

THE BRIDGE

vol 97, no. 1 / summer 2001

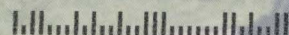
of Eta Kappa Nu

Strategic planning in JACKSON HOLE

A special HKN meeting focused on
revitalizing the organization resulting
in new initiatives for our future.

Also:

- HKN's Greatest Asset
- Six New Eminent Members Inducted
- OYEE and Karapetoff Award Winners



***** ALL FOR ADC 64240
#292747 -- 299
Chairman Elect Engr Dept 1179
Univ Of Missouri-Rolla
Rolla MO 65401-

THE FUTURE OF COMMUNICATIONS BEGINS WITH YOU.



CLEAR IDEAS™ FOR YOUR CAREER.

At Tellabs, developing the communications landscape of the future is more than just an ambition. It is something we do every day. Through innovative technologies like dense wavelength-division multiplexing, Voice-over-IP and SONET, we keep local, long-distance, wireless, cable and Internet service providers on the cutting edge. If you are majoring in electrical or computer engineering, computer science or a related field, help us shape the future of the new public network. Email your resume and cover letter to collegegraduates@tellabs.com or collegerelations@tellabs.com. Mention the department: CTB01.

- HARDWARE DEVELOPMENT AND TESTING
- SOFTWARE DEVELOPMENT
- VLSI DESIGN
- SOFTWARE/SYSTEM INTEGRATION TESTING
- FIRMWARE DEVELOPMENT
- RESEARCH

Tellabs was recently ranked among FORTUNE magazine's "100 Best Companies to Work for in America."



CLEAR IDEAS™

WWW.TELLABS.COM

EOE M/F/D/V

CONTENTS/PAGE

THE BRIDGE of Eta Kappa Nu

Volume 97/ Number 1 / Summer 2001

EDITOR

Ronald A. Spanke

CONTRIBUTING EDITORS

Tom Braxton, Larry Dwon

COPY EDITOR

Jutta Willmann

ART DIRECTOR

Jennifer McGuire

CIRCULATION

Dawn Hughes, J. Karen Gluszczyk

ADVERTISING SALES

1-800-218-1681

HKN International Headquarters Office

Address editorial, subscription and address change correspondence to: P.O. Box 3535, Lisle, IL 60532
tel: 1-800-406-2590, fax: 1-800-864-2051,
Web: www.hkn.org

Postmaster: Send address changes to :
HKN Bridge, P.O. Box 3535, Lisle, IL 60532

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.

Eta Kappa Nu is a member of the Association of College Honor Societies.

The *BRIDGE* is the official publication of the Eta Kappa Nu Association, the electrical and computer engineering honor society. The *BRIDGE* is published quarterly by the Eta Kappa Nu Association, 2651 Yorkshire Lane, Lisle, IL. Printed at Haywood Printing Company, 5th & Ferry St., Lafayette, Indiana. Periodicals postage paid at Lafayette, Indiana. Subscription price: \$15 - three years; Life Subscription \$60

Ideas and Opinions expressed in the *BRIDGE* are those of individuals and do not necessarily represent the views of the Eta Kappa Nu Association, the Board of Directors, or staff.

ISSN-0006-9809

© 2001 by Eta Kappa Nu Association, All Rights Reserved



The *BRIDGE* is printed on recycled paper with a minimum of 10% post-consumer pulp content.

features

6 Out of the 'Hole

Jackson Hole, Wyoming, hosts a special HKN Strategic Planning Meeting to focus on revitalizing the organization.

8 HKN's Greatest Asset: Alumni

Examples of how alumni can become and remain involved in Eta Kappa Nu and make an impact on today's EE/CE students.

10 New Eminent Members Named

Jacob Rabinow, Robert Frosch, Wilson Greatbatch, Leo Beranek, George Heilmeyer, and John Whinnery inducted as Eminent Members.

12 Outstanding Young EE Awards

Casimer DeCusatis is presented the Outstanding Young Electrical Engineer Award at the 2000 HKN Awards Banquet in Princeton, NJ.

14 Amos Joel wins Karapetoff

The "Father of Electronic Switching Systems" and pioneer in telecommunications systems receives the 2000 Vladimir Karapetoff Award.

departments

- 2 From the Bridge
- 2 HKN Calendar
- 3 FeedBack
- 4 What's Nu?
- 4 Ask the Professor
- 5 On Campus
- 15 Education Spotlight
- 15 Bridge Eternal
- 16 HKN Board
- 18 Homework
- 19 Short Circuits
- 19 Book Review
- 20 EE Pioneers
- 21 Career Bridge



ON THE COVER

Archway constructed from antlers greets visitors to downtown Jackson Hole, Wyoming, location of the HKN Strategic Planning Meeting to lay out initiatives to restructure and revitalize the organization.
photographer: Jutta Willmann

FROM THE BRIDGE

All NEW Bridge Format Debuts

I sometimes thought this day would never come. After countless long hours, many committee meetings, and trash cans full of discarded graphic designs and content suggestions, this first edition of our new *Bridge* format has finally made it into your hands.

The differences start right on the cover. We've moved from an all black and white format to a color cover format. We've introduced several new departments: An *HKN Calendar* highlights upcoming banquets, national activities, and award nomination deadlines. *The Feedback* column is a forum for your letters and suggestions to the editor. *What's Nu?* brings you relevant news in the general field of electrical and computer engineering. *Ask the Professor* will feature our own off-the-wall EE design expert, Professor R. F. Detecta, as he pokes a little fun at giving serious answers to your design questions. A new *On-Campus* column will feature highlights of interesting chapter activities submitted by the local chapter *Bridge* correspondents for other chapters to learn from and build upon. *Education Spotlight* will feature topics, trends, and new programs happening in the academic world.



The Bridge Eternal section remembers our fellow HKN colleagues who have passed on.

Find new and challenging brainteasers each quarter in the *Homework* department along with the answers to last quarter's assignments. Put your mind to work and send in those answers. See the *Short Circuits* column for humor and a little reality break. The *Book Review* section will highlight short reviews of current books as well as list recent books by HKN authors. If you've published a book lately, let us know. Finally, *EE Pioneers* will take a closer look at the lives and accomplishments of the true pioneers of electrical engineering.

We welcome advertisers to the Bridge and introduce the new *Career Bridge* section featuring specific positions offered.

This new *Bridge* format would not have been possible without the dedicated involvement of members of the HKN *Bridge* committee. A tremendous amount of thanks goes to my fellow committee members: Don Christiansen, Larry Dwon, and Mohammad Shahidehpour.

—RAS Ω '82

HKN CALENDAR

EVENTS

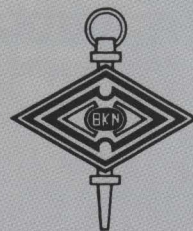
HKN Fall Awards Banquet, October 18, 2001, San Jose, CA 11:30-3:00. Honoring new HKN eminent members and 2001 OEES award winners. Luncheon tickets \$35, Contact HQ for reservations.

NOMINATIONS DUE

Outstanding Chapter Activities Award (OCAA) nomination forms and Chapter Annual Reports due September 30, 2001. Nomination forms and criteria have been mailed to chapters, but contact HQ if additional forms or assistance is required.

Outstanding Young Electrical Engineer (OYEE) Nominations due September 15, 2001. 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, 2001. Contact HQ for more information.



Eta Kappa Nu Association

The Electrical and Computer Engineering Honor Society

Founded October 28, 1904

International Board of Directors

PRESIDENT

Mohammad Shahidehpour

VICE PRESIDENT

Jim Melsa

EXECUTIVE SECRETARY

Ronald A. Spanke

PAST PRESIDENT

Richard J. Gowen

DIRECTORS

Curran Cotton

Eric Herz

Charles Gross

Hans Kuehl

HKN STANDING COMMITTEES

Constitution and Bylaws Committee

Jim Melsa, Chair

Finance Committee

Bill Hord, Chair

BRIDGE Committee

Ron Spanke, Chair

Awards Committee

Robert Egbert, Chair

HKN AWARDS COMMITTEES

Outstanding EE Student Award

Marcus D. Dodson, Chair

Outstanding EE Junior Award

Laureen H. Parker, Chair

Outstanding Young EE Award

John G. N. Henderson, Chair

Outstanding Teaching Award

Robert F. Arehart, Chair

Outstanding Chapter Activities Award

Alan Lefkow, Chair

Vladimir Karapetoff Award

Donald Christiansen, Chair

Eminent Member Award

Donald Christiansen, Chair

Distinguished Service Award

Larry Dwon, Chair

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

FEEDBACK

I would like to take this opportunity to thank you for the Millennium Collector's Edition of the Bridge (vol. 96, no 3).

Although technology changes, much of the information in past articles is timeless. This recent edition is extraordinary.

—Timothy D. Elmore, ZΘ '77

Congratulations on the recently published Bridge. I was very impressed with the overall look and especially the content. I am sure that this will greatly help the recovery process for HKN.

—Robert Bartolini, ΔM '62

I just received the interesting Millennium Collector's Edition of The Bridge and feel that it is perhaps useful to send you some remarks about a couple of items. On page 36, I was on the Faculty of City University when this happened. After he served as President of Eta Kappa Nu, the late Dr. Sydney Parker (Naval Postgraduate School, Monterey) invited me to become involved in the international aspect of Eta Kappa Nu, which led to the Annual Student Award being established at City University London. This was one of the few universities in UK which responded positively to the initiative to try to establish some kind of Eta Kappa Nu activity in UK EE Departments.

Dr. Ellison retired from City University well over a decade ago, and died towards the end of last year. I moved from City University to King's College in 1990, and I do not know if the annual award is still given.

—Anthony C. Davies, H '79
Emeritus Prof., King's College,
Univ of London.

Congratulations on the new Bridge. The Millennium Collectors edition is an auspicious start. A thoughtful collection. Congratulations.

You may be interested to read the following suggestions for improving the Bridge.

The Bridge should be the sparkling show window of HKN. It should contain

inspirational material including introductions to the professions, reviews of inspirational books, in addition to other features.

Efforts should be directed to publish the Bridge more economically, not only by distributing mostly via the Internet, but also by considering reducing the publishing schedule from quarterly to triennially, such as on April, August and December, to coincide with semester endings.

Consideration should also be given to separating the duties of the Executive secretary from the Bridge Editor, with Editor remuneration adjusted to advertising revenue.

Secrecy, I believe, has no place in HKN. I believe that contributions and their allocation should be publicized annually.

—Bert Sheffield, ββ '49

I see from the current issue that you have included an article about the award given by Eta Kappa Nu to The City University student and presented by my late husband, Emeritus Professor Arthur James Ellison. It was interesting to see it again, as was the article by Paul Hudson, who asked my husband to be a member of the board.

I wish every success to Eta Kappa Nu in the future.

—Mrs. Marian Ellison

The Millennium Bridge edition is a well-conceived idea: Alumni members among the older active HKN volunteers should find it to be a nostalgic review of the old Bridge. It contains an interesting sample of articles from past Bridge issues. In my opinion, it omits some noteworthy articles that were especially in tune with career-related issues of millennium 2000. That prompts the question: What criteria guided the selection of contents for the Millennium Collector's Edition?

My opinion is supported by substantial involvement as a writer for The Bridge—a voluntary response to A. B. Zerby's call for help in 1935, — and years

of close association with very dedicated active members in the New York Alumni Chapter and other alumni activities.

The OYEE program, in 1936, became and still is the most outstanding activity within HKN. It and its creator, Roger I. Wilkinson, should have been mentioned prominently in this special Bridge issue. It would have been fitting to give Roger well deserved recognition for the foregoing contributions as well as for his important article—"Why Engineers Organize."

Copies of articles based on OYEE candidates' dossiers provided information, which educators, managers in industry, and government agencies requested. I consider it unfortunate that the articles about the OYEE program were not covered in some appropriate manner. I believe also that the following articles would have enhanced your excellent tribute to old Bridges:

- Trends in Modern Education
- Good Management Prospects for Engineers
- Forces Influencing Engineering Education from Power
- Some Truths about Engineering Technology Education and Accreditation
- Roger I. Wilkinson OYEE Award: 50 Year Review.

Hopefully we can make the new Bridge an informative and open magazine about HKN affairs and provide an opportunity for all members to read and write realistic career experiences to help our younger members

—Larry Dwon, K'35

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

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

Low-Power FM License Process Proceeds

Ever wanted to operate your own radio station? Sure, you could build one, and you might even have ideas about what you'd do with it. Most every techie has had that dream at some point, but it was out of the question—until last year.

The Federal Communications Commission (FCC) in 2000 authorized the establishment of a new Low Power FM (LPFM) license class intended to serve small communities or neighborhoods. The stations would be 10, 100, or 1000 Watts, depending on local terrain and frequency availability. First priority would be given to community groups and local nonprofit organizations, with the only requirement being that the stations be noncommercial. The FCC's assumption was that at such a small scale, equipment and expertise requirements would be minimal, allowing otherwise voiceless groups of people to be heard.

That was until a group of established station owners, led by the National Association of Broadcasters (NAB), heard about it. Their protests were long and loud, going so far as to lobby the House Commerce Committee to introduce legislation overruling the FCC's technical specifications. The act, which passed both houses of Congress and was signed by the President, slowed down the license-approval process.

But there are still some frequencies and locations available. If you'd like to see what it's about, go to the FCC's LPFM website at www.fcc.gov/lpfm and check out the process. Who knows? You might see your dream come true.

Bluetooth Is Coming—Ready Or Not

As technology continues its march toward making us all connected to everybody else, the Bluetooth wireless-network standard is leading the parade. Named for the Swedish Viking King Harold Blatand (Bluetooth), who ruled several Scandinavian countries and fostered commerce networks among them, the standard is intended to provide complete wireless interoperability among electronic products.

And we do mean complete. The Bluetooth consortium (www.bluetooth.com) envisions a world in which everything from laptops to refrigerators will be talking to each other over this wireless party line. Spread-spectrum technology is what makes this possible, riding on unregulated frequencies around 2.4 GHz. Compatibility and interference risks are a concern, but industry proponents are confident they can be overcome.

This is a real work in progress. But the momentum is such that it's going to happen and it'll be sooner rather than later. Depending on how successful the early trials are, this could prove to be an explosively growing industry. In whatever corner of the industry you find yourself working, you'll need to be familiar with this before it becomes familiar with you.



...Hmmm, every answer I write seems to generate two more questions! ...ahhh, now that's job security.

ASK THE PROFESSOR

Professor R. F. Detecta, renowned circuit-design expert and bon vivant, has recently joined the *Bridge* staff. He just showed up one day and moved in, so we decided to put him to work. He makes himself available to *Bridge* readers to answer your snappy questions: —TB

Dear Professor,
I developed a circuit design for a system using a high-speed processor and a series of digital signal processors (DSPs). I was able to build a working prototype, and what a handsome thing it is! But a consultant told us that we shouldn't go into production until we've checked the signal integrity. What a lot of nerve! How could anybody question our circuit's integrity? He said we should ask a real expert if we didn't believe it. Since we couldn't find one, somebody suggested we ask you.

— Offended

Dear Offensive,
Couldn't find a real expert, so you thought you'd try me? Who's the one with a lot of nerve?

Relax ... signal integrity has nothing to do with your circuit's rectitude. Poor signal integrity is one cause of circuit-design heartburn: it's how well a received signal matches the transmitted signal.

That signal path on your board is an impedance obstacle course. Your signal-driving device has some characteristic impedance and so does the receiving device. If the transmission path doesn't have the same impedance, then your nice sharp square wave at the originating end might look like wet spaghetti at the receiving end. You'll get weird, intermittent failures.

Use a simulation tool to check your board design before it's built. Simulate the critical signal paths after entering values for transmit and receive devices, trace dimensions, and any passive components attached to the path. Then you'll see whether your board has real (ahem) integrity. If not, you can adjust the design to clean it up.

But hey, don't take my word for it. Better find a real expert.

ON CAMPUS



Kappa Omicron, HKN's Newest Chapter, Off to a Good Start

The Kappa Omicron Chapter of HKN at SUNY—New Paltz has finished its first semester. Kappa Omicron, a new HKN chapter, was installed at the State University of New York at New Paltz on October 23, 1999. Mr. Ralph J. Preiss represented the HKN National Association and granted the chapter charter to SUNY—New Paltz. Ten charter members were inducted into the chapter with the help of Mr. Preiss; Dr. William Ma, faculty advisor to the chapter, Dr. Babcock Izadi, an Electrical and Computer Engineering faculty member; and Dr. Owen Hill, the Dean of Engineering.

The ceremony was conducted in the new Resnick Engineer-

ing Building and was attended by family members, Ms. Barbee Geider, VP of Student Affairs, guests, and representatives from the local media. All guests were invited to a buffet lunch to celebrate the installation and induction.

The ten charter members are: Brian C. Johnson, Robert J. Bubel, Hoi Gonn Cheung, Jeremy Cooke, Karyn Velasquez, Lyn-Marie Kiefer, Tuan Van Nguyen, Paul R. DePuy, Stavros Boglou and Michael J. Wielgos.

Elections for the new chapter's officers were held at the first official meeting on December 3, 1999. Meetings will commence after break to plan activities for the spring semester and vote on new members to be inducted into the chapter in the Fall semester.

—Submitted by Karyn Velasquez
Kappa Omicron Chapter Vice President

Delta Chi Chapter of Eta Kappa Nu is Awarding CASH Money !!!

Delta Chi chapter at The Cooper Union is sponsoring an award this year. At the end of the year, the EE professors will choose the group with the best senior project from EE163, and that group will receive \$500 in cash. The group with the

best VLSI project from EE143 (as chosen by the professors) will receive \$250.

All enrolled students in EE163 and EE143 at The Cooper Union are eligible to compete. Delta Chi chapter created and posted flyers advertising the award and publicized them on campus as a great way to increase visibility and interest in Eta Kappa Nu.

Delta Omega Pledge Picnic

On October 7th, 2000, we had our annual HKN Pledge Picnic at Sand Island Park. If you've never heard of the place, there's a good reason you haven't. Sand Island Park isn't exactly the best park on the island of Oahu. Certain areas smell like dead fish and oil and there's just as much dirt as there is grass. However, one good thing about the place is that it's deserted, and since no one was at the park, the pledges were free to embarrass themselves while doing their skit and playing the annual HKN relay. Overall, though, the purpose of the picnic was to familiarize the pledges and officers with each other, as well as just having a good time, and as you can see, everyone had a good time.

Pledges were creative in their choice of skits this year, basing them on current popular TV programming. One game centered on "Who wants to be an HKN member?" requiring correct answers to increasingly difficult EE questions. Even when the candidates had selected their response from the multiple choices, they were always asked "Is that your final answer?"

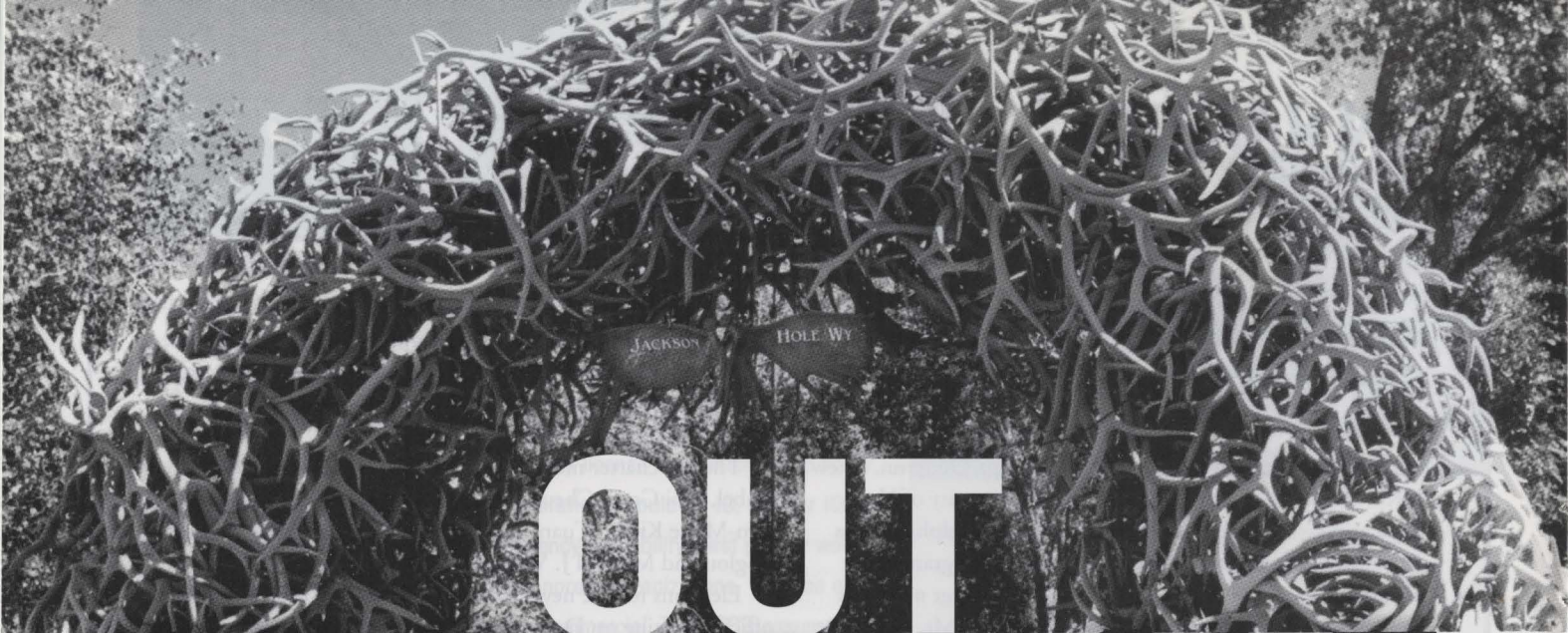
Another successful game was based on "Survivor: EE371



Delta Omega members and pledges take a break between games to pose for a group photo.

style", where the group faced challenge after challenge, but the biggest challenge the pledges faced was not getting voted off of the team.

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



OUT OF THE HOLE

Jackson Hole, Wyoming hosted a special HKN strategic planning meeting that focused on revitalizing the organization which resulted in many new initiatives.

The special HKN Strategic Planning Meeting (SPM) was proposed to discuss revitalizing the organization, membership trends, alumni chapters, and to develop effective models for governing the organization in the future. The HKN Board and interested parties met on August 2-3, 1998, at the Teton Lodge in breathtaking Jackson Hole, Wyoming.

Attending were Richard J. Gowen (HKN President), Mohammad Shahidepour (HKN Vice President), Robert Egbert (Past President), Jim Melsa (Director), Ron Spanke (Director), Bruce DeMaeyer (Past Director), Bob Bartolini (NY Alumni Chapter), Tom Rothwell (LA Alumni Chapter), and Robert Janowick, and John Pappas from the International Engineering Consortium. The offices listed are the position that the individuals held at the time of the SPM. Bruce DeMaeyer and Robert Janowick were residents of Jackson Hole and graciously served as local hosts for the event. Each participant or their university or company picked up the costs of their own travel and lodging, since no HKN funds were budgeted for this as a regularly scheduled Board function.

A VISION FOR THE FUTURE

After opening discussions about general expectations of the meeting, the morning session focused on a presentation and handout

prepared by then-director Spanke entitled HKN: Visions and Goals, Moving Toward our 2nd Century, which discussed the current membership trends and financial situation of the HKN organization and proposed several new initiatives as a starting point for discussions.

Membership data was collected from the past eight years and showed a year-after-year decrease in new HKN members from 5500 in 1990 to only 2713 in 1998. Three initiatives were recommended that included increasing the acceptance rates in active chapters, working to reactivate currently inactive chapters, and identifying prospects for new chapters. Suggestions for increasing the acceptance rate were to decrease the national initiation fee, better promote the benefits of joining HKN, and improve the overall HKN image via promotional materials and a more modernized Bridge magazine. It was proposed that a direct domain name be acquired for the HKN website and email, like www.hkn.org, instead of the current indirect website and email which was at www.umn.edu/~hknhdqrs.

The financial data for the National HKN office for the past three years was presented which showed a troubling trend. With the recent decline in new memberships, the expenses associated with running the national headquarters were becoming greater than the revenue generated by the new membership fees. Even though

the national headquarters had recently increased the new membership fee from \$30 to \$40, the annual revenue was still insufficient for the current HKN headquarters operation. Reversing the declining membership trend is one source of increasing revenue. Other suggestions for new sources of revenue were discussed including alumni contribution programs, a corporate partnering program, and selling advertising in the Bridge. All of these new programs would require significant development effort by the headquarters staff.

GOVERNING STRUCTURE

The afternoon session concentrated on proposed changes to the organization and the governing structure for HKN. After discussion, a list of 45 necessary changes was compiled. The participants attempted to prioritize this list, concentrating on those items with the highest leverage. Participants felt that the current 2-year term for directors was not optimum since there were only two scheduled Board meetings each year. New directors took one or two meetings to get on board, and then didn't feel like getting involved in major projects during their last meetings. Two new directors were elected each year, resulting in a constantly changing board with no continuity. A three-year term for directors was suggested, increasing the total number of directors from four to six thereby increasing the continuity and effectiveness of the Board.

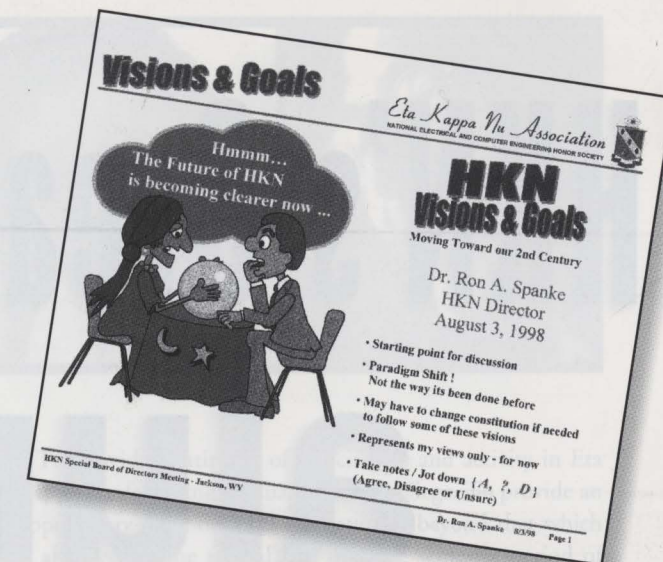
There was concern that the current Executive Secretary role as an elected officer of the Board and Executive Council may not be the most effective way to run the annual activities of the organization. A proposal was discussed to create an "Executive Director" position as a hired employee, but not as an elected officer of the board. This is similar to most other non-profit organizations. The Executive Director would directly report to the BOD with similar duties of the current Executive Secretary, except that he would not be an elected officer.

The participants also evaluated alternative operational models for the organization, including contracting with other organizations like IEEE or the International Engineering Consortium (IEC) to run the headquarters operation. Bob Janowick and John Pappas were present from the IEC and discussed possibilities and scenarios of that form of headquarters operation. At the end of the meeting, the consensus was to pursue the Executive Director model and 3-year terms for Directors. However, that would require changes to the HKN constitution, which would need to be ratified by all of the college chapters.

REVITALIZE COMMITTEES

To implement many of the suggestions brought forth at the SPM, it was recommended to reactivate many of the HKN standing committees that had been dormant for many years. The finance committee was reactivated to analyze and oversee the HKN annual budgets and audits and investment strategies. The Bridge committee was reactivated to modernize and develop a new look and feel for the Bridge magazine.

The Awards committee was reactivated to study possibilities for new HKN award opportunities to honor electrical and computer engineering students and alumni, including a revival of the Eminent Member program, which had been dormant for many years.



The Constitution and Bylaws committee was reactivated to study and propose changes to our constitution and bylaws to simplify them, and to incorporate many of the governing model suggestions that came out of this meeting.

SUMMARY

For several years beginning in the early nineties, the growth of HKN had appeared to stagnate. Annual membership trends had been decreasing, and the expenses of operating the National headquarters and funding the national activities of the organization were becoming larger than the annual revenue from the membership initiation fees. There had been concerns over the quality of the Bridge magazine, and other national programs for several years. The Board of Directors, over many years had noticed some of these signs and had made numerous recommended changes to improve the Bridge and add new and improved national programs. However, each year there was growing concern that the recommended changes and new programs were not being implemented by the headquarters staff.

HKN's Board of Directors began to push harder to implement the new changes. Ultimately, a decision was reached at the Spring '98 Board meeting that Dr. Robert Betten would serve out the remainder of his elected term until July 2000, but that he would not be put up for reelection for another term as Executive Secretary. This background created the stimulus for calling the special Strategic Planning Meeting in Jackson Hole the following summer to discuss the governing of the organization in the future.

Many changes that HKN members are just now beginning to see in this new millennium had their genesis at the Strategic Planning Meeting in Jackson Hole. Individuals were appointed to the newly revitalized committees shortly after the Planning Meeting concluded. Over the next few semesters, the committees worked out the details of new constitutional changes, new financial reporting changes, and a new and improved Bridge Magazine. The fruits of the last few years of effort are just now starting to become visible to the full membership of HKN. In the near future, HKN members and alumni will begin to reap the benefits of many of the suggestions and initiatives that sprang forth out of the 'Hole.

HKN's Greatest Asset: alumni

by Larry Dwon, K '35

The history of HKN is a struggle of setting honorable goals and striving to achieve them. There were occasions when the Association was in serious financial and governance trouble. It survived only because of its most valuable asset — Involved and dedicated alumni members.

Alumni members who have not yet become actively involved in the affairs of our society in a positive, honorable, and continuing manner represent a potential asset, which should be nurtured to become the association's greatest asset.

Maurice Carr, principal founder of the Association, stated the foregoing in the following elegant manner: "Eta Kappa Nu grew because there have always been many members who have been willing and eager to serve it loyally and unselfishly..."

Tom Rothwell, a good example, expressed himself on this subject as follows: "Yes, alumni are HKN's greatest asset. We have the wisdom, the history, and bring the continuity to HKN that our formal governing bodies are incapable of providing."

EXAMPLES

John Weigt volunteered to edit and publish the Bridge when it was in its most serious editorial and financial difficulty period. Roger I. Wilkinson conceived, developed, implemented and guided the Outstanding Young Electrical Engineer Award program from 1936 until his death in 1985. He also served HKN in other distinguished ways. A. B. Zerby served our society unselfishly for 20 years before becoming Executive Secretary and Bridge Editor for an additional 23 years. Many other alumni members served on committees, as elected officers, or as advisors to elected officers, at the national and student chapter levels.

Three advisory groups played substantial roles in times of great difficulty—National Advisory Board, New York Alumni Chapter's Advisory Council and the Los Angeles Area Alumni Chapter. Each of these groups of alumni members provided guidance (when requested) to those alumni who were elected and entrusted to govern Eta Kappa Nu honorably and effectively.

FACULTY ADVISORS

Faculty advisors guide our active college chapters and are expected to provide the continuity of HKN tradition among the new initiates and inspire them to become active on campus and in the adjacent community. Effective faculty advisors have an advisory responsibility to student members and can directly influence the quality of activities, the image of the HKN chapter, and the number of student member initiations. HKN should always find ways to get quality performers appointed as faculty advisors to its student chapters.

VISITATIONS

The Eta Kappa Nu constitution specifies visitations by the Executive Secretary or other alumni members to whom he delegates such duties. This provision was inserted when, for financial reasons, assembled conventions were discontinued. In 1962, a Regional visitation program by alumni volunteers was developed to supplement personal visits to chapters. They provided some of the benefits of former conventions, but with less cost than the original assembled conventions incurred.

The principal purpose of the regional visitation program was to facilitate open communication between alumni and college chapter members. Alumni with long experience in HKN affairs

could provide guidance and motivate students to continue to serve the society for mutual benefit. Chapter activities, local and national HKN problems, and future goals of the association were discussed. The main idea in this program was to utilize alumni to inform and help student members, faculty advisors and any officers who might attend.

ALUMNI AS MENTORS

Tom Rothwell, chair of the Los Angeles Area Chapter, recommends a mentor program which deserves the attention of the association. Such an activity can be held wherever alumni work

- To provide continuity of associations and activity in Eta Kappa Nu following graduation from college. To provide an opportunity for individual development beyond that which is afforded by the typical two or three semester period of student membership
- To provide support and inspiration to college chapters and their members, and to provide a liaison with college chapters which may result in attracting and placing particularly promising new graduates.
- Contribute to and enhance the appeal of the Bridge.
- To broaden the membership base of Eta Kappa Nu Association through the formation of new chapters and by the induction of a proportionally larger number of outstanding practicing engineers as professional members.

"Eta Kappa Nu grew because there have always been many members who have been willing and eager to serve it loyally and unselfishly" —Maurice Carr

or live in close proximity of an electrical engineering school with an active chapter of HKN. It would be a continuing association between alumni and student chapters rather than one shot visits, as is the case with either visitation program. While personal contacts between a mentor and the students would be the most desirable, it is conceivable that mentors could also be effective using the telephone and/or email by which to communicate.

INDUSTRIAL CHAPTERS

Another idea that has great potential is the Industrial Chapter concept. Only one group of alumni employed by American Electric Power Service Corp. petitioned and was granted permission to install such a chapter in 1975.

The Industrial Chapter concept was suggested by a Board-appointed committee comprised of B. Sheffield, chair, W. H. Pickering, A. A. Chizmadua, and R. S. MacMillan. In 1973, these members stated that the creation of Industrial Chapters would provide a means of achieving or promoting the following objectives;

- To improve the professional image and to reestablish the identity of, and pride in, the profession of electrical engineering and thereby promote professional status and well-being.

ciation through the formation of new chapters and by the induction of a proportionally larger number of outstanding practicing engineers as professional members.

This program encompasses tremendous potential for alumni participation in the objectives of HKN regarding education, quality performance, as well as ethical and professional practices. It could lead to the formation of alumni chapters in areas where several industrial chapters exist. This would provide opportunities for alumni members who are employed in companies where industrial chapters do not exist to become active in HKN.

OTHER EXAMPLES

It should be pointed out that alumni may also serve on committees and write or solicit appropriate articles for the new Bridge.

CONCLUSION

As Maurice Carr stated, all it takes is loyalty, dedication and unselfish effort. A response by letters to the editor would be appreciated.

Don't just be members, Become HKN Assets.



PHOTO DISC

NEW HKN EMINENT Members Named

Eta Kappa Nu established the rank of Eminent Member in 1950 as the society's highest membership classification, to be conferred upon those select few whose contributions and attainments in the field of electrical and computer engineering have resulted in significant benefits to humankind.

Six such individuals have recently been named to this rank by the Eta Kappa Nu National Board of Directors. Jacob Rabinow was named as an Eminent Member at the HKN Fall Board meeting on October 21, 1999 in San Jose, CA. Robert Frosch and Wilson Greatbatch were inducted as Eminent members during the HKN Spring Awards Banquet on April 3, 2000 in Princeton, NJ. Leo Beranek, George Heilmeier, and John Whinnery were inducted as Eminent Members as part of the IEEE Honors ceremony held in Vancouver, BC, Canada on June 24, 2000.



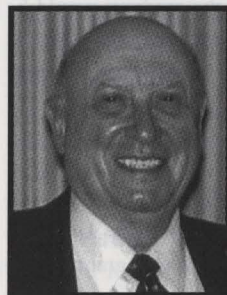
JACOB RABINOW, a prolific inventor, was granted over 225 U. S. patents. After graduating from the College of the City of New York with degrees in EE, he began his career as a radio serviceman, from 1934 to 1938. He took a position with the National Bureau of Standards (1938-1954), after which he formed the Rabinow Engineering Co.

It was acquired by Control Data Corp. in 1964, where he became vice-president. He rejoined NBS as a research engineer in 1972, where he became chief engineer of the National Engineering Laboratory. He became a consultant to the National Institute of Standards and Technology in 1989.

Rabinow was elected a Fellow of the IEEE and received its Harry Diamond Award. He was also elected to the National Academy of Engineering and the Philosophical Society of Washington.

Among his awards were the Lemelson-MIT Lifetime Achievement Award, the Cosmos Club Award, the Longstreth Medal of the Franklin Institute, and the President's Certificate of Merit. He wrote the book *Inventing for Fun and Profit*, in which he described the process of innovation and

discussed the merits of the patent system, the economics of invention, the nature of creativity, and the need for improvement in secondary and higher education.



ROBERT FROSCH was Administrator of NASA throughout the Carter Administration and oversaw the continuing development of the Space Shuttle and the first free flight of the orbiter, Enterprise.

Dr. Frosch earned his undergraduate and graduate degrees in physics at Columbia University. From 1951 to 1963, he worked as a research scientist and directed the research programs for Hudson Laboratories where he worked on underwater sound technology, and served as technical director for Project ARTEMIS, the large experimental active sonar system program.

In 1963, he joined ARPA (the Advanced Research Projects Agency of the Department of Defense). He worked on nuclear test detection technology and became deputy director of ARPA. Dr. Frosch was named Assistant Secretary of the Navy

for Research and Development in 1966. He joined General Motors as vice president for research and headed the GM Research Labs from 1982 to 1993. He also served as assistant executive director of the United Nations Environmental Program and as the first president of the American Association of Engineering Societies.

His leadership in research has been recognized through numerous awards, including the NASA Distinguished Service Award. He is a Fellow of the IEEE and the National Academy of Engineering and is a member of the American Academy of Arts and Sciences. He is currently a senior research fellow at the Harvard University John F. Kennedy School of Government.



WILSON GREATBATCH in 1958 implanted a pacemaker in a dog. It worked but a few minutes, as bodily fluids contaminated it. Greatbatch recognized the need for a battery that could be completely sealed from such fluids, and by 1960 a device using lithium batteries was implanted in a human and worked without need for replacement over a year.

Greatbatch was inducted into the National Inventors Hall of Fame in 1986 for his pacemaker-related inventions. In all, he is the holder or co-holder of over 150 domestic and foreign patents.

Greatbatch graduated with a BEE from Cornell University in 1950, and joined the Cornell Aeronautical Laboratory in Buffalo as a project engineer. He earned his MSEE at the University of Buffalo, and was an assistant professor there until 1957. His pacemaker work ultimately grew into Wilson Greatbatch Technologies, Inc., the world's foremost supplier of energy sources for implantable medical devices.

Greatbatch has been recognized through many awards, including the Lemelson/MIT Career Achievement Award, and the Eta Kappa Nu Vladimir Karapetoff Award for career technical achievement. He is a Fellow of the IEEE and the American College of Cardiology, and a member of the National Academy of Engineering. Today, Greatbatch has moved on to new research fields, including that of biomass energy.



LEO L. BERANEK. As president of BBN, Inc. in 1969, Dr. Beranek oversaw the invention of the internet, originally called ARPANET. Known as a world-expert on concert-hall and opera-house acoustics, noise and vibration control, he helped shoehorn in the jet age by setting noise standards that required jet airplanes to use

exhaust mufflers and special takeoff patterns in the late 1950s.

Dr. Beranek holds a D.Sc. from Harvard. He is a Fellow of IEEE, a member of the National Academy of Engineering, and President of the American Academy of Arts and Sciences. He was CEO of a Boston TV station that the New York Times in a lengthy article said, "Some say this is America's best TV station," (1981).



GEORGE H. HEILMEIER. Dr. Heilmeier's work with electro-optic effects in liquid crystals led to the first liquid-crystal displays for calculators, watches, computers, and instrumentation. He joined RCA Laboratories in 1958, and became Head of Solid State Device Research in 1966, where his work on liquid-crystals earned him the prestigious David Sarnoff Award, the IR-100 Award for the most outstanding technical product of the year, and the Eta Kappa Nu Outstanding Young Electrical Engineer Award.

He served as director of DARPA in 1975, where he was twice awarded the Department of Defense Distinguished Civilian Service Medal, the highest civilian award given by the Department and one that is rarely given twice. He has served as Senior VP and CTO for Texas Instruments and as President and CEO and currently Chairman Emeritus of Telcordia Technologies (previously Bellcore). He received the National Medal of Science, the National Academy of Engineering Founders Award and the IEEE Medal of Honor. He was awarded the Eta Kappa Nu Vladimir Karapetoff Award for career technical achievement in 1992.



JOHN R. WHINNERY. With fundamental theoretical contributions to the study of electromagnetic fields and waves in radio and communications, Dr. Whinnery's contributions to technology have made possible applications from microwave ovens to satellite and fiber-optic communications. He served as chair of the EE

Department and as Dean of the College of Engineering at University of California at Berkeley and is now Professor Emeritus.

The Institute of Radio Engineers elected him a Fellow "for his contributions to the knowledge of electromagnetic theory and the applications of that theory to microwave problems."

He has received the NAE Founders Award, the National Medal of Science from the U. S. government, and the IEEE Medal of Honor. Dr. Whinnery also received the IEEE Education Medal, the American Society of Engineering Education Lamme Medal, and in 1974 was named Outstanding Educator in America.

OUTSTANDING Young Electrical Engineer AWARDS



Casimer M. DeCusatis
Winner of 1999 Eta Kappa Nu OYEE Award

BY VIRTUE OF HIS OUTSTANDING INDIVIDUAL CONTRIBUTIONS
TO THE TECHNOLOGY AND APPLICATIONS OF FIBER OPTICS
AND FOR HIS SERVICE TO YOUTH.

Eta Kappa Nu held its spring awards banquet on April 3, 2000 in Princeton, NJ to honor the 1999 Outstanding Young Electrical Engineer recipients, the 2000 Karapetoff Technical Achievement award recipient and the induction of several new eminent members.

Casimer M. DeCusatis, BN '88, is a senior engineer in IBM Corporation's system/390 server division, Poughkeepsie, N.Y. His current projects include development of wavelength division multiplexing devices for metropolitan area networks, such as the recently announced IBM 2029 Fiber Saver. He has participated in many fiber optic data communications development efforts, including the InterSystem Channel used on six generations of Parallel Sysplex architectures, and FDDI/ATM/Gigabit Ethernet interfaces for the Open Systems Adapter family. His other research interests include signal processing using wavelets.

DeCusatis is the co-inventor of 17 patents with some 20 more filed and pending and coauthor of more than 80 technical papers. He is the coauthor of the books *Acousto-optics: Fundamentals and Applications* (Artech House, 1990) and *Wavelets and Subbands: Fundamentals and Signal Processing Applications* (Birkhauser, Fall 2000). A member of the editorial board of Optical Engineering, he has also contributed articles to the *Encyclopedia of Electrical and Electronic Engineering* (Wiley,

1990). He is the current president of the Institute for Optical Data Communications, and is a member of the IEEE, the Optical Society of America, SPIE, Sigma Xi Research Society, Mensa, Tau Beta Pi, Eta Kappa Nu, and eight other academic honor societies.

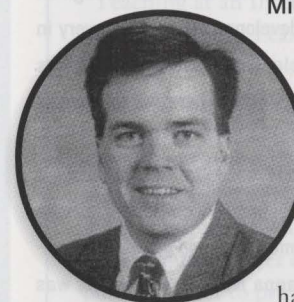
DeCusatis was born in Hazelton, Pennsylvania in 1964. He received the B.S. degree magna cum laude in the Engineering Science Honors Program from the Pennsylvania State University in 1986 and the M.S. and Ph.D. degrees from Rensselaer Polytechnic Institute. Studying at RPI under a University Space Research Association Student Assistantship he worked on the Apollo Lightcraft Project theoretical design and engineering of a prototype laser-propelled space vehicle for low Earth orbit missions, and completed his Ph.D. thesis in 1990 entitled "Theory and signal processing applications of acousto-electro-optic effect in anisotropic media."

He attributes his achievements to his opportunities in a growing, changing field, saying "the job that I'm doing now didn't exist" 10 years ago. He is involved with young people, giving talks to local school groups during National Engineering Week, explaining the work he does. In his spare time he collects antique technology, relaxes through golf, bowling, playing the piano, and spending time with his wife and two daughters.

OYEE Honorable Mentions



Ashok Venketaraman Krishnamoorthy, for his outstanding contributions to the development of optoelectronic technology and devices and his service to technical societies. Ashok is a member of the technical staff at Bell Laboratories, Lucent Technologies. He created a method for designing optoelectronic VLSI (OE-VLSI) circuits based on optical devices that are flip-chip bonded to silicon VLSI chips. Krishnamoorthy has published more than 130 technical papers and two book chapters, presented more than 20 conference invited talks and filed more than 30 patents. Noted for his service to technical societies, he has been a member and chair of several conference program committees for the IEEE Laser and Electro-Optics Society, IEEE Computer Society, and the Optical Society of America. Krishnamoorthy received his BS degree from California Institute of Technology, the MSEE degree from USC and the Ph.D. degree from the University of California, San Diego.



Mikko Herman Lipasti, for his seminal contributions to computer processing and architecture and for service to his community and church. Dr. Lipasti is an assistant professor at the University of Wisconsin, Madison who has done vital work in the field of predicting data values for computer loads, thus enhancing performance. Before joining the faculty at the University of Wisconsin, he worked for IBM Rochester; when he left he carried with him an IBM grant of \$750,000 in equipment for his research use. Lipasti has coauthored several technical papers and presented many others at technical conferences. A member of the IEEE, he is trilingual in Finnish, Chinese, and English. Lipasti received the B.S. degree in computer engineering from Valparaiso University in 1991, having compressed a four-year education into six semesters because of his compulsory military service with the Finnish Armed Forces during his Junior year. Lipasti received the M.S. and Ph.D. degrees from Carnegie Mellon University.



Kumar Ramaswamy, for his outstanding technical contributions and team leadership in development of digital communications products and for actions that embody his conviction to help others. Dr. Ramaswamy is the manager of the future communications group in the corporate research department at Thomson Consumer Electronics. He is currently responsible for the global coordination of Thomson's digital home networking (DHN) activities. As part of the design team for a communication link integrated circuit for satellite reception, he designed the Viterbi decoder section of the IC and has also defined the link layer specification for a generation of multichannel, multipoint distribution systems (MMDS) and led a team on a Fiber to the Curb (FTTC) and digital subscriber loop (DSL) system development. Ramaswamy holds nine U. S. patents, with 30 others pending. He holds a BS in electronics engineering, an MS in Mathematics and a Ph.D. in computer systems engineering from RPI. In 1996 he cofounded the local chapter of Asha for India ("asha" means "hope"), an organization that raises funds to promote primary education in India.

The Outstanding Young Electrical Engineer Award

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

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

Since 1936, 65 young engineers who are less than 36 years old have received the award and 136 engineers have received honorable mentions. The award is given on the basis not only of what success the young electrical engineers have had in their vocation, but also what they did to broaden themselves culturally and what they have done for others.

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

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

OYEE AWARD JURY

Dr. Richard Gowen
John Henderson
Dr. David Lang
Dr. Richard Johnson, Jr.
Virginia Johnson
John Logrando
Dr. Edward Shaffer

2000 VLADIMIR KARAPETOFF AWARD



Amos Joel (left) receives award from President Gowen.

Amos E. Joel, Jr. is the winner of the year 2000 Vladimir Karapetoff Award for career technical achievement. He received this award for his developments, teaching, and writing in the field of telecommunications and electronic switching systems (ESS).

He earned his BSEE and MSEE from the Massachusetts Institute of Technology. Joel spent his entire professional career with Bell Labs, for the most part concentrating on electromechanical and electronic switching systems, to the extent that he was often referred to as "Mr. ESS." Indeed, the city of Genoa, Italy, named him "Mr. Switching" when they awarded him the Columbian Medal in 1984.

Joel began his interest in things electrical as a boy, with crystal sets and track switching and signal circuits for his elaborate

model railroad layouts. At ten years of age he wrote to New Jersey Bell for information about how the dial telephone system worked. After graduating from MIT in 1940, he went to work for Bell Labs on West Street in New York City, where he worked on military cryptographic systems during World War II, receiving one of his first patents for synchronizing digital data at each end of an encyphering system that used pulse code modulation.

Joel designed complex circuits for the Model V computer used for artillery firing tables, and after the war returned to the design of switchgear. His first major computer project was the Automated Message Accounting Computer, whose patent listed over 250 claims.

In 1947, when Joel was introduced to the transistor by Bell Labs colleagues, he thought, "Boy, this is really the opportunity." He joined a "browser" group on transistor applications, which ultimately convinced Bell Labs management to invest in electronic switching. In 1952, Joel headed the architectural design of a new transistorized switching system. By 1958, he was in charge of the architecture for the Number 1 Electronic Switching System (ESS), which went into service in 1965. Because of his many contributions across various systems, in 1967 he began circulating from laboratory to laboratory as a "director without portfolio" and was soon named an internal consultant. This work led him to one of the basic patents on cellular communications in 1972.

Joel helped create the International Switching Symposium and was its program chairman in 1972. In the course of his career, he has developed courses and textbook material that surpassed previous work in that it developed generalized principles of switching system architecture.

He has been awarded the Alexander Graham Bell Medal, the Kyoto Prize Laureate in advanced Technology, the Stuart Ballantine Medal of the Franklin Institute, the International Telecommunications Union Centenary Prize, the Charles E. Scribner Trophy (AT&T's patent recognitions award), and the IEEE's highest honor, the Medal of Honor. He is a member of the National Academy of Sciences, the American Academy of Arts and Sciences, and a Fellow of the IEEE. In 1993, he received the National Medal of Technology. Not content with total retirement, Joel most recently received a patent in the field of photonic switching. In all, he is the holder or co-holder of more than 70 patents.



The Vladimir Karapetoff Award

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

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

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

2000 AWARD JURY

Charles K. Alexander
Jonathan C. Coopersmith
Robert E. Larson
Wallace S. Read

EDUCATION SPOTLIGHT by Mohammad Shahidehpour

Online Courses: A New Paradigm in Education

There is no doubt that online education is here, and that educational institutions and for-profit providers of courseware and training are scrambling to capitalize on a large global market for online education. But simply offering courses and programs via the Internet doesn't guarantee their success or longevity. Many factors go into making online education a success or failure. There are still serious doubts about the effectiveness of teaching and learning online, and questions about which students may genuinely benefit and which will not, from online education. For an overview of current issues relating to online pedagogy and an inventory of current research on the subject, see the University of Illinois report, "Teaching at an Internet Distance: The Pedagogy of Teaching and Learning Online," www.vpaa.uillinois.edu/tid/report.

Educational institutions have experienced disappointments and successes in their Internet course offerings. Those that experienced disappointments did so most often because they were not familiar with distance learning. Common mistakes included underestimating the resources required for online courses and overestimating the marketing power of the Internet. Institutions that were disappointed forgot to provide the resources for training, financial support, incentives and a clear objective. Eventually, faculty, staff and students felt unsupported and lost interest in the project.

Most of the successful online programs view online courses as

an extension of their existing programs. Therefore, their primary objective is providing convenience to existing students and secondarily to serve new students. By trying to serve existing students, the successful group already has an audience. The less successful online efforts often attempted to market their programs to anyone and everyone - hoping students would flock to the Internet to earn online degrees. By not having an audience, the less-than-successful institutions were forced to commit heavily to marketing and in many cases are still waiting for the students.

It is noted that online courses are appealing to many students who will have access to all lectures in online courses for the entire semester, chat rooms for discussion with other students and the course instructor, convenience of scheduling and hyperlinked course topics for non-linear access in preparation for exams. However, the success in offering online programs will require institutions of higher education to continually inform themselves of the interests and preferences of current and prospective online students, and create forward-looking plans for the development of online offerings that attract and retain students. In planning on-line programs, it is also imperative for faculty, staff and administrators to work together to ensure a positive experience for students in this new paradigm of higher education.

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

BRIDGE ET ERNAI

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

B '56	Robert E May	08/15/1995	BA '73	Stephen A Kozul	no details
Δ '46	Meyer Gilden	no details	BA '67	Stuart C Berger	05/02/1998
Δ '47	Robert E Swartwout	11/02/1999	BZ '41	Walter G Schultz	05/06/2000
Γ '29	R C Newhouse	10/22/1998	BΘ '41	Roger E Robertson	09/21/2000
Λ '43	Hajime Honda	no details	BΠ '54	Joseph B Aidala	02/22/1997
M '33	Morton S Brewer	06/22/2000	BP '52	Raymond B Potts	02/07/1999
N '55	J Robert Betten	07/20/2000	BΨ '55	L P Shildneck	no details
N '58	Howard E Jackson Jr	10/17/1999	ΓΘ '52	Paul L Hydingen	no details
P '74	Rex Philip Durham Jr	05/01/1996	ΓM '57	Emil E Umlang	no details
Θ '39	Ira H Bowker	no details	ΘA '76	Henry R Koen	09/18/1995
Θ '39	Robert C Warnek	03/20/2000	IM '87	Roberta A Arnold	no details

2000/2001
HKN OFFICERS AND DIRECTORS**MOHAMMAD SHAHIDEHPOUR — INTERNATIONAL PRESIDENT**

Dr. Mohammad Shahidehpour is a professor of the Electrical and Computer Engineering Department at Illinois Institute of Technology. He won two national awards for his contributions to electrical engineering research and education, including the Edison Electric Institute's Power Engineering Educator Award and the Eta Kappa Nu C. Holmes MacDonald Outstanding Young EE Professor Award in addition to four Excellence in Teaching awards at the University of Michigan and IIT.

Dr. Shahidehpour served as a member of the HKN Board of Directors and as Vice President of HKN from 1998-2000. He served as faculty advisor for the Delta Chapter of HKN at IIT between 1982 and 1990 and was credited with the outstanding IIT Faculty Advisor award for having the most successful student organization at IIT.

Dr. Shahidehpour is a Fellow of the IEEE and has served as vice-chairman of the 1993 IEEE Systems, Man and Cybernetics Conference; he is a member of the technical committee of the IEEE PICA; and served as the chairman of the Operation Methods Subcommittee of the IEEE Power Engineering Society. He is a member of the Ph.D. planning committee for the San Juan University in Argentina.

He has published over 200 papers on power systems optimization and modeling and currently serves as an editor for IEEE Transactions on Power systems. Mohammad Shahidehpour earned his masters and Ph.D. degrees in EE from the University of Missouri-Columbia.

JAMES L. MELSA — INTERNATIONAL VICE PRESIDENT

Dr. James Melsa is currently Dean of the College of Engineering and a Professor of Electrical and Computer Engineering at Iowa State University, Ames, Iowa. He has previously held positions as the Vice President of Strategic Quality and Process Management, Vice President and General Manager, Data Communications Division, Vice President of Strategic Planning and Advanced Technology; Vice President of Research and Development; and Vice President of Research for Tellabs. Dr. Melsa received his B.S.E.E degree from Iowa State University, Ames, in 1960 and his M.S. and Ph.D. degrees from the University of Arizona, Tucson, in 1962 and 1965.

From 1973 to 1984, Dr. Melsa was professor and Chairman of EE at the University of Notre Dame. Dr. Melsa previously served as a Professor of Information and Control Sciences at Southern Methodist University and as an Assistant Professor of EE at the University of Arizona. He has done research in the areas of speech encoding and digital signal processing. He has published over 100

papers and has authored or co-authored ten books in these areas.

Dr. Melsa is a member of HKN and has served as the West-Central Region Director on the HKN National Board of Directors from 1997-1999. Dr. Melsa is a Fellow of the IEEE and has been awarded the Third Millennium Medal by the IEEE. He has served in numerous leadership positions in professional organizations. He served as an examiner for the Malcolm Baldrige National Quality Award from 1995 to 1999. He is currently serving as a trustee of the Herbert Hoover Presidential Library Association.

RONALD A. SPANKE — EXECUTIVE SECRETARY

Dr. Ron Spanke is currently a Bell Labs Fellow at Lucent Technologies, working in research and development of modern telecommunications systems, ATM switching systems, and photonic switching architectures. He worked with lithium niobate directional coupler based optical switching devices and pioneered research in non-blocking, low-crosstalk, optical space and time division switching architectures. In the 1990's, he has been the primary architect for Lucent's CDMA digital wireless architecture and for the core switching fabric of Lucent's large 5ESS telecommunications switch.

Dr. Spanke has received 26 U.S. patents and over 100 foreign patents. In 1992, he received the AT&T patent award for the most financially valuable patent to AT&T, and in 1998 he received a Lucent patent award for one of the most financially valuable patents to Lucent Technologies. He has over 20 articles published in international scientific journals and proceedings, three of which have been reprinted in books.

He received the BS in Mechanical Engineering from Oklahoma State University in 1980, an MSEE from OSU in 1982, and the Ph.D. EE from Northwestern University in 1994. In 1982, he was named the recipient of the Phoenix Award as the top graduate student at OSU. In 1988, he was named the winner of the HKN OYEE award. From 1997-1999, he served as the East-Central Region Director on the HKN Board of Directors, and served as interim HKN executive secretary from 1/1/2000 to 6/20/2000 when he was elected as the new executive secretary. Since 1995, he has also served on the corporate board of directors and as the Chief Financial Officer of a local utility company.

CURRAN D. COTTON — WEST CENTRAL REGION DIRECTOR

Curran Cotton was most recently Vice President of Research and Development for Maytag Appliances. Previously he served at Maytag as manager of an advanced technology group in 1986, director of

advanced technology groups in 1989, and assistant vice president in 1991-1992. Mr. Cotton was instrumental in pioneering in-house microprocessor-based electronics design for Maytag and Admiral Products and holds 18 U.S. patents related to the appliance industry.

Mr. Cotton is a member of the University of Evansville Industrial advisory board, past president of Maytag Management Club and has served on the Newton, IA Planning and Zoning Commission. He has served as a past board member of the Newton community children's center and the Newton YMCA. He is a member of the Newton Rotary Club, the Newton Chamber of Commerce, the Executive Board of the Mid-Iowa Council of the Boy Scouts of America, and the Congregational United Church of Christ. He is also a Director on the United Way board and is active in the local scouting program.

CHARLES A. GROSS — EAST CENTRAL REGION DIRECTOR

Dr. Charles Gross is currently Professor of EE at Auburn University in Auburn Alabama and has been on the faculty since 1972 in the area of Electrical Power Systems. From 1961-1972 he taught at the University of Missouri-Rolla and was a visiting Professor at the United States Military Academy at West Point from 1986-1988. He has also worked for the U.S. Corps of Engineers in Mobile, AL; the Tennessee Valley Authority; the City of Los Angeles Water and Power; Alabama Electric Company in Andalusia, AL; General Electric Company in Schenectady, NY; the Electric Power Research Institute in Palo Alto, CA; and the ABB Corporation in Raleigh, NC.

Dr. Gross received the B.S. in Physics and Mathematics in 1960 and the B.S. in EE in 1961 from the University of Alabama and received the M.S.E.E in 1966 and Ph.D.E.E. in 1969 from the University of Missouri-Rolla. Dr. Gross has published over 100 technical papers and reports and is the author of Power System Analysis. He has served as an HKN chapter advisor at both UMR and AU. Dr. Gross is the chair of Auburn's Academic Standards Committee. He received the Tau Beta Pi Excellence in Teaching Award honorable mention in 1979. He was the recipient of the Square D company endowed chair of Electrical Power Engineering in 1982-present; the Mortar Board Favorite Educator in 1986; the outstanding civilian service medal from the Department of the Army, USMA in 1988; the Birdsong Teaching Award in 1990; the University of Alabama Department of EE Outstanding Fellow in 1991 and Distinguished Fellow in 1996. He is a Member of the Academy of EE at UMR.

ERIC HERZ — EASTERN REGION DIRECTOR

Dr. Eric Herz is Director Emeritus of the IEEE, having retired after

The 2000-01 HKN Board of Directors. Seated L-R: Hans Kuehl, Eric Herz, Mohammad Shahidehpour, Ron Spanke, Curran Cotton. Standing L-R: Charles Gross, Jim Meisa.



14 years as General Manager and Executive Director. For 22 years, he held various engineering and management positions at General Dynamics in San Diego, CA, primarily in the areas of automated telemetered data processing and test equipment, position location systems, and avionics and electronic ground systems for space shuttle

and cruise missiles. Prior to that he participated in the development of what eventually became LORAN C/D at the Sperry Gyroscope Company.

He holds a BEE from Brooklyn Polytechnic Institute, now known as Polytechnic University, and a D.Sc. (hon) from Manhattan College. He is a Fellow of IEEE, AAAS and the Chinese Institute of Electronics, and has received numerous awards from IEEE for leadership and service and the Kenneth Andrew Roe award from the American Association of Engineering Societies for achievements in promoting engineering unity.

Eric has been an active volunteer in IEEE: Student branch secretary/treasurer, section officer including chair, region officer, society officer including president, division director, vice president for technical activities, member of the board of directors, and member or chair of a number of committees. He was an officer and member of the board of the IEEE Foundation, and a governor of the American Association of Engineering Societies.

HANS KUEHL — WESTERN REGION DIRECTOR

Dr. Hans Kuehl is currently Associate Chairman of the Department of Electrical Engineering at University of Southern California. From 1987 to 1998 he served as Department Chair of the EE department. He was co-chair of the EE curriculum review task force at USC and has served as the lead faculty member in the development of the Web-enhanced version of basic EE courses. From 1958-1959, he was a Member of the Technical Staff at Hughes Aircraft and from 1975-1976, served as a consultant at Hughes. He has also consulted for the Aerospace Corp in 1969, the Naval Weapons Center in 1971, and the Deutsch Co. from 1974-1975.

Dr. Kuehl has received the Teaching Excellence Award from USE in 1964; the faculty service award in 1970 from the USC Archimedes Circle, the outstanding EE faculty award at USE in 1977; and the Halliburton award for exceptional service at USE in 1980. He was elected a Fellow of the IEEE in 1980 for contributions to the theory of antennas and plasmas. He has been an active member of HKN for over 40 years and worked closely with the Upsilon chapter of HKN at USE and with the Los Angeles Area Alumni Chapter of HKN.

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: Ron Spanke, HKN Headquarters, P.O. Box 3535, Lisle, IL, 60532. We also welcome any new individual problems, especially with an EE aspect, and chapters that would like to sponsor an entire assignment with their own set of problems.

Current Assignment

1 Resistance is Futile: To verify that his circuit worked in the lab, Jim needed to try a large number of different resistance values. However, Jim only found four resistors in the lab, each successive one being half the resistance of the previous resistor. How many different values of resistance was Jim able to test his circuit with?

2 Cool Geography: A man starts at a point on the surface of the Earth and walks one mile due south, then one mile due east, then one mile due north to end up at the exact point that he started from. Describe where he could have started from if he always stayed on the surface of the Earth, which for this exercise, we will assume is a perfect sphere.

3 Time to Think: The software design consisted of an infinitely repeating loop with four processes that had to execute on each pass through the loop. The designer determined that the square of the time required for the first process was equal to the product of the times required for the second and third processes. The final process would require 172μs more than the first three processes combined. Each process required an integral number of microseconds and the entire loop had to repeat at 1KHz. What process times were allocated to each process during the loop, assuming no overhead for process switching functions?

4 Lonely Hearts Club: Walt was going to demonstrate a card trick, but only had a partial deck of cards. Beth selected three cards from Walt's deck, and was surprised that they were all hearts. Walt explained that the odds were 11 to 2 against that happening. Beth replied that she now knew how many cards were in Walt's partial deck, and exactly how many of them had been hearts. What was Beth's answer?

Answers for Last Assignment

Normally, answers for the problems given in the last issue will be published here. However, since this is the first edition of the *Homework* column, there was no previous assignment.

Instead, we will use this space to discuss the solution to "The Ancestor Problem" by Ellery Paine, originally published in August 1970, and reprinted in the Millennium Collector's edition from the last issue.

In response to the Millennium issue, Dr. Anthony C. Davies sent in the following comments and analysis of the problem:

Dear Dr. Spanke,

Maybe the solution to this apparent paradox is well-known, I am not sure. For a few years I have been using it as a homework assignment

problem for engineering undergraduates taking a software design methods course. They are asked to explain why using this obvious method to evaluate the world population is evidently seriously incorrect. (The underlying aim is to convince them that a plausible algorithm to solve a problem is often incorrect). I had no idea that the problem had appeared in *The Bridge*.

Ellery's method assumes that the number of your ancestors doubles in each generation. There are approximately 60 generations between now and the time of Christ, so that using this method, the number in one generation at that time should be about:

$$2^{60} = 1,152,921,504,606,846,979.$$

The entire world population at the time of Christ is estimated by historians to have been only a few hundred million. The method therefore suggests that the number of your ancestors was trillions of times greater than the total world population at the time—so the method must be very inaccurate.

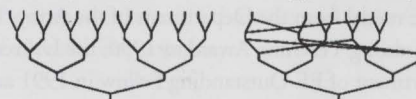
The principal reason that the proposed method gives a vastly greater estimate than the world population which historical data suggests is that in practice, many of our ancestors are related, and so the method is counting the same people many times over. In most societies, there are rules which forbid marriage between close relatives—so that the method is likely to be valid back as far as grandparents and perhaps even great grandparents. Prior to that, the rules cannot be applied and there are so many intermarriages between individuals on each persons 'ancestor-tree' that the method becomes increasingly fallacious.

Note that the fallacious solution is not much dependant on birth or death rates or short life expectancy, famine, wars, etc. Your own ancestors must have survived at least long enough to have children, even if many other people of long ago died young, etc. otherwise you would not be here now. The definition of an ancestor is someone successful at producing descendants.

Note also that with an 'estimate' of millions of trillions of your own ancestors and an actual population of a few hundred million, this does not mean that the estimate is a few trillion times too big, it is much worse than that because only a few of the people alive at the time of Christ were really your ancestors.

By going back enough generations, we would find that we almost all share ancestors (so we are almost all relatives!) but generally that takes much more than 1000 years.

The 'trees' below show how interbreeding drastically reduces the number of ancestors of a given individual. Extending the two cases back more generations quickly shows a far bigger discrepancy between the two.



—Anthony C. Davies, H '79, Emeritus Professor
King's College, University of London

Names of members or friends and family of members who submit perfect entries will be published in the next edition of *The Bridge*. Good Luck!

SHORT CIRCUITS

Three young electrical engineers and three managers were taking the train to attend a technical conference. The managers bought three tickets at the ticket booth. The engineers bought only one ticket between the three of them.

"How are three people going to ride on one ticket?" inquired the managers.

"Watch and see" replied the engineers.

The managers and engineers boarded the train. Shortly before the conductor came through, the three engineers crowded into the restroom at the end of the car. As the conductor passed, he knocked on the restroom door and said "Ticket Please".

The single ticket was slid under the door and taken by the conductor.

On the way home from the conference, the three managers decided to try the same approach and bought only one ticket, seeing how managers like to save money and all. The three engineers didn't buy any tickets at all.

"We understand how three can travel using only one ticket, but how are three going to travel with no ticket at all?" asked the managers.

"Watch and see" replied the engineers.

The managers and engineers boarded the train. Shortly before

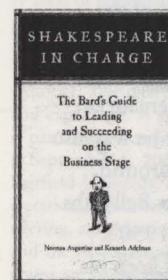


"Actually I started out in quantum mechanics, but somewhere along the way I took a wrong turn."

the conductor came through the cabin, the three engineers crowded into the restroom, while the three managers crowded into the other restroom. After a short while, one of the engineers emerged, walked over to the managers' restroom door, knocked, and exclaimed "Ticket Please"

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

BOOK REVIEW Shakespeare a Modern CEO



SHAKESPEARE IN CHARGE:
The Bard's Guide To Leading and Succeeding on the Business Stage.

by Norman Augustine and
Kenneth Adelman
1999, Hyperion, 219 pages
List Price USA \$22.95

Are there really practical applications for Shakespeare's ancient pronouncements? "Yes indeed", say authors Augustine and Adelman in *Shakespeare in Charge*. They give myriad examples of how the actors in Shakespeare's plays, of nearly 400 years ago, offer thoughtful advice in the fundamentals of business to todays budding or even senior executive.

The Prologue offers "...that time spent with the Bard is a sound investment and unpredictably enjoyable. For business leaders find that Shakespeare's plays ...remain as relevant today as they were in the sixteenth century."

In "Taming of the Shrew," for example, Petruchio kept changing strategies to counter each version of Katherine's shrewish response to his wooing. The authors likened his broad overall goal and flexibility to the successful campaign used by 3M in developing their Post-it notes. Cassius and his conspirators, in "Julius Caesar," offer six steps executives should use to maintain secrecy. Other

examples of business applications are given from "Henry V," "Julius Caesar," "The Merchant of Venice" and "Hamlet."

Brutus "commits the unpardonable management sin of excluding the best talent to do the job for fear of being overshadowed." From "Antony and Cleopatra" we learn how to increase the odds of recruiting success, and to watch for flashing lights warning of troubles ahead.

In the entire book only one small typographical error was noted. In the success story about Volkswagen, the name of Ferdinand Porsche's grandson Piech should have no dieresis over the letter e.

Shakespeare in Charge is an entertaining, informative, thoughtfully-arranged and well-written book. I wished it had been available to me in my early professional life.

—Review by Bert Sheffield, ββ '49

HKN AUTHORS

- **An Introduction to Mixed Signal IC Test and Measurement.** By Mark Burns, T '83, Oxford University Press, 2000, List 704 pages, \$90.
- **Computational Electrodynamics: The Finite Difference Time Domain Method, 2nd Ed.** By Allen Taflov, βT, and Susan Hagness, βT '91, Artech House, 2000, List \$119.
- **Computer Systems Organization and Architecture.** By John D. Carpinelli, ΓK '91, Addison Wesley Longman, 2000, 584 pages, \$84.

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

Claude E. Shannon

Father of Information Theory

For decades, he was admired and idolized by scientists and students around the world who studied his theories. Now, more than 50 years after publishing his most renowned work, many of a new generation of disciples regard him as the most important scientist of the 20th century. Old friends, meanwhile, remember him as the juggler who rode his unicycle down the halls of Bell Labs and as a man who loved to laugh.

Claude Elwood Shannon was born in Petoskey, Mich., on April 30, 1916. After receiving his master's degree in electrical engineering and Ph.D. in mathematics from M.I.T. in 1940, Shannon joined AT&T Bell Laboratories in Murray Hill, New Jersey. Shannon was inducted as a professional member of Eta Kappa Nu's Beta Epsilon chapter in 1956.

His master's thesis is today regarded as one of the most important theses ever written. In it he laid the groundwork for modern computers and today's telecommunications systems by using electrical circuits to execute Boolean algebra. Eight years later Shannon published his second masterpiece in the Bell Systems Technical Journal, the seminal, "Mathematical Theory of Communications."

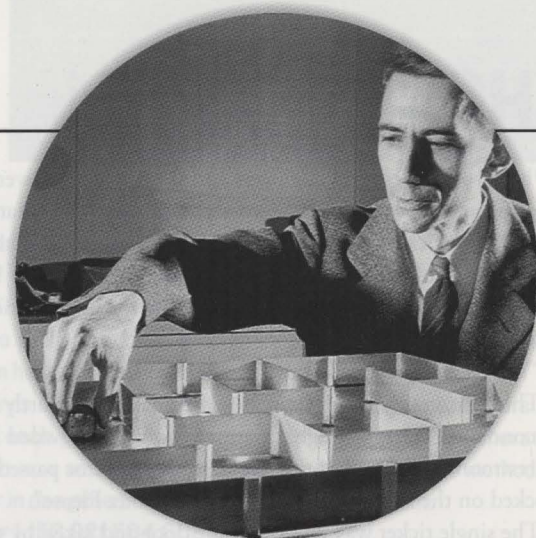
Shannon's 1948 paper marked the birth of Information Theory. For the first time ever, he offered a concise, mathematical definition of information and in doing so, defined the foundation and boundaries for today's telecommunication systems.

TIMELESS THEORIES

What Shannon knew before anyone else in 1948 continues to serve as a touchstone for information theory research, more than half a century later.

"Shannon gave the building blocks, the motivation and the inspiration to generations of researchers in information and communication theory," said Adriaan Wijngaar, a mathematician at Lucent Bell Labs. "My main area of research has been on frame synchronization and the associated problems of constrained coding, detection and error control. For almost all the problems I have ever worked on, Shannon is directly or indirectly the initiator of that area of research."

His concise mathematical definition of information defined the foundation and boundaries for today's telecommunication systems.



Claude Shannon's electrical mouse with a man-made "super-memory" winds its way through a series of complicated mazes.

Shannon remained affiliated with Bell Labs until 1972. He became a faculty member at M.I.T. in 1958 and professor emeritus in 1972.

MORE THAN A MATHEMATICIAN

Shannon's love for math and engineering was born at a young age. He chose Thomas Edison as his boyhood hero and enjoyed building radio-controlled planes and boats in his spare

time. Although this love for science culminated in his becoming one of the most revered and influential minds of his time, it also led to Shannon becoming much more than a mathematician. "Shannon was a genius, but he was also an extraordinary person all around," said David Slepian, a former Bell Labs

employee who worked with Shannon in the early 1950's.

Slepian recalled the days when Shannon would keep his door shut and keep to himself, then ride his unicycle around the Bell Labs complex by night. "Shannon was shy, but if you took the bull by the horns and approached him, he was more than willing to help," said Slepian. "He was extremely likeable and loved to laugh."

Perhaps it was his love of laughter that sparked Shannon to invent and build such eclectic wonders. Powered pogo-sticks, a cable car for his visiting grandchildren, bent-wheeled unicycles, chess-playing computers, motorized turtles, and juggling machines are just some of Shannon's curious creations.

After a long struggle with Alzheimer's Disease, Shannon died on February 24, 2001 at the age of 84. He is clearly remembered and celebrated in a variety of ways, but one thing is certain—Claude Shannon is definitely unforgettable.

This edition of EE Pioneers written by Maryellen Casse

COURTESY OF BELL LABS

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

The University of California, Los Angeles, is seeking applicants for temporary, full-, or part-time faculty and other academic staff positions in various areas of electrical engineering. These areas include, but are not limited to, Biomedical Engineering, Computer Engineering, Control Systems, Digital and Analog Circuits, Electromagnetics, Signal Processing, and Solid State Electronics. The level of appointment will be commensurate with the applicant's qualifications. A Ph.D. in Electrical Engineering or an equivalent degree is required with appropriate professional and research experience. Please send your resume to (Ms.) Harue Suzuki, HR/Personnel Manager, Electrical Engineering Department, UCLA, Los Angeles, CA 90095-1594. Please visit our website (<http://www.ee.ucla.edu>). UCLA is an Equal Opportunity Affirmative Action Employer.

Fairfield University, School of Engineering, Faculty Position: Assistant/Associate Professor, Software Engineering: Applications are invited for a tenure-track position at the Assistant/Associate Professor level in the Department of Software Engineering. The primary areas of responsibility will be teaching at the undergraduate and graduate level and providing leadership in the evolution of the academic programs in the Department. A terminal degree in the discipline is required. The salary is commensurate with education and experience. A generous package of fringe benefits is part of the compensation. Anticipated starting date is September 1, 2001. The School of Engineering at Fairfield University offers undergraduate programs in electrical, mechanical, computer and software engineering, and Master's degrees in Software Engineering and the Management of Technology. Additional programs are being planned. All computer and engineering laboratories are fully equipped and networked. Fairfield University, founded by the Jesuits, is an independent Catholic, comprehensive university. Located in the scenic shoreline community of Fairfield, Connecticut. It prepares undergraduate, graduate, and Continuing Education students for leadership in their disciplines and for service in a constantly changing world. The University has six Schools and enrolls approximately 5,000 undergraduate and graduate students. To express an interest in the position, please send a resume with a cover letter, and names and addresses of at least three references, to: Dr. E. Hadjimichael, Dean, School of Engineering, Fairfield University, North Benson Road, Fairfield, CT 06430. Fairfield University is an Affirmative Action/Equal Opportunity Employer. Visit our website at www.fairfield.edu.

Purdue University School of Electrical and Computer Engineering invites applications from outstanding candidates for tenure-track faculty positions at all levels. Openings are anticipated in several areas. Candidates are expected to have demonstrated exceptionally

strong research and superior teaching potential. Salary is commensurate with qualifications and experience. Send a resume, including a statement of research and teaching interests and a list of at least three references, to: Head, School of Electrical and Computer Engineering, Purdue University, 1285 EE Building, West Lafayette, IN 47907-1285. Applications will be considered as they are received. Purdue University is an Equal Opportunity/Affirmative Action employer.

Princeton University: The Department of Electrical Engineering invites applications for a full-time tenure-track faculty position at the assistant professor level in the area of optics and advanced photonic materials, devices or systems. Materials, devices or architectures work should concentrate on their application to ultra high bandwidth or high density photonic systems. Examples include semiconductor lasers, photonic and optoelectronic integrated circuits, III-V and organic photonic device fabrication and characterization, integrated optics, optical/materials interactions, photorefractive and nonlinear optical materials and devices, optical architectures including computers, signal processors, etc. Candidates should have a desire for working in a group environment on collaborative projects with new scientific objectives and content. Please send a complete resume, a description of research and teaching interests, and names of three references to Professor Stephen R. Forrest, Chair, Dept. of EE, Princeton University, Princeton, NJ 08544. Princeton is an Equal Opportunity/Affirmative Action Employer.

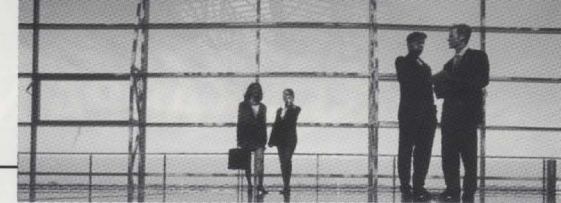
Computer Engineering and Electronics Engineering: The University of Nebraska has several openings for tenure track faculty at all professorial levels in its rapidly expanding computer engineering and electronics engineering programs housed in a new, state-of-the-art facility located on the Omaha campus. The new Peter Kiewit Institute of Information Science, Technology, & Engineering - a \$70 million initiative to enhance engineering and information science education in the state of Nebraska is the first step in the proposed Aksarben Research Park. Earned Ph.D. in Computer Engineering, Electrical Engineering, or closely allied field is required. Must have demonstrated evidence of research, scholarly activity, and potential for success in developing courses and teaching at the undergraduate and graduate level in computer engineering. Relevant industrial experience is desirable. The areas of interest include, but are not limited to, computer architecture, parallel processing, and networking. The ideal candidates would have a strong desire to partner in R&D with local high-tech companies. The successful candidates will play a key role in expanding the undergraduate and graduate computer engineering and electronics engineering programs. Applications are being reviewed and will continue until suitable candidates are found. Rank and salary are commensurate with qualifications. Preferred starting date is August 20, 2001. Apply with letter and resume to rsash@unomaha.edu or to Prof. Roger D. Sash, Department of Computer and Electronics Engineering, College of Engineering and Technology, The University of Nebraska, Omaha Campus, 60th & Dodge Streets, Omaha, NE 68182-0672. For more information visit our Web site at www.eeen.unomaha.edu. The University of Nebraska is committed to a pluralistic campus community through Affirmative Action and Equal Opportunity and is responsive to

the needs of dual career couples. We assure reasonable accommodation under the Americans with Disabilities Act; contact Prof. Roger D. Sash at (402) 554-2926 for assistance.

INDUSTRY

Microsystems Packaging Engineer: Job Description: Research and development to demonstrate miniaturized next generation hand-held broadband wireless systems (microsystems) capabilities using next generation electronic packaging technologies. Packaging technologies include advanced low-cost organic boards with integrated analog, digital, RF, and optical functions; and novel high I/O chip to board interconnects. Target system will have low-cost, lightweight, and high performance (1Gbs wireless broadband) attributes. Will act as interface between systems group and packaging group to translate and coordinate requirements and specifications. Will perform high level system-on-a-chip (SOC) and system-on-package (SOP) design partitioning. Qualifications: MS or Ph.D. in related engineering or science field, plus at least 5 years (10-15 years preferred) of relevant industry R&D experience. Ideal candidates will have experience with communications, consumer, and computer systems applications. Compensation: \$80K-120K per year (commensurate with experience) plus benefits. Location: Packaging Research Center and Broadband Institute at the Georgia Institute of Technology in Atlanta, Georgia. Contact: Send resume and 3 references to Angie Hughes (angie.hughes@ee.gatech.edu, 404-849-3842 FAX). Please reference "Microsystems Packaging Engineer" position in correspondence.

Power Systems Engineer: MAPPCOR is an organization providing services to the members of the Mid-Continent Area Power Pool, an association of 85 electric utility industry companies serving 7 midwestern states and 2 Canadian provinces. Our Security Center Engineering Group is seeking an experienced Power Systems Engineer to work in a team-oriented environment, providing engineering services in support of real-time power system operations. Tasks include engineering project management, process development and analysis, and operational support for a wide range of advanced engineering applications, including the EMS functions of State Estimation and Contingency Analysis, as well as NERC Congestion Management. These tasks include involvement in both regional and national operating practices. May include engineering application software development. Applications should have a BSEE, MSEE, or an equivalent Software Engineering degree, with experience in Power Systems Engineering. Strong organizational and communication skills are a must. Experience with technical project management and leadership, application development process and knowledge of information systems technologies are preferred. MAPPCOR offers a highly competitive salary combined with an excellent benefits package. Submit resumes and cover letter to Human Resources, MAPPCOR, 1125 Energy Park Drive, St. Paul, MN 55108.



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