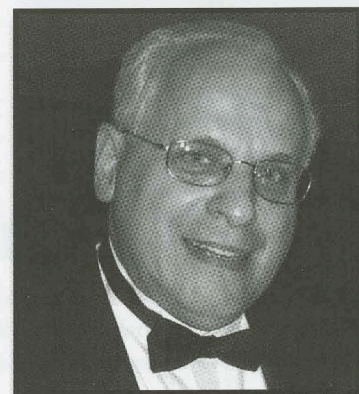
standing young Electrical or Computer Engineering teachers under age 35 who have demonstrated, early in their careers, special dedication and creativity in their teaching responsibilities, in addition to professional activities, service to the community, and cultural development. Letters of recommendation are required from at least one student and two professional associates.

There have been 27 winners and 37 honorable mentions named throughout the history of the award. The recipient is honored with a certificate and a plaque from the National Board of Directors. Nomination forms are mailed to all chapters annually, and can also be obtained from HKN headquarters.

2002 Award Jury

Dr. James L. Melsa, Dr. Hans Kuehl,
Dr. Aleta M. Ricciardi, Mr. Curran Cotton, Mr. Willis Long

DSA DISTINGUISHED SERVICE AWARD



Alan Lefkow 2002 DSA Recipient

Lifetime HKN Activities:

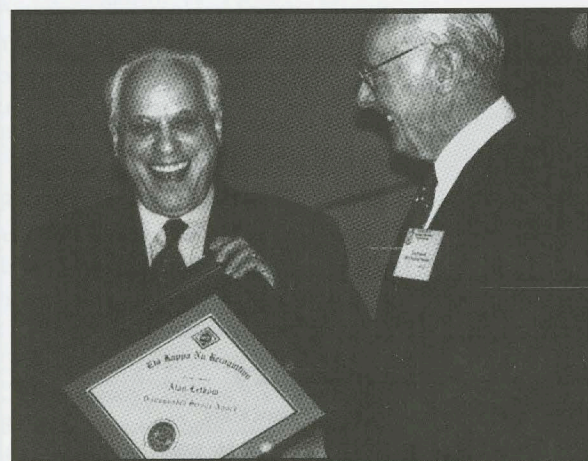
Initiated in 1963 into Beta Pi Chapter at City College of New York. In 1965, he was elected president of Beta Pi Chapter and led the chapter on to win the Outstanding Chapter Activities

Award for that year. After graduation, he joined the New York Alumni chapter and was elected alumni chapter Vice-President 1968-1969 and President 1969-1970.

From 1967 to 1969, he served as a juror for the Outstanding Chapter Activities Award, and in 1970 was named chair of the OCAA committee, a role which he still holds today after serving in that position for the past 33 years. Alan has made numerous contributions to the OCAA program during his tenure as chair.

Alan was elected national director on the Eta Kappa Nu Board of Directors from 1979 to 1981. In 1985-86, he was elected as the HKN National Vice President, and in 1986-87, he was elected as the HKN National President.

He has assisted the national organization in several activities including travelling to college campuses to install five new chapters. In 1980 he installed Theta Iota chapter at Rochester Institute of Technology and Theta Mu chapter at State University of New York at Stonybrook. In 1981, he installed Theta Sigma chapter at University of Bridgeport. In 1984, he installed Iota Delta chapter at Stevens Institute of Technology and Iota Epsilon chapter at the University of Hartford. Alan has also assisted other HKN award programs by serving as a national juror in 1986 of the OYEE award and as a national juror in 2000 for the Outstanding EE student award.



Alan Lefkow receives the 2002 Distinguished Service Award certificate from **Tom Rothwell, HKN 2002-03 President**. The award was presented at the HKN Spring Awards Banquet in Princeton, NJ on April 28, 2003.

The Eta Kappa Nu Distinguished Service Award

In recognition of dedicated service and long-term contributions to Eta Kappa Nu that have resulted in significant benefits for all members

Eta Kappa Nu created the Distinguished Service Award (DSA) in 1971 to recognize those individuals who have made significant contributions to the society throughout their life. The background for this important activity began in 1939 when founder Maurice L. Carr wrote "Eta Kappa Nu grew because there have always been many members who were willing and eager to serve it loyally and unselfishly. I would like to see some form of recognition conferred upon members who have rendered such service to HKN." The board of directors approved the DSA recognition in 1971.

The DSA charter now limits this award to at most one individual per year. The DSA award committee is comprised of all living past recipients of the DSA award plus the current HKN national president. Nominations of members with significant HKN service and contributions can be made by any member and should be submitted to HKN headquarters.

2002 DSA SELECTION COMMITTEE

Larry Dwon, Chair
James L. Melsa, 01-02 President
Donald Christiansen
Marcus D. Dodson
John E. Farley
Tony Gabrielle
Thomas L. Rothwell
Berthold Sheffield
John Tucker

HKN BOARD

2003 HKN OFFICERS AND DIRECTORS

The 2003-04 HKN Board of Governors, L-R, Tom Rothwell, Karl Martersteck, J. David Irwin, Bruce Eisenstein, Lyle Feisel, Eric Herz, Tim Trick, David Borth, and Ron Spanke. Not Pictured: John Choma.



ERIC HERZ—NATIONAL PRESIDENT

Dr. Eric Herz is Director Emeritus of the IEEE, having retired after 14 years as General Manager and Executive Director. For 22 years he held various engineering and management positions at General Dynamics at San Diego, CA. Prior to that, he participated in the development of what eventually became LORAN C/D at the Sperry Gyroscope Company. He holds a BEE from Brooklyn Polytechnic Institute, now known as Polytechnic University, and a D.Sc (hon) from Manhattan College. He is a Fellow of IEEE, AAAS, and the Chinese Institute of Electronics, and has received numerous awards from IEEE for leadership and service, and the Kenneth Andrew Roe award from the American Association of Engineering Societies for achievements in promoting engineering unity.

Eric has been an active volunteer in IEEE—region officer, society officer including president, division director, vice president for technical activities, member of the board of directors, and member or chair of a number of committees. He has worked on more than a dozen conferences as General Chair as well as in other positions, and has edited and published over ten conference proceedings. In addition, he was an officer and member of the board of the IEEE Foundation, and a governor of the American Association of Engineering Societies. Eric served as HKN East Region director 2000-2002, and as HKN national vice president 2002-03.

KARL MARTERSTECK—NATIONAL VICE PRESIDENT

Karl E. Martersteck is currently a telecommunications consultant. On January 1, 1999, he retired as President and Chief Executive Officer of ArrayComm, Inc., of San Jose, CA. After a tour of duty in the U.S. Navy as the chief engineering officer of a destroyer, Mr. Martersteck joined Bell Laboratories in 1959. From 1964-1972, at Bellcomm, Inc. (an AT&T subsidiary under contract to NASA), he led mission planning and systems analysis activities for the Apollo lunar landing and Skylab projects. Throughout much of the 1980s, he had overall responsibility for the design and development of the 5ESS digital switch, extensively deployed throughout the world. He subsequently became Vice President, AT&T Architecture.

He is a member of HKN, the U.S. National Academy of Engineering, an IEEE Fellow, and a Fellow and senior member of the Board of Directors of the International Engineering Consortium. He previously served on the HKN Board of Directors as the West Central Region Director 1994-1996. Mr. Martersteck is the first recipient of the IEEE Medal for Engineering Excellence. He received a BS degree in Physics from the University of Notre Dame and a Master of Electrical Engineering degree from New York University.

LYLE D. FEISEL—EAST CENTRAL REGION DIRECTOR

Dr. Feisel is Dean Emeritus (retired) of the School of Engineering and Applied Science and Professor Emeritus of Electrical Engineering at the State University of New York at Binghamton. Following service in the U.S. Navy, he received the B.S., M.S., and Ph.D. degrees in EE from Iowa State University. From 1964 to 1983 he was on the faculty at South Dakota School of Mines and Technology and served as Head of the EE department from 1975 to 1983. He has had industrial employment with Collins Radio, Honeywell, IBM, and Northrop, and has been active in accreditation and continuing education activities.

Dr. Feisel is a Life Fellow of the IEEE and a Fellow of ASEE and NSPE. He has served as Vice President - Educational Activities of IEEE and as President of ASEE, the IEEE Education Society, and the EE Department Heads Association. He has served as a member of the Engineering Accreditation Commission and the Board of Directors of ABET, and is on the board of RAE Systems. He has received the achievement award of the IEEE Education Society, the IEEE Centennial Medal and Millennium Medal and the 2002 NSPE award. He was named the outstanding alumnus of Tau Beta Pi for 2002.

DAVID BORTH—WEST CENTRAL REGION DIRECTOR

Dr. Borth is corporate vice president and director of the Communications Research Labs of Motorola, Inc. At Motorola, he has conducted research on digital modulation techniques, adaptive digital signal processing methods for communication systems and cellular and PCS systems including GSM, TDMA, and CDMA. In 1990, Dr. Borth became manager of the Communication Systems Research Laboratory. In 1996, he became director of the Motorola Corporate Communication Research Laboratories and in 1988 he became director of Communication Systems and Technologies Labs.

Dr. Borth received B.S., M.S., and Ph.D. degrees in EE from the University of Illinois. He has 31 patents, 25 publications and has authored chapters of five books. He is an IEEE Fellow and was named a Dan Nobel Fellow, Motorola's highest technical award.

CONTINUING DIRECTORS

HKN welcomes Eric Herz, Karl Martersteck, Lyle Feisel, and David Borth as the new officers and directors for 2003-04. Information for the continuing directors and executive director can be found in previous editions of *The Bridge*. Vol 98, No 1 contains information for Past President Tom Rothwell, East Region Director Bruce A. Eisenstein, West Region Director John Choma, Director-at-Large J. David Irwin, and Director-At-Large Tim Trick. Vol 97, No 1 contains information on Executive Director Ron Spanke.

HOMEWORK

If the professor's assignments haven't used up all of your brain cells, or you just have too much time on your hands at work, we're glad to present this issue's homework assignment for all to ponder. Send your homework answers to: HKN HQ, P.O. Box 3535, Lisle, IL, 60532. We also welcome any new individual problems, especially with an EE aspect, and chapters are invited to sponsor an entire assignment with their own set of problems and answers.

Current Assignment

1 In the Crosshairs: As we were finalizing this issue of the Bridge here at HKN HQ, we noticed an interesting phenomenon. Our large monitor that we use for graphical layout is on a swivel allowing us to work from both sides of the desk. When we were sitting in the chair with the monitor facing East, we taped a crosshair to the center of the monitor screen to help with graphical layout. When we sat in the other chair and swiveled the monitor to face West, we noticed that the image no longer aligned with the taped crosshairs. Our monitor is a 21" diagonal B/W CRT monitor with a 20,000V accelerating voltage. The distance between the electron gun and screen is 0.4m. How much did the image move with respect to the crosshairs and in which direction?

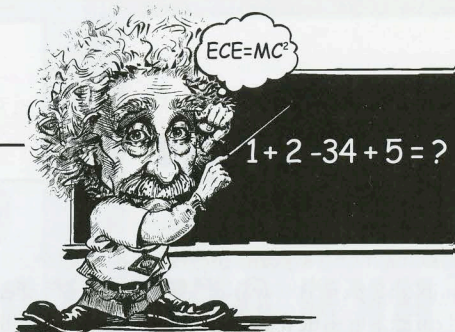
2 Knight Moves: A knight goes two spaces forward and one space sideways on each move. How many ways (different paths) can a knight touch down once and only once on all 64 squares if he starts out in one corner and ends up in the opposite corner of a chess board?

3 Picture Worth a Thousand Odds: When it came time to take the class photo, the class decided to draw names and line up in the order drawn. After the picture was taken, John exclaimed that it was quite a coincidence that there were only four girls in the class, yet their names were all drawn first. Mark said that the odds of taking a picture like that were 1000 to 1. How many students were in the class?

4 Plus and Minus: $1\ 2\ 3\ 4\ 5\ 6\ 7\ 8\ 9 = 100$. How many ways, and what are they, that exactly seven plus or minus signs can be inserted between the digits 1 and 9 to make the equation correct? Since there are 8 possible locations, two of the consecutive digits will form a 2-digit number. Now, how about if we only used three plus or minus signs. What are all the ways that three plus or minus signs can be inserted to make the equation correct?

Answers for Last Assignment

1 Pattern Recognition: To get an idea of the allowable locations for the dashes, first superimpose the known patterns in the first four boxes. The result is a standard 7-segment numeric display. Interpreting the patterns in the first four boxes as the energized segments yields gibberish. However, if they are interpreted as the non-energized segments, the remaining energized segments form intelligible digits. The first four boxes then contain the digits: 0, 2, 4, and 6. The pattern is now obvious and the next box should contain the digit 8 which will energize all segments of a 7-segment display, leaving no segments as non-energized. Therefore the correct answer is nothing or empty.



2 Back to Basics: From beginning circuit analysis class, we realize that this resistive network is planar and therefore mesh analysis can be easily applied to solve this 4 node, 3 mesh circuit. Connecting an arbitrary source voltage V across the input terminals completes the left side mesh. Assign a clockwise current i_1 , i_2 , and i_3 to the left, top right, and bottom right mesh circuits respectively. This gives the three mesh equations for the left, top right and bottom right meshes to be $-V + 1(i_1 - i_2) + 2(i_1 - i_3) = 0$; $8i_2 + 4(i_2 - i_3) + 1(i_2 - i_1) = 0$; and $i_3 + 2(i_3 - i_1) + 4(i_3 - i_2) = 0$. With 4 unknowns and 3 independent equations, we solve for i_1 in terms of V to get $i_1 = V/2$. The equivalent resistance $R_{eq} = V/i_1$. Combining this with the previous result gives $R_{eq} = 2\Omega$.

3 Numerous Numbers: The number of unique 10-digit numbers that can be created using each digit only once is a matter of permutations. The number of permutations of 10 things taken 10 at a time is given by $n!/(n-r)!$ with both n and $r = 10$ so the number of permutations of 10 digits is $10! = 3,628,800$. However, a 10-digit number cannot start with the digit 0, otherwise it would only be a 9-digit number. One tenth of the above numbers start with the digit 0, so subtracting these gives $3,628,800 - 362,880 = 3,265,920$ valid 10-digit numbers.

4 Tsyanshidzi: Since the only valid moves are to take any or all stones from one group or to take the same number of stones from both groups, (1,2) is a losing position, because no matter what you do, your opponent will be able to win on the next turn. Other losing positions would be a position that no matter what you did, your opponent could make a move to win immediately, or leave you with (1,2) or another proven losing position. The losing positions form a sequence and are (1,2), (3,5), (4,7), (6,10), (8,13), (9,15), (11,18), (12,20), (14,23), ... The first pair differs by 1, the second pair by 2 and the n th pair by n . Every positive integer appears once and only once in the sequence.

Help Wanted: The Bridge staff is looking for a writer/editor for the Homework column each issue. If you enjoy writing these kinds of problems, please call/write the editor to discuss the position. Everyone else - send in those creative homework problems!

PERFECT SCORES

Go ahead and send in those answers, even if you can only answer 3 of the 4 problems. Next issue we'll also list those who got all but one right. Several members submitted answers to last issue's homework assignment. Problem 3 was missed most often, with many members giving 10! as the answer. The editor was particularly impressed with the many different ways of deriving and proving the Tsyanshidzi answer. This was a particularly difficult assignment and only two members got all four problems correct. Congratulations.

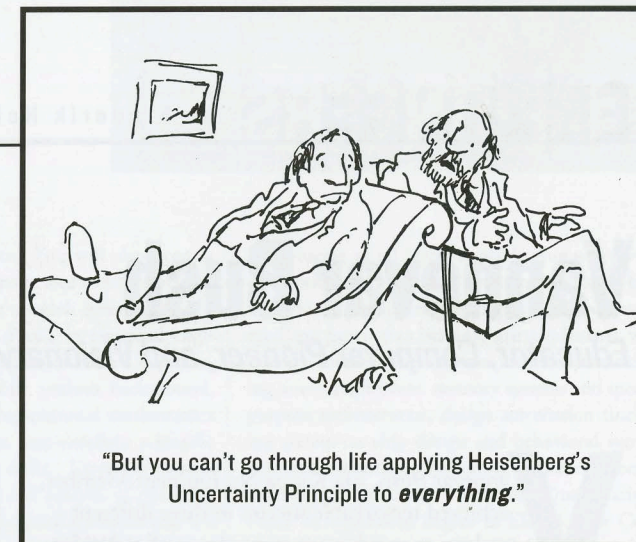
Rod Callison, ZΘ '80
R. Dudley White, ΓΠ '74

SHORTCIRCUITS

Oops, Wrong e-mail !

The Laughlab experiment recently determined the funniest jokes around the world. After a year of collecting responses and careful statistical analysis, they noted that different countries perceived different jokes as being funnier. This joke was rated as being the funniest joke in Australia. Here goes ...

A man left for a vacation to Jamaica. His wife was on a business trip and was planning to meet him there the next day. When he reached his hotel, he decided to send his wife a quick e-mail. Unable to find the scrap of paper on which he had written her e-mail address, he did his best to type it in from memory. Unfortunately, he missed one letter, and his note was directed instead to an elderly preacher's wife whose husband had passed away only the day before. When the grieving widow checked her e-mail, she took one look at the monitor, let out a piercing scream, and fell to the floor dead. At the sound, her family rushed into the room and saw this note on the screen: Dearest Wife, Just got checked in. Everything prepared for your arrival tomorrow. Your Loving Husband. P.S. Sure is hot down here.

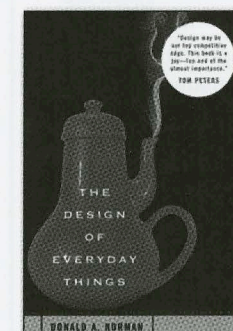


LaughLab was created by Dr. Richard Wiseman (University of Hertfordshire) in collaboration with the British Association for the Advancement of Science. More info on the LaughLab project and other jokes can be found at the laughlab.co.uk website.

Members are encouraged to submit their favorite tidbits of humor, or original cartoon artwork to this column. We are constantly amazed at the bizarre creativity that lurks within an engineer's mind.

BOOK REVIEW

Everyday Things



THE DESIGN OF EVERYDAY THINGS

By Donald A. Norman
2002 First Basic Paperback
List Price: USA \$16.50

You are not at fault when you fail to open a door by pulling it (instead of pushing, or swinging, or sliding it). The fault is the designer's, says author Norman. In this instructive and entertaining volume Dr. Norman gives many examples of both good and bad designs. He is a keen observer and makes thoughtful recommendations for remedying design shortcomings.

For example, he was among a group of scientists called in to investigate the cause of the 1979, nuclear power plant accident at Three Mile Island in the U.S. The group concluded that the power plant control operators were not to blame for the terrible mistakes. He added that "...the control panels of many power plants looked as if they were deliberately designed to cause errors." Another one of his illustrations describes the historical development of the typewriter keyboard. An obvious implementation--such as an alphabetical arrangement of characters--was not the best. He shows why the Qwerty arrangement was eventually adopted internationally, even though it is more difficult to learn.

At the end of the book are sixteen pages of "Notes." Particular-

ly interesting are the notes for Chapter 7 on Hypertext. They sound prophetic, as does his reference to Vannevar Bush's 1945 Atlantic Monthly article "As we may think." [See Pioneer's article on page 24 in this Bridge issue.]

The author's expertise and thorough research are attested to by the variety of "Suggested Readings" and over 100 references. Thus, you will find "The Design of Everyday Things" a valuable addition to your library.

Dr. Norman is Professor of Computer Science and Psychology at Northwestern University. He has published numerous books. His latest book, "Emotional Design: Why We Love (or Hate) Everyday Things," is to be published in January 2004.

— Review by Bert Sheffield, BB '49

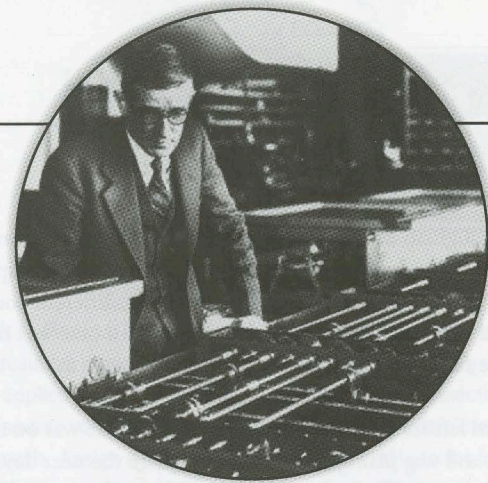
HKN AUTHORS

- **Adaptive Control Design and Analysis**, by Gang Tao, ΓΠ '92, IEEE Press, 2003, 640pp, \$99.95.
- **Electrical Engineers Portable Handbook**, by Robert Hickey, ΓB '89, McGraw-Hill, 2003, \$59.95.
- **Embedded Linux**, by Dr. Craig Hollabaugh, ΓX '83, Addison Wesley, 2002, 432pp, \$49.99.
- **Networking Basics**, by Walter Y. Chen, ΖΣ '82, Prentice Hall, 2004, 576 pp, \$59.99

Members can notify HKN Headquarters of recent books they have written. Please include name, chapter and year, book title, publisher and list price.

Vannevar Bush

Educator, Computer Pioneer, and Visionary



Vannevar Bush with the Differential Analyzer

Vannevar Bush, Eta Kappa Nu Eminent Member, achieved remarkable success in three different realms: as an educator, a developer of technology, and a proponent of a large social role for science and engineering. Born 11 March 1890 in Everett, Massachusetts, Bush studied mathematics at Tuft's College, earning both a bachelor's and a master's degree, and then electrical engineering degrees at MIT and Harvard. In 1916 these two institutions jointly awarded him a Ph.D. During World War I he became involved in military research, inventing a submarine detection device.

EDUCATOR

In 1919, Dugald C. Jackson, head of the EE department at the Massachusetts Institute of Technology, hired two new faculty members: Bush and William H. Timbie. The two new professors collaborated on a textbook for the introductory EE course: *Principles of Electrical Engineering* (1922). A demanding book, it assumed the reader had knowledge of calculus and physics and included some five hundred problems ("for illustration, for practice in applying the principles and for the purpose of bringing before the student useful and interesting engineering data"). It became widely used, appearing in four editions in the United States (the last in 1951) and in translation in other countries.

PIONEER OF COMPUTING

Bush studied the behavior of electric-power networks. In 1924 Hugh Spencer and Harold Hazen, working under Vannevar Bush, constructed in the laboratory a model that simulated a full-scale system. MIT and General Electric collaborated in building a much more sophisticated device for modeling power systems, which in 1929 received the name 'network analyzer'. The network analyzer became a standard tool of power systems engineering, and remained in use into the 1960s. They were eventually replaced by digital computers.

Network analyzers were used to simulate the operation of power systems. A more cerebral approach was to write equations describing the power system and then study the equations. Engineers were indeed able to write a set of equations constituting a mathematical description of the system, but

deducing the logical consequences of the equations was extremely difficult.

Bush, working with Harold Hazen and other research assistants, built a series of electromechanical analog computers to solve these network and other differential equations. The most famous was Bush's Rockefeller Differential Analyzer, which was completed in 1941 and was used to calculate ballistic tables and to study radar and fire-control systems. Bush also worked on techniques of information retrieval, including the so-called Rapid Selector that allowed microfilmed information to be located rapidly through a binary code on the edge of the microfilm that could be read automatically. In 1945, he wrote an

article for *Atlantic Monthly* entitled "As we may think." In it, Bush described an imaginary desktop personal information machine, called Memex, which would permit rapid access to huge amounts of information and would form links between associated items. He was a hypertext-prophet decades before the Internet came into being.

ARCHITECT OF THE MILITARY-INDUSTRIAL COMPLEX

In 1932 Bush had been named Dean of Engineering at MIT, and by the time of World War II he was the most prominent engineer in the United States. In June 1940, Bush presented a plan to President Franklin Roosevelt for the National Defense Research Committee to coordinate military research. Roosevelt approved it immediately, and it became the principal means of organizing military R&D, with Bush as chairman.

After the war he proselytized for government support of research, notably through his 1945 publication *Science: The Endless Frontier*, and he played a large part in establishing the National Science Foundation.

Bush served as president of the Carnegie Institution from 1939 to 1955. In 1949 he published the widely discussed *Modern Arms and Free Men: A Discussion of the Role of Science in Preserving Democracy*. After his retirement in 1955, he served on the boards of several companies. In 1964 President Lyndon Johnson presented him the National Medal of Science. Bush died in Belmont, Massachusetts on 28 June 1974.

The network analyzer became a standard tool of power systems engineering and remained in use into the 1960s.

CAREER BRIDGE



The Career Bridge classified advertising section serves as a bridge between various educational, governmental, and industrial employers and HKN members seeking employment or a change of career. For advertising information, please call HKN advertising sales, 1-800-218-1681.

INDUSTRY

Broadcom Corporation is the leading provider of highly integrated silicon solutions that enable broadband communications and networking of voice, video, and data services. Broadcom has positions available at our corporate headquarters in Irvine, CA as well as our offices in San Jose, Sunnyvale, Santa Clara, San Diego, CA and New Jersey. Positions are also available in our subsidiary offices at ServerWorks, Santa Clara, CA, Altima Communications and Altocon in San Jose, CA.

Broadcom seeks professional and technical candidates with backgrounds in Computer Science and Electrical Engineering to work in the following positions:

- * Software Engineering, Job Code: SW03
- * Design Engineering, Job Code: DE03
- * ASIC Design Engineering Managers, Job Code DEMGR03
- * Principal ASIC Design Engineers, Job Code: PRNDE03
- * Chip Lead Engineers, Job Code: CHLDE03
- * Test Engineering, Job Code: TSTENG03
- * Systems Engineers, Job Code: SYSENG03
- * Field Applications Engineers, Job Code: FLDAP03
- * Firmware Engineers, Job Code: FWR03
- * Staff Scientists, Job Code: STFSCI03
- * Director, Optical Transport Line of Business, Job Code: DOTLOB03
- * Marketing Specialists, Job Code: MKSPC03
- * Program Managers, Job Code: PRGMGR03
- * Business Technologists, Job Code: BUSTEC03
- * Product Line Managers, Job Code: PRODM03

Salary will be determined in accordance with applicable experience. Education and experience required will vary with the available positions. **Resumes may be submitted directly to our website listed below. All resumes must note the appropriate job code for consideration.** www.broadcom.com (Please click the employment tab within our website) **BROADCOM CORPORATION EOE**

Research Engineer, SRI International, a premier independent research organization for over 55 years, has a great opportunity in our Menlo Park, CA HQ for an experienced professional to join our team. Working closely with a team of researchers, you will investigate remote sensing data phenomenology, develop/evaluate state-of-the-art computer algorithms, and develop physics-based models of the geophysical environment comprehending sen-

sor and processing effects. You will also prepare proposals & technical reports and conduct presentations to clients and the research community. To qualify, you will need a Ph.D. in electrical engineering, physics, mathematics, or related engineering field, a strong scientific analysis background, expert knowledge of computational mathematics and statistical techniques, and excellent scientific computer programming skills. Extensive experience with the processing and analysis of real data, computer modeling and numerical simulations is a must. Additional skills in any of the following would be a plus: remote sensing, electromagnetics, hydrodynamics and geophysical phenomena, digital signal/image processing, computer algorithms, and optical/radar imaging sensors. Postdoctoral experience helpful. We also have openings for Research Engineers in Bioengineering, Microfluidics and Optical Sensors. Must be a U.S. citizen and clearable to Top Secret in a reasonable period of time. To view complete job descriptions and to apply online, please reference Job#1237VW-HKN on our website (sri.hrdpt.com), and follow the instructions for submitting your resume profile. Please send your resume (including e-mail address), Equal Opportunity Employer/AA. www.sri.com

ACADEMIA

The Department of Electrical and Computer Engineering (ECE) at Boston University anticipates several openings for faculty positions at all ranks in computer engineering, signal and image processing, photonics, solid state devices and nanostructures, and related areas. The ECE Department is part of a rapidly developing and innovative College of Engineering. Excellent opportunities exist for collaboration with colleagues in outstanding research centers at Boston University, at other universities/colleges, and with industry throughout the Boston area. The Department has approximately 40 faculty members, 200 graduate students and 400 BS majors. For additional information, please visit <http://www.bu.edu/ece/>. Qualified candidates must have an earned Ph.D. in a relevant discipline and have or be capable of developing a program of funded research in their area of expertise. Applicants should send their curriculum vita with a statement of teaching and research plans to: Professor Bahaa E. A. Saleh, Chair, Department of Electrical and Computer Engineering, Boston University, 8 Saint Mary's Street, Boston, MA 02215. Boston University is an Equal Opportunity/Affirmative Action Employer.

Assistant/Associate/Full Professor (Computer Engineering/Tenure-track/One or more positions) Electrical and Computer Engineering: The Department of Electrical and Computer Engineering at Louisiana State University invites applications for one or more tenure-track positions in Computer

Engineering at all levels available August 2004 or until positions are filled. Though applicants from all areas of Computer Engineering will be considered, of particular interest are applicants with research interests in computer architecture (including microarchitecture, memory systems and special-purpose architectures), design automation (including system-on-chip design and behavioral synthesis), and networking (including traffic engineering and network security). Required Qualifications: Ph.D. or equivalent degree in Electrical or Computer Engineering or related field; potential for excellence in teaching and research. The positions involve teaching graduate and undergraduate courses in electrical or computer engineering and research in areas of individual interests. Salary is competitive and commensurate with qualifications and experience. Release time and resources are provided in order to enhance the development of a quality research program. Opportunities for summer support are available. In addition to the resources in the department, the faculty has access to a 1024-processor cluster. Application deadline is March 1, 2004, or until candidate is selected. Please send your resume (including e-mail address), names of at least three references, and a statement of teaching and research interest, in electronic form to kemin@ece.lsu.edu (preferred) or mail your application package to: Dr. Kemin Zhou, Interim Chair, Electrical and Computer Engineering, Louisiana State University. Ref: Log#0518, Baton Rouge, LA 70803. LSU is an Equal Opportunity/Equal Access Employer.

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