THE|BRIDGE

of Eta Kappa Nu

BIOENGINEERING

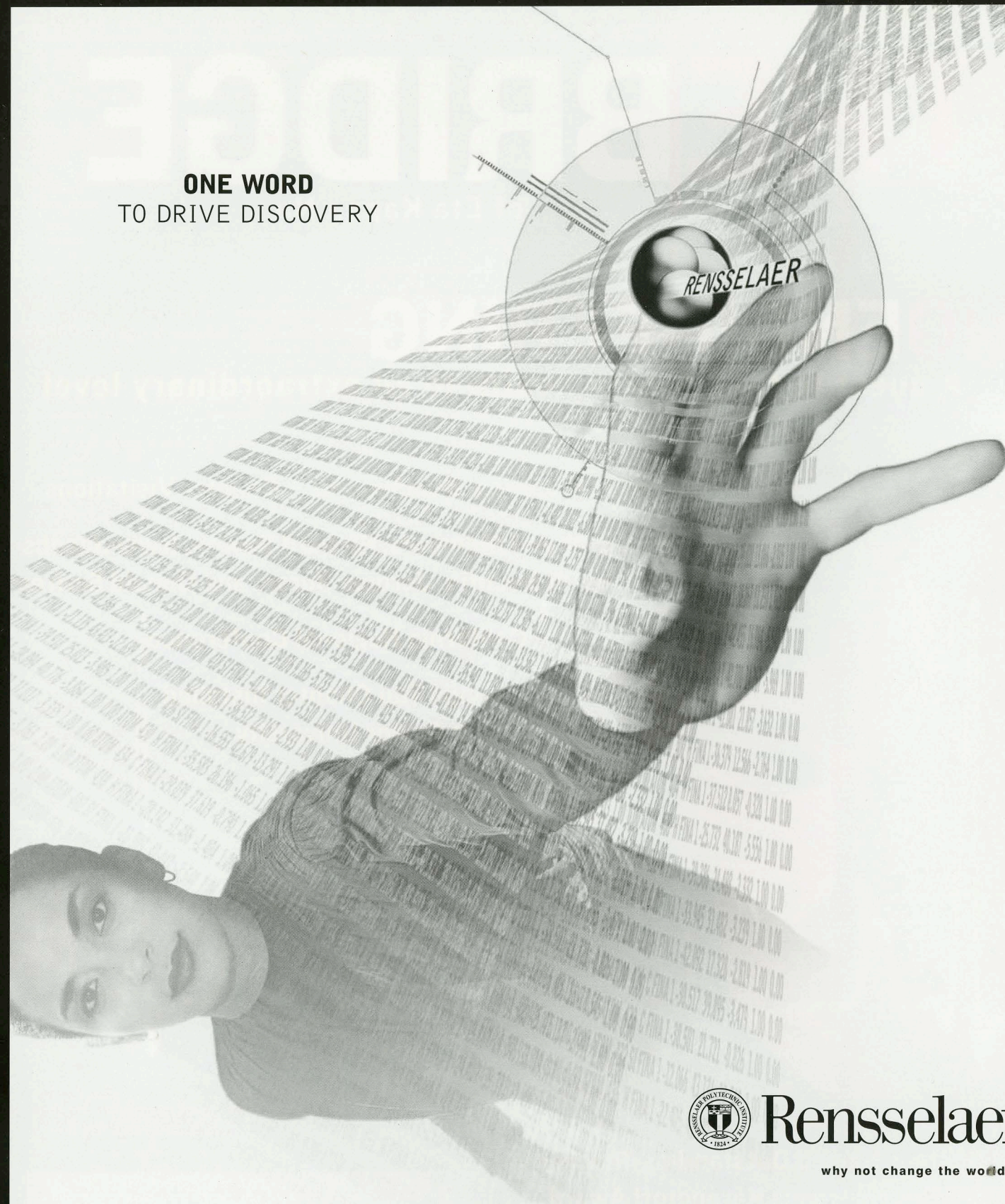## A quest to take human health to an extraordinary level

- HKN Historical Benchmarks - Chapter Visitations
- New Eminent Members: Richard Gowen, Irwin Jacobs Eberhardt Rechtin, Jerome Suran, and Donald Scifres
- California Regional Conference
- Kappa Tau Chapter Installed at Baylor University

Also:

- Daryl Beetner Named Outstanding Teacher
- Bernard DeLoach wins Karapetoff Award
- Robert Arehart receives DSA
- Vladimir Zworykin - EE Pioneer

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ON THE COVER
Education Spotlight takes a look at bioengineering opportunities and the intersection of the electrical and computer engineering fields with biology. Career Focus presents real world advice from the bioengineering field. Our EE Pioneers column features Vladimir Zworykin who, in addition to his major contributions to the field of television, was one of the pioneers of biomedical engineering.

FROM THE BRIDGE

The Quest to Improve Human Health

Engineering and technology have been components of advances in the medical profession for centuries, from developments of microscopes, thermometers, and stethoscopes, up to the modern heart monitors, CT scans, and MRI machines. Electrical and computer engineers have contributed greatly to the current state of medical technology. However, we are seeing a growing trend to take this to the next level by moving into the area of biology. Combining the skills of engineering with the field of biology, we now possess the tools to investigate and understand health far beyond our current limitations and to apply these skills to engineer and repair cells, tissues and organs. The field of BioEngineering encompasses cross-discipline study between biology and engineering and is the focus of this issue of *The Bridge* magazine. Education Spotlight features the new study opportunities in this emerging BioEngineering field and our Career Focus department addresses such issues as working environments, future opportunities, and the ethics and moral issues related to this branch of engineering. Finally, our EE Pioneers column features Vladimir Zworykin, known not only for his contributions to television, but also as a pioneer of biomedical engineering.

We are now into our Centennial year, a great historical milestone for Eta Kappa Nu. While many activities and programs are being planned by national, I would like to take this opportunity to highlight our Chapter Centennial Projects program. All chapters have been encouraged to undertake a meaningful local project as part of our overall centennial program. These projects are of the local chapters choosing, but might include such ideas as creating a centennial page on their chapter website to recognize past alumni and achievements of that chapter, erecting an HKN monument on campus, creating an HKN membership plaque displaying names of all past HKN alumni, and many other ideas. I wish each of the chapters success on their individual chapter centennial projects and look forward to an exciting HKN centennial year.

—RAS, Ω '82

HKN CALENDAR

EVENTS

HKN Spring Awards Banquet, OYEE, Karapetoff, DSA Awards, and new Eminent Member Recognition will be presented April 11, 2005. New Brunswick, NJ, 6:00-10:00 p.m. Reception and Dinner tickets $85-individual, $850-corporate Table. Contact HKN HQ for reservations.

NOMINATIONS DUE

C. Holmes MacDonald Outstanding Teaching Award (OTA) nomination forms are due February 15, 2005. Nominees must be 35 or under at the time of the award.

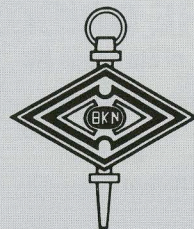**Zerby/Koerner Outstanding Electrical/Computer Engineering Student (OECES)** nomination forms are due March 31, 2005. Information and Nomination forms available on www.hkn.org.

Norman R. Carson Outstanding Junior Electrical/Computer Engineer nomination forms are due March 31, 2005. Information and Nomination Forms available on www.hkn.org.

HKN National Director nominations and resumes for the term 7/1/2006-6/30/2009 are due to the nominating committee by July 1, 2005.

FEEDBACK

I read with interest the article on Restoring Power to Iraq in the last issue of *The Bridge* and would like to highlight a few points.

First, speaking as a retired Army officer and strategist, as well as a private-sector professional in critical infrastructure protection, the electrical infrastructure is essential to the long-term viability of the emerging Iraqi government and, ultimately, the advancement of Iraqi society. Without reliable power, the Iraqis can only meet their most basic needs and any transition to a more 'modern' living standard and society will be problematic.

Second, those against this transition of Iraqi society cannot directly and overtly confront the security forces currently providing stability. As a consequence, they have adopted indirect and covert techniques of attack.

As the central infrastructure of a modern society, the electrical system is as vulnerable as it is indispensable. The challenges of restoring and expanding the Iraqi electric power sector can only be met by combining to an unprecedented degree the disciplines of engineering and infrastructure security.

The situation in Iraq is complicated and dangerous. Engineers and security personnel in Iraq, working to improve infrastructures and Iraqi society, are to be commended.

-Bill Flynt, Ph.D.
President
The Flynt Group, Inc.

The Recent Bridge, Vol. 99, No 1 was most enjoyable to read because it dealt with topics and people that were intimately related with my career. I worked in power from 1935 until 1992, starting in Diehl Mfg. Co designing motors, and at Holophane Lighting designing prismatic lighting equipment and systems. In 1938, I joined American Electric Power Co. This company's destiny was primarily in the hands of Phillip Sporn, HKN Eminent Member. He interviewed me in 1935, but it took three years of persistent effort to become employed there. This was the middle of the Great Depression.

Mr. Sporn and I became involved in various ways over the 40 years of my employment in that company. During World War II, he authorized my leave so I could accept employment in OSRD, which was headed by Vannevar Bush, whose biography was in this issue of *The Bridge*. I played an important part in the installation of a network analyzer at AEP before I joined OSRD.

-Larry Dwon, K '35

I enjoy reading about the various activities chapters are doing, the homework section, and book reviews. I look forward to the updated website being fully functional.

-Vincent J. Forte, Jr. B '77
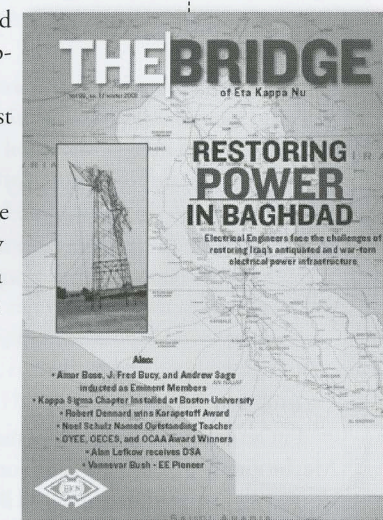
Letters to the editor are encouraged and welcome. Readers are invited to comment about material published in THE BRIDGE and on matters of general interest to the members of HKN. All material and comments received are presumed to have been submitted for publication unless otherwise noted and may be edited 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

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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 year from July 1, 2004 until June 30, 2005.

Centennial Pantheon Student Challenge
*** Win $1000 ***

Match wits with prominent historians of technology who will assist Eta Kappa Nu in naming twenty philosophers and mathematicians to Eta Kappa Nu's "Electric Pantheon" as part of its centennial celebration. The foundations of our profession began well before the 19th century, based upon the experimental and theoretical work of pioneers like Alessandro Volta. Eta Kappa Nu will announce the final make-up of the pantheon in April 2005.

Hint: The HKN Pantheon members will not include pioneers known just for engineering, but will consist exclusively of the progenitors of the profession. Send your entry, listing your choice of twenty names, to pantheonchallenge@hkn.org no later than January 31, 2005. The first entry received that matches all 20 names will receive U.S. $1000.00. Up to ten prizes of U.S. $100.00 each will be awarded to those who match the greatest number of pantheon members. Qualification: You need not be a member of Eta Kappa Nu, but you must be an undergraduate electrical or computer engineering student.

Nano-Scale Transistors Degraded by Swirling Current

Nature will always find a way to remind us that we don't make the rules. Studies at the University of Glasgow in Scotland have found that the performance of new nano-scale transistors will be degraded by spontaneous quantum vortices. That is, swirling eddies of current flow, just like you see among the bends and obstructions of a small creek or river.

As reported in *Electronics Weekly*, current flow in nano-devices forms "trapped regions of circulating current that block the net flow through the channel," according to Professor John Barker of UG's Nanoelectronics Research Center. The vortices appear whenever a wave loses or gains angular momentum, such as turning a wire corner or meeting an oxide boundary.

While this is not an insurmountable problem, the surprising finding reminds us again that it's always useful to look to nature as the best modeling device. After all, that's where the rules were written.

Wal-Mart Suppliers Scramble to Meet RFID Requirements

The top 100 suppliers of Wal-Mart's multi-thousand store empire are trying to meet Wal-Mart's requirement that they implement Radio-Frequency Identification (RFID) technology on their products by January 1, 2005. RFID is a scheme in which a passive microchip device is implanted in a product. A polling signal from an RFID transmitter is sent, such as in a warehouse or on the floor of a retail store, triggering a response from the implanted device. The responding signals allow virtually instant inventory to be taken.

Wal-Mart has decided that it wants this technology to cut costs. And generally, what Wal-Mart wants, Wal-Mart gets. The technical significance of this is that after Wal-Mart convinces enough suppliers to make this technology available, it will be everywhere. The implications are profound, both as a technical breakthrough and as a long-term concern for personal privacy. After all, if y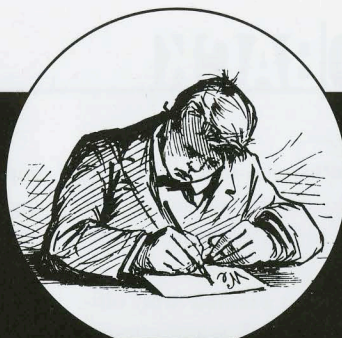our new sweater and jeans have embedded microchips that can be surveyed by a remote signal burst, it would be a simple matter to know where you are and what you're wearing. Talk about fashion police!

How do I fix thee... Let me count the ways..

ASK THE PROFESSOR

As the months wear on, industry gadfly and self-appointed expert Professor R. F. Detecta finds himself sorting his mail. Some questions that come his way are just too good to pass up - but he does anyway. However, we did get him to check out one such query for the sake of our readers: —TB

Dear Professor:

I've recently started a new job and my boss has asked me to check out a customer's complaint about CRT monitors with wavy lines. The weird thing is that when I move the monitors, or even move myself around them, the wavy lines change or go away. Is there some strange flexing going on? The desks and tables where the monitors are located seem to be stable enough. I was told that you had insight into mysterious equipment behavior, so what do you think?

--Wavy Guy

Dear Wavemaster,

I'm an expert on mysterious machine behavior, all right. Maybe another time I'll talk about my experience with mysterious coin-operated machines - I thought I'd never get that candy bar out of there.

But you don't have a problem with wobbly furniture; you've got a case of magnetic-field interference. You can verify it by getting a hand-held magnet and moving it around the monitor and you'll see your own wavy lines. If you can do that well, maybe you've got a career in electronic art!

Look around the room where these monitors are. Is there a big power supply or transformer nearby? Put one of those monitors on a movable cart with a long extension cord and move it around the room. You'll see the wavy lines fade or get worse, depending on where you are. It's like finding the source of a draft in a room - it's usually not as obvious as an open window, so you have to move around to locate it.

Unless your customer wants to spend big money to provide magnetic shielding, the best remedy is to find the low-interference locations in the room and move the monitors there. It's the most economical fix, and you'll pick up some interior decorating skills to boot!
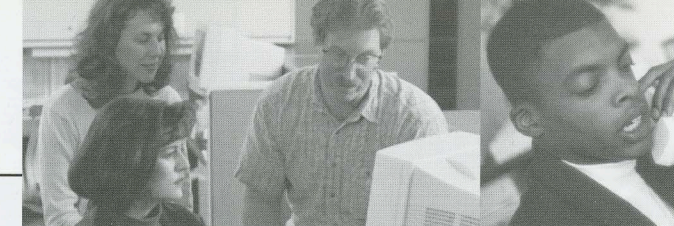
Advice from the Field: BioEngineering

by Patricia Irwin, IN '87

The Department of Labor reports that "the number of biomedical engineering jobs will increase by 31.4 percent through 2010---double the rate for all other jobs." The report attributed the rapid rise in biomedical engineering jobs in part to an aging U.S. population and the increasing demand for improved medical devices and systems. Specific growth areas cited in the report included computer-assisted surgery, cellular and tissue engineering, rehabilitation, and orthopedic engineering.

Name: Donna Hudson
Position: Prof, Univ of California, San Francisco
Background: Hudson has been working in the biomedical engineering field for more than twenty years. She started out working on computer-assisted medical decision-making and now works for UC's medical school--finding ways to use signal analysis (EEG and EKG) as part of the decision process. Hudson has researched how best to use artificial intelligence, neural networks and medical imaging in the decision process. Hudson has a bachelors and masters in mathematics and a PhD in computer science.

Description of current job:

Hudson has worked at UCSF since 1982--teaching and performing research. She works with a bioengineering co-op graduate group with UC Berkeley and a graduate group at UCSF that works on biological and medical informatics. She is also the director of the grants and research office at a branch campus.

What is the best advice you ever received?

The best advice I ever received came from my advisor when I completed my master's degree in mathematics. Dr. Cohn virtually insisted that I go on and get a PhD. And, I think that without that advice and the insistence on his part, I wouldn't have done it. It really did make a difference in my life. I feel that women in engineering really need encouragement, especially these days, because there are still barriers out there.

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

Students need to pick an area that they really enjoy--something that inspires them, because the important thing about your life at work is that you enjoy what you are doing and that you don't think of it as a job. You should think of it as an integral part of your life.

What was the most surprising thing learned after graduation?

How rapidly everything changes. So, here is another piece of advice for students: You will have to learn how to learn because everything will change. Change is what you have to expect, so you have to keep an open mind. You can't hold on to what you have been doing.

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

I think the field has a fantastic future. Two examples that come to mind are areas like nanotechnology and drugs designed for specific individuals. Another hot topic is artificial implants that will be made out of organic materials. Soon, I think tissue engineering will take great leaps forward and we will be able to repair body parts. It sounds like science fiction, but it is becoming reality now.

When people think of engineers they often picture people working in an office or on a plant floor. What kind of work environment could someone entering the bioengineer field expect?

This really depends because you will have some people who are working in offices doing theoretical work. You will also have people participating in surgeries, watching surgeries, actually watching the devices they developed being implanted. You have people working in medical imaging, who are there with the MRI and the CT machines. Often, biomedical engineers work with clinicians and they may be in the patient environment. So, there is really a wide variety of conditions and people have a wide range of work environments to choose from and can choose based on their inclinations.

Probably more than any other, the field of biomedical engineer is rife with ethical challenges. What part do ethics play in your work?

I think, especially in biomedical engineering, ethics are always a concern. In fact, the things I just mentioned have enormous ethical implications. Once we have the ability (which we are getting very close to having) to alter genes, we will be faced with enormous ethical questions. Another sensitive area is stem cell research, which is now a part of bioengineering. Once you have the human component, ethics is something that always has to be considered. Therefore, we include sections on ethics in all our meetings.
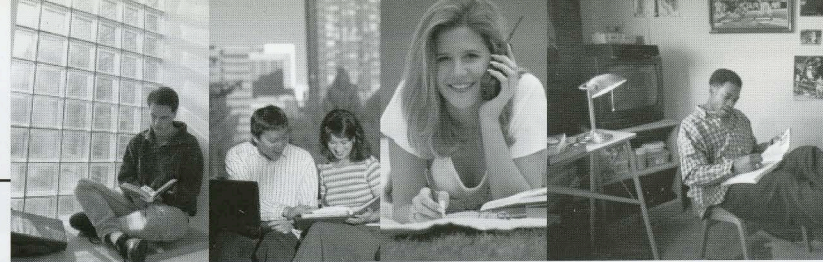
Iota Chi Tutors Mark Twain

Mark Twain elementary school is located in Pontiac, Michigan within a few miles of Oakland University. Michigan tests elementary school children across the state with a standardized test called the MEAP. On the math section of the MEAP, Mark Twain was falling in the lowest 1.2% of the state!

This was a disgrace with a university a few miles down the road filled with plenty of students and Eta Kappa Nu members especially willing to donate their time and math skills to helping a community in need. Dr. Oakley, our faculty advisor, set up a workshop for the teachers at Mark Twain, teaching them better, more effective ways of demonstrating math skills to their students. The three Saturday mornings previous to the MEAP were devoted to placing a student with a volunteer tutor to help practice their math skills. Along with that, HKN members would also go into the school on weekdays and help out in the classrooms.

—Submitted by Iota Chi Chapter

Mock Interviews Provide Experience and Feedback

Theta Chi chapter at the University of Colorado at Colorado Springs conducted several service projects to improve the organization's visibility among the student body and provide programs to benefit both the students and the department. One major service project was the Mock Interview program. At the conclusion of the Fall and Spring semesters, a new interview preparation service for graduating seniors was instituted. After the Senior Design project is due, and before the rush of finals week, several members from the engineering corporate community volunteered to come in on a Saturday morning to advise and conduct mock interviews to any graduating seniors who wish to participate. These interviews are not for actual positions, but rather to give the student valuable experience and feedback on job interview techniques and pitfalls. They also provided the College with feedback on special emphasis areas needed, such as curriculum they would prefer to see reflected on a graduate's resume, specific industry problems with which students should be familiar, or software / hardware tools being introduced throughout industry. Students would move from one interviewer to the next, meeting with each for half-an-hour, with a five-to-ten minute break in between for feedback.

This activity was conducted in December and May, and was met with great success in spite of a limited number of students participating. In both cases, five industry interviewers met with seniors in the Electrical or Computer Engineering Program. In one case, the interviewer was so impressed with a student, that a paying position was offered with the interviewer's company.

— Submitted by Erin K. Reeves
President, Theta Chi Chapter

Delta Phi Robots Play Pong

The Delta Phi Chapter at the University of South Carolina is located in Columbia, SC. Recent chapter activities include tutoring lower classmen in circuit analysis and participating in the University of South Carolina's Showcase. Showcase is an annual event held to attract prospective high school seniors and to entertain and inform the surrounding community about the University. Seniors in Eta Kappa Nu presented their design projects at the event, located on the University's historic horseshoe. The seniors built robots that would compete in a game of Pong. Participation was a great success!

— Submitted by Kathleen Young
Bridge Correspondent - Delta Phi Chapter

A future EE enjoys watching an intense game between Delta Phi members' robots operated by Omkar Jani, James Southard and Steve Herlihy.

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 Tau Chapter Installed at Baylor University

On March 28, 2003, Eta Kappa Nu installed its 210th campus chapter, the Kappa Tau chapter at Baylor University. This chapter was established with great enthusiasm and support from Baylor's School of Engineering as well as the hard work of Dr. Jim Farison and Dr. Norm Griswold. In addition, Stephanie Rackler, the club's inaugural president, was instrumental in getting the organization approved on campus.

Eta Kappa Nu President Thomas Rothwell traveled to Waco, Texas to officially install the chapter and to present them with their charter and signature book. After some opening remarks by Dr. Benjamin Kelley, the Dean of Baylor's School of Engineering and Computer Science, Mr. Rothwell personally congratulated all fourteen inaugural members of the Kappa Tau chapter as they were inducted. The new members are:

John Brandon Bedford, Walter Davis Ford, Matthew Alan Garth, Eric Conley Green, Amanda Elizabeth Hickey, Sen Wen Kan, Phillip Andrew Kelly, Courtney Marie Maxwell, Douglas James Murphy, Steven Patrick Potter, Stephanie Renee Rackler, Paul Daniel Reynolds, Carter Todd Smith, and Bron Olan Weston.

Thomas Rothwell, left, presents new HKN chapter charter to Inaugural President Stephanie Rackler and Faculty Advisor Dr. Jim Farison.

After the ceremony, the new members had the opportunity to talk to Mr. Rothwell about Eta Kappa Nu while having punch and dessert.

— Submitted by Erin Green
President, Kappa Tau Chapter

Back: The charter members of the Kappa Tau chapter. Front row guests seated L-R are Dr. Norm Griswold, Faculty Advisor Dr. Jim Farison, Dr. Benjamin Kelley, HKN President Tom Rothwell, Dr. Don Farris, and Dr. Mike Thompson.

Outstanding Chapter Activities Awards

University of California-Berkeley named repeat winner for 2002-03

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 2002-2003, five chapters were recognized for their outstanding programs. Mu Chapter (University of California-Berkeley) topped the list as National Winner. This marks the second straight year that Mu chapter has captured the winning position. The chapter expanded upon the success of the previous year, and adjusted their activities to the changing needs of the students, school, and community. The strategy worked well and allowed Mu chapter to repeat their success in capturing the National Winner position.

Honorable Mentions went to Beta Chapter (Purdue Univ.) 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 two Certificate of Merit winners: Beta Epsilon (University of Michigan) and Iota Chi (Oakland University).

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.

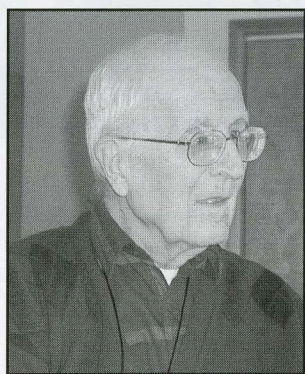The Outstanding Chapter Activities Award program has been an ongoing staple of Eta Kappa Nu since 1932. There can be any number of Honorable Mention or Certificate of Merit awards each year. For this reason, all chapters are encouraged to submit an annual chapter report that is worthy of their year's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

HKN Historical Benchmarks

CHAPTER VISITATION PROGRAMS AND NATIONAL CONVENTIONS

by Larry Dwon, K '35

Starting in November, 1993, a series of brief historical articles have appeared in the Bridge. Their purpose was to cover various aspects of Eta Kappa Nu history and to alert members to the 100th anniversary of HKN, in October, 2004. This is part nine and the concluding article in the historical series and covers the visitation programs, national conventions and regional conventions of the association.

The Chapter visitation program was intentionally selected to be the last subject in this series of historical benchmarks; but not because it is the least important activity within HKN. In my opinion, it is a very important program through which the founders' original spirit and enthusiasm can be transmitted to future generations of Eta Kappa Nu members. I remember how A. B. Zerby's and E. B. Wheeler's dissertations, about the founding and evolution of HKN, inspired me to volunteer my services.

EARLY NATIONAL CONVENTIONS

In the early years, alumni volunteers often met and worked with founders, at national conventions and alumni chapter meetings. The national conventions made it possible for college chapter delegates to interact directly with experienced alumni members who transmitted their enthusiasm and spirit. This close association kept the underlying enthusiasm and purpose alive among members of all chapters. The national organization's business was carried out at these assembled conventions until 1932. After that, the NEC decided to hold biennial assembled conventions, in order to reduce expenses.

CHAPTER VISITATION PROGRAM

Mail conventions were instituted and a visitation program was provided in the years when assembled conventions were not held. The first and only biennial convention was held in 1933. Thereafter, each college chapter was visited annually, either by the Executive Secretary, another officer, or a selected alumni member. L. A. Spangler reported this program in his article *"Visitation Plan Progressing"* in the December 1932 *Bridge*.

The success of the personal visitation program combined with the substantial reduction in expenses were positive gains at the expense of advantages that assembled conventions provided through person-to-person contacts. However, by a special vote of the chapters assembled conventions could be held. The next assembled convention was held in 1954. Between 1933 and 1954, the principal contact among chapters was through interaction with the visiting alumni members or mail and by reading *The Bridge*.

REGIONAL VISITATION CONFERENCES

In 1941, a four-chapter regional visitation conference was held in Cleveland, Ohio on May 17th and 18th. National Vice President P. E. Harrell and the Cleveland Alumni Chapter hosted the student delegates from Universities of Ohio State, Pittsburg, Carnegie Institute of Technology, and Case Institute of Technology. It was reported in "Regional Visitation conference" in *The Bridge*, July 1941.

In the 1950s decade, mixed reactions about some personal visits began to emerge. As a consequence of this reaction, the personal visitation activity almost ceased to be used and this subject became a major focus of discussion at the 1962 national assembled convention.

At that convention, the New York alumni chapter and all college chapters from the metropolitan New York area, with support of the Philadelphia Alumni chapter, recommended a formal regional visitation plan. Prior to this convention, a regional conference was successfully held in the New York area. It included representatives from Boston and Philadelphia alumni chapters and some student delegates from schools in those areas.

The year following the assembled convention, Boston and New York alumni each organized separate regional visitation conferences. A similar conference was held in Chicago. A formal national regional visitation plan was instituted in 1967. For a few years, P. K. Hudson, Executive Secretary, implemented the program. Larry Dwon was appointed chairman of the visitation program in 1970. The Regional Visitation Plan devised by Larry Dwon at first divided the country into 12 and later into 16 regions, on the basis of two criteria - reasonable travel and enough chapters to assure good discussions.

The main purpose of regional conferences was to provide a means for college chapters to get direct help from each other and from the visiting officers and alumni members who had long experience in HKN affairs. The conference made it possible to compare chapter activities and to obtain new ideas from discussions at the conference regarding problems facing the chapters and the national association, as well as future goals of the organization. The hope was that such direct interaction among the participants would improve a chapter's performance in activities that would help students, schools, communities and the profession in accordance with the HKN Constitution provisions.

The Regional Visitation plan was designed to keep the cost/benefit ratio as reasonable as possible. This activity operated successfully for a decade as shown in the sidebar beginning 1963. Then the Executive Secretary declared that the program was costing too much. It began to lose momentum until it no longer was reported in the Bridge after 1974.

For each regional conference, a national officer was assigned to make the visit. Each conference was provided ground rules of how the conference was to be conducted and specific questions that were to be discussed.

The main reasons for the demise of this important program were cost and the increase in number of chapters without a corresponding increase in funds and volunteers to carry out the program. From 1974 until 2002, Eta Kappa Nu no longer held any national conventions or conferences, regional conferences or individual chapter visitations by national officers or delegates.

> The conference made it possible to compare chapter activities and to obtain new ideas from discussions at the conference regarding problems facing the chapters and the national association, as well as future goals of the organization.

GOING FORWARD

Our current Executive Director, Dr. Ron Spanke, has shared his belief in the importance of these conference and visitation programs for promoting chapter interaction at the national and regional level. In 2002, HKN decided to reinstate national and regional conferences to realize many of the benefits of the lapsed visitation programs. These conferences were designed to be different than the previous national conventions, because they would not be official voting conventions, where each chapter had a vote. HKN would continue to use the annual mail convention for the purposes of official voting matters so that chapters who could not attend the conference would not be unduly disenfranchised of their vote.

The national leadership conferences instead would concentrate on visits from national officers and the executive director, leadership seminars on how to effectively lead chapters, and a sharing of best chapter practices between chapters. The first such national leadership conference was hosted by Nu chapter in Ames, Iowa in 2002. The next national leadership conference is hosted by Alpha chapter in Urbana, Illinois in 2004. HKN also experimented with a regional conference in California in 2003.

INCREASE IN HKN CHAPTERS

There were 23 chapters in 1932 when the NEC decided to discontinue the national assembled conventions and begin the individual chapter visitation program. As the number of chapters grew, the visitation program became too costly. When the regional conference visitation plan started in 1963, HKN had grown to 98 chapters and had grown to 138 chapters in 1974 when that program was also discontinued due to cost. As we enter our Centennial year, HKN now has 210 total chapters installed. The current chapter list is shown on the back cover of the Bridge magazine.

As of 2004, four of these chapters have been permanently closed. A closed chapter remains on the national records and all members from that chapter are still full members of HKN, however, once a chapter is closed no further initiations will occur for that chapter. Beta Beta (Brooklyn Polytechnic) and Beta Zeta (New York University) were discontinued when the two schools merged to form Polytechnic University of New York. A new chapter, Zeta Sigma was installed to represent the new school going forward. Delta Theta chapter at Pratt Institute and Zeta Mu at Northrup Institute of Technology were closed when the schools ceased to offer engineering degrees.

Several other chapters have experienced periods of inactivity. The main reason given for inactivity is that volunteers were unavailable to serve as faculty advisors to the chapter among the educators at the school or among alumni members employed in industry.

EPILOG

As this historical series comes to an end, it should be very clear how much the future destiny of Eta Kappa Nu is dependent on voluntary services of its members. Having accepted membership in this electrical and computer engineering honor society, each member assumed the responsibility to help carry out the mission of the association for the benefit of the electrical and computer engineering profession. Many members have been given recognition in this historical series for their generous voluntary efforts. HKN needs similar voluntary efforts from its members as we move into the 21st century.

HKN Regional Visitation Conferences

1963-64	New England Area	
1965-66	Hawaii	
1966-67	Chicago Regional	
1967-68	Philadelphia Regional	
	Los Angeles Regional	
	Chicago Regional	
	Rocky Mtn. Regional	
	New York Regional	
1968-69	Philadelphia Regional	
	New York Regional	
	Kansas Regional	
1969-70	Philadelphia Regional	
	Boston Regional	
1970-71	Philadelphia Regional	
	New York Regional	
	Chicago Regional	
	Columbus Regional	
	Southeast Regional	
	Southwest Regional	
1971-72	Philadelphia Regional	
	Rocky Mtn Regional	
	Boston Regional	
	Western Regional	
1972-73	New York Regional	
	West Central Regional	
	Los Angeles Regional	
	Akron Regional	
1973-74	Texas Regional	
	Detroit Regional	
	Philadelphia Regional	
	N.C. State Regional	
2003-04	California Regional	

CALIFORNIA REGIONAL COLLEGE CHAPTER CONFERENCE

by Ron A. Spanke, Ω '82

Forty-five HKN student members, chapter officers, and alumni gathered in Long Beach, California on Saturday, November 1, 2003 for the California Regional College Chapter Conference (CRCCC). The Los Angeles Alumni Chapter hosted and coordinated the event and chapters from across the state participated in the conference. The conference was held in conjunction with the HKN Fall Awards banquet in the evening and the HKN Fall Board of Governors meeting held the following day.

The agenda began with a tour of the Queen Mary and lunch from 10:00 to 1:00. The conference opened at 1:00 with an
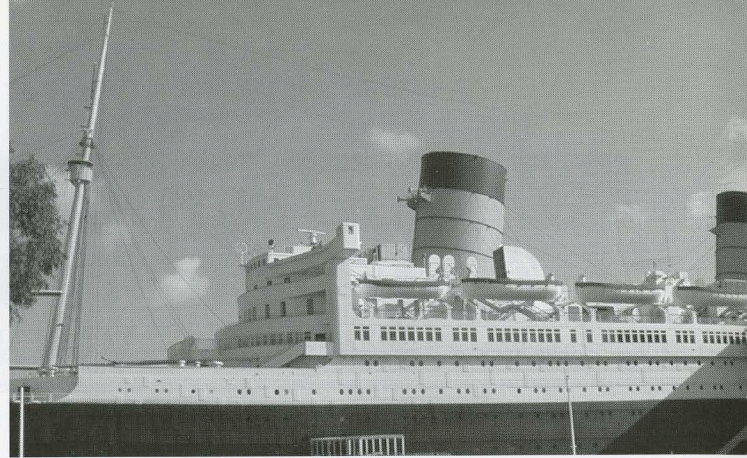
The California Regional Conference was held on board the historic Queen Mary. The H.M.S. Queen Mary is more than just a ship, she is a legend - the grandest ocean liner ever built. Launched in 1936 by the Cunard Steamship Company, she held 3131 passengers and crew and cruised at 28.5 knots (33 mph). From 1940-1946 she was converted into WWII troopship service. She was decommissioned in 1967 and today is operated as a hotel and conference center in Long Beach, California. Conference attendees enjoyed a full tour of the ship, bridge, radio room, engine room, lifeboats, and first class passenger and promenade decks before getting down to serious HKN chapter business.

All Hands On Deck! Student conference delegates assemble at their mustering station on the foredeck of the Queen Mary with HKN President Eric Herz (front left), HKN past president Tom Rothwell (back left) and Executive Director Ron Spanke (right)

overview of HKN, where we are and where we are going by HKN National President Eric Herz. Executive Director Ron Spanke led a session on HKN headquarters operations and how chapters should interface with HKN headquarters. HKN Past President Tom Rothwell gave a talk on the role of alumni chapters.

After the opening talks, the attendees participated in a few ice breakers designed to help them get acquainted with the officers and members from other neighboring chapters in the state.

A Student Interchange Session followed, with each chapter describing some of their local programming and activity ideas and sharing what they felt were their best chapter practices. Each chapter took back several new ideas to try on their own campus. Everyone found it amusing that one chapter hosted an annual formal dance for all engineers which they called E-PROM. Chapters also shared issues and common problems that they encountered in running their chapters. In several cases, another chapter would share their solutions to those same problems.

Tom Rothwell returned to the podium to give a keynote address sharing experiences from the work world and discussing the ever important question of staying in school to pursue a Masters degree versus entering the workforce after the Bachelors degree. The final session of the conference was a panel discussion with several board members and alumni which fielded many questions and recommendations from the student attendees.

It was noted that IEEE and HKN are both organizations for ECE students, but each one has different goals. The organizations are not competitors, and members in each group should support the other group. There was also a growing concern about inactive or minimally active Faculty Advisors. The position is not regarded as highly by the school administration as it had been in the past and many FAs do not even attend the chapter's weekly board meetings. Chapters should try to improve this situation by meeting with the FA or perhaps speaking with the Department Chair if they would like to request a new Faculty Advisor.

A reception was held in the 1930s vintage Observation Bar with students, L.A. area alumni, national officers, and special guests. The evening concluded with the HKN Fall awards banquet in which new eminent members Irwin Jacobs and Jerome Suran were inducted, and the winners of the Outstanding ECE Student awards were honored.

Vrushail Korde, student chair for the CRCCC, reports to the HKN National Board of Governors about the success of the conference.
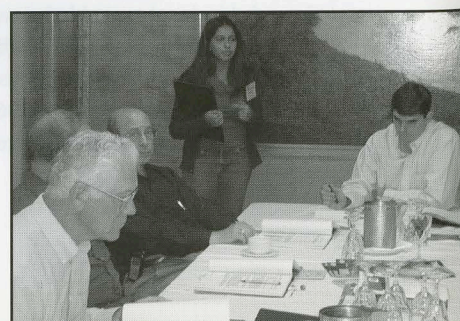
NEW HKN EMINENT Members Inducted

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. Five such individuals have recently been named to this rank by the Eta Kappa Nu National Board of Directors. Richard Gowen, Eberhardt Rechtin, Donald Scifres, Irwin Jacobs, and Jerome Suran have been inducted as HKN's newest Eminent Members. Each of the newly inducted Eminent Members shared insights and reflections at their induction ceremonies, some of which have been reprinted here.
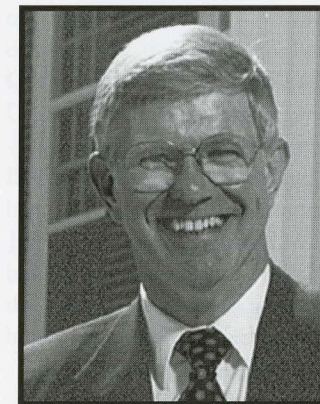
RICHARD J. GOWEN continues to serve as an educator, community leader, government liaison and engineer despite the fact he's already retired twice. Executive Director of the Homestake Laboratory Conversion Project, Gowen coordinates activities to convert the Homestake Gold Mine in South Dakota into a NSF-supported National Underground Laboratory thousands of feet under the surface. In 1957, Gowen received his BSEE from Rutgers University, began his career at RCA Laboratories as a researcher, and was called to active duty. He served as an Air Force Officer for 20 years--15 as faculty of the EE Dept. of the Air Force Academy. He helped develop defense systems and educational programs. Simultaneously he earned his MSEE and Ph.D. in EE at Iowa State University (1962). Before retirement from the Air Force in 1977, he directed the joint NASA-Air Force Space Medical Instrumentations Laboratory that developed experiments to assess weightlessness effects on the cardiovascular system during space flight. Gowen also was on the NASA Astronaut Medical Launch and Recovery team for the Apollo and Skylab missions.

Gowen joined the South Dakota School of Mines and Technology (SDSMT) in 1977 as Vice President for Academic Affairs and Dean of Engineering. He guided the integration of computer technologies into the sciences and engineering programs. From 1984-87 he was president of Dakota State University, leading the development of computer information systems degrees in both business and education. Gowen rejoined SDSMT as President in 1987 until retirement in 2003, all the while supporting student learning, research, economic and community development. Always an advocate of Web technologies to provide equal access to education for all students, Gowen was Commissioner of the national Web-Based Education Commission reviewing all levels of education in the U.S. emphasizing equitable participation for all persons. He also led in developing High Priority Connection Internet Software with its advances in database technologies to provide personalized information services to business and industry.

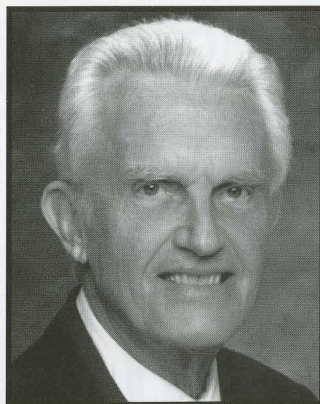Gowen was President of Eta Kappa Nu, 1998-2000, and currently chairs the HKN Centennial Committee. An IEEE Fellow, Gowen was centennial President of IEEE, President of the Triangle Coalition for Science and Technology Education, and Chairman of the Board of the American Association of Engineering Societies. A founding director of ETA Supercomputer Company, Gowen continues to serve on private and civic boards.

EBERHARDT RECHTIN

An expert in systems architecture in the fields of electrical engineering, industrial & systems engineering, and aerospace engineering, Dr. Rechtin is the former President of The Aerospace Corporation, and professor emeritus from the University of Southern California. His principal technical contributions were in communications/noise theory applied to optimum linear circuits; architecting direction of NASA/JPL Deep Space Network (DSN) for communicating with, and navigation of, spacecraft exploring the solar system; and application of formal insights (heuristics) into architecting of complex systems. The DSN never failed a mission in more than 40 years of operation.

Rechtin contributed to national security communication networks and intelligence; managing ARPANET in its formative years (1967-70); and to defense projects serving as the president who restructured Aerospace Corporation in the 1980's to support rapid expansion of national security space systems.

Besides serving in the US Naval Reserve, Rechtin's career took him from CalTech's Jet Propulsion Laboratory to the Office of the Secretary of Defense, to Hewlett-Packard, to The Aerospace Corporation.

An IEEE Fellow, Dr. Rechtin received its Alexander Graham Bell Award, among a myriad of awards from the US government and other organizations such as INCOSE, CalTech, and NASA. He is particularly appreciative of the Rodney D. Chipp Award from the Society of Women Engineers, and the Robert Herndon Black Engineer of the Year Award. He is the only white ever to receive it from the Aerospace Corporation Black Caucus in 1987. When he isn't busy in systems architecture, he pursues his interest in chamber music, hiking in the High Sierra, and clinical modeling of prostrate cancer.
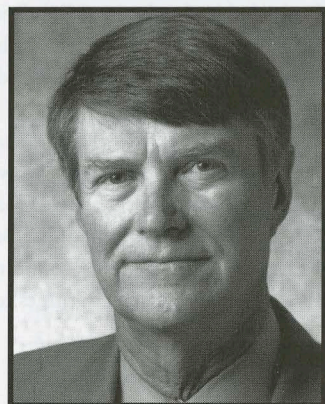
DONALD R. SCIFRES

credits the liver dinner. When one afternoon Scifres called his wife and discovered she was serving liver for dinner, he decided to stay late at work. He fiddled with some discarded parts, and discovered the key to the first distributed feedback semiconductor injection laser, now the preferred light source for high speed long distance optical fiber communications. It was patented in 1974 by Dr. Scifres and his colleagues, Drs. Burnham and Streifer while at Xerox Palo Alto Research Center. Also while there, Dr. Scifres and colleagues developed very high power semiconductor laser arrays leading to the founding of SDL, Inc. (Spectra Diode Laboratories, Inc.) in 1983. A holder of over 130 patents, Dr. Scifres also invented the vertical cavity surface-emitting laser for which he received the Rank Prize from the The Rank Foundation.

In 2001, with Dr. Scifres as CEO, President and Chairman of the Board, SDL merged with JDS Uniphase Corporation, the largest Technology deal to date. Dr. Scifres served as Co-chairman of the Board and Chief Strategy Officer until his retirement in 2003. He now is chairman of SDL Ventures, LLC, an investment company.

Having published over 300 technical articles, Dr. Scifres also served in editorial and board capacities for such journals as *IEEE Journal of Quantum Electronics* and *Photonics Spectra*. He is a member of the National Academy of Engineering and a Fellow of the Optical Society of America and IEEE, where in 1992 he was President of the Lasers and Electro-Optics Society of IEEE. In 2000 he received the IEEE Third Millennium Medal, among a myriad of other awards for his pioneering scientific and entrepreneurial contributions to the field of high power semiconductor lasers and their transformation into commercial products.

Dr. Scifres received his B.S. from Purdue University with highest distinction, and his M.S. and Ph.D. in Electrical Engineering from the University of Illinois where he earned two fellowships.
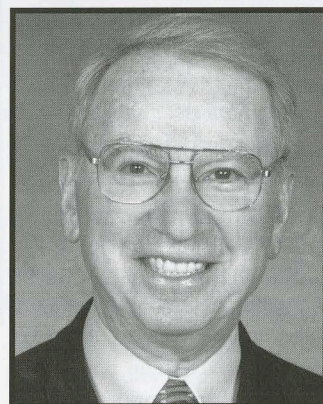
IRWIN M. JACOBS

entered the hotel administration program at Cornell University because his high school guidance counselor told him there was no future in science and engineering. Jacobs' roommate was in chemical engineering and challenged Jacobs to take some courses. A year and a half later Jacobs switched to chemical engineering, showing a strong start when he won the outstanding sophomore award from Cornell's Eta Kappa Nu chapter.

After having earned a BSEE from Cornell and a MS and Ph.D. in electrical engineering from MIT, Jacobs taught first at MIT and then at the University of California--San Diego. While at MIT he co-authored a basic digital communications textbook, *Principles of Communication Engineering* still in use today. Fascinated by information theory, Jacobs left academia after over seven years of teaching to show that digital communication theory had practical applications. He advises students to take basic theory courses because they "turn out to be very useful".
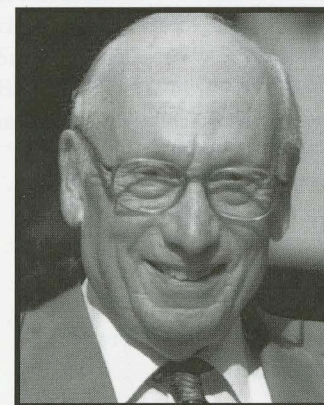
Jacobs served as co-founder, president, chairman and CEO of LINKABIT Corporation that introduced Ku-band Very Small Aperture Earth Terminals (VSATs), commercial TDMA wireless phones, and the VideoCipher satellite-to-home TV system. Over 35 San Diego communications companies trace their roots back to LINKABIT Corporation, which Jacobs grew from a few part-time employees in 1969 to over 1400 by 1985. LINKABIT merged with M/A-COM in August 1980 and Jacobs served on the board of directors until resigning from M/A-COM in April 1985.

Today Jacobs is co-founder, chairman and CEO of QUALCOMM Incorporated, the pioneer and world leader of Code Division Multiple Access (CDMA) digital wireless technology. Jacobs led its commercialization, vaulting CDMA into worldwide renown where it stands as the choice technology for third-generation wireless communications services used by tens of millions of consumers worldwide. Jacobs holds several CDMA patents and QUALCOMM boasts more than 2300, both issued and pending U.S. patent applications.

Jacobs serves on industry and community boards, and is an IEEE and AAAS Fellow. Awards include the IEEE Alexander Graham Bell Medal, 1995; Entrepreneur of the Year, RCR, 1996; and The National Medal of Technology Award, the highest award bestowed by the U.S. president for extraordinary achievements in the commercialization of technology, or the development of human resources, that foster technology commercialization, 1994.

L to R: Jerome Suran and Irwin Jacobs are inducted as HKN's newest Eminent Members and display their Eminent Member certificates alongside HKN Executive Director Ron Spanke after the induction ceremony.

JEROME J. SURAN believes

in serendipity. It put him in the right place at the right time when, in 1951 at Motorola, Suran studied the first transistor out of Bell Labs. "We had no idea at all we were standing at the cusp of a triple revolution in technology," he said, explaining that the "little, impractical, tender, delicate, noisy, tending to oscillate" transistor in beeswax would one day replace the vacuum tube. This would lead to integrated circuits, revolutionizing the manufacturing of electronic circuits and ultimately putting us on the threshold of being digitalized.

Suran pioneered work in transistor and integrated circuit technology. Serendipity again played a role when the unijunction transistor was accidentally discovered. "When you find something that doesn't behave the way you think it should, don't just throw it away. Ask why." After working for Motorola, Inc., and the J. W. Meaker Company, Suran spent the next 30 years at General Electric Company where he blended strategic business plans with technology trends and market requirements. Over his career, he developed the implantable cardiac pacemaker for GE, obtained 19 patents, and co-authored two books on transistor circuits.

In academia, Suran is Senior Lecturer Emeritus in the Graduate School of Management and the ECE department of the University of California in Davis, which recognizes him for teaching excellence. He developed courses on management policy and strategy, on the management of professionals, and on microelectronic analog and digital circuits and systems. With insight gained as both engineer and high-level manager, he tells students "if you really want to get the most out of creative people you must give them their own head." Let them pursue their passions in their own way. Known as the originator of flextime at GE, Suran once (unsuccessfully) threw out a GE auditor because he only clocked when employees came in-never when they left.

Suran cautions his students to stay grounded if they ascend the management ranks and never to take themselves too seriously. Power and money are the two stress points that could land them in muddy ethical waters. In a touching tribute to his recently deceased spouse of 51 years, Suran said she kept him--tactfully and gently--grounded.

A member of the Connecticut Academy of Science and Engineering, Suran was elected as an Eminent Engineer of Tau Beta Pi. He is a Fellow of AAAS and IEEE. In 1979 he served as IEEE President and in 2000 received the IEEE Third Millennium Medal for outstanding achievements and contributions to the profession.

OUTSTANDING
Young Electrical Engineer
AWARDS
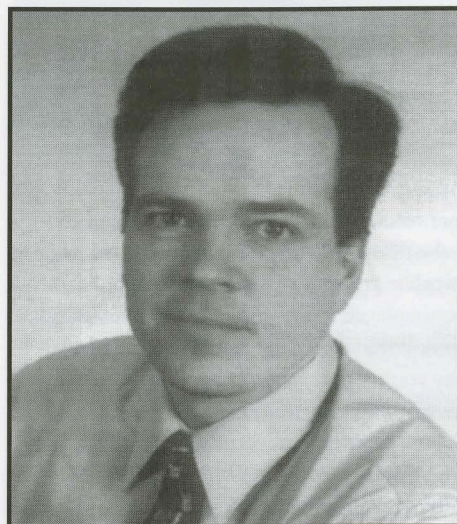
Mikko Herman Lipasti

Winner of Eta Kappa Nu OYECE Award

BY VIRTUE OF HIS SEMINAL CONTRIBUTIONS TO COMPUTER
PROCESSING AND ARCHITECTURE AND FOR SERVICE
TO HIS COMMUNITY AND HIS CHURCH

E ta Kappa Nu held its spring awards banquet on April 28, 2003 in Princeton, NJ to honor the 2002 Outstanding Young Electrical Engineer recipients, the 2003 Karapetoff Technical Achievement award recipient, and the 2002 Distinguished Service Award recipient. Mikko Herman Lipasti was named the winner of the 2002 OYEE award. Mikel White and David Weigandt were named as OYEE honorable mentions.

Dr. Lipasti is currently an assistant professor in the Department of Electrical and Computer Engineering at University of Wisconsin - Madison. He received his B. S. in Computer Engineering from Valparaiso University in 1991, and M.S. (1992) and Ph.D. (1997) degrees in Electrical and Computer Engineering from Carnegie Mellon University. He was born in Taichung, Taiwan in 1968 before his parents returned to Finland.

Prior to beginning his academic career in 1999, he worked for IBM Corporation in both software and future processor and system performance analysis and design guidance, as well as operating system kernel implementation. While at IBM he contributed to system and microarchitectural definition of future IBM server computer systems.

He is a member of IEEE and Tau Beta Pi, has co-authored a textbook in computer architecture and has served on numerous conference and workshop program committees. He is co-organizer of the annual Workshop on Duplicating, Deconstructing, and Debunking (WDDD). He has published numerous conference and journal papers, in particular the seminal work on value locality and value prediction, and has filed seven patent applications. He won the Best Paper Award at MICRO-29 for one of his seminal papers, *Exceeding the Dataflow Limit via Value Prediction*, and has received IBM Invention Achievement, Patent Issuance, and Technical Recognition awards. He is currently advising four Ph.D. students and seven MS students at the University of Wisconsin, and consistently receives higher-than-average teaching evaluations from students in his courses. His research interests encompass the architecture and design of high-performance desktop, server, and application-specific computer systems.

In addition to his professional accomplishments, Mikko has regularly volunteered his time through various religious and service organizations. At Christ Memorial Lutheran Church, he has taught Sunday School, led a midweek confirmation class discussion section, served on the school planning committee and currently sings in the church choir, attends a weekly home-based cell group and a biweekly men's accountability group. On campus, he leads an English-language discussion group at the International Friendship Center, advises multidisciplinary students in the undergraduate AMEP (Applied Mathematics, Engineering, and Physics) program, and serves on various departmental committees.

He enjoys spending his remaining free time with his wife, Erica, and two children, Emma, who is ten years old, and Elias, who is seven.

OYECE Honorable Mentions
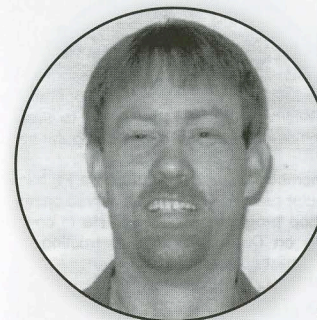
Mikel J. White, *for his innovations in microwave integrated circuit amplifier architectures, and for his coaching of his community's youth and his volunteer chaplaincy of its imprisoned.* Dr. White is a Principle Engineer in the Raytheon Dallas Monolithic Microwave Integrated Circuit (MMIC) design center. There he developed a new MMIC topology which permitted the design of low-power and low-noise amplifiers and enabled system architectures that had never been practical before. He worked closely with designers, wafer fabrication and device development scientists in factories throughout the product chain to perfect the devices. He was the Raytheon team lead for a ku-band solid state amplifier and received the Raytheon Honors title in 2000, and a Raytheon Excellence in Technology award in 2003 for a transmit/receive module for Phased Array Antennas that "redefines the state of the technology performance". Mikel is a member of IEEE and has published 21 papers in various journals as well as in various international conference proceedings. He received the BSEE degree in 1992 magna cum laude, the MSEE in 1996 and a Ph.D in 1997 from the University of Utah. Mikel grew up in Milford, Utah and spent many years working on a farm. He coaches youth basketball, soccer, and wrestling; teaches adult Sunday school class; and serves in a volunteer chaplaincy program at a Texas prison unit.
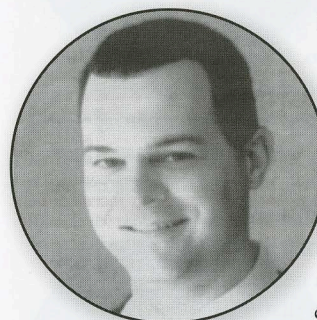
David A. Weigandt, *for development and application of carrier interferometry spreading codes, and volunteer work among his community's needy.* Dr. Weigandt is an ECE instructor at Colorado State University. Working at the CSU Advanced Wireless Communications Laboratory in the area of Orthogonal Frequency Division Multiplexing (OFDM), his contributions have led to improvements in system performance, power efficiency, and throughput via use of carefully designed Carrier Interferomenry (CI) spreading codes. These codes enable the exploitation of channel diversity through frequency domain equalization. As a result of this work, two companies, Idris Communications and CIAN Systems, hired David as a technical consultant to support design and proof-of-concept testing. Motivated by David's design and testing results, these companies are currently prototyping the CI/OFDM techniques for use in satellite links and WiFi cards. David's work has led to 14 conference and journal publications and he is co-author of the book *Multicarrier Technologies for Wireless Communications*. He has served as a reviewer for IEEE journals and conferences. Dr. Weigandt chairs the CSU Student Technology Committee as well as CSU's chapter of the Order of the Engineer Society. David received the BSEE from New Mexico State University in 1999, graduating as part of the Honors Certificate program, and the Ph.D in EE from Colorado State University in 2003. He volunteers with the Good Samaritan Village nursing home, the Special Olympics, and helped fundraise for the Ronald McDonald House.

OYECE Finalists
Fred D. Barlow, III
Antony N. Selim

THE ALTON B. ZERBY AND CARL T. KOERNER

OUTSTANDING
Electrical Engineering Student
AWARDS

Aaron Ohta, left, displays his OECES winners plaque alongside Marcus Dodson, chair of the OECES Award Committee.

Aaron Takami Ohta
Winner of 2003
Eta Kappa Nu OECES Award

Eta Kappa Nu held its Fall Awards Luncheon on November 1, 2003 in Long Beach, California to honor the 2003 Alton B. Zerby and Carl T. Koerner Outstanding Electrical Computer Engineering Student award recipients and the induction of new Eminent Members. Aaron Takami Ohta was selected as the winner of the 2003 OECES award. In addition, Joseph Case, Kimberly Grogan, and Kirshan Gupta were named as OECES Honorable Mentions, and five individuals were identified as OECES finalists. HKN President Eric Herz presented the OECES award at the awards dinner.

AARON TAKAMI OHTA graduated with a GPA of 4.0, number one in his class of 121 EE Seniors, for his BS in EE from the University of Hawaii. He was nominated by the Delta Omega Chapter of Eta Kappa Nu, where Dr. Wayne Shiroma is the Faculty Advisor. Aaron is a member of IEEE and has been honored with membership in Eta Kappa Nu where he served as Treasurer.

From his freshman year he was interested in the "Micro Mouse" an IEEE sponsored competition to build a small autonomous robot whose task is to solve a maze in the shortest time. He joined a team and eventually led a group of teams, including securing the financing, to winning several places among the top 10 in competitions, often first place. He held tutorials to train new members.

As a sophomore Aaron was part of a student team that designed a 5GHz wireless transceiver, a project led by the 2001 Zerby-Koerner Award winner.

In his role as a project leader of the University of Hawaii "CubeSat" project, he led a group of more than 60 civil, electrical, and mechanical engineering students in designing and building a pico satellite into low Earth orbit. As overall project director, Aaron organized the design, managed seven multidisciplinary teams, secured a $120,000 Grant and managed the project budget. It was run as a small business. The satellite was launched in October 2003.

Aaron wrote proposals and received well over $100,000 for several research projects at the University of Hawaii. He co-authored a book and eight conference papers, and made many presentations to high schools, universities, communities, and professional meeting settings, as well as private presentations to the dean, the university president, state legislators, and the general manager of the Aerospace Corporation. He participated in four international conferences where he presented papers.

Aaron saves his weekends for a full social life. He is very close to his family and girlfriend of six years. He is an avid surfer and also enjoys fishing and hiking. He has completed eight Honolulu Marathons.

OECES Honorable Mention
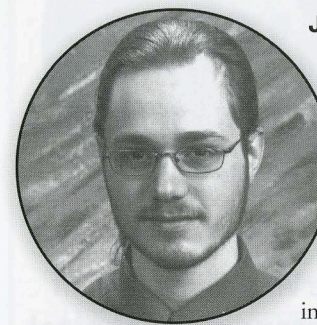
Joseph Tobias Case graduated with a GPA of 3.97 for his BS in EE, and his second major in physics, from the University of Missouri-Rolla. Joseph is a member of IEEE, Society of Physics Students, American Physical Society, Golden Key, Toastmasters, and HKN. Joseph worked as a research assistant at Applied Microwave Laboratories. This laboratory uses microwave techniques of analyzing and monitoring corrosion on various materials. On this subject, he authored a journal paper, eight conference proceedings, and three technical reports - all published. He interned at IBM in a branch that specializes in recovering computer data following a catastrophe. He is active in his church, teaching both adult and intermediate classes and organizing and updating announcements of events, meetings, etc. He enjoys playing and making games on his PC.
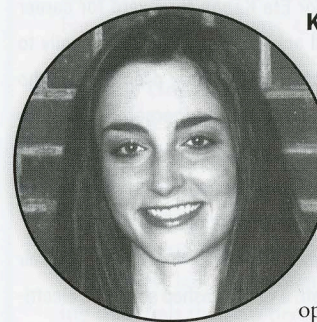
Kimberly Erin Grogan graduated with a GPA of 4.0, ranking number one in her class of 167 EE seniors, for her BS in EE from Colorado State University at Fort Collins. Kimberly is a member of IEEE, the National Society of Collegiate Scholars, Honor Student Association, and HKN where she served as its president. Kimberly interned at Hewlett-Packard where she prototyped a networked digital camera and wrote the code for the camera's firmware. While interning at Lockheed-Martin she ran simulations to verify test procedures used for rocket launches, and developed a test procedure tracking system. Kimberly tutored students in her engineering school, arranged and organizing ECE field trips, and demonstrated engineering projects for engineering visitation days. Outside of school she assisted Cub Scouts, participated in food drives, and worked on restoring trails in Horse Tooth Mountain Park.
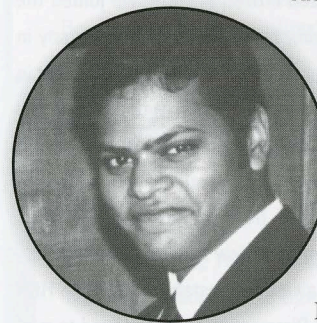
Kishan Gupta graduated with a GPA of 3.9 for his BS in EE and Computer Science from the University of California at Berkeley. He also has a minor in Business Administration. Kishan is a member of IEEE and was honored with membership in Tau Beta Pi and HKN where he served as treasurer. Kishan worked as an undergraduate student researcher with Professor Boris Rubinsky on Electrical Imaging Tomography. He also co-authored papers on "Surface Micro Machined Polarization Beam Splitters," and "Etch Rates for Micro Machining." Kishan interned at Aligent Laboratories. Kishan was co-president of "Computer Literacy for Kids", a non-profit corporation dedicated to forming alliances with other organizations to distribute hardware and software to underprivileged families. This is in association with "Berkeley Neighborhood Computing", a group of UC students that repair and rebuild computers to distribute to low-income families.

2003 OECES Finalists:
Grant Cochenour, Kansas State University
Richard D. Halloran, III, Oakland University
Steven Herrera, University of Southern California
Jennifer A. Mueller, Gannon University
Justin Turnier, Rensselaer Institute

VLADIMIR KARAPETOFF AWARD

Bernard C. DeLoach, Jr.

2003 Winner

For technical contributions in the fields of microwaves and optics

Bernard C. DeLoach, Jr. was named the 2003 winner of the Vladimir Karapetoff Award. He received this major award of Eta Kappa Nu for his technical contributions in the fields of microwaves and optics.

He earned the B.S. and M.S. in physics from Auburn University and his Ph.D. in physics from Ohio State University. He joined AT&T Bell Laboratories in 1956 as a member of the technical staff working

Bernard DeLoach (right) displays the Karapetoff award alongside Don Christiansen, retiring chair of the Karapetoff award committee.

on microwave filters, microwave devices, and microwave and millimeter wave parametric amplifiers. In 1962 he was made supervisor of the microwave device group responsible for switching PINs, varactors, and computer diodes. During this assignment, he initiated a search for a solid-state source of millimeter wave power. He worked on Gunn diodes and ultimately discovered the impact avalanche and transit time device (IMPATT).

In 1966, as department head at AT&T Bell Labs, he worked on the development of IMPATT diodes, leading to the deployment by AT&T of a millimeter wave communication system. In 1970, while involved in the development of visible light emitting diodes, he invented a way to incorporate them into telephones for dial illumination.

Beginning in 1973, DeLoach initiated semiconductor laser reliability studies at Bell Labs, during which he and his colleagues Hakki, Hargman, and D'Asaro discovered the principal laser failure mechanism, which permitted the subsequent increase in laser lifetime from a matter of minutes to 1000 years. DeLoach was a department head in charge of superconductivity research and coherent optical communications from 1981 to 1983. From 1983 to 1989 he was in charge of all photo detector and LED work at AT&T, and AT&T's program of monolithic integrated opto-electronics.

DeLoach is the holder of 18 patents. His principal technical contribution to long-lived lasers occurred early on with his prediction that dark "strain" lines would appear when looking inside the laser. "They were there and we were off to the races," he said recently.

In recognition of his work on microwave sources that culminated in the IMPATT discovery, and of his paper placing all known solid-state sources into a theoretical framework that clearly indicated their capabilities, he was awarded the David Sarnoff Medal (IEEE) and the Stuart Ballantine Medal (Franklin Institute).

He is a Fellow of the IEEE, a member of Sigma Pi Sigma, Pi Mu Epsilon, Sigma Xi, and Tau Beta Pi. DeLoach is the author of numerous papers including an invited paper, *"The IMPATT Story,"* that was published in the *IEEE Transactions on Electron Devices,* July 1976.

In 1993 he received the IEEE Medal for Engineering Excellence for the first development of highly reliable semiconductor lasers. He retired from Bell Laboratories in 1989 and is currently Courtesy Professor, at the University of Central Florida EE department.

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 humankind.

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.

2003 AWARD JURY

Malcolm Currie

Eli Fromm

John E. Hopcroft

Margorie R. Townsend

OUTSTANDING TEACHER AWARD

DARYL G. BEETNER is the winner of the C. Holmes MacDonald Outstanding Teaching Award for the year 2003. Dr. Beetner received his BSEE from Southern Illinois University at Edwardsville in 1990 and MSEE from Washington University at St. Louis in 1994. Beetner was granted his D.SC. in Electrical Engineering at Washington University in 1997.

While in school Dr. Beetner served as a Research Associate at Washington Univ. and served a year as a visiting Faculty member at Southern Illinois. Upon graduating from Washington Univ. he joined the faculty of the University of Missouri-Rolla as Assistant Professor of Electrical and Computer Engineering.
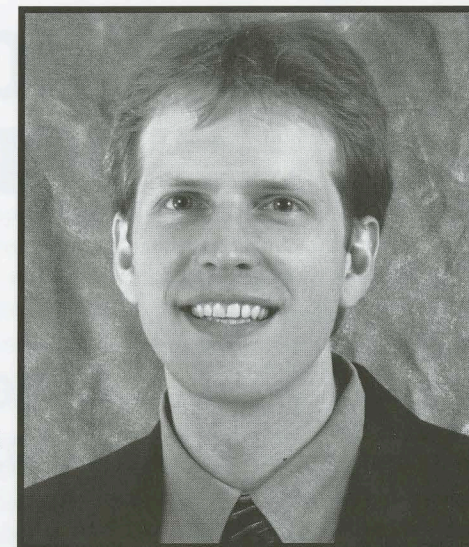
Beetner was the first professor hired at the University of Missouri to develop a computer engineering program. He developed a new lab course complete with teaching materials that has been significantly helpful to students. The new course has been presented at conferences, distributed through web seminars and with the use of CD's, given to at least 75 other universities.

The St. Louis Section of IEEE selected Beetner as an Outstanding Faculty Member who has made considerable contributions to Engineering Education. It was noted that his teaching style is both unique and innovative. In the professional area, Beetner has been active in the Rolla Section of IEEE where he progressed through the officer chairs serving eventually as president of the Section. Beetner is a registered Professional Engineer in the State of Missouri.

Dr. Beetner is a Co-advisor to the HKN undergraduate Chapter. He works with the Chapter to sponsor projects that improve the local community. He also participates in community events that interest young people in pursuing an ECE education. This includes high school workshops and career fairs. Beetner is involved in the Boy Scout Merit Badge program, and has sharpened his speaking skills by participating in the local Toastmasters Organization where he has become a club officer.

Beetner is currently involved in significant work in the medical area: performing clinical research on skin cancer and electrocardiology. He is performing research in Humanitarium Mining - developing methods to help find and remove land mines. In the research area, Beetner has been involved in grants totaling $3.5 million with his personal contribution being $708 thousand. He has made 11 presentations, co-authored 5 books, 17 technical reports and 27 refereed conference proceedings and journal publications. In the words of a colleague, Beetner is a renaissance faculty member who appropriately balances excellence in teaching and advising with active research.

Honorable Mention

Dr. Annette R. von Jouanne at Oregon State University was selected as the Honorable Mention for the 2003 C. Holmes MacDonald Outstanding Teaching Award.

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 outstanding 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 28 winners and 38 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.

2003 Award Jury

Mr. Thomas L. Rothwell, Dr. April S. Brown, Dr. Richard R. Schultz

Dr. John Undrill, Dr. Bruce Wollenberg

DISTINGUISHED SERVICE AWARD
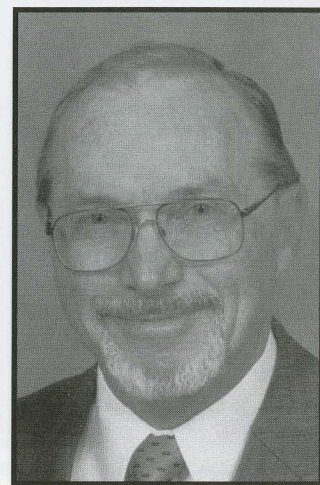
Robert H. Arehart

2003 DSA Recipient

Lifetime HKN Activities:

Bob Arehart was initiated in 1949 into Beta Alpha chapter of Eta Kappa Nu at Drexel University. After graduation, in 1951 he joined the HKN Philadelphia Alumni Chapter eventually becoming president in 1970-71. The alumni chapter held monthly luncheon meetings with a speaker making a presentation of interest to all. The president ran the meetings, and the vice president obtained the ten monthly speakers. In 1970-71, he organized and promoted an area HKN undergraduate chapter Visitation at Drexel's Lodge outside Philadelphia. This was a meeting of the officers of nine local undergraduate chapters. Bob was elected to the HKN national board of directors as the Eastern Region director from 1986-88. He was elected HKN national Vice-President in 1989-90 and National President in 1990-91. During his tenure as president, the board established the Vladimir Karapetoff Award.

After a year in which the HKN C. Holmes MacDonald Outstanding Young E.C.E. Teaching Award was not presented in 1988, Bob brought together a committee to resurrect the award. In 1989, Bob was named chair of this committee, a position he has continuously held to the present. Bob arranged for support from Drexel University, which supplied an administrator to help with the award details. As chairman, he has provided many articles and pictures of the award winners to *The Bridge*.

Bob has been very active in the expansion of Eta Kappa Nu. He installed the Iota Phi chapter at West Point, Iota Psi at NYIT-Old Westbury, Kappa Beta at Wilkes University, Kappa Epsilon in SUNY-Binghamton, Kappa Zeta at NYIT-New York City, Kappa Mu at Capitol College, and Kappa Xi at the Univ. of South Florida. He provided articles and pictures of the installations to *The Bridge*. In May 1993, Bob inducted Merril W. Buckley, Jr. IEEE president, into HKN as a Professional Member.

Bob Arehart receives the 2003 Distinguished Service Award and Bridge-shaped certificate from Eric Herz, HKN 2003-04 President. The award was presented at the HKN Spring Awards Banquet in New Brunswick, NJ on May 3, 2004.

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 lives. 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.

**2003 DSA
SELECTION COMMITTEE**

Larry Dwon, Chair

Donald Christiansen

Marcus D. Dodson

John E. Farley

Tony Gabrielle

Alan Lefkow

Thomas L. Rothwell

Berthold Sheffield

John Tucker

EDUCATION SPOTLIGHT

by Mohammad Shahidehpour

Bioengineering: A quest to take human health to an extraordinary level

Exciting and important areas of science and technology are currently in interdisciplinary arenas, especially subject areas aimed at biomedical research which apply engineering principles to human biological challenges. The quest has led many universities across the country to embark on a new engineering discipline called bioengineering. The bioengineering department is a great role model for bringing together domains of knowledge that were not previously coupled, said Dr. Paul Gray, vice chancellor and provost at UC-Berkeley. "We're not really joining engineering and biology," noted Professor Plummer, dean of the School of Engineering at Stanford. "We're building something new which sits at the intersection of engineering and the life sciences. We believe that interdisciplinary teaching and research at this intersection represent one of the great opportunities for this century." Historically distinct disciplines in engineering, science, and medicine are finding new areas of synergy in bioengineering driven by the recent molecular and genomic revolutions and advances in information and computing technologies. The bioengineering departments include faculty from several fields of engineering and the biological and health sciences as well as from the medical schools. To fulfill degree requirements, students may select courses from such diverse subjects as medical sciences, engineering, computer science, animal sciences, food sciences, mathematics, chemical sciences, and biology. The range of research opportunities available to bioengineering students is equally broad. "One of the research directions in bioengineering is tissue engineering and
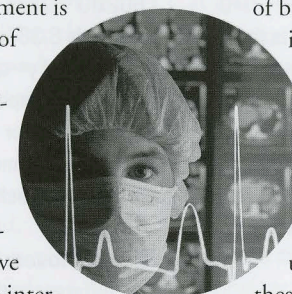
the improvement of mechanical devices, such as prosthetics," says Dr. Malcolm Pope, a leading authority in the field of biomechanics. Tissue engineering is a rapidly growing high-tech field. Engineers contribute very significant knowledge concerning the characteristic movements of healthy and diseased cells in the body, the relationship between bodily tissue and metallic implants, and the effect of mechanical forces on cells. Bioengineers, some of whom focus on biomedical engineering, are developing better methods of breast cancer detection, devising technologies for assisting in reproduction, and improving methods of insuring a safe food supply. Neuroengineering is another bioengineering field for the study of neural function through the use of computer simulation, hardware-based modeling, and mathematical analysis, in concert with physiological and psychophysical experiment. The goal is to use engineering analysis to uncover the principles of neural function and to use these principles in the design of neuromorphic systems. Other examples of bioengineering include developing methods to destroy bacterial biofilms containing E. coli and Salmonella, cryopreserve living tissues and cells, use microbes to purify water, determine the nature of physiological control during exercise, and evaluate respiratory stress caused by protective mask wear. These are just sample projects in which bioengineering department faculty and students could be engaged in this exciting field of engineering which has captured so much attention in universities and leading industries throughout the world.

Dr. Shahidehpour is Professor of Electrical and Computer Engineering at the Illinois Institute of Technology, and has also served HKN over the past decade as Director, Vice President and President.

BRIDGE ETERNAL

The condensed format for these notices of death is necessary due to Eta Kappa Nu's large membership and by space limitations in *THE BRIDGE*. The assistance of all members and member families is requested in reporting to the Editor the deaths of HKN members, with appropriate details.

–	–	William R Horsfall	no details	Θ	'48	Harold A Peterson	05/08/01	ΒΚ	'41	Wilber G Hole	no details
–	–	Dr. George L Haller	no details	Λ	'32	Howard H Sheppard	11/04/99	ΒΚ	'43	Mr. Bryce G Russel	04/29/01
–	–	William H Freund	01/11/02	Λ	'85	Leslie H Robinson	02/19/90	ΒΠ	'48	Morton R Galane	no details
–	–	John R Pierce	Apr 02	N	'37	Sanford K Fosholt	08/14/98	ΒΡ	'47	Zeno Neri	07/14/01
–	–	Jacob Rabinow	Sept 99	O	'50	John A Holmquist	no details	ΒΣ	'49	Edward Spiglanin	07/07/02
Α	'44	Arthur Hoogerhyde	no details	Τ	'50	John W Wilson	Dec 01	ΒΦ	'48	Thomas S Woodson	08/23/00
Β	'36	Harold F Wells	02/05/01	Ξ	'70	Ronnie E Walls	Sept 98	ΓΒ	'52	Leonard Fine	02/13/02
Γ	'42	Roger L Frantz	01/18/02	Ξ	'90	William Shields Neely	05/14/90	ΓΗ	'51	Stanford Goldman	07/12/00
Γ	'44	Clarence J Carter	May 01	Ψ	'53	Alton W Sissom	no details	ΓΜ	'78	Allen M Dewey	no details
Δ	'48	Frank R Valvoda	04/11/02	ΒΔ	'63	G Timothy Anderson	no details	ΔΕ	'91	Steven Black	03/15/99
Δ	'49	John C Lund	no details	ΒΘ	'54	Cleo M Stearns	05/22/01	ΔΧ	'95	Harold Kiel	12/06/99
Ε	'39	Richard B Steele	12/21/00	ΒΙ	'49	Harvey G Nelson	01/24/02	ΘΞ	'90	Mark K Manghi	12/22/98
Ε	'49	Wilferd E Yohe	10/02/01	ΒΙ	'58	Edwin C Lowenberg	2001				

HOME|WORK

Current Assignment

❶ Digital Logic: The sum of all of the digits needed to write down all of the numbers from zero to 15 would be 0+1+2+3+4+5+6+7+8+9+1+0 +1+1+1+2+1+3+1+4+1+5 = 66. Without writing a program, what is the sum of all the digits needed to write down all of the numbers from zero to 1 billion?

❷ Infinite Resistance: Imagine an infinite ladder of 1Ω resistors. There is a resistor for each rung of the ladder, and a resistor on each upright between each rung. What is the resistance between two nodes that are a knight's move apart?

❸ Pathology: A rook starts in the upper right corner of a chessboard and travels to the lower left corner. It can move any number of squares, but can only move left, right, or down on each move. For our problem, it cannot move back up toward the top. If it does not cross any square more than once, how many different paths are possible?

❹ Sample Survey: John wanted to send a survey to about 2% of the members on the list and used the following scheme. He would select the first name, then skip a name, pick the next name, then skip 2 names, pick the next name and skip 3 names, etc. The last name he picked turned out to be the last name on the list. When he counted up the number of names he selected, he found that he hit the 2% target exactly. How many surveys did he send out?

Answers for Last Assignment

❶ In the Crosshairs. The factor causing the image on the CRT monitor to shift from the taped-on crosshairs when the monitor was swiveled from facing East to facing West is the Earth's magnetic field. The Earth's magnetic field has an average value of approximately 0.5×10^{-4}T, however it varies considerably in intensity, declination, and inclination from the equator to the poles. To get a correct local value you need the precise location on the Earth, which we gave in the problem as the HKN national headquarters, which can be found in the masthead of the magazine to be in Lisle, IL. 60532. Since the Earth's magnetic field also slowly changes with time, you need a particular point in time, which we stated as preparing that issue of the Bridge, which would be December 2003. A simple search in reference books or on the web will find a current reference model for the Earth's magnetic field to plug in the location and the date. This gives a local value for the field to be 0.5548×10^{-4}T, with a declination of $2^0 33m$ West and an inclination of $70^0 11m$ down. The horizontal component of this field in the N-S direction is given by $B = 0.5548 \times 10^{-4}T*\cos(2o33m)$
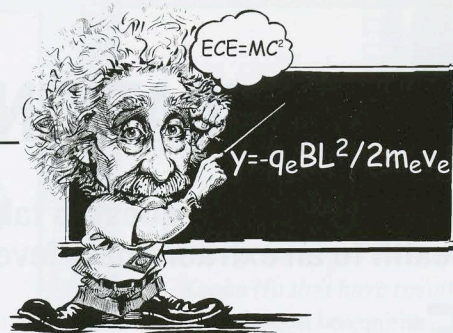
$*\cos(70^0 11m) = 0.18795 \times 10^{-4}$T. The distance from the electron gun to the screen was given as L=0.4m. With an accelerating voltage of 20,000V, the electrons have a velocity of $v_e = (2q_e V/m_e)L/2$. With $q_e = -1.602 \times 10^{-19}$C and $m_e = 9.11 \times 10^{-31}$kg, and V=-20,000V, the electron velocity is 8.387×10^7m/s. The effect of the magnetic field gives a deflection of $y = -q_e BL^2/2m_e v_e$. With the monitor facing East, the effect of the N-S component gives a displacement of 3.15mm downward. With the monitor facing West, the displacement is 3.15mm upward, so by rotating the monitor we moved the image 6.3mm upward off of the crosshairs, which is enough to significantly affect Bridge layouts.

Knight Moves: Before one should attempt to count the number of
❷ different paths that a knight could take from one corner of a chessboard to the opposite corner touching each square only once, we should at least determine if it is possible at all. For a knight starting in one corner of a chessboard to touch down once and only once in each square would require exactly 63 moves. A knight must move from black to white, or from white to black on each move. However, the opposite corners of a chessboard are always the same color, requiring an even number of moves to get there. The task is impossible, therefore the answer is zero.

Picture worth a thousand Odds. Odds of 1000 to 1 is 1/1001.
❸ Assume there were x students in the class. Since there were four girls in the class, the odds of drawing a girl's name are 4/x for the first name drawn, 3/(x-1) for the second girls name, 2/(x-2) for the third name, and 1/(x-3) for the fourth name. The overall probability of this occurring is 4*3*2*1 / [x*(x-1)*(x-2)*(x-3)] which must equal 1/1001. 4*3*2*1=24, so x(x-1)*(x-2)*(x-3) must equal 24024. Each factor: x, x-1, x-2, and x-3 must be a factor of 24024 and must be consecutive. The factors of 24024 are 2*2*2*3*7*11*13. The consecutive factors must therefore be: 2*7=14, 13, 2*2*3=12, and 11. 14*13*12*11=24024. So x = 14 for the total number of students in the class.

Plus and Minus. There is only one way that seven plus or minus
❹ signs can be inserted between the digits 1 and 9 to make the equation 1 2 3 4 5 6 7 8 9 = 100 correct and that is 1+2+3-4+5+6+78+9=100. With 3 plus or minus signs, there is also only one way and that is 123-45-67+89=100.
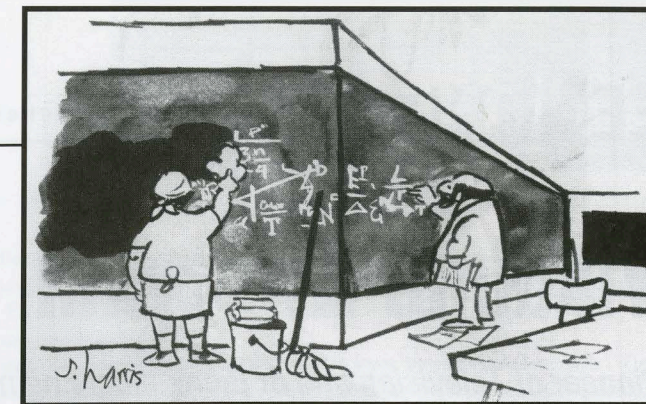

SHORT|CIRCUITS

Engineers will be Engineers...

There are 10 kinds of people in the world, those who count in binary and those who don't.

Two electrical engineering students were walking across campus when one said, "Where did you get such a great bike?" The second engineer replied, "Well I was walking along yesterday minding my own business when a beautiful girl rode up on this bike. She threw the bike to the ground, took off all her clothes and said, "I'm yours, take what you want." The second engineer nodded approvingly, "Good choice; the clothes probably wouldn't have fit."

A young computer engineering student was crossing the road one day when a frog called out to him and said, "If you kiss me, I'll turn into a beautiful princess." He bent over, picked up the frog and put it in his pocket. The frog then cried out, "If you kiss me and turn me back into a princess, I'll stay with you and do ANYTHING you want." The engineer took the frog out, smiled at it and put it back into his pocket. Finally, the frog asked, "What is the matter? I've told you I'm a beautiful princess and that I'll stay with you and do anything you want. Why won't you kiss me?" The engineer said "Look, I'm an engineer. I don't have time for a girlfriend, but a talking frog, now that's cool."

-submitted by Danel Kunkel
see his website at biowaves.com for more jokes.

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 — Stuff You Don't Learn
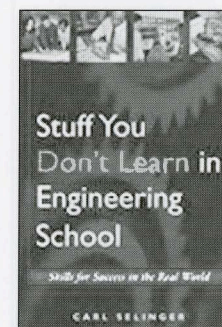
**STUFF YOU DON'T LEARN
IN ENGINEERING SCHOOL:**
Skill for Success in the Real World
By Carl Selinger
Wiley-IEEE Press (WWW.wiley.com)
192 pages, List Price: USA $32.95.

Written in plain terms, *Stuff You Don't Learn in Engineering School* is an excellent book for recently graduated engineering students. The book focuses on important, real-world issues with which newly minted engineers have little or no experience. Since the topics covered are all basic business skills, this book is not for someone who has been out of school for a few years.

The book is designed to acquaint engineers with real-world issues, target a person's strengths, improve weaknesses and help young engineers work more effectively by: Setting priorities, Working in a team, Being more effective at meetings, Speaking in front of a group, Negotiating personal or business issues, Dealing with stress, and just having more fun in the process!

Let's face it, starting a new (first) job is an exciting but trying experience. The simplest things, like taking notes at a staff meeting and attending a job performance evaluation, can be daunting. *"Stuff You Don't Learn"* provides advice and suggestions on how to deal with and succeed in these types of situations.

An engineer himself, Selinger knows where an engineer's interpersonal weaknesses lie. (From the stories he chose to include in the book, some he evidently found out about through painful, personal experience.) The book also contains quotes and comments from students who have attended his *"Stuff You Don't Learn…"* seminars, which he has been giving for ten years. As a result, the book covers a range of important topics--from writing and speaking in a business environment to negotiating a salary increase.

On the back cover of the book, Selinger correctly points out that "in order to succeed in your career, you'll need more than just great technical skills. You'll need to be able to promote your ideas, share them with others, and work with a wide variety of people." Unfortunately, these soft skills are often glossed over or dismissed as unimportant in heavily technical fields.

— Review by Patricia Irwin, IN '87

HKN AUTHORS

• **Elements of STIL - *Principles and Applications of IEEE Std. 1450,*** by Greg Maston, K '81 with Tony Taylor and Julie Villar, Kluwer Academic Publishers, 332 pp, $145.00.

• **Electrical Engineers Portable Handbook,** by Robert Hickey, ΓB '89, McGraw-Hill, 2003, $59.95.

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

by Frederik Nebeker

Vladimir Zworykin

Pioneer of Television and of Biomedical Engineering
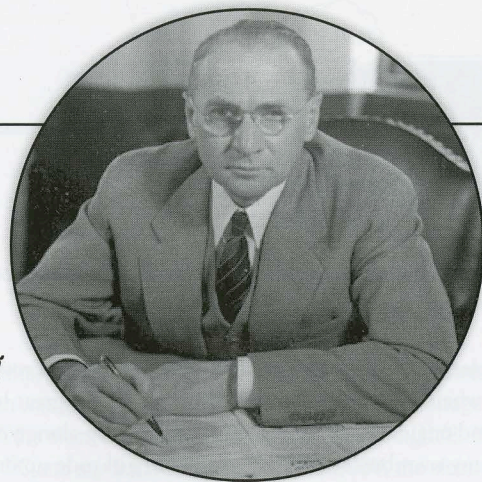
Vladimir Zworykin, Eta Kappa Nu Eminent Member, did as much as anyone to bring about modern television, inventing both television cameras and picture tubes. He contributed to many other technologies, including the electron microscope and infrared night-vision, and he was one of the first to recognize that electronics could contribute much to biomedical research and practice.

FROM CZARIST RUSSIA TO THE UNITED STATES

Zworykin was born 30 July 1889 in the Russian city of Murom, where his father operated a steamship passenger service on the Oka River. He remembers gaining an interest in electrical engineering when as a boy he saw with amazement how his father could push a button and cause a response elsewhere on the ship. Zworykin studied electrical engineering at the St. Petersburg Institute of Technology, receiving his degree in 1912. There he studied under Boris Rosing, who was working to develop a partly mechanical, partly electronic television system. After a period of study in Paris, Zworykin returned to Russia to serve as a radio officer in the army. The Russian revolution and civil war prompted his immigration to the United States.

In 1920 Zworykin accepted a job at the Westinghouse research laboratory to pursue the development of electronic television. In 1923 he patented a camera tube, and in 1924 he patented a picture tube. The following year he gave a demonstration of his system for Westinghouse executives. Zworykin was proud of his work, but the executives were unimpressed with the faint and stationary image of the letter x that appeared on the receiving tube. They concluded that Zworykin should work on something more useful.

> Zworykin called his receiver tube the kinescope; it was similar to a cathode-ray oscilloscope except that there is an additional element to control the intensity of the beam.

TELEVISION DEVELOPMENT AT RCA

Zworykin then directed his research toward subjects that were of immediate concern to Westinghouse and, at the same time, relevant to television: photoelectric cells, sound recording, and facsimile systems. In late 1928 and early 1929 he made important improvements to his camera tube and receiving tube, and in 1929 he arranged for a meeting with David Sarnoff of RCA. Sarnoff agreed to hire Zworykin and to support his program to develop fully electronic television. Over the next decade Zworykin's group gradually solved the countless problems

involved in making a practical system. Zworykin called his receiver tube the kinescope; it was similar to a cathode-ray oscilloscope except that there is an additional element to control the intensity of the beam. His camera tube he called the iconoscope. A new version, called the image iconoscope, combined ideas from the image dissector tube invented by Philo Farnsworth.

Finally in 1939 RCA was ready to commercialize television. At the opening of the New York World's Fair in 1939 there was a television broadcast that featured President Franklin Roosevelt, along with David Sarnoff. It was only in the late 1940s that television finally became common; there were just 250,000 sets in use in the United States in 1947, but 8 million in 1951.

OTHER APPLICATIONS OF ELECTRONICS

Zworykin worked on many things besides television. He developed infrared image tubes, as used in the Snooperscope and Sniperscope in World War II. He designed secondary-emission multipliers, used in scintillation counters and elsewhere. And he worked with James Hillier in developing the electron microscope. This work got him interested in the use of electronics in medicine and biology, and after his retirement from RCA in 1954 he became director of the Medical Electronics Center at the Rockefeller Institute in New York City, a position he held until 1962. His work included development of an ultraviolet color-translating microscope and the so-called endosonde, a pill that, after being swallowed, transmitted data from the gastrointestinal tract. (After the 1957 launch of Sputnik, Zworykin's endosonde got the name Gutnik.) He was founder president of the International Federation for Medical Electronics and Biological Engineering.

In an interview with Zworykin in 1975, when he was 85 years old, he acknowledged that he did have a television set, but it stood in a corner and he seldom turned it on. He found television programming abominable and said he felt guilty, having done what he did to develop television. But he loved movies, and dreamed about the day when you could build a collection of the movies you liked and watch one whenever you felt like it. Zworykin died on 29 July 1982, just a few years before videos made this dream possible.

CAREER BRIDGE

INDUSTRY

Product Marketing Engineer - Lexington, MA STMicroelectronics is seeking a JR. Product Marketing Engineer with 2+ years of microcontroller and/or non-volatile memory experience to expand our presence in the mass market. Will provide direct technical assistance, evaluate applications and make recommendations for alternative devices, design and propose alternative solutions with our products. Will identify new opportunities in collaboration with the sales force and propose the most appropriate technical solutions for the customers' needs. Facilitates the technical presentation of the new products to the customers and to internal sales force. Interfaces with the Product Divisions in France/US/Italy. Trains distributors/customers and sales force. Position Requires a BSEE, 2 years experience with microcontroller and/or non-volatile memory and experience with customers in a technical role. To apply, email stcareers@st.com and reference JOB:160-Bridge in the subject line.

PDF Solutions - The fastest growing independent provider of advanced yield ramp consulting services and software for major IC manufacturers. PDF is seeking both recently graduated and experienced candidates with PhD, MS or BS degree. Engineering positions in San Jose, San Diego and Dallas, TX include: Technical Yield Managers, Yield Ramp Engineers, Technology Developers, Software Engineers, Product Engineers, Process Integration Engineers, Sr. Engagement Director, Application Engineers, Program Managers, Device Engineers, and dataPOWER Apps Engineers. For more information visit http://www.pdf.com or call 408-938-6432, Attn: Staffing, email jobs@pdf.com. Mail: PDF Solutions, Inc. 333 W. San Carlos St. Suite 700, San Jose, CA 95110.

Sr. Measurement Engineer - Corning Incorporated is looking for electrical engineers to join our team. Responsibilities include Design, develop, and implementation of measurement equipment and techniques, Identify and work to resolve gaps between the attribute and technology roadmap and existing measurement capability, Design experiments to evaluate gauging technology; solid understanding of statistical methods / analysis is required, Develop software for gauge and/or sensor evaluations (and/or production use). Prefer-

ence for Visual Basic and/or Visual C++. 20-50% travel, including international. Required skills include Proficiency in Electrical Engineering, Solid understanding of measurement technology and testing methods, and Understanding of optics. Desired skills include Computer programming experience (Visual Basic, Visual C++, PLC, robotics), Understanding of statistics, Aptitude in foreign language / foreign culture (Japanese, Chinese, and/or Korean). BS in Electrical Engineering plus 8 years experience. To apply please visit http://www.corning.com/careers/opportunities and reference Req#11270.

Senior Controls Engineer - Corning Incorporated is looking for electrical engineers to join our team. Responsibilities include Take projects from design to build, install and debug phases, Thoroughly document all designs to ensure fast and efficient technology transfer to various facilities. Required Skills include Experience with manufacturing control systems design/build/install/debug phases, Experience with real-time control systems (e.g. RTOS, PLC, various industrial controllers etc.) including s/w, Experience with HMI & Database technologies (e.g. iFIX, OSI PI, VB etc.), Experience with Motion Control technologies (e.g. Giddings & Lewis, Compumotor, RSLogix etc.). Desired skills include Some experience with Project leadership skills (e.g. scope, budget, timelines, etc.) Advanced controls experience such as fuzzy logic, neural net etc., Familiarity with various power heating solutions (e.g. SCR's etc.), Familiarity with AutoCAD, Robotics, Flexible with respect to travel to international sites, Knowledge of Chinese or Japanese language is a plus. BS in EE plus 5 years experience. To apply please visit http://www.corning.com/careers/opportunities and reference Req#11041.

ACADEMIA

The University of California, Los Angeles, invites applications for temporary, full- or part-time faculty and other academic staff positions in various areas of electrical engineering. These areas include, but are not limited to, Nanoelectronics, Communications Engineering, Computer Engineering (especially the field of embedded computer systems), Control Systems, Digital and Analog Circuits, Electromagnetics, Signal Processing, and Solid State Electronics. The level of appointment will be commensurate with the applicant's qualifications. A Ph.D. in Electrical Engineering or an equivalent degree is required with an excellent professional and research record and experience. Please send your resume to (Ms.) Harue Suzuki, HR/Personnel Manager, Electrical Engineering Department, UCLA, 56-125B Engineering IV, Los Angeles, CA 90095-1594. The University particularly invites

applications from women, minorities, and persons with disabilities. UCLA is an Equal Opportunity Affirmative Action Employer.

Washington State University, Pulan, WA: Three Faculty Positions in Bioinformatics/Computational Biology: The College of Agriculture, Human, and Natural Resouce Sciences, the College of Engineering and Architecture, and the College of Sciences at Washington State University will fill three tenure-track positions in bioinformatics/computational biology to begin August 2005 or later, at the Assistant, Associate, or Full Professor level. Applicants should have expertise in the broadly defined fields of bioinformatics or computational biology. Areas of research interest can include any effort to bring mathematical or computational approaches to bear on important questions in biology. These may include development of statistical, theoretical, or computational approaches for interpreting biological, health, or medical data; mathematical models or computational techniques; or quantitative strategies for integrating diverse types of biological information and developing higher-level understanding of complex systems. Successful candidates will be expected to develop and maintain a vigorous research program supported by extramural funding, train graduate students, and participate in graduate and undergraduate teaching. Required: Earned doctorate at time of application. Desired: Ph.D. in a discipline related to bioinformatics or computational biology, or an earned doctorate at time of appointment and a record or research accomplishment in bioinformatics or computational biosciences, broadly defined; ability to communicate effectively with both students and colleagues; record indicating outstanding abilities and potential in research and teaching; record of research accomplishment in bioinformatics or computational biology. Clusters of highly-qualified individuals are encouraged to apply. Screening begins January 10, 2005. Send letter of application addressing qualifications, curriculum vitae, statement of current and long-term research interests, and arrange for four letters of reference addressing research potential, teaching, and communication skills to be sent to: Dr. Sandra Ristow, Search Committee Chair, WSU CAHNRS, 403 Hulbert Hall / PO Box 646240, Pullman, WA 99164-6240, rostow@wsu.edu, (509)335-4563, Fax (509)335-6751. Full notice of vacancy can be viewed at: http://www.chr.wsu.edu/vacancies.asp (Search#3857). EEO/AA/ADA.

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