

THE BRIDGE

vol 97, no. 2 / winter 2002

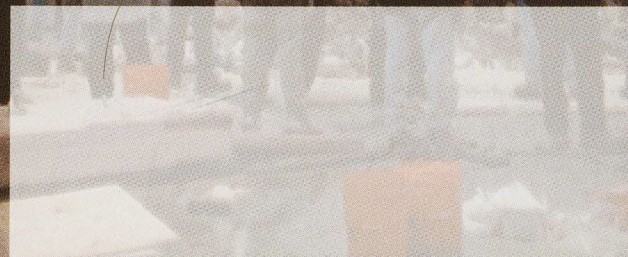
of Eta Kappa Nu

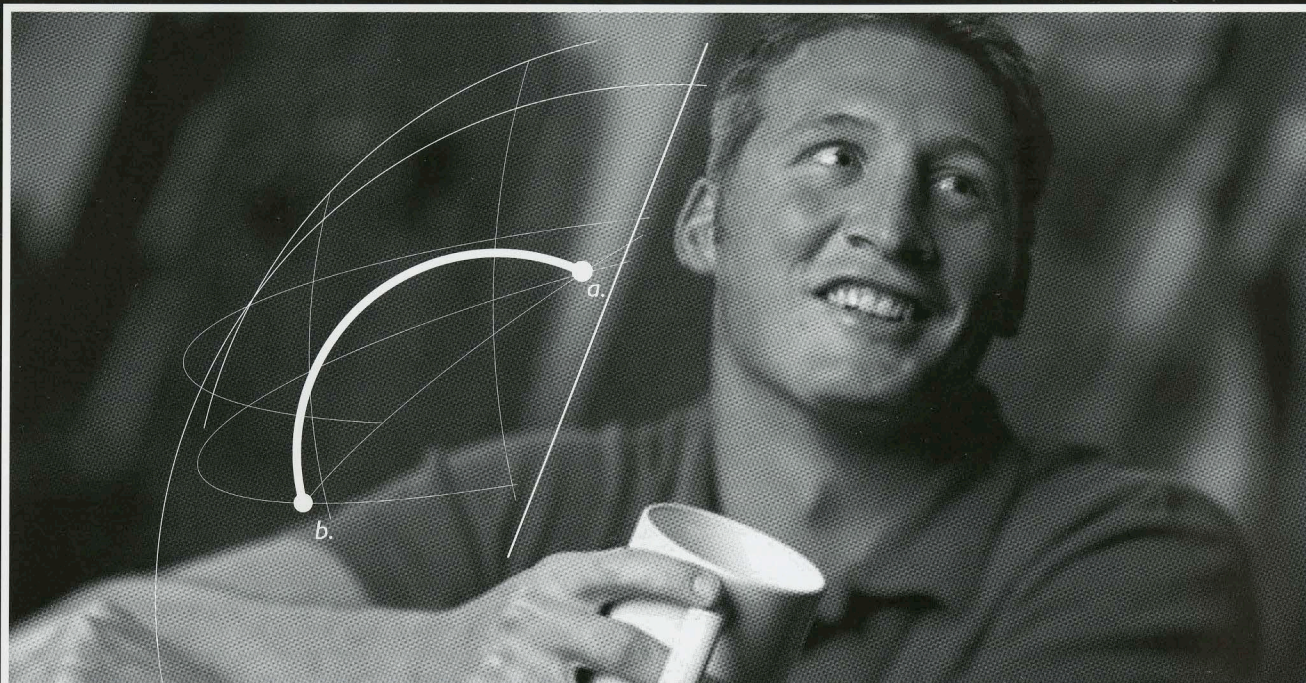
AFTERMATH OF TERROR

Restoring the Communication Infrastructure
after the September 11 Attacks

Also:

- HKN Historical Benchmarks part 8
- ACHS Honors Top 5 HKN Contributors
- 3 New Eminent Members Inducted
- OEES and OJEE Award Winners
- Outstanding Teacher Named





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of Eta Kappa Nu

Volume 97/ Number 2 / Winter 2002

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

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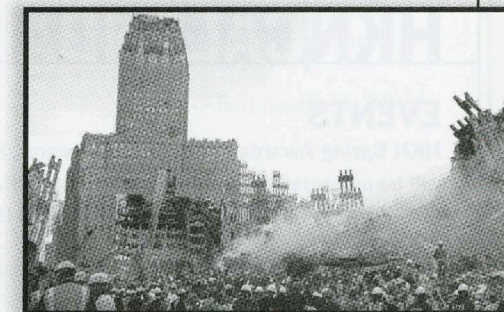
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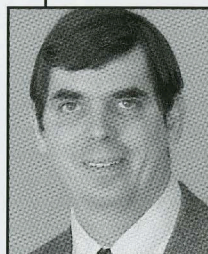


ON THE COVER

The 140 West Street building is still standing but heavily damaged after the collapse of the World Trade Center. Several of the lower floors contain the telephone switching systems supplying service to lower Manhattan, requiring a challenging and unparalleled effort to restore service after the attacks. photo: Verizon Wireless

Touched by Tragedy

With the world alongside us, we all watched the terrible events of September 11 unfold. It seems hard to imagine anyone who was not touched by the visual images of that day, the magnitude of devastation that occurred, and the stories of the lucky, the unlucky, the victims, and the heroes. As engineers, many of us pondered questions like why the towers collapsed and the engineering challenges of the monumental rescue, cleanup, and restoration efforts that lay ahead.



Our cover story this issue looks at one of the many restoration efforts after the attack: that of restoring the communication infrastructure in lower Manhattan. While restoration efforts like these touched many thousands of engineers across the country, this particular effort touched my own life as well.

Balancing responsibilities between serving as the HKN executive secretary and editor of the Bridge, and also my professional EE design responsibilities for Lucent Technologies, these last few months have been truly rewarding. It has been an experience of not just seeing one of the largest design projects I have worked on over the past several years make it into the marketplace, but of watching it become the cornerstone of one of the major rebuilding efforts right at the heart of ground zero.

Rewarding as the engineering challenge was, it remains impossible to forget what caused us to be there in the first place. The installation site address of 140 West Street was a constant reminder of the terrorism that struck America at its heart on September 11, and the thousands who were killed. Likewise, the collaboration from the many engineers, including many of my fellow brothers and sisters in HKN, was a reminder of the impact that our profession and our actions can have on the world.

We would like to invite any of our members to write a short letter that shares their own contributions and involvements in the rescue and restoration efforts after the attack or in the war efforts of operation enduring freedom, for inclusion in our next issue.

—RAS Ω '82

HKN CALENDAR

EVENTS

HKN Spring Awards Banquet: OYEE Awards, Karapetoff Award, and Eminent Member Awards will be presented April 29, 2002, Princeton, NJ, 6:00-10:00. Reception and Dinner Tickets \$85-Individual, \$850-Corporate Table. Contact HKN HQ for Reservations.

IEEE Honors Ceremony with HKN Eminent Member Inductions, June 22, 2002, Toronto.

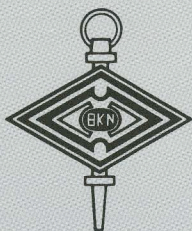
HKN Leadership Conference, Nov. 15-16, 2002 Ames, IA.

NOMINATIONS DUE

C. Holmes MacDonald Outstanding Teaching Award (OTA) nomination forms are due March 31, 2002. Nominees must be 35 or under at the time of the award.

Zerby/Koerner Outstanding Electrical Engineering Student (OEEES) nomination forms are due April 5, 2002. Nomination forms and criteria have been mailed to chapters.

Norman R. Carson Outstanding Electrical Engineering Junior (OEEJ) nomination forms are due April 6, 2002. Nomination forms and criteria have been mailed to chapters.



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Founded October 28, 1904

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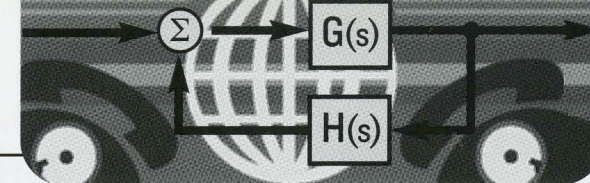
Eminent Member Award

Donald Christiansen, Chair

Distinguished Service Award

Larry Dwon, Chair

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



Thanks for the great article about Claude Shannon. Ever since the loss of this great genius there has been an outpouring of praise for his groundbreaking work. It's a shame, though, that it took his passing away for young electrical and computer engineers such as myself to learn about his achievements instead of hearing about them while he was still alive.

I have one problem with the article: it mentions his place of birth, where he obtained his Master's and Ph.D., and where he worked after school but there is no mention of the fact that Claude Shannon received Bachelor's degrees in electrical engineering and math from the University of Michigan. Perhaps more astute readers could deduce this from the fact that Mr. Shannon was born in Michigan and was inducted into HKN's Beta Epsilon chapter, i.e. the University of Michigan's chapter, albeit after he had graduated. I, however, find the lack of reference to my alma mater very disappointing.

— Hahn Kim, BE '98

I received my issue of the new 'Bridge' this morning—what a wealth of information and change! That, obviously, took a lot of work.

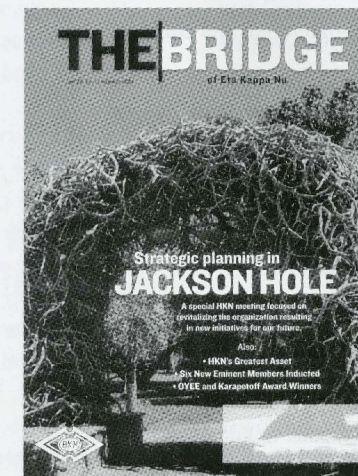
I have placed a photocopy of the Claude Shannon article in his faculty personnel file in our Dept. files. I knew him well through my past administrative position with MIT's EECS Dept. (although it was only EE Dept. back in the '50's & '60's!).

Beta-Theta finished setting up the Chu Room last year, for which it received a Certificate of Merit for Outstanding Chapter Activities Award 1999-2000. The rededication was attended by the widow Mrs. Chu, Prof. Paul E. Gray (past Pres. of MIT), myself and others.

Chee We Ng, Beta-Theta President who led the project has now graduated and is back in China working. We maintain e-mail contact. He was a super energetic chapter leader.

I wish I could say I have a super energetic Faculty Advisor coming along as a replacement, but not as of now. MIT is a busy place of high technical achievement where honoring people becomes commonplace as you are aware!

— John A. Tucker, ΓB '50
Fac. Advisor, Beta-Theta Chap. HKN



I received my copy of the 'new' HKN Bridge recently and just wanted to take a minute to say that I am truly impressed by the quality and layout. As one of the participants in the strategic planning session at Jackson Hole, I felt that there were a number of changes that HKN needed to make if it was to continue to function effectively. One such change was the format of the Bridge. You, the HKN staff, and the Board all need to be congratulated for a job well-done.

— Robert I. 'Bob' Egbert, ΓΘ '71
HKN National President 1996-97

When I went through my mail a couple of days ago, I passed over the magazine type items because they're usually junk mail. But this time I did a double take when I saw the prominent word BRIDGE. I had to sit down because the cover was so modern and inviting. I had to stop everything and go over the whole

issue. After doing so, I can tell you as an engineer with 23 years in the publishing business of one of the top ten magazines in the nation, that your makeover is a tremendous success in so many ways. My congratulation to you and those who worked with you. I know how difficult it can be to solve seemingly simple problems of layout, fonts, style, white space, color and the like. They are, in fact, very difficult to solve. But solve them you did and so very well.

—Alan Lefkow, BΠ '63

The new BRIDGE is outstanding. The hard work of you and your associates is evident throughout. I am proud to show it around. The cover photo topic was appropriately chosen, with provocative composition and superb reproduction. The content is informative, exciting and entertaining. It was meticulously edited. No errors anywhere in the entire issue.

A suggestion for your HOME-WORK page. Can you consider publishing the answers on line before the next issue, and using a counter to keep track of the hits. That may give you an idea of the electronic readership. Believe counter programs are readily available.

I hope you will continue on this exciting path. My hearty congratulations and best wishes for your continued success.

—Bert Sheffield, BB'49

Note: Extra copies of the Millennium Collector's Edition as well as most recent issues are available from Headquarters for \$5.00.

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

Extra! Electronic Paper!

Wouldn't it be handy to be able to roll off a sheet of electronic circuitry the way newspapers roll off their dailies? It could happen. Developers at Bell Laboratories, Lucent Technologies' research lab, have announced a single-molecule transistor that can be organically grown. Such a device makes the idea of flexible, printable circuitry possible because it's made up of carbon compounds instead of silicon. Current semiconductor manufacturing techniques require elaborate clean rooms and tightly controlled processes. An organic, molecular-level semiconductor could be "grown" instead of manufactured, and could be formed as sheets.

Does this mean you'll be reading your horoscope on the bus from a paper electronic display? Could be. The molecules, like the stars, have apparently aligned to make it happen. Check out www.bell-labs.com for details.

9/11 Revives Legacy of Major Armstrong

One of the consequences of the attacks in New York on September 11th was the loss of the transmitter sites for many of New York's broadcast stations. The site was a total loss, forcing the stations' engineers to scramble to find other sites for their transmitters and antennas. A couple were able to temporarily relocate on other rooftops in Manhattan, but several of them leased space on a 425-foot tower in Alpine, NJ, which was originally built by E. Howard Armstrong, the inventor of FM transmission. The tower is where his first FM station was located in the 1930s.

Armstrong, who became an army officer in World War I and was commonly referred to as "Major," endured a long and bitter patent battle with RCA over the rights to FM technology. Armstrong invented it, but wouldn't sell it outright to RCA. RCA developed a competing system and the two sued each other for twenty years until a desperate Armstrong committed suicide in 1954.

Now the irony: WNBC in New York is one of the stations that lost its site in the Trade Center collapse. It has worked out an arrangement to mount its antenna with the current owners of Armstrong's Alpine tower.

WNBC is NBC's flagship TV station, which was the main outlet for RCA for decades. So after all the anguish and legal maneuvering RCA/NBC exerted over Armstrong, it turns out his tower is saving its signal. Just goes to show you that you really never know whom you're going to need to ask for a favor.



... Hmmph!
where do all these
questions come
from? ... lucky
for them, I have
answers.

ASK THE PROFESSOR

He's back! After his officious debut in the last issue, circuit-design expert Professor R. F. Detecta has returned to answer your questions. Seems he has a lot on his mind...let's see if he drops a load here: —TB

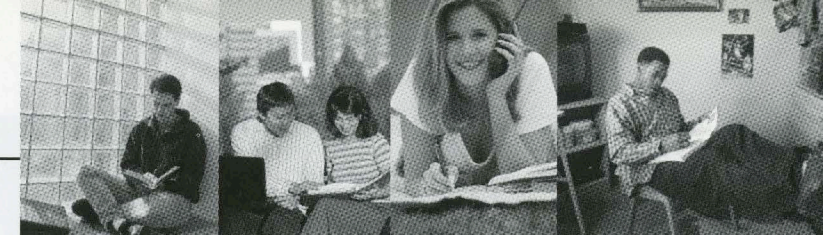
Dear Professor,
I've just started a new job that has me doing circuit design for a new product that's targeted at a specific customer. This is really important to my boss, so it's important that the customer stays happy. But other than the basic specs for the product, I don't know what it is that the customer is most worried about. Size? Temperature? Cost? Where do I go to get answers to technical questions that aren't in a spec?
—Nervous

Dear Nervana,
Technical answers aren't in the spec? No real surprise there. Ever read a sales brochure? It'll tell you how *well* the product will work, but not *how* it'll work. The techies will figure that out, right? Right...and that means you.

Chances are your boss doesn't know either. So the only people who would know what the customers want are the customers themselves. If you're able to, call the customer directly and ask! If company protocol or circumstances make that impossible, then find out exactly who in your company is talking to the customer. Then go find that person and don't let go until you get the answers you need. All the technical specs tell you is what's necessary to make the product do something. It may do something very well, but if it's not doing what the customer wants or expects it to do, then it's as bad as having no product at all. So find out!

If there's a sales staff at your company, they ought to have a clue. If there's a marketing organization, they should know how it was advertised. If there are field technicians working for your company, they probably know the customers pretty well. Call them all. Offer to buy them coffee. Your success as an engineer depends as much on your ability to understand your customer as it does on your technical savvy.

So don't be nervous. Be nervy instead.



Kappa Chapter Promotes Tutoring Program

The primary program of Kappa Chapter of Eta Kappa Nu at Cornell University in Ithaca, New York is the Philip N. Summers Memorial Tutoring program. For the past nineteen years, a unique tutorial program for electrical engineering has been providing undergraduates with personal tutoring. The program is funded by an endowment established in 1981 in memory of Philip N. Summers (EE '76), by his parents, Willard and Charlotte Summers.

Six to ten EE courses are now being provided with tutorial services in a dedicated effort that assists hundreds of students each year. In addition to weekly group tutoring sessions, the chapter offers individual tutoring by appointment. In the spring semester, tutors provided over 140 hours of tutoring and the chapter had nine full-time tutors helping out in seven classes.

The response from the students was overwhelming and over 200 students participated in the program. We anticipate that the response next year will be even better and are looking into ways of attracting even more tutors.

—Submitted by Ben Greenblat, Kappa Chapter

Sigma Chapter Organizes Awards for the 'Meeting of the Minds'

Sigma Chapter of Eta Kappa Nu had quite a busy semester and held a number of functions for the benefit of the Carnegie Mellon communities.

The chapter continued to provide tours of the Electrical and Computer Engineering Department for prospective students of the department. The tours remain in high demand and are greatly appreciated by the prospective students and

the department.

This year the chapter created and organized the ECE project awards sponsored by Lockheed Martin to be held during CMU's annual undergraduate research symposium: the Meeting of the Minds. This competition rewards \$500 to the five most innovative student designs in Electrical and Computer Engineering projects. These designs will be judged by a panel of professors and Lockheed Martin representatives.

—Submitted by Eric Reif
Bridge Correspondent, Sigma Chapter

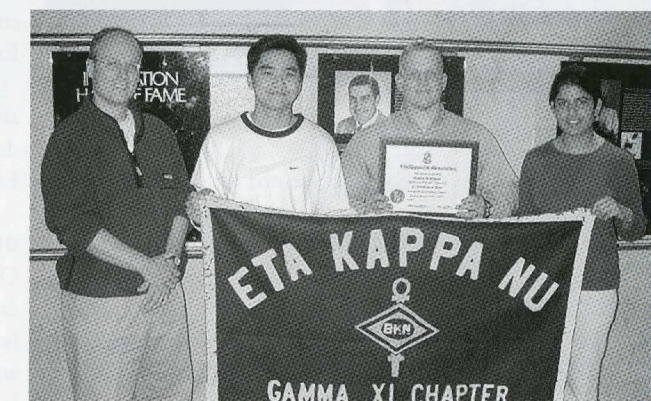
Beta Chapter at Purdue Wins Outstanding Chapter Activities Award

The Outstanding Chapter Activities Awards were presented to chapters during Spring 2001 for the 1999-2000 academic year. The national winner was again Beta Chapter at Purdue University at Lafayette, Indiana. Beta Chapter has been the national winner of the OCAA award for the past four years, and has either been the national winner or an Honorable Mention for the past 20 years.

There were two Honorable Mentions for the 1999-2000 year: Mu Chapter at University of California-Berkeley, and Gamma Theta Chapter at University of Missouri-Rolla.

Three chapters received a Certificate of Merit in the competition. The Certificate of Merit Chapters were: Gamma Xi Chapter at University of Maryland-College Park; Beta Theta Chapter at Massachusetts Institute of Technology; and Sigma Chapter at Carnegie Mellon University.

The previous winners for the 1998-1999 academic year were awarded in Spring 2000 and recognized Beta Chapter as the national winner and Beta Epsilon Chapter at University of



Gamma Xi members display their Certificate of Merit plaque from the Outstanding Chapter Activities Award.

Michigan as the Honorable Mention. Delta Omega, Mu, and Alpha chapters received Certificates of Merit for that year.

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

THE AFTERMATH OF TERROR

by Ron A. Spanke, Ω '82

RESTORING THE COMMUNICATION INFRASTRUCTURE



BRIAN BARONE, STUDENT AT NYU

The terrible events of Sept. 11 presented the communications industry with an enormous challenge. Perhaps at no time in history has a telecommunications company been faced with having to quickly repair widespread damage in an area as densely populated and so critical to the financial world as lower Manhattan. While thousands of engineers across the country responded to the call, the restoration events touched my own life as well.

140 WEST STREET

The scene at Verizon Communication's switching central office at 140 West Street resembled a war zone. The building was still standing, but it had received heavy damage following the collapse of the World Trade Center towers across the street and the #7 World Trade Center building next door.

By the afternoon of Sept. 11, two existing Lucent Technologies 5ESS® switches were still operating, but badly damaged. They would continue to provide wireless and wireline service to the immediate area around ground zero for several more critical hours. However, com-

mercial power was gone and the emergency backup power to run the four computerized call switching systems and other data transmission equipment in the building would be depleted shortly due to massive flooding in the structure's basement.

Verizon team members had been safely evacuated and awaited a confirmation that the building was structurally sound enough to re-enter. Once inside, they faced an enormous clean-up job before they could even begin assessing damage to the switching systems. Heavy dust and debris that had cascaded in through broken windows and holes in the building had coated the very sensitive computer equipment.

By the weekend, it was concluded that most of the switching systems were intact. The focus turned to bringing in portable generators and air conditioning units to keep the systems cool. By late Sunday, they had begun turning on power from the portable generators and testing some of the switches and placed the first phone call from the West Street facility since the attack.

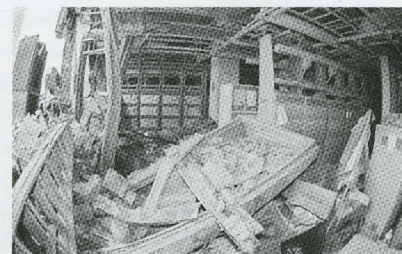
NEW YORK STOCK EXCHANGE

"Some 1,000 telephone circuits on the trading floor were connected to the telephone company building that was destroyed," said NYSE Telecommunications Director Anthony Delfino. To remedy the situation, Verizon furnished the NYSE with additional lines from different buildings to supply those out of service. The entire Verizon team was focused on getting the New York Stock Exchange going.

The Sept. 17 reopening of the U.S. equities markets – six days after the terrorist attacks on America – would become the busiest day in NYSE history. Aided by its advanced technology, the Exchange handled a record 2.3 billion shares that day.

OUTSIDE PLANT

Of the more than 500 cables containing millions of data circuits and over 300,000 local voice lines served by the West Street building, about 300 were either damaged or rendered inoperable. Verizon began temporarily bypassing those cables by running new cables out of the upper story windows of the West Street building, along streets to the north and back around the scene of the attack to the east. They were then re-spliced back into the original cables in areas where the cables weren't damaged.



Heavily damaged telecommunication equipment at 140 West switching facility.

Another problem was a steel beam from one of the World Trade Center buildings that fell from at least the 60th floor. The beam pierced the underground vault where many of the cables running into



Verizon technicians splicing outside plant cables to bypass damaged cable sections.

and out of 140 West St. were spliced into the switching systems. The beam was like a huge javelin that sliced through the wires. Thousands of hours were spent in that vault re-connecting those splices one by one, following the beam and water damage.

One month following the Sept. 11 attacks, ninety percent of the voice service provided through the damaged 140 West Street call-switching center had been restored or re-routed. The attacks damaged or disrupted some 200,000 voice lines, 100,000 business lines, 3.6 million data circuits, and 10 cellular towers.

PERMANENT REPAIRS

The switches were still badly damaged and stressed by smoke, dust, and water, and their ongoing reliability was uncertain. The decision was made to replace the two switching systems on the seventh floor with a new switching system. That's when I got the call.

I had just spent the last several years of my electrical engineering career as the chief architect designing a new central core fabric for the Lucent 5ESS® switching system. The project had grown from my initial design concepts into a full-fledged development with contributions from over 300 different individuals. The new core fabric was slated for general availability on December 31, and was currently undergoing rigorous system lab testing.

The call informed me that Lucent was going to place this new central fabric core into the heart of the replacement switch going into 140 West Street, and that it was needed by October. A special exception was being made to install and ship this product prior to the announced general availability due to the critical time pressure of get-

ting the new system at 140 West Street up and running. Then the questions started coming in....Could it really handle the capacity at 140 West Street? This new switch would combine the traffic from the two previous switches and would max out the entire capacity of the bay. It would equal the largest 5ESS® office ever shipped. It had been designed for this capacity, but had not yet been installed in an office this large. Would it work? It had to work; failure was not an option.

This new fabric and messaging core was known as Communications Module 3 (CM3), and could terminate 768 optical fiber pairs (1536 fibers) in a single bay of equipment. We were currently in the middle of an effort to further increase the capacity of the core fabric by a factor of four, and I was informed that 140 West Street would upgrade to this increased capacity as soon as we could get it developed. This planned growth would represent the largest Lucent switch, and perhaps the largest telecom switch by any vendor, that was ever installed, anywhere.

The next few weeks were spent on the phone, reassuring project managers and eventually Verizon that the new fabric core and the upcoming large fabric core expansion would work as needed, specifically at 140 West Street. This core fabric of the system was so critical, that it had been designed to meet a rigorous reliability standard of better than "six nines" which referred to a system uptime of better than 0.999999 instead of the industry standard of "five nines".

Ordinarily, it would take up to a year and a half to prepare the building space, engineer, build, and install a switch of this magnitude. The Lucent 5ESS® replacement switch, along with the new central fabric core was built in Oklahoma City and shipped to 140 West Street, and installation was completed in only 28 days. This represented the fastest installation of a switch of this size ever, and under very challenging conditions. The new switch was turned over to Verizon on November 12, and traffic began to cut over to the new switch shortly thereafter. As the new switch took over the load, the battered and war-torn existing switches were finally decommissioned after serving well above and beyond the call of duty.



The author, shown alongside the new Lucent CM3 core switch fabric bay that would be the heart of the replacement switch.

HKN Historical Benchmarks

ORGANIZATION, OFFICERS, AND OPERATING RESPONSIBILITIES

by Larry Dwon, K '35

Starting in November 1993, a series of brief historical articles have appeared annually in the Bridge. Their purpose was to alert members to the 100th anniversary of Eta Kappa Nu which will occur in October, 2004. This is part eight in the series and covers the organizational structure, officers, and operating responsibilities of the association.

1904 TO 1928

The original Constitution defined the National government of Eta Kappa Nu in Article IV sections 1 through 6. Section 5 stated *"The National Executive Council (NEC) is charged with the enforcement of the statutes of the national convention."* Section 6 stated, *"The NEC shall be vested with judiciary power, in the case of disputes, and in the interpretation of the Constitution and Statues. Such decision of the NEC shall be subject to revision by the national Convention."* These two sections established how the affairs of Eta Kappa Nu were to be carried out. The stipulations were modified several times as the Association grew and began to face new situations and problems.

Section 4 describes the initial management concept to consist of informed and experienced members. It serves as a model for comparing future revisions. It stated: *"The officers of the NEC shall be a President, a Treasurer, and a Secretary, who shall be elected by the National Convention. They shall be elected from the graduate members, and for the first two years, they shall be chosen from the founders of the organization. Their terms of office shall be three years. They shall serve as Treasurer, Secretary, and President one year each in rotation. At the first national Convention, the President shall be elected for one year, the Secretary for two years, and the Treasurer for three years. The President, Secretary, and Treasurer shall constitute the NEC and they, as such, shall perform all the duties vested in them by the Constitution."*

In 1913, the office of Vice President was added to the NEC. This office included the responsibility of Editor-in-Chief of the Bridge. In 1918, the NEC comprised five officers – President, First Vice President, Second Vice President, Secretary, and Treasurer. In 1922, seven officers constituted the NEC as an Assistant Secretary and a Bridge Editor were added. The principle problem facing HKN has always been that most of the work of running the organization was performed by volunteers in their spare time.

1928 TO 1951

J. A. Umhoefer wrote *A Silver Anniversary – A Golden History* in the November 1929 Bridge from which the following is an excerpt:

"The executive organization of the Association remained the same essentially throughout the years from its founding; all work connected with the offices was done by men working part time, devoting the spare hours to the advancement of fraternity activities. The twenty-third national Convention, however, completely revised the set-up, establishing the office of Executive Secretary as a full-time office and making the NEC a Board composed of the President, Vice President, and Executive Secretary. It also established the National Advisory Board, (NAB) composed of five members, three of whom hold elective positions and the other two being the last two past Presidents of the NEC. This new organization officially went in office on July 1, 1928."

This change, for the first time, provided for a paid national officer to be employed by HKN. The first Executive Secretary was J. A. Umhoefer from 1928-1931. He was followed by L. A. Spangler from 1932 to 1934, A. B. Zerby from 1935 to 1958, P. K. Hudson from 1959 to 1988, R. J. Betten from 1988 to 1999, and R. A. Spanke from 2000 until the present.

The growth of Eta Kappa Nu was phenomenal during the early part of this period as measured by the following parameters: Growth of Chapters and membership; Number of Outstanding Activities at engineering schools and among alumni; Improved Financial position compared to the years before the Great Depression; and a significant increase in the number of volunteers who served HKN unselfishly in a large number of activities and offices.

The NAB was vested with judiciary power and with the responsibility to interpret the Constitution and Statutes. Decisions of the NAB were still subject to revision by the National Convention. The NAB had power to remove members of the NEC for cause and to appoint successors for any unexpired terms of NEC officers. The NAB had access to all records of the Association, but it was not a body of the National Convention. It did report to the Convention in writing, however. All decisions, appointments and acts of the NAB required ratification by the National Convention.

1951 TO 1958

On August 6, 1951, HKN was incorporated in the State of Delaware. This culminated many years of dedicated voluntary work by John M. Monstream, a patent lawyer by vocation, and a very active member of the New York Alumni Chapter for many years. The names of the incorporators were: Frank E. Sanford, Ovid W. Eshbach, and Alton B. Zerby.

Executive powers of the association were now vested in three national corporate officers: President, Vice President, and Executive

Secretary. These three persons constituted the National Executive Council. They also constituted the Board of Directors. The advisory and judiciary powers remained vested in the NAB. In 1951, coincident with incorporation, the NAB was increased from 5 to 7 members.

1958 TO 2001

On April 11, 1958, a certificate of Amendment was filed with the Secretary of the State of Delaware by President C. T. Koerner and Executive Secretary A. B. Zerby. On that date, the Board of Directors became responsible for the policies of the Association. The NEC became responsible for administration and execution of the acts and statutes of the National Convention, and such policy as established by the Board of Directors.

Thus, beginning in 1958, the NAB went out of existence. The Board of Directors, (BOD), took its place and was increased from three members (President, Vice President, and Executive Secretary) to also include directors from each of the geographic regions as fixed by the board. Regional directors served a two-year term as provided in the constitution. After 1958, two directors were elected from each region, giving eight directors and a total BOD of 11 members. During the 1980's, this number was reduced to one director from each region giving a BOD of 7 members.

The BOD was vested with policy determination, future plans, interpretation of the Constitution and Statutes, compensation for the Executive Secretary, and removal of any member on the NEC for good and sufficient cause.

2002 AND BEYOND

Between 1999 and 2001, the Constitution and Bylaws committee, chaired by Jim Melsa, drafted a revised Constitution and Bylaws which were submitted to the BOD and approved. These changes have been sent out to the chapters for ratification.

This 2001 revision completely restructures the Board of Directors. The number of directors is increased from four to six directors and the terms of the directors are increased from two to three years. The major change is the elimination of the Executive Secretary Officer position on the Board of Directors and the creation of an Executive Director that is responsible for running the day-to-day activities of the organization. The Executive Director has essentially the same duties and responsibilities of the Executive Secretary, however they are no longer an elected member of Board of Directors, and now become an employee reporting to the Board of Directors. The immediate past president has also been added to the Board of Directors. A three-member National Executive Council (NEC) is still used, but now consists of the President, Vice President, and Immediate Past President.

PERSONAL REFLECTIONS

I had the unique privilege of serving HKN as Vice President in 1957-1958 and as President in 1958-

1959. This transition period required major changes in headquarters staff and location. My article *"Sign of Times—Eta Kappa Nu in Transition"* in the Fall 1958 Bridge provides more detail. The most important thought is the one which the principal founder and first President, Maurice L. Carr, wrote. *"Eta Kappa Nu grew because there have always been many members willing and eager to serve it loyally and unselfishly."*

Among the members to whom Maurice Carr specifically referred were the members of the New York Advisory Council of the New York Alumni Chapter. They had been members of the NEC, NAB, and Presidents of the New York Alumni Chapter. It is appropriate and fitting to mention a few of the more effective contributors to the destiny of this Association. In my opinion, they were R. I. Wilkinson, C. A. Faust, M. Buck, E. B. Wheeler, J. W. Weigt, F. E. Brooks, R. Beach, and N. S. Hibshman. This selection is based on my vivid recollection of the special advisory services which they provided to A. B. Zerby, to the national officers, during the Great Depression and the transition period when the BOD came into existence.

The N.Y. Advisory Council gradually became less used by the NEC after the BOD became an effective advisory body. The Los Angeles Area Chapter continued to provide guidance to the BOD into the new millennium, culminating with the 1999 BOD's plans for HKN's future as the proposed new constitution provides.

HKN Presidents 1904-2001

04-05	--	37-38	M. Buck	70-71	A. F. Cabrielle
05-06	M. L. Carr	38-39	L. A. Spangler	71-72	L. B. Cherry
06-07	E. B. Wheeler	39-40	B. F. Lewis	72-73	F.C. Weimer
07-08	C. E. Armstrong	40-41	F. X. Burke	73-74	W.E. Murray
08-09	A. F. McKee	41-42	F. X. Burke	74-75	W.A. Klos
09-10	C. C. Carr	42-43	F. E. Harrell	75-76	C.M. Butler
10-11	C. T. Evans	43-44	C. B. Hoffmann	76-77	E.D. Eyman
11-12	B. T. Anderson	44-45	W. E. Kock	77-78	M.D. Dodson
12-13	L. H. Harris	45-46	O. H. Loynes	78-79	A. Hauser
13-14	A. H. Heitmann	46-47	R. W. Fouse	79-80	A.R. Stoudinger
14-15	A. B. Zerby	47-48	N. S. Hibshman	80-81	S.R. Parker
15-16	R. H. Webb	48-49	T. W. Williams	81-82	R. Lueg
16-17	B. E. Miller	49-50	R. Beach	82-83	J. R. Betten
17-18	H. S. Cocklin	50-51	F. E. Sanford	83-84	P.B. Jacob
18-19	F. A. Coffin	51-52	O.W. Eschbach	84-85	E.L. Stelle
19-20	P. MacGilvary	52-53	E.B. Kurtz	85-86	J.L. Waite
20-21	B. T. Anderson	53-54	E.T.B. Gross	86-87	A. Leffkow
21-22	J. M. Spangler	54-55	J.E. Hobson	87-88	H.K. Knudsen
22-23	D. G. Evans	55-56	S.R. Warren	88-89	V. Elerbruch
23-24	J. B. Kelly	56-57	J.D. Ryder	89-90	R.J. Kennerknecht
24-25	G. P. Sawyer	57-58	C.T. Koerner	90-91	R.F. Arehart
25-26	A. A. Hofgen	58-59	L. Dwon	91-92	J. D'Arcy
26-27	F. E. Brooks	59-60	A. Naeter	92-93	L. H. Parker
27-28	E. S. Lee	60-61	A. Naeter	93-94	D.G. Meyer
28-29	J. W. Weigt	61-62	J. H. Craig	94-95	B.P. Johnson
29-30	M. S. Mason	62-63	J.A.M. Lyon	95-96	M.R. Hajny
30-31	G. H. Kelley	63-64	J. E. Lagerstrom	96-97	R.I. Egbert
31-32	E. F. Watson	64-65	R.J. Koopman	97-98	J.D. Wolf
32-33	J. M. Newman	65-66	H. H. Sheppard	98-99	R.J. Gowen
33-34	R. I. Wilkinson	66-67	C.M. Hyde	99-00	R.J. Gowen
34-35	N. L. Best	67-68	W.P. Smith	00-01	M. Shahidepour
35-36	C. A. Faust	68-69	J.E. Farley	01-02	J. A. Melsa
36-37	C. A. Faust	69-70	J.C. Hancock		

NEW HKN EMINENT Members Named

Eta Kappa Nu established the rank of Eminent Member in 1950 as the society's highest membership classification, to be conferred upon those select few whose contributions and attainments in the field of electrical and computer engineering have resulted in significant benefits to humankind. Three such individuals have recently been named to this rank by the Eta Kappa Nu National Board of Directors. Thelma Estrin, Ivan Getting, and Charles Townes were inducted as Eminent Members at the HKN Fall Awards Ceremony on October 21, 2000 in Anaheim, CA.



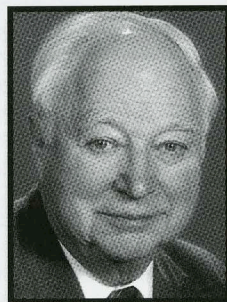
THELMA ESTRIN furthered the use of computers in medicine through her research in biomedical engineering and computer technology. After earning her Electrical Engineering undergraduate and graduate degrees from the University of Wisconsin, she joined the Brain Research Institute of UCLA in 1960, where she founded the Data Processing Laboratory, and served as its director

from 1970 to 1980. She designed and implemented the first general purpose system for analog-digital conversion of electrical activity of the nervous system. In the 70's, before the Internet, her computer system transferred health care data from UCLA to UC Davis. On leave from 1982 to 1984, she served as Director of the National Foundation Division of Electrical, Computing, and Systems Engineering. A Professor Emerita in the Computer Science Department of the University of California, Los Angeles, she previously served as Assistant Dean of its School of Engineering and Director of the UCLA Extension Department of Engineering and Science.

An active IEEE member, Estrin was elected an IEEE Fellow "for contributions to the design and application of computer systems for neurophysiological and brain research". She also was President of the IEEE Engineering in Medicine and Biology Society, and has served on numerous national boards and committees, including on the editorial boards of the IEEE Press and *IEEE Spectrum*. Estrin is also a Fellow of AAAS, Society of Women Engineering, and Founding Fellow of the American Institute for Biomedical Engineering.

Deeply involved in the advancement of women in the computer science fields, Estrin is widely recognized for her contributions to engineering education. Her present interests are encouraging girls and women to enroll in science or engineering curricula and to select, as an elective, a course from Women's Studies Programs to understand the problems females encounter as they integrate into a formerly male profession.

Numerous honors awarded to Estrin include the IEEE Centennial and Millennium Medals; IEEE Haraden Pratt Award; Superior Accomplishment Award of the National Science Foundation; Outstanding Achievement Award from the Society of Women Engineers; the Pioneer in Computing Award from the Grace Hopper Conference for Women in Computing; the Augusta Ada Lovelace Award from the Association For Women in Computing; and election to the Women's Technology International Hall of Fame.



IVAN A. GETTING was the founding President of the Aerospace Corporation and served as such from 1960 to 1977. The Corporation was founded as a nonprofit organization to provide scientific support to government. Its mission was "to aid the United States Air Force in applying the full resources of modern science and technology to the problem of achieving those continuing advances in ballistic missiles and military space systems which are basic to national security." As President, Getting led defense-

related work on space launch and satellite systems including development of the Navstar navigation system. Today, as President Emeritus, Getting remains associated with Aerospace Corporation and serves as a consultant to and board member of various companies.

Getting received his B.S. from MIT, and earned a Ph.D. in Astrophysics while attending Oxford University as a Graduate Rhodes Scholar. He was a Junior Fellow at Harvard University before joining MIT where he became an EE Professor in 1946, and through various projects began a lifetime of support to the United States Military in all its three branches. For example, he was the Director of the division of fire control and Army radar at the Radiation Laboratory of MIT from 1940-45. He also worked with the Navy Department in 1956, studying submarine warfare weapons. Among the recommendations of the study group was a submarine-based, solid-propellant IRBM which formed the basis for what became the Polaris missile.

However, the bulk of his work was for the Air Force. In 1951 Getting became Vice President for Engineering and Research at Raytheon Corporation, which suggested the first three-dimensional, time-difference-of-arrival position-finding system in response to an Air Force requirement for a guidance system. It

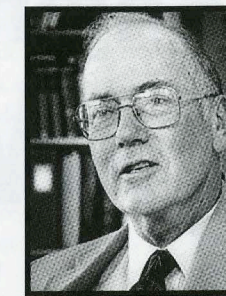


Ivan Getting, Thelma Estrin, and Charles Townes are inducted as HKN Eminent Members in Anaheim, CA.

was to be used with a proposed ICBM that would achieve mobility by traveling on a railroad system. When Getting left Raytheon, this proposed technique was among the most advanced forms of navigational technology in the world, and its concepts were crucial steppingstones in the development of the Global Positioning System. Under Getting's direction, Aerospace engineers and scientists studied the use of satellites as the basis for a navigation system for vehicles moving rapidly in three dimensions, ultimately developing a concept crucial to GPS. Aerospace also worked on new ballistic missile systems, oversight of space launch systems, and the development of high-powered chemical lasers.

Getting was a founding member of what became the Scientific Advisory Board, which promoted the exchange of scientific and technical information to enhance Air Force mission perfor-

mance. Often recognized for his numerous contributions, Getting has received many awards, including the President's Medal of Merit; IEEE's Pioneer Award and Founders Medal; and the 1997 Department of Defense Medal for Distinguished Public Service.



CHARLES H. TOWNES received the 1964 Nobel Prize "for fundamental work in quantum electronics which has led to the construction of oscillators and amplifiers based on the maser-laser principle." He holds the original patent for the maser and, with Arthur Schawlow, the original laser patent. Townes' principal scientific work is in microwave spectroscopy, nuclear and

molecular structure, quantum electronics, radio astronomy and infrared astronomy. His contributions paved the way for applications in the modern communications, medical, manufacturing, and defense fields.

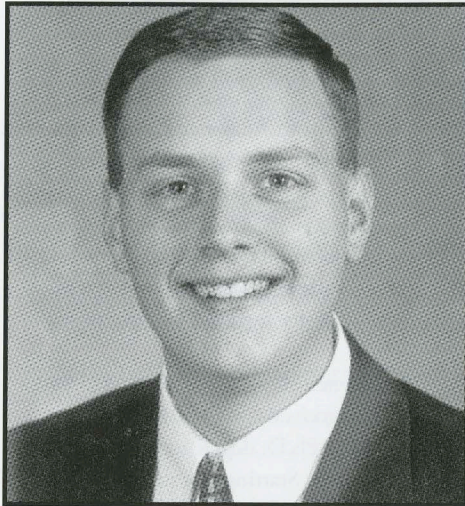
At Furman University, Townes earned a B.S. in physics and a B.A. in modern languages. He received a master's degree in physics at Duke University and a Ph.D. degree in physics at the California Institute of Technology. Starting as a staff member of Bell Laboratories, Townes next moved to Columbia University where he became Professor and Chairman of the Physics Department. Then he went to Washington and served as Vice-President and Director of Research of the Institute for Defense Analysis before becoming Provost and Institute Professor at MIT. Later he moved to the University of California where he became a University Professor Emeritus, and in 1994 became a Professor in the Graduate School.

At the University of California, Townes returned to full-time research and teaching, and pursued new interests in astrophysics. His work in radio astronomy resulted in the first detection of polyatomic molecules in interstellar clouds and the use of molecular spectra to characterize these dark clouds, now an important astronomical field. In the infrared region he has worked primarily on high spectral and spatial resolution for astronomical observations. Much of this work has been directed towards understanding the galactic center. Since 1998, Townes has been using a pair of moveable telescopes for obtaining very high angular resolution of astronomical objects at infrared wavelengths by spatial interferometry. A third telescope for this system will soon be installed.

Throughout his career Townes has been active as a government advisor. He served as a member of the President's Science Advisory Committee from 1965-1969, and also advised for the Apollo Program, plus chairing committees on Strategic Weapons and the MX missile. His active career has won him numerous awards besides the Nobel Prize. Townes received the 1982 National Medal of Science; the IEEE Medal of Honor; NASA's Distinguished Public Service Medal; and the 1979 Niels Bohr International Gold Medal, among others.

THE ALTON B. ZERBY AND CARL T. KOERNER

OUTSTANDING Electrical Engineering Student AWARDS



Wesley James Bolsen
Winner of 2000
Eta Kappa Nu OES Award

liturgy at Rose-Hulman. Wesley was Chief Justice of the Rose-Hulman Student Government, handling all cases of non-academic misconduct, so difficult decisions had to be made. Also, he tutored students in writing, math, physics, and chemistry.

As a sophomore, Wesley presented a paper on "Artificial Intelligence" to the Department of Defense. He interned at Texas Instruments and at Raytheon. He was a technical sales manager at Intel, where he traveled across the country and dealt with distributors on a daily basis. At Texas Instruments, he worked in the RF/Microwave Division on web development. At Raytheon, he worked on secure information transfer for overseas transactions with outside companies. At Delphi Delco Electronic Systems World Headquarters, he assisted the platform integration division for the automotive division of General Motors.

Wesley wrote a technical paper on the "Agricultural Uses of the Global Positioning System" which earned him the "Humanities and Social Sciences Research" Award. Among other awards he has received were: Heminway Perfect 4.0 Scholar for Freshmen, Outstanding Sophomore Award, HKN Outstanding Junior EE Award, USA Today All American Award, American Angus Award, and the Garry Scholar Award.

Wesley grew up on the family farm where they raised corn, soybeans, and cattle. He was manager of the baseball team and football team. His special interests include horses, black angus cattle, and his root beer bottle collection.

The Award Jury for the 2000 OES awards included Richard J. Gowen, HKN President 1998-00; Charles K. Alexander, Jr, IEEE President 1996-97; John E. Farley, HKN President 1968-69; and Alan Lefkow, HKN President 1986-87.



Wesley Bolsen displays the OES winners plaque with Marcus Dodson, Chair of the OES committee.

Eta Kappa Nu held its Fall Awards Banquet on September 21, 2000 in Anaheim, California to honor the 2000 Outstanding Electrical Engineering Student award recipients and the induction of three new eminent members. Wesley James Bolsen was selected as the winner of the 2000 Alton B. Zerby and Carl T. Koerner Outstanding Electrical Engineering Student award. In addition, three individuals were named as OES Honorable Mentions, and five individuals were identified as OES finalists.

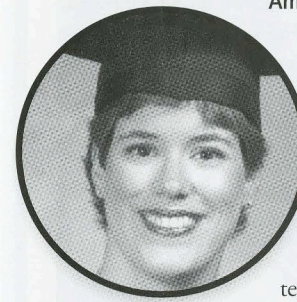
Wesley James Bolsen graduated with a GPA of 3.9, ranking second in a class of sixty EE Seniors and was nominated by the HKN Epsilon Eta Chapter at the Rose-Hulman Institute of Technology. He was honored with membership in Alpha Lambda Delta, Pi Mu Epsilon, Tau Beta Pi, Blue Key, as well as Eta Kappa Nu. He also holds membership in IEEE.

Wesley was founder and president of "Students Against Destructive Decisions" – an organization to educate the students about drug and alcohol abuse. He worked with MADD and the Indiana State police at sobriety checkpoints to arrest DUI's. He was a member of the Catholic Youth Council for Terre Haute and head of

OES Honorable Mentions



Gregory Ian Masaru Kodani, with a GPA of 3.82, graduated in December 2000, and was nominated by the HKN Delta Omega Chapter at the University of Hawaii, Manoa. He is a member of Golden Key, HKN, IEEE, and SPIE. Gregory interned with the CIA, working with battery/radio testing and also at Lawrence Livermore National Laboratory working with signal analysis to determine device characteristics. At school he helped in many events, such as the Engineering Expo and TEAMS competitions. He headed a group that put together a 40-year retrospective video history of the EE Department. He served as facilitator to assist fellow students with technical presentations and to obtain NASA Space Grant Fellowship projects. On the personal side, Gregory participates in tennis, football, volleyball, bodybuilding, and enjoys reading and video/photo editing.



Amy Sue Purdy graduated with a GPA of 3.82, and was nominated by the HKN Epsilon Chapter at Pennsylvania State University. She is a member of HKN, Phi Eta Sigma, Golden Key, SWE, and IEEE. While at CONSOL, Inc, Amy worked on an underground power distribution system and the certification of mining machinery. At Bettis Atomic Power Laboratory, as a junior engineer, she developed code to read data from a serial communication card, manipulate the data, write multiple outputs to a D/A converter, and designed the architecture for a fiber optic receiver card. Back at Penn State, Amy interned, assisting in teaching lecture and laboratory sessions for a Freshman Seminar. Amy assisted her fellow students through HKN sponsored tutoring and being a dorm representative. She set aside her own time to meet with first-year students on a weekly basis to discuss questions regarding not only electrical engineering but other issues, such as drinking, that confront university students. Music is a big part of Amy's life. She participated with the Orinada Singers, singing and being a part of its administration. She was also a member of the Penn State Concert Choir. Her other interests include ballroom dance, crochet, and calligraphy.



Samantha C. Sutton, with a GPA of 3.95, graduated in December, 2000. She was nominated by the HKN Alpha Chapter at the University of Illinois, Urbana. She is a member of HKN, Tau Beta Pi, Phi Eta Sigma, Alpha Lambda Delta and SWE. Samantha worked at Argonne National Laboratories as a researcher in their computational biology department, where she wrote a paper related to her work. While interning at Hewlett-Packard, she developed a defect analysis test for their automotive group, and wrote three levels of software code. In September 2000 in Singapore, she presented a paper titled "The use of chemical gradients in the patterned stamping of neuronal grids." At school, Samantha developed a class to introduce incoming students to the resources available at UI. She tutored through HKN and held a "little sister" event with SWE. She has studied in France, and while there, helped restore rural French villages in the same way as when she was a volunteer in Habitat for Humanity in the U.S. She was a Senator in the UI Student Government. Samantha participates in over 15 intramural sports, including running and swimming.

2000 OES Finalists:

Jason Todd Gentry, Colorado State University, Fort Collins; **Gustavo E. Gonzalez**, University of Oklahoma, Norman; **Carrie Marie Harder**, University of New York, Buffalo; **Mehmet Tamer Ozgun**, University of Southern California; **Anita Villanueva**, University of California, Berkeley

The Outstanding EE Student Award

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

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

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

Norman R. Carson Outstanding Junior Award

The Outstanding Electrical Engineering Junior Award was established by Eta Kappa Nu in 1984 in order to recognize student leadership in addition to academic and technical excellence. The goal is to encourage students to develop leadership skills before they enter the job market. Thus, this award strives to acknowledge those students who have demonstrated their ability to lead, persuade, and influence the actions of others in addition to their diligence, intelligence and technical competence. Other considerations are community service and well-roundedness.

The Outstanding Junior EE award is presented annually and is administered by the Lone Star Alumni Chapter of Austin, Texas. Since its inception, 16 students have received this award. Over 30 students were honored as runners-up and over 60 students received honorable mention.

The award is named for Norman R. Carson, who served on the HKN National Board of Directors from 1983 to 1985 and worked to define and implement the award program. The Outstanding Junior award consists of \$500 and a certificate. The fund to support the award was a gift from Mr. and Mrs. Norman R. Carson.

The award covers activities up to and including the nominee's Junior year and applications are submitted during the Spring Semester of each year. Nomination packages are mailed to each of the college chapters and can also be obtained by contacting HKN headquarters.

Norman R. Carson Outstanding Junior Electrical Engineering Award

KEVIN FREDERICK 2000 WINNER

by Laureen Parker, Ψ '82, HKN Lone Star Alumni Chapter

KEVIN FREDERICK, Sigma Chapter, Carnegie Mellon University, is the 2000 winner of the Norman R. Carson Outstanding Junior Award. Kevin has served as the President of the Explorers Club, Treasurer of the International Relations Organization, Corresponding Secretary of Eta Kappa Nu, and Social Chair of Eta Kappa Nu. He is also a member of Tau Beta Pi and is an Eagle Scout.

At Carnegie Mellon, Kevin initiated a new orientation overnight backpacking trip for incoming freshman called Hiking the Highlands. He also played a key role in organizing a trip to New York City for 25 international students. Kevin frequently serves his community through Circle-K, Alpha Phi Omega, The Lutheran University Center, and United Campus Ministries whenever time permits. In addition, Kevin is active in tennis, badminton, and water polo.

During the academic year, Kevin worked on characterizing the affects of aging and extended use on the physical properties of multilayered CMOS microelectromechanical structures (MEMS). In addition to measuring the fatigue limits of the structural material under stress, he has also set up a computer control system to automatically test the devices and monitor response. As a result of his research, he has submitted abstracts to the SPIE Micromachining and Microfabrication Symposium and the Carnegie Mellon Meeting of the Minds conference.

Kevin has worked at Dell where he evaluated the performance and compatibility of hard disk drives for Dell products. He has also been a technical assistant at Carnegie Mellon and a ranger at the Philmont Scout Ranch in Cimarron, New Mexico.

RUNNERS-UP

KENNETH L. BREIDING, III has served as the president of HKN's Epsilon Eta chapter, president of Tau Beta Pi, and treasurer of Pi Kappa Alpha. He was a charter member of Rose-Hulman's Water Polo Club, serving as interim president and then as treasurer for the first year. Kenneth is a member of IEEE and Alpha Lambda Delta. He is also an Eagle Scout and serves as Assistant Scoutmaster whenever possible. He has been active in community service through several organizations helping with food drives, community suppers and cleanups, planting trees, the Salvation Army, and Cub Scouts.

At Boeing, Kenneth developed and tested the Airplane Safety Events database to track all possible safety events with the hopes of being able to detect patterns or trends to prevent any serious future problems. He has also developed a system to map out Boeing's resources according to geographic location and then integrated it with emergency simulation software in conjunction with FEMA to predict the effects of major natural disasters on both the company and surrounding community.

BYRON YU has served as Treasurer and Engineers' Joint Council Representative for HKN's Mu chapter. As treasurer, he organized a Career Fair that was attended by 42 companies and over 300 students and made over \$15,000 for the chapter. Byron has served on the Engineers' Joint Council Fundraising Committee and was the student representative at EECS department meetings. He is also a member of Tau Beta Pi. Byron has spent many hours tutoring EECS students and volunteering at the Santa Teresa Community Medical Center.

At Hewlett-Packard, Byron modeled, built prototypes of, and tested different configurations of a High-Frequency Contactless Conductivity Detector. This detector performs ion analysis and is used in a Lab-On-a-Chip detection system, which miniaturizes chemical analysis by using micro-fabricated structures. His research centered on developing alternative schemes for minimizing the optical power requirement in optical communications systems that use multiple-subcarrier modulation.

HONORABLE MENTION

Esther A. Erickson, Gamma Theta Chapter, University of Missouri-Rolla
Ishwar K. Ashok Sivakumar, Beta Theta Chapter, Massachusetts Institute of Technology
William B. Smith, Bf, Beta Rho Chapter, West Virginia University

2000 OUTSTANDING TEACHER AWARD

SHEILA S. HEMAMI is the winner of the C. Holmes MacDonald Outstanding Teaching Award for the year 2000. Dr. Hemami is Assistant Professor and Kodak Term Professor of Electrical Engineering at Cornell.

Hemami is the third Cornell faculty member to receive the award, giving Cornell the most award winners from any single institution. Previously, C. Richard

Johnson and Clifford Pollock were named winners of the award in 1982 and 1988.

Hemami received her B.S.E.E from the University of Michigan in 1990, and her M.S.E.E in 1992 and Ph.D in 1994 from Stanford University. During her final year at Stanford, she was a member of the technical staff at Hewlett Packard Laboratories in Palo Alto, California. In 1995, she joined the electrical engineering department at Cornell where

she now directs the Visual Communications Laboratory. In 1997, she received a National Science Foundation Career Award.

Dr. Hemami has concentrated on multirate video compression techniques, and network-specific compression algorithms targeted for packet and other data networks, as well as psychovisual considerations of various compression algorithms.



The internet, she believes, provides an excellent example of the flexibility required of image and video compression and transmission techniques. Varying network capacities, differences in viewing devices and differing user needs suggest the desirability of multiple coding techniques that can efficiently span large quality and bandwidth ranges.

The results for honorable mention for the outstanding teaching award were so close that no clear-cut winner of the honorable mention was chosen for this year.



Sheila S. Hemami is the 3rd Winner from Cornell University in addition to Clifford R. Pollock (left) and C. Richard Johnson.

The C. Holmes MacDonald Outstanding Teacher Award

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

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

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

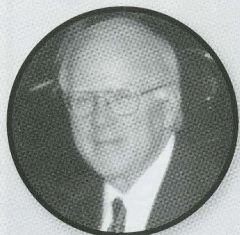
standing young Electrical or Computer Engineering teachers under age 35 who have demonstrated, early in their careers, special dedication and creativity in their teaching responsibilities, in addition to professional activities, service to the community, and cultural development.

There have been 25 winners and 35 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.

2000 Award Jury

Dr. Mohammad Shahidehpour, Dr. William Hord,
Dr. Wen-Mei Hwu, Dr. Frank J. Mercede, Mr. Albert G. Mikalauskas

ACHS Honors TOP FIVE HKN CONTRIBUTORS



JAMES A. D'ARCY



LARRY DWON



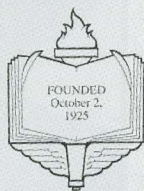
PAUL HUDSON



THOMAS L. ROTHWELL



ROGER I. WILKINSON



Five distinguished Eta Kappa Nu members were honored by the Association of College Honor Societies (ACHS) during its 75th Anniversary celebration in 2000. As part of its 75th anniversary program, ACHS created this one-time award to recognize the top five contributors to each of its member honor societies, and commissioned a special ACHS award certificate to signify the award.

The five Eta Kappa Nu members were selected based on their lifelong contributions to HKN and are listed in alphabetical order:

JAMES A. D'ARCY, *Delta Mu '63*, President of the Philadelphia Alumni chapter and chair of the Outstanding Young Electrical Engineer Award committee for many years. HKN Director 1983–85, Vice President 1990–91, and President 1991–92.

LARRY DWON, *Kappa '33* served as a member of the National Advisory Board 1955–56, as HKN Vice President 1957 and HKN President 1958. Assistant Bridge editor for many years and wrote over 44 feature articles for the Bridge. Proposed the Distinguished Service Award in 1971 and serves as chair of the DSA committee.

PAUL HUDSON, *Alpha '50*, served as HKN Executive Secretary from 1958–88 and Bridge Editor from 1963–88. Implemented the Regional Visitation Program and the DSA program.

THOMAS L. ROTHWELL, *Upsilon '53*, Long-time president of LA Alumni chapter, HKN director 1962, HKN Vice President 2001, Member of the HKN Constitution and Bylaws and the Finance committees and writer of the LA Alumni Chapter Newsletter.

ROGER I. WILKINSON, *Nu '24*, proposed and implemented the Outstanding Young Electrical Engineer award in 1932, and chaired the OYEE award committee. President of New York Alumni chapter and wrote over 20 feature articles for the Bridge. HKN President 1933–34 and Chair of the National Activities Board from 1935–37.

To select the recipients of this one-time award, a special nomination process was used. All living past-presidents of HKN were contacted and asked to select the top five contributors to the society from their individual perspective. The results were then merged, and the individuals receiving the most nominations became the recipients of this special award. This process recognized the ongoing contributions of the winners that spanned their entire careers. The five selected names were then submitted to ACHS to become part of the special 75th anniversary program.



ACHS President Jack Sagabiel (right) presents executive secretary Spanke with Eta Kappa Nu's certificates during the 75th anniversary meeting.

EDUCATION SPOTLIGHT by Mohammad Shahidehpour

Engineering Ethics Curricula: Is It a Fantasy or a Moral Issue?

One potential outcome of ABET 2000 is increased attention in the engineering curricula to the ethical responsibilities of engineers. Teaching engineering ethics is believed to be part of teaching future engineers how to practice the profession. In a general sense, the term "ethics" refers to the study of morals. It is argued that the professional ethics is as much a part of what members of a profession know as their technical knowledge. A good source for the articles on engineering ethics is the website of the Center for the Study of Ethics in the Professions at Illinois Institute of Technology (www.iit.edu/departments/csep/PublicWWW/).

The question that is often raised is: How can teaching ethics increase student knowledge of relevant standards? The answer is that there are enough university educators out there who believe that a student who has to answer questions about the ethics code is more likely to recall the relevant provisions than one who has not. For example, a student who has read ABET's Code of Ethics of Engineers (www.abet.org/ethics.html) or IEEE Code of Ethics (www.ieee.org/about/whatis/code.html) is more likely to know what is in it than a student who has not. It is also conceivable that the ethical judgment tends to improve with use. If a faculty member gives a student a chance to make ethical judgments, explain them, and com-

pare them with those of other students, the student is presumed to judge better in the profession than is the one who gets no such experience. The classroom provides a safe environment to make mistakes and learn from them.

There are alarming signs, however, that suggest putting teeth in the ABET 2000 ethics requirement may be a major struggle in universities. The obstacles include indifference towards ethics initiatives on the part of some university administrators, a lack of faculty commitment to including ethics material in engineering courses, and a lack of student motivation for learning such material. However, integrating ethics into engineering courses may not require anything extraneous. It can work like an alloy, adding strength to the course without adding to its volume. The argument here does not mean to suggest that universities ought to try to send out graduates who are masters in ethical sensitivity. In essence, it is unwise to claim too much for what teaching ethics can accomplish. No matter how much ethics instruction universities have in their engineering curricula, there will always be some engineering scandals. Teaching ethics can, at best, assure that the well-meaning will be substantially less likely than otherwise to do what they should not. And even that is hard to prove.

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



NEWSMAKERS

Jason Woolever, BΘ '00 won first place in the 2001 TopCoder Collegiate Challenge and was awarded the \$100,000 first place prize. Coders competed against each other in real-time contests, coding and analyzing algorithmic solutions under tight time constraints.

Dr. Michael Isnardi, BΘ '80 received the 2000 David Sarnoff Award, Sarnoff Corporation's highest technical honor in recognition of his innovation and leadership in MPEG systems. His leadership helped bring about the world's first real-time MPEG-2 encoder, used in satellite TV systems.

Donald Bentley, BI '48 CEO and chair-

man of Bentley Nevada Corporation was inducted on June 9, 2001 into the Distinguished Engineering Alumni Academy at the University of Iowa's School of Engineering.

Ryan Andrew Beasley, EA '98 received an outstanding minority scholars fellowship in the 2000 Ford Foundation fellowship program which is administered by the National Research Council of the National Academies. The program seeks to increase the presence of underrepresented minority groups on the nation's college and university faculties.

Mario D. Martinez, BN '95 and **Danielle Ayodele Hinton**, BΘ '99 both were awarded honorable mention in the 2000 Ford Foundation Predoctoral and Disser-

tation Fellowships for Minorities.

Eric R. Tkaczyk, B '00, **Mark C. Fershahl**, BX '00, and **Christopher W. Reis**, T '00 were named as Tau Beta Pi Scholars for the 2001–2002 academic year. Each winner received a cash award of \$2000 for his senior year of engineering study.

Kevin J. Mack, BN '00, **Amita Pugalia**, BΞ '00, **Heath T. Keene**, ΓN '99, **Darren A. Rand**, ΔX '00, **Amy E. Vaughn**, Ξ '99 and **Byron M. Yu**, M '98 were awarded Tau Beta Pi Graduate Fellowships for 2001. The TBP fellowships are awarded on the competitive basis of high scholarship, campus leadership and service, and promise of future contributions to the engineering profession.

HOMEWORK

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

Current Assignment

1 Defies Logic: Bob found a collection of 2-input combinational logic gates in the lab. Each gate had inputs X and Y and output Z, where X, Y, and Z are binary values. After testing each one, Bob remarked that he had one gate of every possible function (i.e. 1 AND gate, 1 OR gate, etc.) How many logic gates did Bob find?

2 Basic Math: Everyone knows that $10+10+40=60$, but which letter represents which digit?

TEN
TEN
+ FORTY
SIXTY

3 Rhyme or Reason:

If it is true, that One Three Two,
Can add with Glee, to One Two Three,
That when they're done, give Three Two One.
Then what would be, if One Two Three
Would add in fun, to Three Two One?

4 Time to Think Again: The software design consisted of an infinitely repeating loop with four processes that had to execute on each pass through the loop. The designer determined that the square of the time required for the first process was equal to the product of the times required for the second and third processes. The final process would require 182m s more than the first three processes combined. Each process required an integral number of microseconds and the entire loop had to repeat at 1KHz. What process times were allocated to each process during the loop, assuming no overhead for process switching functions?

Answers for Last Assignment

Correct answers were received for all problems, however, from all of the HKN members out there, no individual managed to get all four problems correct. Was the professor's homework too much of a challenge for these outstanding HKN members? Take the challenge this issue, and see if you fare better. The correct answers for last issues homework are as follows:

1 Resistance is Futile: First determine all possible circuit connections of one, two, three and four resistors. For one resistor there is only one configuration (R). Two resistors can be connected in series (R+R) or in parallel (R||R) resulting in two configurations. Three resis-

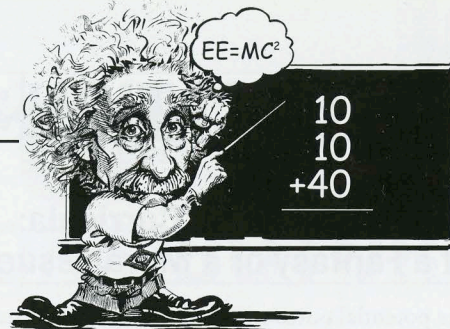
tors can be connected in four different configurations: R+R+R, R||R||R, R+(R||R), and R||(R+R). Four resistors can be connected in ten different configurations: R+R+R+R, R||R||R||R, R||R||R+(R), R||R+(R||R), R+(R||R||R), (R+R)||R, (R||R)+(R||R), R||R+(R||R||R), and R+(R||R||R||R).

Each of these 17 configurations can have different permutations of four different value resistors. Since there are four different resistance values, the number of permutations of 4 things taken 1 at a time is 4, taken 2 at a time is 12, taken 3 at a time is 24, and taken 4 at a time is 24. This gives the total number of $1! + 2!12 + 4!24 + 10!24 = 361$ distinct configurations of 4 different valued resistors. However, many of these configurations will generate the same resistance value when actual resistance values are plugged in. Arbitrarily setting $R1=1$, $R2=2$, $R3=4$, and $R4=8$, will yield 96 distinct values of resistance. Adding open circuit and short circuit conditions gives a total of 98 different resistance values that Jim can test with.

2 Cool Geography: A man can walk 1 mile due south, 1 mile due east, then 1 mile due north and end up exactly where he started if he starts from the North Pole. But there are also an infinite number of small circles parallel to the equator, very near the South Pole, where each circle has a circumference of $1/N$ mile ($N=1$ to ∞). The man can also start on a circle exactly 1 mile North of any of these circles, walk South 1 mile to this circle, walk East around the circle N times, and walk 1 mile North back to his starting point.

3 Time to Think: A typographical error made this problem trivial to solve. 172 should have been 182. But with the number 172, the answer is that the sum of the four process times $a + b + c + d = 1000$ m s. Since $d = a + b + c + 172$ m s, then $a + b + c = 414$ m s, giving the process time for the fourth process $d = 586$ m s. Since 414 is exactly divisible by 3, giving an integer value of 138 then trivially, 138×138 is equal to 138 squared. The process times are 138, 138, 138, and 586 microseconds. The problem appears again this issue with the typo corrected. Remember that the process times must be an integer number of microseconds.

4 Lonely Hearts Club: Odds of 11 to 2 means a probability of $2/13$. Assume that Walt's deck contained x cards with y of them being hearts. The probability of three hearts is $(y/x) \times (y-1)/(x-1) \times (y-2)/(x-2) = 2/13$. Then $13y(y^2-3y+2) = 2x(x^2-3x+2)$. However, y must be ≤ 13 so $2x(x^2-3x+2) \leq 13^2 \times (13^2-3 \times 13+2)$; $x(x^2-3x+2) \leq 11154$. But $24^2 \times (24^2-3 \times 24+2) = 12144$, so x must be < 24 . Now to achieve a probability denominator of 13 then x or x-1 or x-2 must be a multiple of 13, therefore x = 13, 14, or 15. Solving for y with each of these values of x, results in an integer value for y only with x=14 giving y=8. Walt's deck contained 14 cards of which 8 were hearts.



SHORTCIRCUITS

Many Ways to Skin a Cat ...

During an exam covering transmission line theory, the instructor asked the students to describe how it was possible to determine the height of a tall radio transmitting antenna tower with the aid of an electrical instrument called a Time Domain Reflectometer (TDR).

One particularly difficult student, taking advantage of the ambiguity of the question, and not wanting to give the anticipated answer, stated that there were many different ways to solve a problem like this, and gave the following examples:

- 1) Climb to the top of the tower with the TDR. Attach a string to the TDR and lower it to the ground. Pull the TDR back up measuring the length of the string. The length of the string is the height of the tower.
- 2) Take the TDR to the top of the antenna tower and drop it, measuring the time of its fall with a stopwatch. Then using the formula $S=(1/2)at^2$, calculate the height of the radio tower.
- 3) On a sunny day you can measure the height of the TDR and measure its shadow. Then measure the shadow of the radio tower and by simple proportion you can determine its height.
- 4) Finally, you could walk into the radio operating engineer's

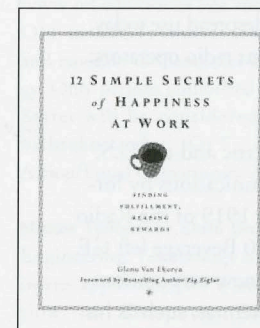


"Due to tightening of the budget, we are forced to curtail our overtime and weekend schedule, and request that all major breakthroughs be achieved as early in the week as possible."

office with the TDR and address the engineer as follows: "Mr. Engineer, here I have a very fine Time Domain Reflectometer. If you will kindly tell me the height of your radio tower, I will give you this fine Time Domain Reflectometer".

BOOK REVIEW

12 Simple Secrets of Happiness at Work



12 SIMPLE SECRETS OF HAPPINESS AT WORK: Finding Fulfillment, Reaping Rewards.

by Glenn Van Ekeren
2001, Prentice Hall Press
List Price: USA \$11.00

An exciting little book titled *12 Simple Secrets of Happiness at Work* shows how to attain happiness at work (and outside the office, too).

The so-called "Secrets" are replete with life principles of achievers that are instantly applicable.

As an example, listed are some of Henry Ford's working principles that are readily emulated. He maintained that time-wasting tasks to be avoided are performed by thousands of people, such as: making too many phone calls, writing letters three times as long as necessary, working on little things and neglecting big ones.

On perfection: Lord Chesterfield's credo is that it is unattainable, but concentrates on how one may approach it. Again, on perfection, the interview is cited in which Admiral Rickover asked Jimmy Carter whether he always did his best at the US Naval Academy. To Carter's hesitant, candid reply, Rickover asked "Why Not?"

Inspirational insights on attaining perfection are given from many other disparate super achievers including Ludwig van Beethoven, Andy Grove, Lair Ribeiro, and Mark Twain.

The book of about 200 pages is an easy read, with humor, good sense, and non-preaching advice, all attesting to the author's great effort. He evidently enjoys life and his writing avocation. He succeeded in making his book instructive, and a memorable experience.

From the biographical sketch of the author, Glenn Van Ekeren is the Executive Vice President for Vetter Health Services in Omaha, Nebraska. He is the author of a number of books.

— Review by Bert Sheffield, BB '49

HKN AUTHORS

- **CDMA Mobile Radio Design.** By John Groe and Lawrence Larson, IT '84, Artech House, 2000, \$93
- **Communication Systems, Fourth Ed.** by A. Bruce Carlson, BN, Paul B. Crilly TX '83, and Janet Rutledge BN'81, McGraw-Hill, 2002, List \$101.88.
- **Tolerance Analysis of Electronic Circuits Using MATLAB and Tolerance Analysis of Electronic Circuits Using Mathcad** by Robert R. Boyd AO '83, CRC Press, 1999.

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

Harold Beverage

Antenna Engineer and Research Director



Antennas, which couple electromagnetic waves in space with oscillations in electrical circuits, constitute one of the most important interfaces in all of technology, and one of the most important antenna engineers of all time was Harold Beverage, 1955 Eta Kappa Nu Eminent Member.

FROM RADIO HOBBYIST TO RADIO ENGINEER

Harold Henry Beverage was born 14 October 1893 in North Haven, Maine. As a boy he took up radio as a hobby, and in April 1912 with his homemade set he picked up signals from both the *Titanic*, after it struck the iceberg, and the *Carpathia*, which rushed to the scene. Upon completion of a B.S. degree in electrical engineering at the University of Maine in 1915, he took a job with General Electric. There he soon became lab

assistant to E.F.W. Alexanderson, the illustrious GE engineer famous for the so-called Alexanderson alternator, a machine to generate continuous radio waves (in contrast to the irregular wave trains produced by spark transmitters). At the time, because of the war in Europe (which the United States entered in 1917), Alexanderson was working to improve radio communications across the Atlantic, and Beverage assisted him in developing an antenna that was called the "barrage receiver", which made it possible to receive weak signals in the presence of unwanted strong signals, such as enemy jamming signals.

In 1919 Beverage and others from General Electric installed a radio telephone on the *George Washington*, the ship on which President Woodrow Wilson traveled to and from the Versailles Peace Conference. On 8 July 1919 President Wilson, on board the ship, was able to speak with the Assistant Secretary of the Navy in Washington, D.C. (a man who had, Beverage recalled thinking at the time, a good voice for radio—Franklin D. Roosevelt).

THE BEVERAGE ANTENNA

In 1919 Beverage, in trying to improve radio communications with South America, developed an improved, highly directional antenna, and in 1921 he received a patent on this "wave antenna" or "Beverage antenna". If a long wire is strung above the ground in a straight line, radio waves that arrive in the direction of the wire are received effectively, while those arriving from

other directions are received poorly or not at all. Beverage noticed that as he extended the antenna several kilometers or more, the reception continued to improve (the impulse induced in the wire traveling along with, and continuing to interact with, the free wave). He also discovered that if one end of the wire was grounded through an appropriate resistance (matching impedances so as to prevent reflection of the signal at that end), the antenna became unidirectional rather than bidirectional.

In the summer of 1921 a 9-mile-long Beverage antenna, installed at Riverhead on Long Island, began to be used to receive radio traffic from Europe. Beverage worked with Chester Rice and Edward W. Kellogg on a mathematical analysis of the new anten-

na, and they published their work in 1923. As a highly directional and broadband antenna (receiving a wide range of frequencies well), the Beverage antenna continues to find widespread use today, particularly by amateur radio operators.

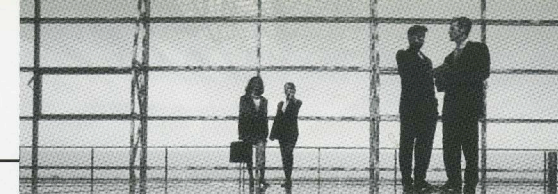
The Beverage antenna continues to find widespread use today, particularly by amateur radio operators.

RESEARCH DIRECTOR AT RCA

Discussions between leaders of General Electric and the U.S. Navy, fearful of domination of radio communications by foreign companies, led to the formation in late 1919 of the Radio Corporation of America (RCA), and in 1920 Beverage left GE to become one of the first employees of the new corporation. He continued to make improvements in antennas, such as his development with H.O. Peterson, of the RCA diversity receiving system (which used multiple antennas to reduce fading). When RCA Communications was formed in 1929, Beverage was named chief research engineer, and laboratories were established in three locations. In 1940 he became vice president in charge of research and development, and the research department was further expanded. During World War II, Beverage was consultant to the War Department, and he played a large part in establishing the Army's radio teletype network.

Beverage received the Armstrong Medal of the Radio Club of America in 1938, the Medal of Honor of the Institute of Radio Engineers in 1945, a Presidential Certificate of Merit in 1948, and many other distinctions. He died at the age of 99 on 27 January 1993 in Stony Brook, NY.

CAREER BRIDGE



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

INDUSTRY

Tavanza, Inc. is hiring for the following positions: VP of Engineering, Chief Technology Officer, Member of Tech Staff at Various Levels. Please send resume to 4655 Old Ironsides Drive, Ste. 480, Santa Clara, CA 95054, Fax 408-327-0215; email: jobs@tavanza.com. Reference job code HS01.

ACADEMIA

Computer Systems Engineering Technology: Oregon Institute of Technology is initiating a search to hire two full-time faculty members in the Computer Systems Engineering Technology Department. Embedded System Design (microcontrollers), Computer Organization and Architecture, Fundamentals of Digital Logic, Design with Programmable Logic Devices (PLDs), Microprocessors and Microprocessor System Design, Master's degree in Computer, Electrical, or Electronics Engineering preferred. Full description of the position is found at our website, www.oit.edu/teach. For more information about OIT or CEST, contact www.oit.edu/academic/ and navigate to Computer Engineering Technology. Only persons authorized to work in the United States will be considered. To apply, contact oit@oit.edu. OIT is an Affirmative Action/Equal Opportunity/ADA employer.

Middle Tennessee State University: The Dept. of Engineering Technology and Industrial Studies invites applications for a tenure-track faculty position in Computer Eng. Tech. at the Assistant/Associate Professor level (#105100). Applicants must have a strong commitment to UG&G teaching and research. Minimum requirements: 1) a Master's degree in EE or EET. 2) Expertise/hands-on in designing and testing microprocessor and digital systems, and in LANs, DSP, or electronic devices. 3) Three years of full-time relevant industrial experience within the last 10 years. The position is open until filled. Send application materials to Dr. Saleh M. Sbenaty, P.O. Box 19, MTSU, Murfreesboro, TN 37132. E-mail: ssbenaty@mtsu.edu. Fax: (615) 898-5697. URL: <http://www.mtsu.edu>

Systems Design Engineering, University of Waterloo. Applications are invited for a tenure-track fac-

ulty position at the rank of Assistant or Associate Professor. The candidates should possess a Ph.D. in engineering and be able to demonstrate a strong ability in both teaching and research. We are seeking candidates whose research activities connect to the ongoing departmental research in systems theory, modeling, and simulation. Desirable areas of research include graph theory, system dynamics, and mathematical modeling of multi-disciplinary problems, with applications to areas such as mechatronics. The successful candidate will be interested in teaching undergraduate and graduate courses in systems modeling, analysis, and design, as well as other core undergraduate engineering courses. Industrial experience and eligibility for registration in a Professional Engineering Association are highly desirable. The successful candidate will be expected to teach both undergraduate and graduate courses, supervise graduate students, and maintain and further develop their research program. Additional information on the University and the Department and its activities can be found at <http://www.uwaterloo.ca/>. Applications should be forwarded to Mrs. V. Grieve, Administrative Assistant, Department of Systems Design Engineering, University of Waterloo, Waterloo, Ontario, Canada, N2L 3G1, or by email to vgrieve@engmail.uwaterloo.ca. Please format your CV in accordance with the instructions provided at <http://sydewww.uwaterloo.ca/>. The closing date for applications is April 30, 2002. All qualified candidates are encouraged to apply; however Canadian Citizens and permanent Residents will be given priority. The University of Waterloo encourages applications from all qualified individuals, including women, members of visible minorities, Native peoples, and persons with disabilities. This appointment is subject to the availability of funds, with a starting date on or before January 1, 2003.

Faculty Position, Computer Engineering: The Johns Hopkins University Department of Electrical and Computer Engineering invites applications for a tenured or tenure-track appointment in computer engineering. Areas of interest are high speed and RF/wireless Microsystems, as well as emerging nano/molecular computational systems and technologies. Candidates must have an earned Ph.D. in electrical engineering, computer engineering, or a closely related field; demonstrated research potential appropriate to rank; and a commitment to teaching. The department is seeking a person who will play a significant role in our computer engineering program. Additional information on the department and its associated centers can be found at <http://www.ece.jhu.edu>. Candidates

should submit a complete resume, including the names and addresses of at least three references, to: Computer Engineering Search Committee, ECE Department, Johns Hopkins University, 3400 North Charles Street, Baltimore, MD 21218, USA. Applications will be accepted until the position is filled. The Johns Hopkins University is an EEO/AA employer.

University of the Pacific: Tenure-track positions are anticipated in BioEngineering and electrical and Computer Engineering. Rank will depend upon qualifications. Candidates for the BioEngineering position must have an earned Ph.D. in bioengineering or a similar field. Background in a related engineering field, such as computer, electrical, or mechanical engineering, would be beneficial. Primary responsibility will be to build a new undergraduate BS program in BioEngineering (BS program initiated Fall 2001 Semester). Candidates for the Electrical/Computer Engineering position(s) must have an earned Ph.D.; industrial experience is desirable. Special interest areas include computer engineering, electronics, and VLSI design. Excellent oral and written communication skills are essential. At Pacific, undergraduate education is given high priority, including curriculum development and advising. Scholarly activity/research and service are also expected. The University of the Pacific (www.uop.edu) is a small, private institution located in the heart of California. Total enrollment is approximately 5500 students, with 4000 at the Stockton campus. The School of Engineering has approximately 410 students. Pacific is an affirmative action/equal opportunity employer, encouraging excellence through diversity. Contact Dr. Richard H. Turpin, School of Engineering, University of the Pacific, School of Engineering, Stockton, CA 95211. (rturpin@uop.edu)

HKN Bridge Magazine is searching for dedicated individuals for the positions of Humor Editor and Homework Editor. These are volunteer positions to help serve our society. The Humor Editor is responsible for the Short Circuits column of this magazine each quarter. The Homework Editor is responsible for the Homework column each quarter. The Humor and Homework editors are each responsible for writing and or procuring material for their column each quarter and clearing/acquiring copyrights if needed. Prior publication experience desirable. Interested members are invited to write or call the editor to discuss the responsibilities of the position in further detail. Contact Dr. Ron Spanke, editor, at 800-406-2590, or spanke@hkn.org.

ETA KAPPA NU HONOR SOCIETY

*Honoring Excellence in Electrical and Computer Engineering
Recognizing Leaders of Today and Tomorrow*

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Γ	Ohio State University	Δ A	Wayne State University	Z X	University of Central Florida
Δ	Illinois Institute of Technology	Δ B	Lamar University-Beaumont	Z Ψ	Southern University A & M
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K	Cornell University	Δ H	University of Massachusetts	Θ Δ	Naval Postgraduate School
Λ	University of Pennsylvania	Δ Θ	Pratt Institute	Θ E	Kettering University
M	University of California-Berkeley	Δ I	Louisiana State University	Θ Z	University of Colorado-Denver
N	Iowa State University	Δ K	University of Maine	Θ H	University of Alabama-Huntsville
Ξ	Auburn University	Δ Λ	Duke University	Θ Θ	Polytechnic Univ. of NY-Farmington
O	University of Minnesota	Δ M	Villanova University	Θ I	George Washington University
Π	Oregon State University	Δ N	University of Alabama	Θ K	California State University-Fresno
P	University of Colorado	Δ Ξ	Air Force Institute of Technology	Θ Λ	University of South Alabama
Σ	Carnegie-Mellon University	Δ O	University of New Mexico	Θ M	State University of NY-Stony Brook
T	University of Cincinnati	Δ Π	Colorado State University	Θ N	North Carolina Agr. & Tech. State Univ.
Y	University of Southern California	Δ ρ	University of North Dakota	Θ Ξ	Norwich University
Φ	Union College	Δ Σ	University of Notre Dame	Θ O	Southern Illinois Univ.-Edwardsville
X	Lehigh University	Δ T	University of Southwestern Louisiana	P Π	University of Missouri-Kansas City
Ψ	University of Texas-Austin	Δ Y	Bradley University	Θ P	Rice University
Ω	Oklahoma State University	Δ Φ	University of South Carolina	Θ Σ	University of Bridgeport
B A	Drexel University	Δ X	Cooper Union	Θ T	University of Michigan-Dearborn
B B	Brooklyn Polytechnic Institute	Δ Ψ	St. Louis University	Θ Y	Lawrence Institute of Technology
B Γ	Michigan Technological University	Δ Ω	University of Hawaii at Manoa	Θ Φ	Virginia Military Institute
B Δ	University of Pittsburgh	E A	Cleveland State University	Θ X	Univ. of Colorado-Colorado Springs
B E	University of Michigan	E B	Arizona State University	Θ Ψ	University of Nevada-Reno
B Z	New York University	E Γ	University of Toledo	Θ Ω	University of the Pacific
B H	North Carolina State University	E Δ	Tufts University	I A	University of Alabama at Birmingham
B Θ	Massachusetts Institute of Technology	E E	University of Houston	I B	Milwaukee School of Engineering
B I	University of Iowa	E Z	University of Massachusetts-Lowell	I Γ	University of California-LA
B K	Kansas State University	E H	Rose-Hulman Institute of Tech.	I Δ	Stevens Institute of Technology
B Λ	Virginia Tech	E Θ	California State Univ.-Long Beach	I E	University of Hartford
B M	Georgia Institute of Technology	E I	San Jose State University	I Z	California St. University at Chico
B N	Rensselaer Polytechnic Institute	E K	University of Miami	I H	University of Dayton
B Ξ	University of Oklahoma	E Λ	Vanderbilt University	I Θ	Portland State University
B O	Marquette University	E M	University of Texas at Arlington	I I	Rochester Institute of Technology
B Π	City College of New York	E N	California State University-LA	I K	Montana State University
B P	West Virginia University	E Ξ	Wichita State University	I Λ	University of Illinois-Chicago
B Σ	University of Detroit	E O	University of Delaware	I M	George Mason University
B T	Northwestern University	E Π	Princeton	I N	Gannon University
B Y	University of Kentucky	E P	Tennessee Technological University	I Ξ	University of Arizona
B Φ	University of Tennessee	E Σ	University of Florida	I O	St. Cloud State University
B X	South Dakota School of Mines & Tech.	E T	Univ. of California at Santa Barbara	I Π	California Institute of Technology
B Ψ	University of Nebraska	E Y	Tuskegee University	I P	Lakefront
B Ω	University of Connecticut	E Φ	California Polytechnic St. University	I Σ	Temple University
Γ A	Manhattan College	E X	University of Louisville	I T	Univ. of the District of Columbia
Γ B	Northeastern University	E Ψ	University of Santa Clara	I Y	University of Washington
Γ Γ	Clarkson College	E Ω	University of Mississippi	I Φ	United States Military Academy
Γ Δ	Worcester Polytechnic Institute	Z A	Monmouth College	I X	Oakland University
Γ E	Rutgers University	Z B	Texas A & I University	I Ψ	New York Institute of Technology
Γ Z	Michigan State University	Z Γ	University of Rhode Island	I Ω	California State University - Fullerton
Γ H	Syracuse University	Z Δ	University of Texas at El Paso	K A	Northern Illinois University
Γ Θ	University of Missouri-Rolla	Z E	Florida Institute of Technology	K B	Wilkes University
Γ I	University of Kansas	Z Z	University of Akron	K Γ	University of Alaska Fairbanks
Γ K	New Jersey Institute of Technology	Z H	Brigham Young University	K Δ	Florida International University
Γ Λ	Columbia University	Z Θ	California State Polytechnic University	K E	Binghamton University
Γ M	Texas A & M University	Z I	Clemson University	K Z	New York Institute of Technology
Γ N	Texas Tech University	Z K	Tennessee State University	K H	University of San Diego
Γ Ξ	University of Maryland-College Park	Z Λ	University of Texas	K Θ	University of Wisconsin-Platteville
Γ O	Southern Methodist University	Z M	Northrup Institute of Technology	K I	Embry-Riddle Aeronautical University
Γ Π	University of Virginia	Z N	University of Tulsa	K K	University of Texas at Dallas
Γ P	South Dakota State University	Z Ξ	University of Massachusetts Dartmouth	K Λ	University of Memphis
Γ Σ	University of Utah	Z O	West Virginia Institute of Technology	K M	Capitol College
Γ T	North Dakota State University	Z Π	University of New York at Buffalo	K N	University of North Florida
Γ Y	Johns Hopkins University	Z P	University of New Haven	K Ξ	University of South Florida
Γ Φ	University of Arkansas	Z Σ	Polytechnic University of NY-Brooklyn	K O	State University of NY-New Paltz
Γ X	New Mexico State University	Z T	San Diego State University		