

THE BRIDGE

vol 98, no. 2 / summer 2003

of Eta Kappa Nu

NATIONAL STUDENT LEADERSHIP CONFERENCE

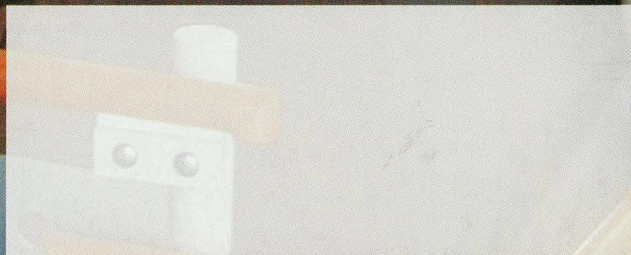
HKN Hosts its first-ever National Student
Leadership Conference in Ames, Iowa

Also:

- HKN Distinguished Service Award Revived
- Kappa Rho Chapter Installed at IUPUI
- Richard Schultz Named Outstanding Teacher
- OEES, OJEE, and OCAA Award Winners
- Thelma Estrin - EE Pioneer



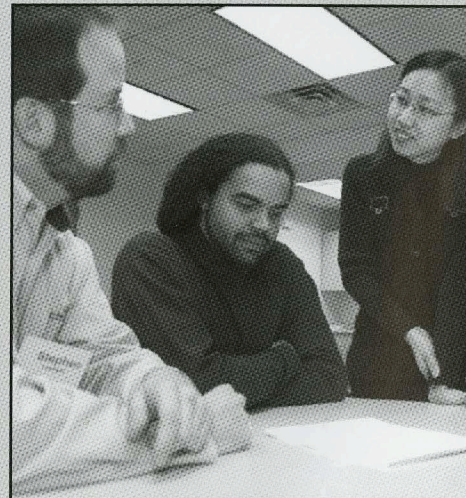
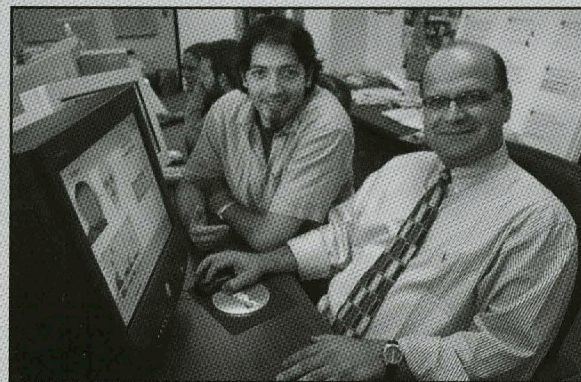
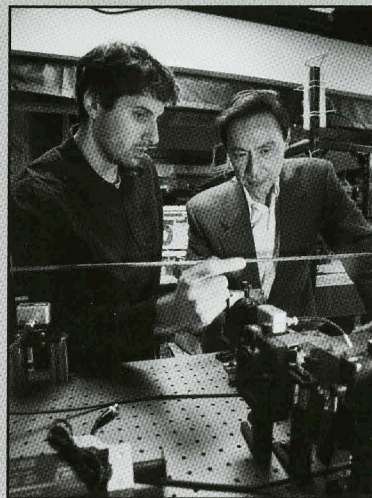
2002 **ETA KAPPA NU**
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Volume 98 / Number 2 / Summer 2003

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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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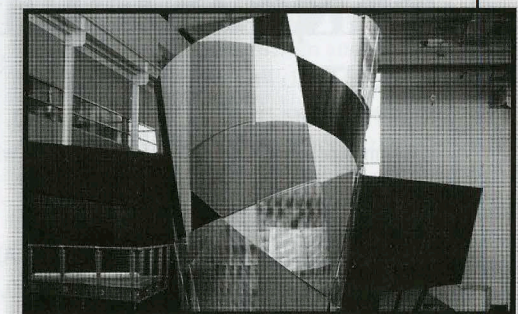
HKN revives the Distinguished Service Award and honors Tom Rothwell, John Tucker, and Don Christiansen as recipients for 1999, 2000, and 2001.

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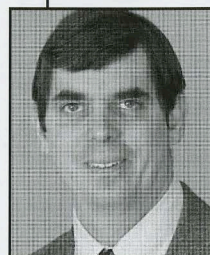
ON THE COVER

The C-6 Virtual Reality Lab in Howe Hall at Iowa State University is one of the most advanced synthetic environments in the world. The 2002 HKN National Student Leadership Conference was held in Howe Hall and participants were given tours of the C-6 and the opportunity to experience the 10x10x10 foot space with virtual images projected on all four walls, ceiling, and floor. photo: Tom Rothwell

FROM THE BRIDGE

New Frontiers

Eta Kappa Nu continues to both grow and transform as it heads toward its second century. Our growth is measured by our newly-installed chapters, with the latest being Kappa Rho featured in this issue, and by increased membership. After seeing our membership rates and number of active chapters decrease every year through the 1990s, we have reversed that trend and have achieved an increase in new members and in active chapters for the past three years running.



However, it is the transformation over the past few years that has been truly remarkable. The society is beginning to see the fruits of the efforts that commenced shortly after the pivotal Jackson Hole strategic planning meeting and that have resulted in our new constitution, new organizational structure, new *Bridge* Format, revived awards, and new activities for our chapters and members. Progress is being made as we continue to revitalize the organization and create a new HKN.

Our cover story this issue highlights one of these new activities: HKN's first-ever National Student Leadership Conference. This new initiative was proposed by the Board and became reality last November, 2002. Chapter officers and representatives traveled from around the country to participate and share experiences. I had the opportunity to meet with several of the participants and discuss ways to improve local chapter activities as well as improving the organization as a whole. We are working to find ways to fund this new initiative so that the National Leadership Conference can become an annual HKN event.

All this is coming into place as we begin to prepare for our upcoming Centennial Celebration. Eta Kappa Nu was founded on October 28, 1904, and will celebrate its centennial in October, 2004. The board has begun to make plans for the centennial year events by creating a special Centennial Committee and has named Past-President Richard Gowen as its chair. Over the next few issues, you will begin to see the plans for the centennial year unfold.

—RAS Ω '82

HKN CALENDAR

EVENTS

HKN Fall Awards Banquet, November 1, 2003, Long Beach, CA, 6:00-10:00 p.m. Honoring new HKN eminent members and 2003 OECES award winners. Dinner \$50, Contact HQ for reservations.

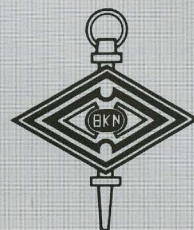
NOMINATIONS DUE

Outstanding Chapter Activities Award (OCAA) nomination forms and Chapter Annual Reports for academic year 2002-2003 due September 30, 2003.

Outstanding Young Electrical Engineer (OYEE) Nominations due September 15, 2003. Nominees must be 35 or under at the time of the award. Nomination packages can be obtained from HKN HQ.

Call for nominations for the **Vladimir Karapetoff Award for career technical achievement**. Presented annually to a single individual judged to have made outstanding contributions resulting in significant benefits to humankind. Due October 31, 2003. Contact HQ for more information.

HKN National Director nominations and resumes for Eastern Region Director and Director-at-Large for the term 7/1/2004-6/30/2007 are due to the nominating committee by October 1, 2003.



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The Electrical and Computer Engineering Honor Society

Founded October 28, 1904

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Eminent Member Award

Donald Christiansen, James A. D'Arcy, Co-Chairs

Distinguished Service Award

Larry Dwon, Chair

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

FEEDBACK

An article in the *The Bridge* of Eta Kappa Nu ("Career Focus", by Patricia Irwin) quoted Dr. Chakraborty as saying "... The field of electrical engineering is not what it was 20 or 30 years ago. Back then, it was effectively just power engineering ..."

Well ... no. Actually, even as long ago as 40 years ago (1962), I can assure you that power engineering was not the only facet of electrical engineering. When I attended Drexel (in Philadelphia) there was another option: one including courses in transistors and computer programming. Granted, the programming was in Fortran, and most of our electronics courses dealt with circuit design using vacuum tubes (get some really old person to explain tubes to you), but the majority of students wanted to study electronics, rather than power engineering.

Commercial radio broadcasting dates back to the 1920's, and television was demonstrated at the 1939 New York World's Fair. The computer ground stations used during ground testing and pre-launch checkout of the Apollo spacecraft and the Saturn launch vehicles were first installed at the spacecraft factories in 1964. It is reasonable to infer that there were a few electrical engineers involved in making these things happen.

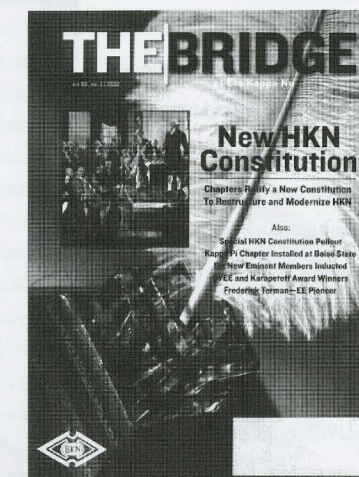
—Richard L. Bates, BA '63

As one of the leaders of the UWB industry's efforts to obtain regulations allowing the introduction of commercial UWB devices, I am extremely familiar with the NASA "test" referred to in your recent HKN *Bridge* article ("Airlines Growing Narrow-Minded over Ultra-wideband"). The NASA test to which you referred in your recent article was bad science -- sufficiently bad that the Department of Commerce's NTIA Office of Spectrum Management refused to accept it as an input document for internal U.S. Government deliberations on UWB.

NASA now has a special assistant to the administrator focused on UWB. He has instituted a major project to evaluate UWB issues and has hired an outside

contractor to conduct measurements. My hope is that they will do first rate science this time, though given the attitude of NASA leadership toward their first report, I must remain highly skeptical.

The UWB emissions issue is extremely complicated, I would highly recom-



mend getting an alternative view before publishing any claims about UWB interference issues.

—Paul Withington
VPI/Senior Technologist
Time Domain Corporation

Congratulations on the recent *Bridge* issue (vol.98, No. 1, 2002). It is a miraculous improvement over the worst issues, which printed chapter reports, using very small type, as space fillers. That amateur editorial practice upset other active alumni beside me and it eventually lead to a change in governance and the new constitution, which *The Bridge* featured.

It was particularly pleasant to see pictures and written mention of distinguished achievers with whom I was personally involved in professional activities of AEP, HKN, IEEE, ECPD, ASEE, and EEI. These activities provided working relationships with distinguished engineers and educators such as Karapetoff, Sporn, Vannevar Bush, Gordon Brown, Phil Alger, Ernst Weber, Bill

Everitt, Eric Gross, Charles Concordia, Eisenstein, and many others listed among the eminent members and elsewhere in the issue.

I was glad to see the career article by D. R. Cullen, but before one accepts the notion that there is a shortage of power engineers per se, it is necessary to understand that more effective usage of technically educated and experienced people would have obviated any shortage perception. This misnamed subject was thoroughly discussed in many conferences and papers during the latter part of the last millennium.

—Larry Dwon, K '35

Now that I've had the time to pour over the latest issue of *The Bridge*, I want to tell you what a magnificent publication you have produced. For the first time in decades, *The Bridge* is a worthy representative of our organization. You've done a terrific job and you should be very proud of your efforts and that of your staff.

Having spent 25 years in the publication business (see the Technical Division portion of the masthead of *Consumer Reports* magazine), I know firsthand how difficult it is to produce a quality magazine. I also know it takes countless hours of effort to edit such a publication, especially in the graphic design and layout areas. And when it all clicks together, as it has in your case, it looks like it was so simple, which is the mark of the true professional. Please extend my congratulations to you and your staff for producing such an outstanding version of *The Bridge*.

—Alan Lefkowitz, BPI '63

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

High-Speed Networks on Low-Voltage Wiring?

In the last installment of "What's Nu", Ultrawideband (UWB) technology was described. UWB employs an encoding scheme that sprays a wireless signal at low power across a wide range of frequencies that are decoded by the UWB receiver.

In April, the Federal Communications Commission (FCC) issued a Notice of Inquiry (NOI) that seeks comment on another system called Broadband over Power Line (BPL). BPL is the wired soulmate of wireless UWB, in that it proposes to overlay high-speed data transmission over the existing power grid to make more efficient use of all those wires out there. Under Part 15 of the FCC's rules, unlicensed radio-frequency (RF) signals can be induced on power lines, but at very low levels. Household baby monitors do this now, inducing a low-level audio-modulated RF signal allowing parents or sitters to hear when the baby calls. But broadband data signals are much more signal-critical than narrow-band audio, and would require higher signal levels to be injected into the power grid in order to be effective. As with UWB, proponents predict breakthroughs in accessibility and economy with BPL. And, as also with UWB, opponents raise concerns about higher noise levels and corrupted power service.

Keep your eyes on these technologies. If they come into being, there will be opportunities galore for engineers and technicians with EE savvy. If the proponents are right, systems will need to be designed. If the opponents are right, filters and other noise-mitigation systems will need to be designed. Either way, there will be plenty of work.

Less Silicon is Moore's Law

You are probably familiar with Moore's Law, which holds that the capacity of integrated circuit devices will continue to double every few years. Sir Robin Saxby, chairman of ARM Holdings plc, sees Moore's Law holding sway another 15 years. In remarks made earlier this year at the Design Automation Conference in Anaheim, California, Saxby said that he fully expects billion-transistor Application-Specific Integrated Circuits (ASICs) to be available by 2007. That's billion, with a "B."

As the device geometries get smaller, ASIC designers have to be more creative. Saxby says that this will require cooperation across companies and institutions. But he's convinced it will happen because the rewards are so great. As reported in *Electronic News*, Saxby said that the application of such tiny devices are very practical: he sees small microprocessors contained on sensor devices and other "dumb" hardware, as a form of "ambient intelligence" that will be distributed computing on an enormous scale. The sky's the limit - if the internet is everywhere, then maybe the hardware can be, too. Moore didn't know just how right he was.



laws, laws, laws,
... Ohm's law,
Kirchoff's law, ...
Hmmm, I wonder
if the statute of
limitations applies?

ASK THE PROFESSOR

Like all of us, Professor R. F. Detecta keeps looking for work. Though the economy is slow, our self-appointed technical wise guy is certain that his sage advice will be a great boost to us all. Let's see what's in his boosters this time: —TB

Dear Professor:

I'm a EE type working in a new job in an established organization. The project I'm involved with has available an emulator package so that we can simulate its behavior before it's committed to silicon and copper. I've been working on the design, so I know it best. But when I asked about writing the code for the emulator, my boss told me that the company has a separate staff that does "software work," and I'm a "hardware guy." What should I tell my boss? I could do such a better job if I were allowed to do both ends.

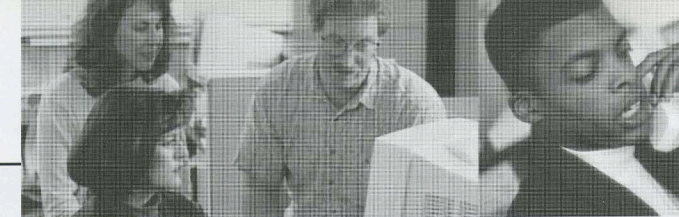
--- Jack of Both Trades

Dear Jack,

What should you tell your boss? You say that maybe you could work with the "software guy" to make sure he or she understands your drawings and specs.

"Because after all," you explain smoothly, "misunderstood requirements are a major cause of delays and cost overruns." "Hmm," says your boss, "cost overruns are a bad thing. I've got an idea! Why don't you work with the software guy?" You then congratulate your boss for the keen insight displayed in that decision.

Your question is all too common, especially if you're just getting started in your career and don't want to be a boat-rocker (at least not yet). If that means putting your skills to work in unconventional ways, like working alongside someone else doing the same job, then that's what you do. Your work is never going to be 100% technical; there will always be a need for salesmanship from time to time. And who knows? When the company reorganizes, they might well be looking for somebody who knows their way around both an emulator and a soldering iron. Then you become the "project guy!"



Advice from the Field: Naval Engineering

by Patricia Irwin/careers editor

Name: Commander Norbert Doerry

Position: Acquisition Manager for Amphibious Assault Ships

Contact info: doerry@navsea.navy.mil

Background: Doerry received his undergraduate degree in EE from the U.S. Naval Academy, and his EE Masters, Naval Engineer Degree and PhD from MIT. Doerry has been a commissioned naval officer since 1983 and an Engineering Duty Officer (EDO) since 1986. He has served tours onboard ship, worked at the Naval Sea Systems Command, and as Supervisor of Shipbuilding in Newport News, VA. Doerry has been the assistant acquisition manager for amphibious assault ships since May 2001.

How did you decide to join the military?

From an early age, I always planned to spend several years in the military for two reasons. First, I wanted to repay the country for allowing my parents to immigrate to the U.S. following World War II. And secondly, I figured the Navy would force me to do and learn things that I normally would not have done. During my senior year in high school, I also discovered the high cost of a college education and the idea of being paid to go to the Naval Academy was very appealing.

How is working in the military as an electrical engineer different from working in industry?

In industry, engineers develop products from specifications. In the military we don't design and build stuff, we create the specifications. We work with sailors and Marines so we understand what they need. Then we translate that into the technical language that engineers from industry can understand.

What is the best advice you ever received?

During my first year at the Naval Academy, a professor told me about the position of Engineering Duty Officer (EDO) and encouraged me to try for the EDO Option program. The program allowed me to become an EDO after serving one tour of duty on a destroyer and it enabled me to attend MIT, get my PhD, and take on a number of technically challenging jobs.

What was the most surprising thing you learned after graduation?

It is important to understand the interrelationship between system architecture and business, because the best technical decision

is not necessarily the best business decision. For example, if you are designing a system with numerous subsystems, from a technical standpoint it may not matter which functions are assigned to which subsystems because the system will still work. If you haven't thought things through, your subsystem design may inadvertently restrict competition (few vendors can meet the spec). A different partitioning of functions could let the Navy use an off-the-shelf (hence less expensive) product.

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

Get your hands dirty. Design and build as many projects as you can while you're still in school. Learn how to use tools. Learn about how to design systems that are easy to troubleshoot. Learn how to be cost conscious. A successful product requires more than just EE.

Understanding user needs, material properties, heat transfer, economics, etc. are all important. You don't have to be an expert in all the fields, but you do have to know when it's time to bring in the expert. Develop the skill of discovering what's missing in a project. Many project teams become so focused on what they are doing that they don't recognize what they should be doing but aren't.

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

First, the term electrical engineering is going to have a different meaning in the next 20 years. Computer engineer and computer science will be broken out and will be considered a separate field. Second, electromagnetic engineering will be a growth area again. Twenty years ago three-phase was all sinusoid, but now we can create waveforms of any shape.

How important is the ability to communicate well in your job?

Being able to communicate is vitally important. Senior decision makers are not, and cannot, be technically proficient in every possible field. They rely on advice from many sources and often this advice is not consistent. Whoever best "connects" with the decision makers has the most influence.

What else would you like young engineers to know?

Never stop learning. A lot of insight comes tangentially, so it's important to learn about topics that aren't directly related to what you're working on.



Gamma Gamma Sponsors T-Shirt Design Contest

A fundraising effort was coordinated between ourselves and IEEE in the spring. Co-sponsored by IBM, Bechtel, Perigee, and National Grid, the T-shirt contest to create a T-Shirt for the ECE department here at Clarkson was a great success, with profits being fully reinvested in the year-end

banquet. Total profit for HKN and IEEE for the T-shirt contest was \$400.

The chapter also held a year-end banquet at the Glass Onion in Canton, NY. In all, 45 people attended, including students and faculty. Also at the banquet, the Gamma Gamma chapter reinstated the yearly awards for outstanding professor and teaching assistant of the year.

—Submitted by Jim Nesteroff
President, Gamma Gamma Chapter

On The Air with Iota Nu's New Radio Station

The Iota Nu members conducted a general EE spring meeting under the leadership of the executive board and the station's advisor and trustee, Professor Frank Bogacki, to discuss the plans for the new Low Power FM and AM station(s) to be built and set up in the fall. The FCC permit to build will be granted over the summer, and students volunteered to serve on various steering committees: broadcast equipment, support equipment, station space and layout, rules and regulations, music availability & copyright issues, contribution and fund-raising, antenna considerations, etc.

HKN members are serving as committee coordinators with about 25 other EE students being involved in doing investigative work over the summer months. Mr. Kevin Bogacki, IN'01, is acting as the lead coordinator.

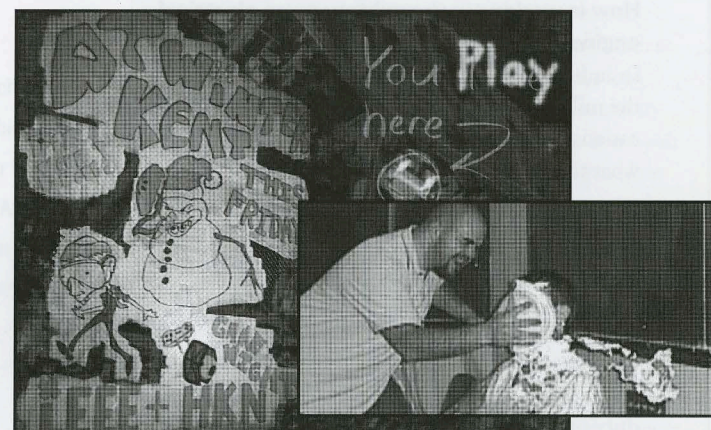
This is also the second year that an engineering summer camp is being held to educate juniors about EE, ME, CE, and CIS and excite them about the field of engineering. HKN is actively involved in helping with all aspects of the camp to include the PC Board Project, outdoor Trebuchet, and Robo-Lab. Similar help was given demonstrating a Robo-lab project at an Explorer Post event held at the University.

—Submitted by Frank Bogacki and Ram Sundaram
Faculty Advisors, Iota Nu Chapter

Gamma Delta Hosts Pie-Crush

The Gamma Delta chapter at Worcester Polytechnic Institute in Worcester, Massachusetts hosted a huge mixer for the faculty and staff to get to know the HKN honors students better; we upheld our weekly tradition of Friday pizza lunches; and co-hosted with IEEE, an end of year party for faculty, staff, students and families. We put out the marketing and held an evening of games (computer games, board games, and cards) and auctioned a few faculty to have pies thrown in their faces as the opening event. Both clubs sponsored a buffet of snacks/food for the guests. :) It was a nice night - and the students got a good laugh when they watched people playing Twister in the lounge, computer games in the engineering labs, and the pie-crush in our department head's face. Prof. Orr is a cool guy - puts up with our student antics pretty well.

—Submitted by David Holl
President, Gamma Delta Chapter



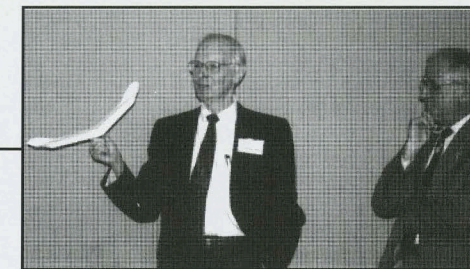
Gamma Delta Publicity for the Pie-your-Prof event. Prof. Orr, Department Head, gets creamed for a good cause.

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

Kappa Rho Chapter Installed at Purdue University at Indianapolis

Eta Kappa Nu continues to grow and has installed its newest chapter at the Purdue University campus located in the Indiana University / Purdue University at Indianapolis (IUPUI) complex on May 11, 2002. This was the result of hard work and dedicated effort by the club's charter members and faculty advisor, Dr. Paul Salama, and the support given by the ECE Department and School of Engineering.

Executive Director Ron Spanke traveled from the HKN National Headquarters in Illinois to officially install the new chapter and present them with their chapter charter and signature book. Ten of the top electrical and computer engineering students received the honor of being the charter members. They include: Joshua Allen, Nathan Allen, Christopher Baird, Derek Curl, Jeremy Mitchell, LaKendra Norwood, Bobby Ramsey, Albert Singh, Timothy Toroni, and Clint Viegas. In addition, Dr. H. Öner Yurtseven, Dean of the Purdue School of Engineering was inducted as a charter professional member.



Keynote speaker Dr. Paul MacCready demonstrates lifting body principles to Dean Yurtseven

Dr. Russell C. Eberhart, chair of the ECE

Department was the master of ceremonies and Dean Yurtseven gave the introductory speech at the ceremony. The keynote speaker for the evening was Dr. Paul MacCready. Dr. MacCready created the famous Gossamer Albatross which conducted the first human-powered flight over the English Channel in 1977, and entertained the new charter members with slides and stories of aircraft, ultralights, and lifting bodies.



HKN's newest chapter, Kappa Rho, is installed by Executive Director Spanke at Indiana University/Purdue University at Indianapolis

Outstanding Chapter Activities Awards

Purdue heads the list of five winners for 2000-2001

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

For the school year 2000 - 2001, five chapters were recognized for their outstanding programs. Beta Chapter (Purdue University) topped the list as National Winner. Beta has been a repeat winner for over a decade. Their basic program of activities has not changed significantly over the years. However, each year the chapter builds on the successes of the previous year, and adjusts their activities to the changing needs of the students, school and community at large. It's been a winning formula for the chapter and for those they have served.

Honorable Mentions went to Mu Chapter (Univ. of Calif.-Berkeley) and Gamma Phi Chapter (Univ. of Ark.-

Fayetteville). Both chapters have been past winners in the Award program at one time or another. Their programs share strong common themes of service to their fellow students and to their surrounding communities.

In addition to these recipients, there were two Certificate of Merit winners: Alpha Chapter (Univ. of Ill.-Urbana-Champaign) and Sigma Chapter (Carnegie Mellon Univ.).

In order for chapters to receive an Outstanding Chapter award, chapters submit an annual chapter report of their activities at the end of the academic year. The reports are usually written by the chapter in the summer and submitted to the Award committee in the fall. The reports are reviewed and judged in the winter, with the winners announced in the spring. Hence, at the time of this writing, reports are starting to come in for the school year 2002 - 2003.

The Outstanding Chapter Activities Award program has been an ongoing staple of Eta Kappa Nu since 1932. Although it has taken different forms over the years in the nature of its award categories, its current form has been its broadest. Specifically, there can be any number of Honorable Mention or Certificate of Merit awards each year. What this means is simple - all worthwhile reports can receive recognition. For this reason all chapters are encouraged to submit an annual chapter report that is worthy of their year's accomplishments. Only in this manner can outstanding chapters receive the recognition they deserve.

—Submitted by Alan Lefkowitz, BIT '63
Chair, OCAA Committee



2002 STUDENT LEADERSHIP CONFERENCE

IOWA STATE'S NU CHAPTER HOSTS FIRST CONFERENCE

by Ron A. Spanke, Ω '82

On a brisk, cool Saturday morning in Ames, officers and delegates from HKN chapters assembled in Howe Hall Auditorium on the Iowa State Engineering Campus. Most had arrived Friday to participate in social activities designed to get attendees from different chapters to mingle. Participants drove from several states, while others flew from both coasts giving a national flavor to the conference.

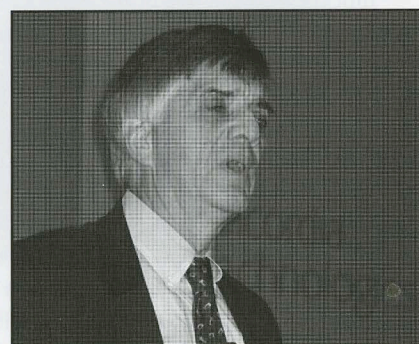
HISTORIC FIRST CONFERENCE

The November 15-16, 2002 conference represented the first national student leadership conference ever held by Eta Kappa Nu. In the early years of our society through 1933, HKN held annual assembled conventions, where delegates voted on national matters. A few additional conventions were held in 1954 for the 50th year anniversary and again in 1959 and 1962. As the number of HKN chapters grew, this practice became too expensive. During the 1960s and 1970s, HKN divided the chapters into 16 regions and hosted several regional visitations, but since the late 1970's no assembled chapter conventions or meet-

ings had been held, and all voting on national matters and officers has been conducted via our chapter mail convention process.

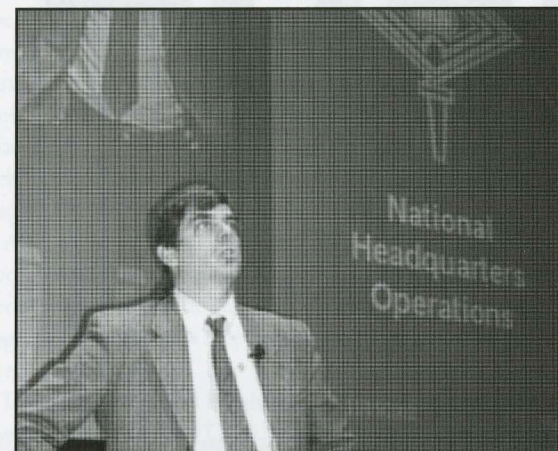
As part of the recent revitalization of Eta Kappa Nu, the HKN board discussed the concept of holding a national HKN student leadership conference. The leadership conference would be different than previous assembled conventions because it would not be a voting convention. The official voting process

would continue to be the national mail convention to assure fair representation by all HKN chapters. The goals for this new leadership con-



Bob Lucky motivates the conference participants with his keynote address.

ference were to assemble student leaders and officers from college chapters to provide officer training, leadership and motivation skills,



Executive Director Spanke discusses HKN headquarters operations, services, and products available to chapters.

and to share best chapter practices on chapter activities, member recruitment, and other common chapter issues.

LUCKY GIVES KEYNOTE

HKN Eminent Member and past National Director Bob Lucky presented the keynote address at the conference. Bob Lucky was Chairman of the Board and CEO of Telcordia, and shared his insights into what makes a successful engineer. Bob recognized that electrical and computer engineers make significant contributions across the full spectrum of project levels from the highest mission level like managing a Space Shuttle Program down to the lowest sub-atomic physics level, and all levels in between including device design, board design, system design, applications programming, etc.

Other conference presentations were given by current HKN president Tom Rothwell and HKN executive director, Ron Spanke. Tom discussed the history of HKN and many of the recent changes in the organization that have been happening over the past few years. Ron Spanke described the HKN headquarters operations and the services that HKN HQ offers for chapter advisors, chapter officers, members, and alumni. He also displayed new honor cords and honor stoles that have been recently designed and can now be ordered from HKN HQ as well as other chapter items.

Rick Stevens from Lockheed Martin was the featured speaker at the Saturday evening banquet. Rick discussed ethics and leadership positions in an engineering career, and ended by sharing some technical videos of the Joint Strike Fighter aircraft currently under development by Lockheed Martin.

CHAPTER BEST PRACTICES

The afternoon sessions featured invited presentations by several college chapters. These chapters have been consistent winners and hon-

orable mentions in the Outstanding Chapter Activities Award and were asked to share ideas on successful chapter programming and activities. Alpha, Mu, and Gamma Theta chapters each presented suggestions on chapter activities and how their particular chapters have organized and motivated their members. Audience participants responded with questions and offered their own observations on what worked or didn't work within their own chapters.

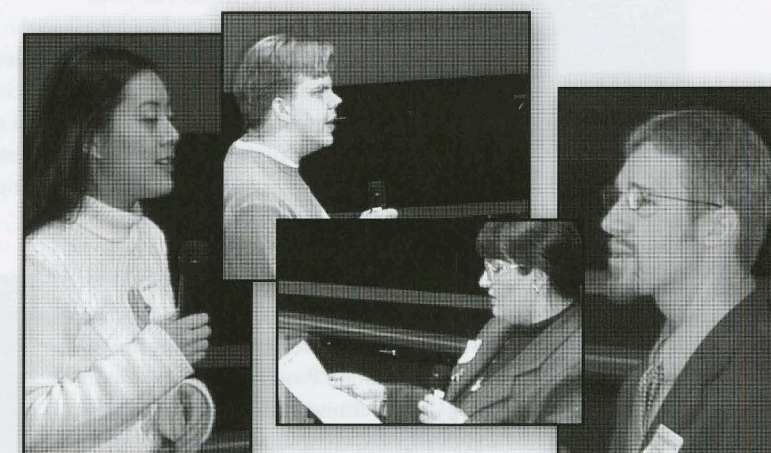
Break-out sessions for small groups were held to generate ideas on improving our organization. While the students and officers met in their sessions, faculty advisors met with the national officers to discuss faculty advisor issues.

REACTIONS

Responses to the conference survey indicated that 100% of the participants enjoyed the conference; 93% would attend another HKN conference; and that 63% would be interested in having their chapter host a conference in the future. Finally, 95% rated the overall success of the conference as good or excellent, and 100% thought the conference registration fee of \$20 per member was good or excellent. The overall budget for the conference was over \$11,000 for hotel and food accommodations, facilities, speakers, publicity, and conference materials. Grants were received from several conference sponsors including the IEEE Foundation, Lockheed Martin, and Iowa State Engineering Department. Thanks to the conference sponsors, the conference registration fee was kept very reasonable for each student attending.

SUMMARY

The 2002 Student Leadership Conference was deemed a success. The HKN board would like this activity to be continued in the future and is working to find ways to fund the conference on an annual basis. Congratulations and thanks to Nu chapter for hosting a terrific first



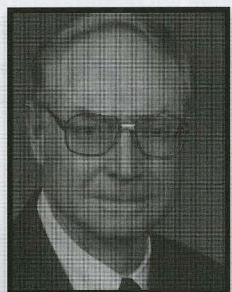
Representatives from Mu, Alpha, and Gamma Theta chapters share examples of chapter activities and best chapter practices with conference participants.

conference without a roadmap to follow. Alpha chapter has volunteered to host the Fall 2004 Student Leadership Conference in Urbana-Champaign, IL to be held in conjunction with the HKN 100-year anniversary, so place it on your chapter calendars early.

NEW HKN EMINENT Members Named

by Jutta Willmann

Eta Kappa Nu established the rank of Eminent Member in 1950 as the society's highest membership classification, 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. Four such individuals have recently been named to this rank by the Eta Kappa Nu National Board of Directors. James Flanagan was inducted as an Eminent Member at the IEEE Honors Ceremony, on June 23, 2001 in New Brunswick, New Jersey. Malcolm Currie, Donald Pederson, and John Pierce were inducted as Eminent Members at the HKN Fall Awards Ceremony on October 18, 2001 in San Jose, California.



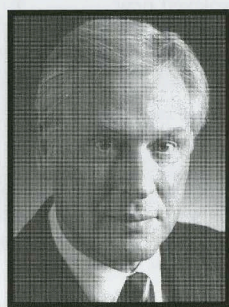
JAMES L. FLANAGAN has been internationally recognized for his research and contributions in voice communications, computer techniques, and electroacoustic systems. His work was the forerunner for many low-bit-rate coding algorithms now widely used in telecommunications systems. A pioneer in acoustic signal processing, Dr. Flanagan's work underlays the development of autodirective microphone arrays for teleconferencing.

Dr. Flanagan earned an M.S. and Ph.D. in electrical engineering from MIT. He joined Bell Laboratories in 1962 and stayed there 33 years, becoming the head of the Acoustics Research Department. Next he joined Rutgers University where he currently serves as vice president for research and director of the Center for Advanced Information Processing (CAIP). Sponsored jointly by industry and government, the center conducts research in parallel and distributed computing, image and speech processing, graphics and data visualization, human/machine communications, robotics, and software engineering.

Over the years, Dr. Flanagan has written approximately 200 papers, holds 48 patents, and has penned two books, including *Speech Analysis, Synthesis and Perception*, considered the fundamental treatment of the theoretical and practical aspects of speech processing systems.

The President of the United States, the King of Sweden, and the Crown Prince of Spain have all presented Dr. Flanagan with scientific awards for his work, and he's been recognized by the University of Paris-Sud, and the Polytechnic University of Madrid.

Other awards include the 1996 National Medal of Science, the IEEE Centennial Medal, and the IEEE Edison Medal. Dr. Flanagan is a Fellow of IEEE, American Academy of Arts and Sciences, and the Acoustical Society of America. Active in IEEE, he served as president of its Acoustics, Speech, and Signal Processing Society. He is also a member of the National Academy of Engineering and the National Academy of Sciences.

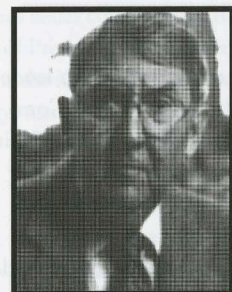


MALCOLM R. CURRIE, named the "Nation's Outstanding Young Electrical Engineer" by Eta Kappa Nu in 1958, was made an Eminent Member on October 18, 2001 in San Jose, California. A leading figure in the nation's field of defense electronics, Dr. Currie has served as President and CEO of both Hughes Aircraft Company and Delco Electronics. He is recognized for his contributions to engineering management as well as theoretical contributions in microwave tube, noise theory, electron and ion beam applications and electro-optics.

Following flight training in the U.S. Navy, Dr. Currie earned his B.S. in physics, and M.S. and Ph.D. in engineering from the University of California at Berkeley. In 1954 he joined Hughes Aircraft where he pioneered early research in traveling-wave tubes, lasers, millimeter waves, electric propulsion, and applications of electron and ion beams. Appointed vice-president and manager of the engineering division of the Hughes Aerospace Group, he was responsible for the development of airborne radar, electronic and sensor subsystems for communications satellites and spacecraft, and electro-optical systems including imaging infrared and laser systems.

After a stint with Beckman Instruments, Inc., Dr. Currie was appointed as U.S. Undersecretary of Defense Research and Engineering where he planned and managed the weapons acquisition program of the Defense Department, and worked with the intelligence community.

In 1977, he rejoined Hughes Aircraft where he eventually served as Chairman and CEO, retiring in 1992. Continued board activities and advisory committees demand his time. He chairs the Board of Trustees of the University of Southern California, and serves on the Defense Science Board where he studies industrial cooperation, technology transfer and trade among nations. An IEEE Fellow, he has received the IEEE Founders Medal, NASA Distinguished Service Medal, French Legion of Honor, and is a member of the Space Technology Hall of Fame.



DONALD O. PEDERSON, throughout his 50-year teaching and research career, concentrated on achieving optimum design and/or limiting performance of electronic circuits. First he used vacuum tubes as active devices, then transistors, and then large-scale integrated circuits. This resulted in pioneering contributions to CAD for LSI electronic circuits including the development of the SPICE simulation tool.

Dr. Pederson received in electrical engineering, a B.S. from North Dakota State University, and a M.S. and Ph.D. from Stanford University. For two years he worked at Electronics Research Laboratory at Stanford University and then, for two more years, he worked with Bell Telephone Laboratories, Inc. In 1955 he joined University of California at Berkeley where he served in the capacities of professor, Director of the Electronics Research Laboratory (1960-1964), and department chairman (1983-1985). In 1991 he became Professor Emeritus.

In support of Dr. Pederson's research, the university has closely interacted throughout the years with electronic and computer companies, often involving Dr. Pederson's former students, while taking the work to an international level. The research efforts have been reported in over 100 technical publications and have led to 32 Ph.D. degrees and over 80 M.S. degrees.

A Life Fellow of both IEEE and of Berkeley, Dr. Pederson has received from IEEE its Education Medal, Centennial Medal,

and the Solid-State Circuits Council's Outstanding Development Award, and the 1998 IEEE Medal of Honor. He is a Fellow of the American Association for the Advancement of Science and the American Academy of Arts and Sciences. Dr. Pederson has served on the Board of Directors of Tektronix, Inc. and of Varian Associates, Inc.



JOHN R. PIERCE, Executive Director of Research for Bell Telephone Labs, where his career spanned 35 years, pioneered work in the development of communications satellites, launched ECHO, and researched electron beam behavior, microwave components, and switching techniques. He invented the Pierce Gun and developed the Pierce scale. Tinkerer, inventor, manager and

writer, Dr. Pierce had a knack for making the complex understandable. In 1992 he recalled some highlights of his career in an interview with Andy Goldstein of the IEEE History Center.

When Pierce entered Cal Tech he thought "in some vague way" of making his living as an engineer, but he "didn't know quite how". After graduation he joined Bell Labs. He became the major force in creating the 100-foot diameter ECHO I launched by NASA (1960). Able to reflect radio waves, it made the first coast-to-coast television transmission possible. He then worked on Telstar I, an instrumented communications satellite launched in 1962 that transmitted the first transatlantic TV signals. Called the father of ECHO, Dr. Pierce merely said "What I did in satellite communications was superficial and short-lived, except that in my position and with my enthusiasm, by a miracle I managed to get ECHO launched."

After leaving Bell Labs in 1971, Dr. Pierce joined the Cal Tech faculty as an engineering professor and worked at JPL as chief technologist. Pursuing a favored subject, he studied acoustics, computer music, and developed the Pierce scale. At the Stanford Center for Computer Research in Computers and Music, he served as a visiting professor of Music at Stanford from 1983 - 1995.

An admitted "writeaholic," Dr. Pierce coined the name "transistor" for his Bell Lab colleagues. In the 1950s, he authored science fiction stories under the pseudonym J. J. Coupling, receiving the Arthur C. Clarke Award. In 1983 he wrote *The Science of Musical Sound*, which became an important textbook in the new field of psychoacoustics.

Intuition, Pierce felt, was an important characteristic for a research engineer. He lamented the growing trend he saw among engineering students of having "zilch physical curiosity". Students must guard against developing "a prodigious math facility without much attachment to anything physical," he warned.

Dr. Pierce earned the National Medal of Science, the Marconi Award, the Edison Medal, the Charles Stark Draper Prize, and the Japan Prize, among others. In April, 2002, he passed away at the age of 92 in California.

THE ALTON B. ZERBY AND CARL T. KOERNER

OUTSTANDING Electrical Engineering Student AWARDS



Ching



Thies

Kendall Shizou Ching William Frederick Thies Winners of 2001 Eta Kappa Nu OES Award

Eta Kappa Nu held its Fall Awards Luncheon on October 18, 2001 in San Jose, California to honor the 2001 Alton B. Zerby and Carl T. Koerner Outstanding Electrical Engineering Student award recipients. Two winners were selected this year, Kendall Shizou Ching and William Frederick Thies. In addition, two individuals were named as OES Honorable Mentions, and six individuals were identified as OES finalists.

KENDALL SHIZUO CHING graduated summa cum laude, first in his class with a GPA of 4.0/4.0, from the University of Hawaii, Manoa. He was nominated by the Delta Omega Chapter of Eta Kappa Nu. He is a member of IEEE and HKN and was Bridge Correspondent and Historian.

Kendall interned at TRW, the CIA, and the Pacific Division Naval Facilities Command. He was named Student of the Year by the Hawaiian Professional Engineers Society, and he received a special commendation from the governor of Hawaii, Ben Cayetano.

As a NASA Undergraduate Research Fellow he wrote research proposals to the Hawaiian Space Grant consortium, resulting in \$12,000 in funding. As a NASA Trainee he led a research team concerning a 5-GHz wireless transceiver. He generated the design specifications, schedule, budget, and documentation. This led to four published papers co-authored by Kendall.

He acted as advisor and tutor to fellow students and gave several presentations to high schools and other organizations. In spite of all his impressive achievements, Kendall remem-

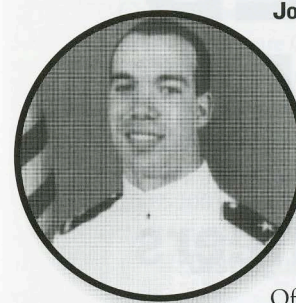
bers it's important to keep his life in balance. He enjoys basketball, golf, softball and reading. Kendall puts into practice Stephen Covey's "7 Habits of Highly Effective People" by living his life according to a personal mission statement based on timeless principles such as honesty, hard work, and proactiveness.

WILLIAM FREDERICK THIES graduated summa cum laude, with a GPA of 5.0/5.0 for a BS in Electrical Engineering & Computer Science in May 2001. In December 2001, he received a BS in Mathematics and a Masters in EE and CS. He was nominated by the Beta Theta Chapter of Eta Kappa Nu at the Massachusetts Institute of Technology. He is a member of Sigma Xi, Tau Beta Pi, and HKN. As an HKN officer, he proposed an evaluation guide for undergraduate research projects and created the first Eta Kappa Nu Undergraduate Research Symposium. The students made summary posters of their research for the event, three of which were put on exhibit at the Boston Museum of Science for two months.

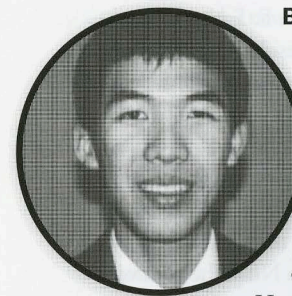
Bill interned two summers, and part-time one semester, with Compaq. His assignments were implementing a Java compiler for "Array Static Single Assignment", and debugging the compiler code and related programs. He, with others, wrote the research paper "A Unified Framework for Schedule and Storage Optimization" for presentation at a conference for Programming Language Design and Implementation. He has given several technical talks, including "Feautier's Solutions to Affine Scheduling Problem", "Threads and Channels: A new Model of Computation", "An Implementation of Array SSA Form", and "StarLogo: A Parallel Modeling Environment".

Bill is a socially conscientious student with a deep desire to contribute to the betterment of humanity. He is studying computational biology, and researching means to bridge the digital divide for developing nations.

OES Honorable Mentions



John Allen Ramsey graduated summa cum laude, first in his class, from Carnegie Mellon University, with a GPA of 4.0/4.0. He was nominated by the HKN Sigma Chapter. He is a member of Tau Beta Pi, HKN, American Society of Naval Engineers, and the Society of American Military Engineers. As a Carnegie Mellon intern in the Microelectronic Mechanical Systems Lab he developed and designed new test structures and monitored the layout of test chips. In his Navy ROTC, John was Battalion Commander, being responsible for all operations of the battalion. At another phase he was Battalion Logistics Officer, responsible for planning and organization. John took part in a number of campus activities, including Intervarsity Christian fellowship, bible study groups, hospital visits, and blood drives. He was a mentor and tutor, and a counselor at an outdoor adventure camp for at-risk youth. He plays intramural floor hockey, and trains by running.



Byron Ming-Shi Yu graduated summa cum laude, with a GPA of 4.0/4.0 from the University of California at Berkeley. He was nominated by the HKN Mu chapter. He is a member of Tau Beta Pi, HKN and IEEE. Byron's undergraduate research included experimental watermarking, i.e., the maximum number of bits that can be hidden in each image while satisfying the restraints of invisibility and reliable detection. He has applied for a patent on a "Contactless Conductivity Detector." He participated in the tradition at Berkeley of repairing old computers and delivering them to low-income families. He assisted the "Committee of 100", a national non-profit group that addresses issues concerning Chinese-Americans, at their Annual Conference. In HKN, he held the offices of President, Department Relations, Joint Council Representative, and while Treasurer, he brought the Mu chapter from debt to \$20,000 surplus. For a change of pace, he reads popular psychology, tutors, studies French, does visions therapy, watches ice hockey, and plays tennis and golf.

2001 OES Finalists:

Zachary K. Baker, University of Southern California, **Natalie Bietry**, University of Maryland, **Jennifer Ann Bowman**, Marquette University, **Esther Anne Erickson**, University of Missouri-Rolla, **Josh Griffith Erling**, Pennsylvania State University, and **Christy Leigh Rogers**, University of North Florida

The Award Jury for the 2001 OES awards included Mohammad Shahidehpour, HKN President 2000-2001; James A. D'Arcy, HKN President 1991-1992, and William E. Hord, HKN Director 1998-2000.

HKN President James Melsa, left, and OES Awards Committee Chair Marcus Dodson, right, congratulate the winners at the Fall HKN Awards Luncheon in San Jose.



The Outstanding EE Student Award

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

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

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

DSA DISTINGUISHED SERVICE AWARD

Reincarnated to Honor Alumni Volunteers

by Larry Dwon, K '35

DSA stands for Distinguished Service Award. The background of this important HKN activity began in 1939 when Founder Maurice Carr wrote "Eta Kappa Nu grew because there have always been many members who were willing and eager to serve it loyally and unselfishly. I would like to see some form of recognition conferred upon members who have rendered such service to HKN." The Board of Directors approved the DSA in 1971 and its implementation was left up to the Board. No standing committee was appointed.

Eta Kappa Nu Distinguished Service Award Recipients

Alton B. Zerby	1971
Roger I. Wilkinson	1972
Clifford A. Faust	1973
C. Holmes MacDonald	1974
Carl T. Koerner	1975
Larry Dwon	1976
Everitt S. Lee	1977
Leyland A. Spangler	1979
John E. Farley	1979
Paul K. Hudson	1979
Bill. T. Burnett	1979
Berthold Sheffield	1981
Tony Gabrielle	1985
Marcus Dodson	1986
Thomas L. Rothwell	1999
John A. Tucker	2000
Donald Christiansen	2001

and appointed Larry as chair of the DSA committee. The members of the committee are the living recipients of the DSA award and collectively administer the award and serve as the selection committee for future recipients. The initial committee members at the time of the award's reincarnation are Marcus D. Dodson,

Tony Gabrielle, Berthold Sheffield, and John E. Farley. The committee also invites the current HKN President to be a member of the selection process in order to provide a close link with the BOD. Dr. Mohammad Shahidehpour served in this capacity for this set of awards.

The Committee met and developed its charter and nomination process. The DSA award committee now limits this award to at most one individual per year, based on their dedicated service and lifetime contributions to Eta Kappa Nu. The committee selected DSA recipients for the years 1999, 2000, and 2001, which were approved by the national Board of Directors and presented in 2002. Thomas L. Rothwell was selected as the DSA recipient for 1999. John A. Tucker was selected as the DSA recipient for 2000; and Donald Christiansen was selected as the DSA recipient for 2001.

Distinguished Service Award for 1999 Thomas L. Rothwell

LIFETIME HKN ACTIVITIES:

Initiated in 1953 into Upsilon Chapter at University of Southern California, he served as chapter treasurer and as chapter president, where he attended the HKN 50th anniversary convention. Since 1955 he has been a member of the L.A. Alumni chapter, where he was elected treasurer in 1959, secretary in 1960, vice-president in 1961, and president in 1962. In 1962, he was appointed as a national director of HKN for the new Western Region and later confirmed by the national convention, and in 1964 he was elected to that position for a subsequent 2-year term. In 1962, he was appointed as a member of the committee on Constitution and Statutes. From 1966 to present, he remained an active member of the L.A. alumni chapter, helping with the administration of the annual Outstanding EE Student Award. Since 1966 he has published the annual L.A. chapter newsletter, helping to set the vision of the L.A. Chapter, and improve the national headquarters situation by being critical of operations when necessary. In 1997 he worked with the Constitution committee to deal with a critical interpretation of nation-

al officer eligibility. In 1998, he participated in the Jackson Hole Strategic Planning Workshop. In 1998, he was formally reappointed to the newly-defined standing committee on Constitution and Bylaws, and initiated a major overhaul of HKN's Delaware Certificate of Incorporation, and Constitution and Bylaws to define a new operating structure for HKN. In 1998, he was appointed to the HKN standing committee on Finance and Investments. In 2001, he was elected HKN national vice-president and was elected the HKN national president for 2002-2003.

Distinguished Service Award for 2000 John A. Tucker

LIFETIME HKN ACTIVITIES:

Attended Northeastern University, where there was no HKN chapter at the time. John organized a group of students and faculty to found a new HKN chapter at Northeastern. He traveled to the national HKN convention in 1949 to present the petitions. The new chapter was approved and installed in 1950, at which time John was initiated into HKN as a charter member of the new Gamma Beta chapter. In 1952 he reactivated the Boston Alumni chapter, and served

as president from 1953 to 1954. Since 1954 he has remained an advisor to the alumni chapter. In 1959 he attended the National Assembled HKN convention in Lincoln on behalf of the Boston Alumni chapter. In 1957, he was appointed faculty advisor of the Beta Theta chapter at MIT, and has served as faculty advisor for 45 years. He is currently HKN's longest-serving faculty advisor. In 1960, he helped coordinate the Eminent Member induction of Philip Alger and was responsible for the Eminent Member induction of John L. Burns, president of RCA, which was televised on national TV in 1961. In 1961, he was appointed chair of the Eminent Member Handbook committee, and prepared the formal Eminent Member ceremony. From 1961-1962 he served on the constitution revision committee. From 1960 to 1970, he coordinated the showing of the HKN guidance movie to more than 10,000 secondary students in the Boston area. In 1992 he presented the Outstanding Junior award to the winner. In 1999-2000 Beta Theta chapter again won the Outstanding Chapter certificate of merit under John's guidance.

Distinguished Service Award for 2001 Donald Christiansen

LIFETIME HKN ACTIVITIES:

Don was initiated in 1949 into Kappa Chapter at Cornell University. From 1973 to the present he has served as a member of the Outstanding Young Electrical Engineer Award Committee. From 1975 to 1982 he served as Juror for the OYEE award. In 1983 he was elected for a two-year term as a national director on the Eta Kappa Nu board of directors. In 1985 he was elected as an Eminent Member of HKN, the society's highest membership classification, for his technical attainments and contributions to society through leadership in the field of electrical and computer engineering that have resulted in significant benefits to humankind. In 1986 he was the editor of the 50th Anniversary hardcover volume celebrating the 50-year history of the Outstanding Young Electrical Engineer award. In 1990 he was appointed as the founding chair for the Karapetoff Award committee for Outstanding Technical Achievement. From 1990 until present he has served as chair of the Karapetoff Award Committee. In 1998, after the Jackson Hole strategic planning workshop, an official Eminent Member selection committee was established by the board of directors.

Don was appointed chair of this newly-defined Eminent Member recognition committee, which was responsible for reviving the Eminent Member award. In 1999, he was appointed to serve on the Bridge Magazine committee that has been instrumental in the redesign and layout of the new *Bridge* magazine.



Tom Rothwell (left) and Don Christiansen (center) receive the HKN DSA recognition from President Jim Melsa at the Spring 2002 awards banquet in Princeton, NJ. John Tucker (right) is presented with his DSA recognition by Executive Director Ron Spanke at the MIT recognition banquet in April 2002. The unique Bridge-shaped award for the reincarnated DSA was designed by Executive Director Spanke.

Search for Major Volunteers in HKN

Eta Kappa Nu Headquarters has just finished constructing a database to be able to associate our members with any HKN offices they previously held and other volunteer HKN activities they undertook throughout their lifetime. However, information on these offices and activities was never collected or retained by headquarters in the past administrations. We are seeking information that would help establish a record of the past HKN activities of our members. If you are aware of members with substantial HKN lifetime activities, please nominate and encourage your nominee to submit their HKN activity information to national headquarters.

Submit information covering undergraduate chapter offices or committee positions held, alumni activities and offices held, national offices and committees, publications and articles written for *The Bridge* or about HKN in other publications, HKN awards received, new chapter installations attended, innovative programs developed for HKN and any other significant HKN activities. This information should be returned to Eta Kappa Nu headquarters, P.O. Box 3535, Lisle, IL 60532. Thank you for your assistance.

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, 17 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

TOBY CASE 2002 WINNER

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

JOSEPH TOBIAS (TOBY) CASE is the winner of the 2001-2002 Norman R. Carson Outstanding Junior in Electrical Engineering Award. This award is given annually to a junior in recognition of his or her leadership abilities in addition to scholastic and technical achievements, and service contributions.

Toby Case, Gamma Theta Chapter at the University of Missouri-Rolla, maintains a 3.99 GPA with a double major in electrical and computer engineering and physics. He is a member of Eta Kappa Nu, IEEE, Society of Physics Students, American Physical Society, The Smithsonian Institution, and Golden Key. In addition, he is an assistant Sunday school teacher for the adult class and a Sunday school superintendent at his church.

As a sophomore and junior, Toby has assisted in the Applied Microwave Laboratory conducting near-field microwave measurements and analysis to evaluate the microwave properties of cement-based material exposed to accelerated chloride ingress. His work has led to presenting a poster at the annual Quantative Non-Destructive Evaluation (QNDE) conference in July 2001. He is first author on two conference papers at QNDE regarding microwave analysis of mortar and co-author on four other conference papers and one journal publication. In addition to his work at the Microwave Lab, he has worked for IBM in Boulder, CO as a summer intern and as a network administrator for the Electrical and Computer Engineering Department at Northern Arizona University in Flagstaff.

In his spare time Toby enjoys astronomy, math, history, and PC gaming (playing and creating his own games). He has done projects on a non-polygonal 3D surface grapher, and fractal geometry and video recording.

Toby's goal is to become a professor researching the physical properties of materials by observing their electromagnetic behavior. He intends to pursue a masters and Ph.D. in electrical engineering concentrating in electromagnetics and nondestructive evaluation of materials in the microwave and/or visible spectrum.

RUNNERS-UP

KEVIN J. BOGACKI, Iota Nu Chapter, Gannon University

JILL PAMPERIN, Kappa Theta Chapter, University of Wisconsin, Platteville.

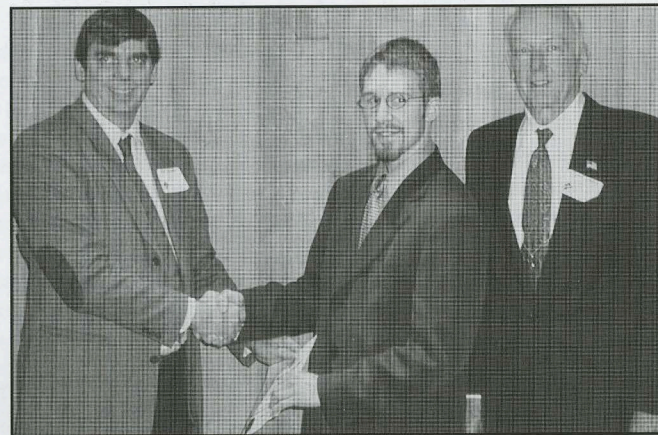
HONORABLE MENTION

MICHAEL P. DIMMEL, Gamma Iota Chapter, University of Kansas

EDWARD M. GRIEBEL, Epsilon Chapter, Pennsylvania State University

AARON W. JOW, Mu Chapter, University of California, Berkeley

MITUL PATEL, Iota Gamma Chapter, University of California, Los Angeles.



HKN President Tom Rothwell, right, and Executive Director Ron Spanke, left, present Toby Case's Outstanding Junior Award Certificate to the Gamma Theta Chapter President, accepting on Toby's behalf at the 2002 Student Conference.

EDUCATION SPOTLIGHT by Mohammad Shahidehpour

Education of Electricity Restructuring

For most of the twentieth century engineers managed the electric power industry and treated it as a very large and challenging problem. However, the industry's expectations regarding the skills of their new recruits have clearly been affected by the electricity restructuring. Since the introduction of competitive electricity markets, economists and other professionals have driven many fundamental decisions in this industry. The objective of restructuring is to make it possible for small customers such as households to select their energy providers in much the same way that they now choose a long-distance telephone carrier. If the supply of electricity in places like California is to remain reliable, and if indeed competition is to deliver the promised benefits, technical realities cannot be ignored in the search for efficient market mechanisms. Power engineers therefore must be able to take part in the

debate. Hence, in addition to the solid analytical skills that are the essence of a power engineering education, new college graduates must also develop the ability to approach problems from non-technical perspectives. This ability is indeed crucial when power engineers have to interact with other professionals. Furthermore, new types of companies have appeared in the wake of the introduction of competition. These companies need power engineers but do not necessarily have a tradition of hiring engineers or sophisticated training programs for the further education of recent non-engineering graduates. All these changes have had and should continue to have a significant influence on university-based power engineering education programs. If all elements are present, the restructuring of the electricity industry can trigger a virtuous circle. New technical issues stimulate good research. Good research inspires undergraduate teaching and encourages students to pursue graduate studies. Better graduate students contribute to the success of the research.

2001 OUTSTANDING TEACHER AWARD

RICHARD RAYMOND SCHULTZ, ΔP '88, is the winner of the C. Holmes MacDonald Outstanding Teaching Award for the year 2001. Dr. Schultz is Associate Professor of Electrical Engineering at the University of North Dakota. Schultz received his B.S.E.E from the University of North Dakota in 1990, and his M.S.E.E in 1992 and Ph.D. in 1995 from the University of Notre Dame. He is active in research in nonlinear digital image and video processing.

Dr. Schultz has taught courses covering much of the undergraduate and graduate curriculum and has developed the coursework and curriculum for new offerings and revised laboratory courses for many classes to keep them relevant to today's technology.

Richard has served on university search committees for VP and provost and on the university-wide Graduate committee. He was active in visiting surrounding communities to discuss the damage and impacts to the university and recovery plans after the devastating April, 1997 Red River Valley Flood in North Dakota.

Dr. Schultz is a member of HKN, Tau Beta Pi, IEEE, ASEE, and SPIE, the International Society for Optical Engineering. He is the faculty advisor of the Delta Rho chapter of HKN at UND. He also serves as faculty advisor to the Engineer's council coordinating all engineering student organizations and was faculty editor of the department's IEEE Newsletter. He was the recipient of the James E. Olson Endowed Professorship and has been named the Outstanding EE Instructor of the year, School of Engineering Outstanding Professor of the year, and Outstanding Student Organization Advisor.

The engraved pewter tray and the award certificate were presented to Dr. Richard Schultz at the American Society of Engineering Educators meeting on September 28th, 2002.

The Honorable Mention for 2001 was awarded to Dr. Noel N. Schulz, at Mississippi State University. The 2001 Award Jury consisted of Mr. Bruce M. Balmat, Dr. Richard G. Baraniuk, Mr. James A. D'Arcy, Dr. Clifford R. Pollock, and Dr. Mohammad Shahidehpour.

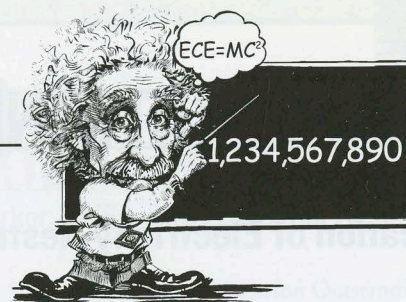
The Outstanding Teacher Award was established to recognize excellence in teaching of Electrical and Computer Engineering Students and to improve Faculty-Student-Alumni relations. The award was conceived by the Philadelphia Alumni Chapter and was first presented for the 1972 academic year.

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: Chair of the National Activities Board, National Director, finance committee and financial counselor; HKN representative to the Association of College Honor Societies; and instrumental work in helping to establish the HKN Outstanding Teacher Award program. The award recognizes the central and crucial role of college professors in educating and motivating future engineers and is presented annually to outstanding young Electrical or Computer Engineering teachers under age 35 who have demonstrated early in their careers special dedication and creativity in their teaching responsibilities, in addition to professional activities, service to the community, and cultural development.

There have been 26 winners and 36 honorable mentions named throughout the history of the award. The recipient is honored with a certificate and a pewter tray from the National Board of Directors. Nomination forms are mailed to all chapters annually, and can also be obtained from HKN headquarters.

HOMEWORK

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



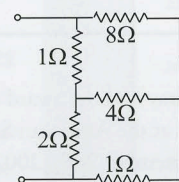
seventh place card was 301.6, Jill came up with a total of 3317.6 for the 10 cards. No fibbing!

Current Assignment

1 Pattern Recognition: The following patterns represent a sequence. What pattern should go in the last box? Submitted by Hubert C. Watton, A '48



2 Back to Basics: Reduce the following network to a single equivalent resistance. Submitted by Jeff Link, @Δ '98.



3 Numerous Numbers: Most people use the decimal system for counting, using the 10 digits 1 through 9 and 0. The exception are those electrical and computer engineers who like to use base 2, 8 and 16 a lot. When using the decimal system, how many different 10-digit numbers can be created if each digit is used only once?

4 Tsyanshidzi: The game of tsyanshidzi (picking stones) dates from early China. The game consists of two groups of stones. Players alternate taking stones from the groups. When you pick up stones you can either 1) take any or all stones from one group, or 2) take the same number of stones from both groups. The player who takes the last stone wins. Winning positions include (N,0) and (N,N). However, (2,1) is a losing position. No matter what you pick up, your opponent can win on the next turn. Going further, any (N,1) position would be a winning position, by picking up N-2 stones from the first group, leaving (2,1) for your opponent. What, if any, are the other losing positions besides (2,1)?

Answers for Last Assignment

1 Additional Complications: Jill created a Fibonacci sequence by selecting two starting numbers and generating the next number from the sum of the two previous numbers. With arbitrary starting numbers x and y, the sum of her first 10 Fibonacci numbers would be $x + y + (x+y) + (x+2y) + (2x+3y) + (3x+5y) + (5x+8y) + (8x+13y) + (13x+21y) + (21x+34y)$ which gives a sum of $(55x + 88y)$, which is 11 times the number in the seventh place, $(5x+8y)$. Since the revealed

2 Of Mice and Men: starting with $x + y = 2z$, where x = weight of the man and y = weight of the mouse, we performed valid operations to get: $x - 2z = -y$ and $x = -y + 2z$, and their product $x^2 - 2xz = y^2 - 2yz$. We added z^2 to get $x^2 - 2xz + z^2 = y^2 - 2yz + z^2$ or $(x-z)^2 = (y-z)^2$. However, the wrong square root of $(y-z)^2$ was used. Based on the conditions in the problem, we should have used $-(y-z)$ and not $(y-z)$, because $(x-z)$, (a man minus a half-man, half-mouse) is positive, while $(y-z)$, (a mouse minus a half-man, half mouse) is negative. Taking the square root, we should get $x-y = -(y-z)$; or $x+y = 2z$, the equation we started with, and luckily, not implying anything about the weight of the mouse (y) being equal to the weight of a man (x).

3 Amateur Radio: Many AM radios use an L-C tuning circuit to tune in the desired station. The resonant frequency of the L-C circuit is $\omega = 1/\sqrt{LC}$. We know the value of the attached inductor is 2.39 mH. To tune to the high end of the AM band (1550 kHz), we need a capacitance of $1/(0.00239 \cdot (1.55 \times 10^6)^2) = 4.41 \text{ pF}$. To tune to the low end of the AM band (550 kHz), we need a capacitance of 35 pF. Therefore, the replacement variable capacitor needed to have a range of 4.41 pF to 35 pF. Slightly different answers were acceptable if slightly different ranges were used for the AM band.

B Bonus: Come on now! We asked what is the name of the HKN member that should send in an original homework problem and answer for publication in an upcoming issue of the Bridge, and hinted to look for the clue in the address label block on the front cover. So I guess we got what we asked for, because almost everyone sent in their own name as the answer, but didn't send in a new homework problem, like we intended. Try again, and send in those original homework problems this time.

Help Wanted: The Bridge staff is looking for a writer/editor for the Homework column each issue. If you enjoy writing these kinds of problems, please call/write the editor to discuss the position.

PERFECT SCORES

Several members submitted answers to last issue's homework assignment. Problem 3 was missed most often from forgetting the square root or mathematical carelessness with the exponents. Only three members got all three problems correct. Congratulations.

Harry Raab, Jr, BΘ '50
Michael Rodby, N '77
Kam F. Yee, BH '90

SHORTCIRCUITS

International Humor

The Laughlab experiment recently determined the funniest jokes based on over 40,000 jokes and almost 2 million ratings. After a year of collecting responses and careful statistical analysis, they noted that different countries perceived different jokes as being funnier. These jokes are the funniest joke based on responses from a given country.

GERMANY: To tell the weather: Go to your back door and look for the dog. If the dog is at the door and he is wet, it's probably raining. But if the dog is standing there really soaking wet, it is probably raining really hard. If the dog's fur looks like its been rubbed the wrong way, it's probably windy. If the dog has snow on his back, it's probably snowing. Of course, to be able to tell the weather like this, you have to leave the dog outside all the time, especially if you expect bad weather. Sincerely, the CAT.

FRANCE: "You're a high-priced lawyer! If I give you \$500, will you answer two questions for me?"
"Absolutely! What's the second question?"

BELGIUM: Well, you see, there are basically three kinds of people in the world. Those who can count and those that can't.

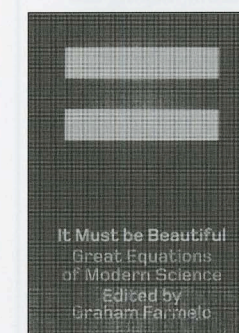


SWEDEN: A guy phones the local hospital and yells "You've gotta send help! My wife's in labour!" The nurse says, "Calm down. Is this her first child?" He replies, "No! This is her husband!"

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

BOOK REVIEW

Everything is Beautiful



**IT MUST BE BEAUTIFUL,
Great Equations of Modern Science**
Edited by Graham Farmelo
2002 Granta Books, London, New York
List Price: USA \$25.00

To summarize this exciting tome, I would call it "A Sampling of Modern Science" presented by masters of their subject. Please note that I did not call it "an easy introduction",

because it is not. But it is a truly fascinating curtain raiser.

The editor, Graham Farmelo, is Head of Science Communication, at the Science Museum, London. He is also Associate Professor of Physics at Northeastern University, USA. His assembly of specialists introduces important equations for the non-mathematical reader. They are ingeniously arranged in chronological order of their creation so chapters can be read in any order. Editor Farmelo himself begins with "The Planck-Einstein Equation for the Energy of a Quantum". Harvard Professor Galison follows with revealing details about Einstein's most famous equation $e=mc^2$.

Other topics included in this remarkable collection are: Professor Penrose of Oxford University with an illuminating chapter

relating gravity to the Einstein equation of general relativity; Prof. Arthur I. Miller, University College, London, on Erwin Schrodinger's Wave Equation; and MIT's Professor of Physics, Frank L. Wilczek, on the birth and application of the Dirac equation.

The collection concludes with an "Afterword" by Nobel Prize winner of Physics, Professor Steven Weinberg. The collection stimulated me to go far back in my life to my first book on Einstein, *The Relativity Theory Simplified And the Formative Period of its Inventor*, written about 1930 by our family ophthalmologist and friend, Dr. Max Talmey (1867-1941). He too was a gifted mathematician and invented the universal language Arulo.

Dr. Talmey gave Einstein *Popular Books on Physical Science* by A. Bernstein, which, said Talmey, "Einstein devoured at the young age of ten". Einstein told Talmey in later years that Bernstein's books had a great influence on him. At age thirteen the brilliant Einstein read and understood Kant's *Critique of Pure Reason*, which Talmey said was "incomprehensible to ordinary mortals".

It Must Be Beautiful is beautiful, stimulating, and a valuable addition to any library.

— Review by Bert Sheffield, BB '49

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

Thelma Estrin

Pioneer of Biomedical Computing



In the months after the attack on Pearl Harbor, U.S. factories stepped up production and millions of men left their jobs to enter the military. The resulting labor shortage was met in part by women: by the middle of 1945 the female work force had risen by 6.5 million, a 57 percent increase. One of the women who helped meet this need was Thelma Estrin, a young New Yorker who, after taking a 3-month engineering assistant course, worked for the Radio Receptor Company in the city where she assembled test equipment and repaired radio transmitters. After the war both she and her husband Gerald Estrin entered the undergraduate EE program at the University of Wisconsin. She later said, "By working 18 hours a day and not taking vacations, we both zipped through Wisconsin, obtaining B.S., M.S., and Ph.D. degrees in record time."

MEDICAL ELECTRONICS AND COMPUTER PROJECTS

After graduation Thelma found a position at Columbia Presbyterian Hospital in New York City, where she oversaw the maintenance of EEG equipment and collaborated with physicians on EEG studies. In 1953 the Estrins moved to Israel to work on a project to build a computer at the Weizmann Institute of Science. Gerald directed the project, and Thelma was a principal member of the engineering group. The computer, known as the WEIZAC, was modeled on the Institute for Advanced Study computer, but significant redesigns were necessary and Thelma played a large role in this process.

THE UCLA BRAIN RESEARCH INSTITUTE

The Estrins returned to Princeton in 1955 and moved to Los Angeles the following year. In 1960 Thelma, because of her earlier work in medical electronics, began work at the Brain Research Institute at the UCLA Medical School. There she helped establish a computer laboratory for nervous system studies. At the time local computing capacity was a new idea; at most universities almost all computing was carried out at a single facility. Thelma designed and implemented an analog-to-digital conversion system for neurophysiological studies, and she resumed research with EEG patterns. In 1965 she designed a time-sharing system that permitted data processing in real time at a number of laboratories in the Brain Research

Institute. In 1970 she became director of the data processing laboratory, supervising six to ten computer professionals and deciding how to allocate personnel and material resources to the many Institute projects.

MEDICAL INFORMATICS

During the 1970s the data processing laboratory, which earlier had concentrated on medical research, directed more and more of its effort to health care delivery. In the mid 1970s Thelma pioneered in the use of interactive graphics as a tool for neurosurgeons and neuroscientists, also in the use of computers for statistical analysis of EEG recordings. Thelma became an early champion of medical informatics, arguing that clinical medicine is inherently an information processing activity. She believed that computers could improve medical care in numerous ways, helping physicians gain higher quality information, making hospital administration more efficient, and

facilitating the evaluation of medical treatments. In 1980 Thelma became a professor in residence in the UCLA Computer Science Department, and in 1982 she accepted a 2-year position as a division director at the National Science Foundation. At the NSF she established a new program, Bioengineering and Research for the Handicapped. From 1984 to 1989 she was a director of the UCLA extension program, managing some 550 courses each year.

WOMEN IN ENGINEERING

Though Thelma had long been a member of the Society of Women Engineers, it was in the 1970s that she became active in the effort to increase the number of women in engineering. From 1975 to 1980 she chaired the IEEE Committee on Professional Opportunities for Women. She gave many talks and wrote articles on women in engineering, and she has been a member of Systers, a computer network for female computer scientists. For these and other efforts she received the Achievement Award of the Society of Women Engineers. Thelma is the recipient also of an Honorary Doctor of Science Degree from the University of Wisconsin. She was named a Fellow of the IEEE in 1977 and an Eta Kappa Nu Eminent Member in 2000.

Thelma became an early champion of medical informatics, arguing that clinical medicine is inherently an information processing activity.

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.

ACADEMIA

Northern Illinois University, Department of Electrical Engineering invites applications for a full-time tenure track Assistant Professor in the area of communications/digital signal processing (DSP). The department's ABET accredited program currently has approximately 420 undergraduate and 80 master students. NIU is located approximately 60 miles west of Chicago and anchors the western end of the East-West Research and Development Corridor. Required: Must have an earned Ph.D. in electrical engineering by the time of appointment; demonstrated research ability; a strong interest in teaching at the undergraduate and graduate levels; ability to develop a funded research program and willingness to interact with local industry. Teaching responsibilities will include delivery of the department's required courses in the digital area. Send application letter, resume, names and telephone numbers of three current references to:

Chair, Search Committee
Department of Electrical Engineering
Northern Illinois University
DeKalb, IL 60115

Complete applications must be received by September 15, 2003. Northern Illinois University is an Affirmative Action/Equal Employment Opportunity Institution. Women and minorities are encouraged to apply.

University of Vermont Electrical & Computer Engineering invites applications and nominations for the position of Department Chairperson at the level of Professor with tenure. The Department of Electrical and Computer Engineering offers an ABET accredited BSEE with four engineering concentrations (electrical, computer, biomedical, and premedical), and graduate programs at the Masters and PhD level. Current research areas include communications, computational intelligence, electromagnetics and optics, semiconductor devices and processes, signal and image processing, and mixed-signal VLSI design and test. Further information on the department can be found at www.emba.uvm.edu/ece/. The University administration is committed to expansion of the Department of Electrical and Computer Engineering, with an increased emphasis in computer

engineering. Applicants should have a doctorate in Electrical and/or Computer Engineering, a record of leadership showing strong interpersonal skills and organizational abilities, a distinguished research record with recognized professional accomplishments, an appreciation for all sub-disciplines of electrical and computer engineering, and a demonstrated commitment to excellence in teaching. We are seeking a scholar and leader with vision who will direct and manage growth of the department and maintain an environment that balances excellence in undergraduate education and nationally recognized research. The successful applicant is also expected to strengthen and build interactions between the Department of Electrical and Computer Engineering and other departments within the University as well as with industry. The University of Vermont is the State's land-grant university. It offers a supportive research environment in a relatively small city that repeatedly has drawn national attention for offering a high quality of life. Local industry is diverse and includes General Dynamics, IBM, Goodrich, and several other high-tech firms. The greater Burlington area includes 125,000 people, and is situated on the shores of Lake Champlain between the Green Mountains of Vermont and the Adirondack Mountains of New York. Burlington and the surrounding area provide an environment rich in cultural and recreational activities. See www.vermont.org for Lake Champlain regional information. Applicants should provide a curriculum vitae and three separate statements addressing a) research interests, b) teaching interests and philosophy, and c) leadership style and experience, and should arrange for three letters of reference to be sent at the time of application. Address all correspondence to Dr. Jean-Guy Beliveau, Electrical and Computer Engineering Chair Search Committee, Office of the Dean, 109 Votey, College of Engineering and Mathematics, University of Vermont, Burlington, VT 05405. To ensure full consideration, applications should be received by October 1, 2003. Start date could be as early as January, 2004. The University of Vermont is an equal-opportunity employer and applications from under-represented groups are welcome.

Faculty Positions Available, Electrical Engineering, Computer Engineering, and Computer Science: The Department of Electrical and Computer Engineering, Graduate School of Engineering and Management, Air Force Institute of Technology (AFIT), Wright Patterson AFB, OH, has several tenure track openings on the faculty with rank and salary determined by qualifications. Positions

are open at the assistant professor level, although qualified candidates will be considered at the associate professor level. Applicants must have an earned doctorate in Electrical Engineering, Computer Science, or a related field. Some areas of specialization to be covered are software engineering, artificial intelligence, computer security/information assurance, database systems, information visualization, VLSI systems, advanced electromagnetics, radar, and low observables. These positions require teaching at the graduate level and carrying out research under the sponsorship of government agencies. This department has close working relationships with Air Force and Department of Defense research and development organizations. The department has excellent laboratory facilities, and computational facilities are of the highest caliber. Employment at the AFIT is only open to U.S. citizens. Submit a complete resume and the names of three references to Dr. Gary B. Lamont, Search Committee Chairman, Department of Electrical and Computer Engineering, AFIT/ENG, 2950 Hobson Way, Wright-Patterson AFB, OH 45433. You may contact gary.lamont@afit.edu or (937) 255-3636, ext 4718, for additional information. The United States Air Force is an equal opportunity, affirmative action employer.

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*

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