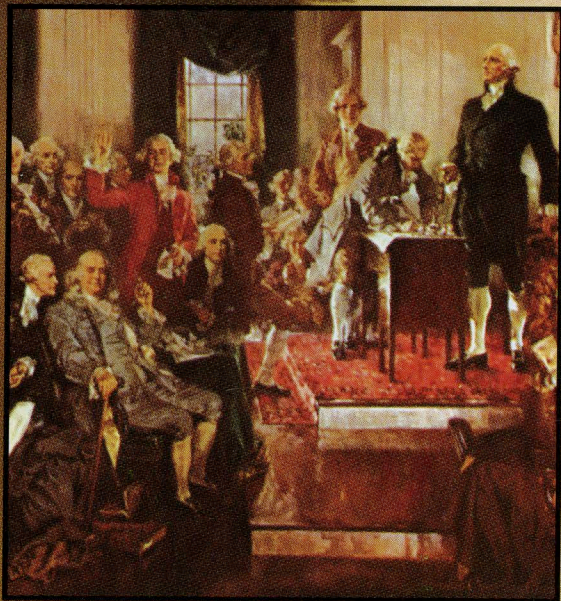


THE BRIDGE

vol 98, no. 1 / 2002

of Eta Kappa Nu



New HKN Constitution

**Chapters Ratify a New Constitution
To Restructure and Modernize HKN**

Also:

Special HKN Constitution Pullout

Kappa Pi Chapter Installed at Boise State

Six New Eminent Members Inducted

OYEE and Karapetoff Award Winners

Frederick Terman—EE Pioneer



information
security

analog and
mixed-signal
design

VLSI

robust,
nonlinear
adaptive
control

power system
security and
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reliable
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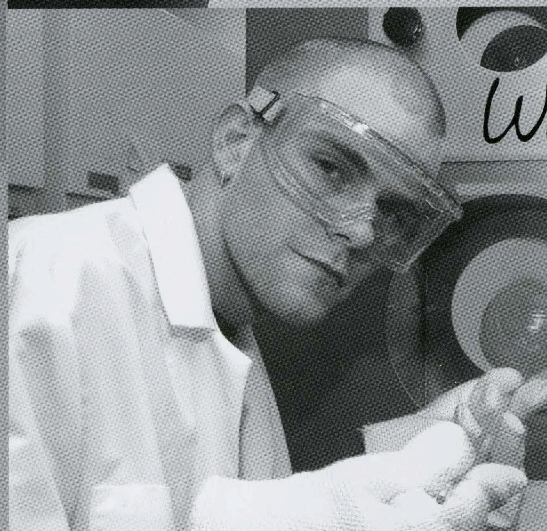
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of Eta Kappa Nu

Volume 98 / Number 1 / 2002

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

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A special centerfold pullout contains the full text of the newly ratified HKN Constitution

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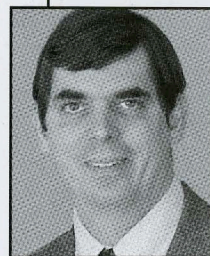


ON THE COVER

Scene at the Signing of the Constitution by Howard Chandler Christy depicts the signing of the U.S. Constitution in 1787. Chosen to highlight the ratification of our new HKN constitution, this historic painting is located in the House of Representatives wing of the U.S. Capitol. © Architect of the Capitol, used with permission.

FROM THE BRIDGE

This issue we celebrate a major HKN milestone as we transition to a new constitution. Ratification by our college chapters represented the final step in a process that spanned several years of effort by our Board of Directors and our Constitution and Bylaws Committee. This process began shortly after the pivotal Jackson Hole Strategic Planning Meeting called in 1998, which identified much needed changes to our operation and organizational structure in order to revitalize the society for the future.



Our cover story discusses our new constitution and summarizes the significant changes that have been incorporated. It also covers the challenges we faced in shaping the new constitution and in achieving the required ratification by the chapters. A complete copy of the new constitution is included in this issue as a reference for all Bridge readers.

One of the changes directly affects my own role in Eta Kappa Nu. With the adoption of the new constitution, the elected position of Executive Secretary on the Board of Directors has been eliminated. The position of an Executive Director has been created as an employee of the organization reporting to the board and having roughly the same

duties as the previous executive secretary position. When the new constitution became effective, the board moved me into this new Executive Director position. Although no longer a voting member on the Board of Directors, I look forward to my new role in revitalizing HKN and helping to shape its future for many years to come.

Beginning with this issue we introduce two new regular departments to our Bridge format. Career Focus will bring insights and advice covering the real world in electrical and computer engineering, and include advice on job-seeking, resumes, working skills, and interviews with practicing engineers. Industry Spotlight will highlight current issues in the electrical and computer industry and how they may affect our members and the profession. Both of these departments were identified by our Bridge Committee as items that our Bridge magazine should include to provide relevant information to our members.

—RAS Ω '82

HKN CALENDAR

EVENTS

HKN Spring Awards Banquet: OYEE Awards, Karapetoff Award, and Eminent Member Awards will be presented April 28, 2003, Princeton, NJ, 6:00-10:00. Reception and Dinner Tickets \$85-Individual, \$850-Corporate Table. Contact HKN HQ for Reservations.

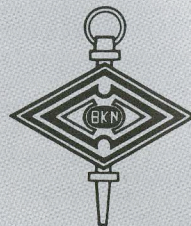
NOMINATIONS DUE

C. Holmes MacDonald Outstanding Teaching Award (OTA) nomination forms are due February 15, 2003. Nominees must be 35 or under at the time of the award.

Zerby/Koerner Outstanding Electrical Engineering Student (OEEES) nomination forms are due April 4, 2003.

Norman R. Carson Outstanding Junior Electrical Engineer (OJEE) nomination forms are due April 1, 2003.

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



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The Electrical and Computer Engineering Honor Society

Founded October 28, 1904

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James A. D'Arcy, Chair

Distinguished Service Award

Larry Dwon, Chair

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

FEEDBACK

As a member of HKN, I received the Winter 2002 issue of *The Bridge*. I think your article was an excellent account of what had happened on 9/11. I currently am an account executive on the Verizon Customer Team and I am sure you had worked with several individuals on my team.

— Colin M. Dino, FK '84

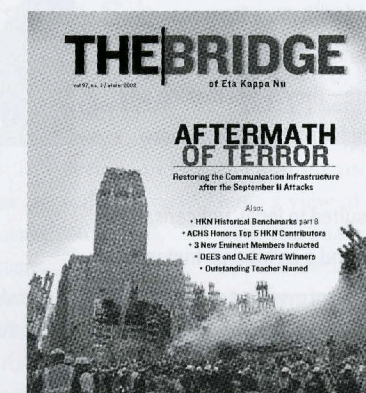
I wanted to write and let you know that I enjoyed reading your article *The Aftermath of Terror* in the winter 2002 issue of the Eta Kappa Nu Bridge. You have provided a great deal more detail than I had found in the 9/12 and 9/17 articles published by Internet Week. I plan to route your article to my colleagues in the hardware design group here. You have dealt with the challenge of rapid service restoration coupled with the accelerated deployment of the CM3. Congratulations on meeting that challenge and in writing an excellent account to share with the profession.

I handle NEBS compliance here at the AGCS location and am in contact with some of the Verizon NEBS reviewers from time to time. Half of the VZ NEBS team had offices in the 140 West St. building, and they were all relocated to the VZ building at 1095 Avenue of the Americas following the 9/11 disaster. There were so many impacts that this event had on Verizon and on the communications infrastructure. Your success in rapid service restoration made a difference in NYC. Congratulations to you and your team!

— Scott Baer, A '84
AG Communication Systems

Just read your article in *The Bridge*, Winter 2002. Nice job and congratu-

tions! I too spent a lot of time at 140 West St and throughout Manhattan



installing the CitiBank FT-2000 Fiber Optic Network in the 1996 timeframe.

— Frederick E. Melen
Merrimack Eta Chapter, 1983.

Although I have been retired nearly 20 years, I still find the articles in the Bridge very interesting. Yours truly,

— James A. Joyner, BH'42

I have a program, signed by my grandfather's friends in attendance, of the April 1st, 1911 Annual Convention Banquet of Eta Kappa Nu Fraternity held in Chicago. The sponsor was the Delta Chapter, but was attended by the Alpha, Gamma, Delta, Epsilon, Zeta, Theta, New York, Pittsburgh, and Chicago Chapters.

My grandfather was Harley James Aaron Gerard, who held one degree in

mechanical and two degrees in electrical engineering from Ohio State. He was a resident of Alton, IL, and worked for Union Electric right after the turn of the 20th century, holding positions of rather great responsibility at a very young age. He built the power plant at Alton on the Mississippi, one of the very first I am told.

My grandfather was a very gifted and interesting man, whom I would have liked to know better. He lived at a time when an understanding of engineering meant one could do quite a lot without having one's hands tied by rules and regulations. I have a newspaper clipping that talks about my grandfather and one of his friends inventing a snowplow for the railroad tracks that ran across the Mississippi and Missouri Rivers when a blizzard hit that did not let up for weeks. They just went down to a foundry and made it, then made another just for good measure! It cleared the tracks in two days. Probably couldn't be done now-days.

All of his life my grandfather would stop and look up with wonder when a plane came over, because he did not know the physics of it and was very curious. He graduated from Ohio State with his last degree in 1912, and was already apparently a member of your organization. Sincerely,

— Nancy Berry

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

Airlines Growing Narrow-Minded over Ultrawideband

Technology marches on. As more gadgets are developed with more features, many of which are wireless, there's an increasing demand for spots on the radio-frequency spectrum. The RF spectrum is like real estate—they're not making any more of it. And like real estate, creative ways need to be found to squeeze more users on fewer frequencies.

Ultrawideband technology is one approach that is suited to local, unlicensed applications like communications between a laptop PC and a cellphone. Instead of sending out a signal on a fixed frequency, the signal is sprayed out across a wide range of frequencies that are picked up and decoded at the receiver. It's a process that's been used by the military for secure communications for years, and it's attractive to wireless gadget-makers because it's extremely low-power and nearly universal.

It's also very noisy. As you might imagine, these low-level signals across wide frequency ranges add to the noise floor of licensed services. NASA has done tests showing that the use of this technique can create harmful interference to airline navigation systems. Because of this, United Airlines, the Federal Aviation Administration (FAA) and others are asking the Federal Communications Commission (FCC) not to relax the restrictions on ultrawideband that are currently in place.

While there aren't any gadgets using this technology yet, high-tech companies trying to hit on the next product breakthrough are leaning hard on the FCC to loosen the requirements.

Good Enough for Government Work?

The state of the economy is no secret to anybody. EE graduates and experienced engineers are being hit hard by layoffs, lower salary levels and greater demands on the job with fewer resources. Pick whichever set of numbers depresses you the most: according to Challenger, Gray & Christmas, a technical placement company, there were nearly 170,000 jobs lost in telecom, 50,000 in the computer sector, and nearly 40,000 in other sectors combined. And that was just between January and June of this year.

But there's always more to the story. Government agencies and non-profit organizations are increasing their hiring of technical personnel. Especially in the wake of last year's terrorist attacks, there is a growing demand at the U.S. Central Intelligence Agency, the U. S. National Security Agency, and the U. S. State Department, among others, for technical staff. Also, a large number of government professional workers will be eligible for retirement over the next five years, creating even more technical job openings. Check it out if you're looking for work. There's no guarantee that you'd be designing exotic spy gear, but you never know.



These young whippersnappers think they know it all. Well, my answers will set them straight.

ASK THE PROFESSOR

No matter how many times we tell him, he just keeps coming back. Professor R. F. Detecta, technical raconteur and self-appointed problem solver, has returned to the Bridge offices to take on another question from our readers. What could he be thinking? Let's find out: —TEB

Dear Professor:

I'm a digital logic designer. I love to set up and run great Boolean simulations — it's like making and solving your own crossword puzzle! But my last design didn't work when a prototype was built. I don't get it, because the logic has been checked and verified. I've got a 400 MHz clock, and somebody suggested that my double-sided circuit board might be part of the problem. What possible effect could a double-sided board have on the operation of verified logic?

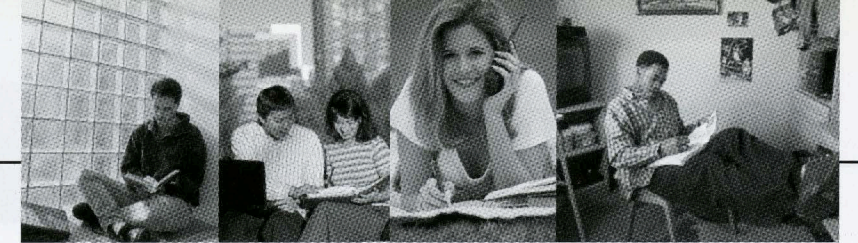
—Logical

Dear Cal,

You like crosswords, eh? Then you should understand what would happen if you tried to play a game of Scrabble at 400 MHz. You'd have little wooden tiles sliding around, bumping into each other and falling off the board. "Egad," you would say, "I don't get it — I know that I'm using the right letters!"

You're falling into a common digital-designer trap: your logic simulation shows that it should work just fine, but when you crank it up to a high clock speed it jumps off the rails. Don't forget that you're dealing with real electrical signals on your board that are traveling at high speeds and facing real impedance. Signal traces have inductance and parasitic capacitance, and as the frequency goes up, signal behavior gets more weird as they navigate those impedance hurdles.

Using a double-sided board for a high-flying circuit like that is like driving on bald tires: if you're lucky, they'll hold up, but there's a good chance for a blowout. Go back and check your board for impedance matches between devices, add a dedicated ground layer to minimize the return-path impedance for your signals, and lay out the components so that the signal paths are at a minimal length. Then your circuit will fly like the wind, and you'll have more time for your puzzles.



Beta Theta Chapter Offers Big-Sib Program to Sophomores

The objectives set by the Beta Theta Chapter for this year were as follows: (1) to organize activities to promote student-faculty interaction, and student-student interaction, and (2) to provide opportunities for students to share and exchange experiences in classwork, curriculum selection and career planning.

The Big-Sib program is responsible for pairing up sophomores with upperclassmen who can provide advice on MIT and the EECS curriculum. The Big-Sib committee organized an information session and two dinners to discuss about cur-

riculum planning in the fall. In the spring, the committee invited faculty to give short talks on industry trends and current research.

Beta Theta chapter also started an Alumni Outreach Program this year, responsible for establishing a link between the alumni and the student body. This allows students to have a view of working life through the eyes of the alumni, with the goal of enabling students to plan their curriculum at MIT better. The Alumni Outreach committee has written and sent out a survey evaluating EECS alumni's MIT experience.

—Submitted by Chee We Ng
President, Beta Theta Chapter

Boo!—Iota Kappa Chapter Sponsors Halloween Food Drive

A canned food drive was held on Halloween. Thirteen HKN members dressed up in costumes spent two hours trick-or-treating for donations. Two hundred pounds of food were collected and donated to the Gallatin Valley Food Bank.

Iota Kappa Members at MSU reached out to the community by supplying food to the food bank and supporting the Big Brothers/Big Sisters program. Iota Kappa also continued a history of service to our fellow students by providing free tutoring, a freshman newsletter, and maintenance of the student lounge.

—Submitted by Lindsey Nussbaum,
President, Iota Kappa Chapter

Kappa Pi Chapter Installed at Boise State University

This past year has been a busy one for electrical engineering students at Boise State University.

The College of Engineering hosted its official installation ceremony for the Kappa Pi chapter of the Eta Kappa Nu electrical engineering honor society this past fall. In doing so, Boise State became the first university in the state of Idaho to house a chapter of HKN. This can be credited to the hard work and dedicated effort by the club's charter members and faculty advisor Dr. Stephen Parke.

The installation ceremony which took place October 27, 2001, was sponsored by Boise State's College of Engineering, the Electrical and Computer Engineering Department, and Idaho Power.

Nine of Boise State's top electrical engineering students received the honor of being charter members. These members include: Matt Overton, Darby Harvey, Kloy Debban, Tyler Waite, Jacob Lemmon, Thad Mason, Cory Bolander, Darren Young, and Tim Murphy. Dr. Ron Spanke, the HKN Execu-

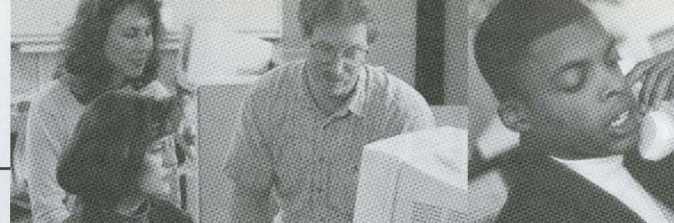


HKN's Newest Chapter, Kappa Pi, is installed by Executive Secretary Spanke at Boise State University.

tive Secretary, traveled from the HKN National Headquarters in Illinois to install the new chapter. Dr. Stephen Parke was the master of ceremonies, while Dr. Lynn Russell (Engineering Dean), Dr. John Owens (V.P. of Research), and Dr. Gary Erickson (ECE Chair) gave short speeches at the ceremony. Robert Batey of Agilent Technologies gave the keynote speech of the ceremony.

—Submitted by Tyler Waite
Bridge Correspondent

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



Advice from the Field: Global Engineering

by Patricia Irwin/careers editor

Name: Amit Chakraborty

Position: Project manager, Siemens, Princeton, NJ

Contact info: Amit.Chakraborty@scr.siemens.com

Background: Chakraborty received his undergraduate degree in electrical engineering from the Indian Institute of Technology in India, and his Masters and PhD from Yale. After graduating in 1995, he accepted a job at the Siemens Corporate Research center in Princeton NJ, where he still works.

Chakraborty began his research career in medical imaging and Computer Vision. He has since moved to the field of multimedia documentation. In his work, Chakraborty uses all the latest media standards, tools, and technologies, such as XML/SGML, Web Technologies and also elements of Artificial Intelligence, Statistical Inference, etc.



What is the best advice you ever received?

A professor once said to me, 'Fields keep changing but if you know your fundamentals well, you will not have a problem.' He was right.

How was the transition from school to workforce?

The transition from academia to industry was quite easy. I was not sure what to expect from industry, but found things to be similar to my research at Yale. It was a very nice experience. Nothing was too surprising.

What was the most surprising thing you learned after graduation?

You have to follow the technology and the market. You have to focus on those areas that are relevant. In academia you can go off in directions that are of interest to only you, but not in industry. Also, I learned that you must keep up with the advancements in the field. You must continue to learn—everyday.

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

Make sure your fundamentals are solid. You graduate and plan to work in one field, but you may move through three specialties in five years. I started in medical imaging. Now I am in multimedia documentation, with other stops along the way.

Broaden your horizons: Things change. The field of electri-

cal engineering is not what it was 20 or 30 years ago. Back then it was effectively just power engineering—designing and maintaining machines. While this work is still important, it is not an area of growth anymore. Engineers are practical people so they should understand this.

Engineers should take a lot of different courses, including liberal arts classes. Most things have engineering applications. For example, music is the arrangement of wavelengths. Take statistics, math, and computer science. Economics is very important. If you don't understand the interplay between engineering and economics, you may never understand why your pet project will not sell. Language skills are also very important for presentations and speeches.

Engineers must also be able to type. Learn how to write well and fast, because engineers will need this skill for everything—from simple emails to customers and co-workers, to major project reports and proposals. A poorly written document will be poorly read. Even if you are an incredibly efficient engineer, you won't be able to convey information unless you are proficient in oral and writing skills. Think about technical articles: The best written ones are the easiest to understand and these are the articles that readers will get excited about. Consider two articles: Even if the concepts are the same, the better written one will get the information across. The other one may well be ignored.

The improvement of long distance communications and travel makes the world seem like a smaller place.

Does that impact your work?

Everyday, engineers from around the world are working together. For example, Microsoft uses programmers in India and China. Global collaboration is where the technology is happening. Siemens Worldwide has 56,000 researchers at 130 research and development centers worldwide; the company has operations in approximately 190 countries. The corporate center itself, where I work, has researchers from 20 nations. Working with a culturally diverse workforce is interesting. It is fun to learn about different customs and cultures.

Is language a significant problem?

No, English is commonly spoken well enough to communicate. But, EE's might well benefit from learning a foreign language.

NEW HKN

EMINENT Members Named

by Jutta Willmann

Eta Kappa Nu established the rank of Eminent Member in 1950 as the society's highest membership classification, to be conferred upon those select few whose contributions and attainments in the field of electrical and computer engineering have resulted in significant benefits to humankind. Six such individuals have recently been named to this rank by the Eta Kappa Nu National Board of Directors. Norman R. Augustine, Charles Concordia, Edward E. David Jr., Roland W. Schmitt, Mischa Schwartz, and John Brooks Slaughter were inducted as Eminent Members at the HKN Spring Awards Ceremony on April 30, 2001 in Princeton, NJ.



NORMAN R. AUGUSTINE has served as CEO, director, governmental advisor, author, and explorer. Currently, he serves as director of Phillips Petroleum, Proctor & Gamble, and Black & Decker and chairs the Executive Committee of Lockheed Martin, after having retired as president and CEO in 1997.

Having earned his B.S.E. and M.S.E. from Princeton University in 1957 and 1959 respectively, he served in the Pentagon as Assistant Director of Defense Research and Engineering and later as Assistant Secretary and Undersecretary of the Army. He served as chair of Martin Marietta Aerospace during its historic merger with Lockheed. Dr. Augustine joined the faculty of Princeton University's Department of Mechanical and Aerospace Engineering as lecturer. He is Chairman of the American Red Cross and served as President of the Boy Scouts of America. He served as chair of the Association of the U.S. Army, which presented him with its highest honor, the George C. Marshall Medal.

A recipient of numerous honorary degrees and over 100 awards, IEEE awarded him the Founders' Medal. Other awards include the National Medal of Technology and the Goddard Medal. Dr. Augustine is a member of the Ameri-

can Academy of Arts and Sciences, and was named chair of the National Academy of Engineering. A world traveler, he has stood at the North and South Poles, and traversed Timbuktu. As an author, he has written several books: *Augustine's Laws*, *Augustine's Travels* and, his most recent, *Shakespeare in Charge*. He co-authored *The Defense Revolution*.



CHARLES CONCORDIA concentrated on the analysis of dynamic performance and control of electric power systems and machinery during a career spanning over sixty years. The safe and reliable generation and transmission of electrical energy can be traced to the creative efforts of Dr. Concordia and his contemporaries who developed new analysis tech-

niques allowing a greater understanding of power system operations. A pioneer in the application of both analog and digital computers, Dr. Concordia designed and built General Electric's first transient network analyzer in 1937.

At the age of 18, Dr. Concordia joined General Electric Company (GE) in 1926 as an instrument calibrator. Six years later he won a position in the Advanced Engineering Program

eventually becoming a member of Advanced Course staff. For most of his GE career, Dr. Concordia was a consulting engineer for the Electric Utilities Engineering Systems Department. His commitment to innovation in analysis resulted in his efforts as a founding member of the Association for Computing Machinery in 1947.

Author of over 130 technical papers, and the noted textbook, *Synchronous Machines* (1951), Dr. Concordia holds six patents. Numerous awards received include the 1942 General Electric Coffin Award, AIEE Lamme Medal in 1962, GE Steinmetz Award in 1973 and the 1992 PES Power Life Award for outstanding contributions to power engineering and harmonious development of electrical technology and the Earth's environment. Dr. Concordia is a Fellow of IEEE and ASME.



EDWARD E. DAVID, Jr. A recipient of the Eta Kappa Nu Outstanding Young Electrical Engineering Award in 1954, Dr. David has now become an HKN Eminent Member after a distinguished career in directing and managing research, development and engineering.

Dr. David received his BSEE from the Georgia Institute of Technology in 1945, followed by an M.S. and Sc.D. both from MIT in 1948 and 1950 respectively. He worked for Bell Telephone Laboratories advancing to Executive Director of the Research, Communications Systems Division in 1965. From 1970 to 1973 he served as science advisor to the U.S. President and as Director of the Office of Science and Technology. Dr. David also served as Executive VP of Gould Inc., and as President of Gould Laboratories from 1973-1977. At Exxon Corporation from 1977-1986, Dr. David was President of Exxon Research and Engineering.

Dr. David received the President's Award of Merit from the American Society of Mechanical Engineers in 1971. A member of the Hall of Fame of the American Society for Engineering Education since 1993, Dr. David is also a 1984 recipient of the "Scientist of Year" Award from *Research and Development* magazine. Dr. David is an IEEE Fellow, a Fellow of the Acoustical Society of America, and Past President and Fellow of the American Association for Advancement of Science. Dr. David is founder and President of EED, Inc.

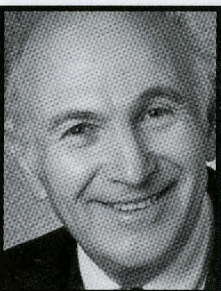


ROLAND W. SCHMITT. Throughout his career, Dr. Schmitt has been involved with education, research and technology. He was president of Rensselaer Polytechnic University from 1988 to 1993. Dr. Schmitt himself earned undergraduate degrees in physics and mathematics and an M.A. from the University of Texas, followed by his

Ph.D. from Rice University.

Joining General Electric in 1951, Dr. Schmitt rose to the position of Director of the Research and Development Center, one of the world's largest and most diversified industrial laboratories. He served as Senior Vice President for science and technology and as a member of GE's corporate executive council. Dr. Schmitt joined the National Science Board in 1982 through 1994, and chaired this governing body of the National Science Foundation from 1984 to 1988. Currently, Dr. Schmitt is Chairman of the Advisory Board of the New York State Office of Science, Technology and Academic Research. Dr. Schmitt is also past president of The Board of Directors of the Industrial Research Institute, and a member of the Executive Committee of the Council on Competitiveness.

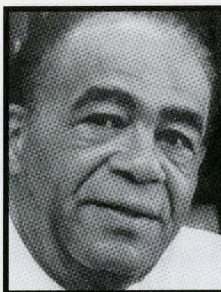
A recipient of numerous awards, IEEE elected him Fellow for "leadership in directing research and development in electronics, energy materials, and chemistry". Dr. Schmitt also received the IEEE's Engineering Leadership Recognition Award and its Founders' Medal. He is a member of the National Academy of Engineering, a Fellow of the American Academy of Arts and Sciences, and a member of the Royal Swedish Academy of Engineering Sciences.



MISCHA SCHWARTZ. Professor and Department Head of Electrical Engineering at Polytechnic Institute of Brooklyn from 1952-1974, Dr. Schwartz has been cited as one of the 10 all-time EE educators (1984). From 1985-1988 he directed the Center for Telecommunications Research at Columbia, one of six national Engineering Research Centers established

under major grants of the National Science Foundation. Published works include nine books and 150 publications on communication theory and systems, signal processing, and computer communication networks. Textbooks include *Computer Communication Network Design and Analysis*; *Telecommunications Networks*; *Broadband Integrated Networks*; and *Information Transmission, Modulation, and Noise*; *Signal Processing*. Dr. Schwartz earned his B.E.E. degree from Cooper Union in 1947, the M.E.E. in 1949 from Polytechnic Institute of Brooklyn, and a Ph.D. in Applied Physics from Harvard University in 1951.

Life Fellow and former Director of IEEE, Dr. Schwartz is past President of IEEE Communications Society and has received the IEEE Education Medal, IEEE Award for engineering management and leadership, and is in the IEEE Centennial Hall of Fame. He received the IEEE Millennium Award in 2000. He is also Fellow of AAAS, and the International Engineering Foundation. Dr. Schwartz served on the editorial board of the *Proceedings of the IEEE*, and as division editor of the *Journal on Communications Networks*.



JOHN BROOKS SLAUGHTER is known for contributions to the design of digital, sample, data control systems, for which he became an IEEE Fellow. Currently, he is President and CEO of NACME, the National Action Council for Minorities in Engineering, the largest private source of scholarships for minorities in engineering. Dr.

Slaughter served as director of the National Science Foundation. He earned his BSEE from Kansas State University, his M.S. in engineering from UCLA, and his Ph.D. in engineering sciences from University of California, San Diego.

Academic posts include Professor of Electrical Engineering at the University of Washington; President of Occidental Col-

lege; Chancellor of the University of Maryland; Academic Vice President and Provost at Washington State University; and, most recently, The Irving R. Melbo Professor of Leadership in Education at the University of Southern California.

Dr. Slaughter serves on the board of directors of IBM, Northrup Grumman, and Solutia, Inc. A member of the National Academy of Engineering, he has served on the Committee on Minorities in Engineering and currently co-chairs its Action Forum on Engineering Workforce Diversity. A recipient of the IEEE Centennial Medal, his other honors include fellow of the American Association for the Advancement of Arts and Science; the first "U.S. Black Engineer of the Year" award (1987); the 1993 induction into the American Society of Engineering Education Hall of Fame; and the Martin Luther King, Jr. National Award (1997).

HKN Eminent Members

Vannevar Bush	1950	John Howard Dellinger	1956	Eric T. B. Gross	1976
Royal W. Sorensen	1950	William Kouwenhoven	1956	Edward A. Erdelyi	1978
Vladimir K. Zworykin	1950	Donald A. Quarles	1958	Larry Dwon	1984
Frederick E. Terman	1951	C. F. Hood	1958	Howard Sheppard	1984
Joseph Slepian	1951	Philip L. Alger	1960	S. Reid Warren	1984
Karl B. McEachron	1951	G. Starr	1960	Donald Christiansen	1985
S. H. Mortenson	1951	Arthur D. Moore	1961	Marcus Dodson	1986
William H. Timbie	1951	John L. Burns	1961	William E. Murray	1987
Lee DeForest	1952	James Hillier	1961	Berthold Sheffield	1993
Edward C. Molina	1953	Charles F. Wagner	1961	Robert W. Lucky	1993
Harold Pender	1953	John Bardeen	1962	Nick Holonyak, Jr.	1998
Charles A. Powel	1953	Lloyd V. Berkner	1962	Gene Amdahl	1999
Philip Sporn	1953	Edward M. Purcell	1962	William Hewlett	1999
Walter R.G. Baker	1954	Jerome B. Wiesner	1962	C. Lester Hogan	1999
Mervin J. Kelly	1954	Ernst Weber	1962	Jacob Rabinow	1999
Reinhold Rudenberg	1954	Gordon S. Brown	1963	Robert A. Frosch	2000
J. B. Black	1954	William L. Everitt	1963	Wilson Greatbatch	2000
A. A. Potter	1954	Lee A. Dubridge	1964	Leo L. Beranek	2000
Ellery B. Paine	1954	Julius A. Stratton	1964	George H. Heilmeier	2000
Everett S. Lee	1954	Donald G. Fink	1965	John R. Whinnery	2000
Ernst F. W. Alexanderson	1955	Simon Ramo	1966	Thelma Estrin	2000
Alfred N. Goldsmith	1955	Winston E. Kock	1966	Ivan A. Getting	2000
Harold S. Osborne	1955	George H. Brown	1967	Charles H. Townes	2000
Harry A. Winne	1955	William H. Pickering	1968	Norman R. Augustine	2001
John B. Whitehead	1955	Harold E. Edgerton	1968	Charles Concordia	2001
Harold H. Beverage	1955	Emanuel R. Piore	1969	Edward E. David	2001
L. N. McClellan	1955	Patrick E. Haggerty	1969	Roland W. Schmitt	2001
William D. Coolidge	1956	Walker Lee Cisler	1969	Mischa Schwartz	2001
Harry Nyquist	1956	E. I. Kanouse	1970	John Brooks Slaughter	2001
Leon N. Brillouin	1956	Edward C. Jordan	1974		



A New Constitution for the 21ST CENTURY

Eta Kappa Nu chapters ratify a new constitution to modernize the organization.

By Ron A. Spanke, Ω'82

THE BOARD OF DIRECTORS OF ETA KAPPA NU has been working closely with the committee on Constitution and Bylaws for the past few years to develop a new version of the Eta Kappa Nu Constitution. Previous attempts to update and modernize the constitution during the early 1990s had failed to gather enough chapter votes to ratify the changes. This most recent effort originated during the Jackson Hole strategic planning meeting held in August of 1998. Many of the suggestions to more effectively run the organization that came out of this strategic planning meeting would require changes to the HKN constitution in order to incorporate them. 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 the strategic planning meeting.

HISTORY

Dr. James Melsa was named as chair of the newly revived Constitution and Bylaws committee, and Tom Rothwell and Warren Jessup were appointed as members of the committee. The committee proposed that the current governing documents (Constitution, Statutes, and Bylaws) be simplified and replaced with a new Constitution and Bylaws. Many elements previously contained in the Statutes section were redundant with items that were covered either in the Constitution or in the Bylaws. After many months of effort and revisions, the committee circulated its first draft of the new constitution and bylaws for review beginning June of 1999. Feedback and further suggestions were received from the current Board and officers. The committee evaluated and incorporated this feedback into the version that was sent to the Board of Directors for official approval at their Fall 1999 Board meeting.

During the Fall of 1999, the Board suggested further changes to the constitution to make it more compliant with federal laws governing charitable organizations, these further changes were evaluated and incorporated by the committee and again presented to the board for approval. By April 2000, the Board had approved the new version of the constitution and directed that it be sent out to all chapters for ratification. The Board also approved a new version of the HKN Bylaws that would take effect upon ratification of the HKN Constitution.

Copies of the new constitution and bylaws, along with supporting explanatory material and the old constitution and were sent out to all chapters during the Spring 2000 mail convention. Unfortunately, not enough chapter votes were received to be able to ratify this 2000 version of the new constitution.

By Fall 2000, some additional minor wording changes had been discussed by the board including adding the words *for the benefit of the public* into our preamble. This final version of the constitution was officially approved by the board in January 2001 and again sent out to all chapters for ratification as part of the Spring 2001 mail convention. An extra effort was undertaken by the executive secretary and regional directors to personally call each of the chapter faculty advisors to impress upon them the importance of the proposed changes and to enlist their effort in seeing that their chapter's ballot was returned. Special thanks go to John DeGraw of the L.A. Alumni chapter for assisting with these chapter contacts.

By December 16, 2001, enough ratification votes had been received from the chapters in order to ratify the new constitution. The executive committee met and set an effective date of January 1, 2002 for transitioning to operation under the new approved constitution. The HKN Bylaws had previously been approved by the board of directors to take effect upon ratification of the new constitution and they also became effective on January 1, 2002.

OVERVIEW OF SIGNIFICANT CHANGES

Computer Engineering – Computer Engineering has now been officially added to the scope of the society and this change is reflected throughout the constitution. Eta Kappa Nu is now the honor society for Electrical and Computer Engineering. Previously, degrees such as computer engineering were already eligible for membership, along with other specializations such as power engineering, telecommunications engineering, etc., because they were simply considered specialized fields under the general category of Electrical Engineering. With the prevalence of computer engineering degrees awarded during the past decade, where in some schools the number of computer engineering graduates outnumber the number of electrical engineering graduates, the scope of the honor society was officially changed to explicitly include them.

THE ETA KAPPA NU ASSOCIATION CONSTITUTION

PREAMBLE

The Eta Kappa Nu Association was founded at the University of Illinois at Urbana in 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. To carry out the purposes and objects of this Association, we do hereby ordain and enact the following Constitution:

ARTICLE I

CERTIFICATE OF INCORPORATION

Section 1. Incorporation. The Eta Kappa Nu Association is a not-for-profit corporation chartered in 1951 in the State of Delaware.

Section 2. Constitution and Bylaws. The governing bylaws of The Corporation are the Constitution and Bylaws.

Section 3. Governing Body. The Board of Directors for The Corporation shall be called The Board of Governors.

ARTICLE II

NAME, SYMBOL, PUBLICATION

Section 1. Name. This organization shall be known as the Eta Kappa Nu Association, often referred to as Eta Kappa Nu.

Section 2. Symbol. The symbol shall be the early form of the Greek letters Eta, Kappa, and Nu. Use of the symbols HKN shall be permitted.

Section 3. Colors. Colors of the Association shall be navy-blue and scarlet.

Section 4. Emblem. The emblem of the Association shall be the Wheatstone bridge.

Section 5. Publication. The official publication shall be called THE BRIDGE, which shall be published at least four times each year.

Section 6. Geographic Regions. There shall be four geographic regions, with boundaries and names established by The Board.

ARTICLE III

MEMBERS, CHAPTERS AND GENERAL GOVERNMENT

Section 1. Membership. Membership shall be by qualification, election, and induction.

Section 2. Chapters. Chapters of the Association shall include College Chapters, an Eta Chapter, and Alumni Chapters.

Section 3. Convention. Legislative powers shall be vested in The Annual Convention (The Convention).

Section 4. Board of Governors. Policy determination, advisory, and judiciary powers shall be vested in a Board of Governors (hereinafter often referred to as The Board).

Section 5. Executive Council. Administrative powers shall be vested in The Executive Council. The Executive Council shall report to The Board and be responsible for administering the Association between meetings of The Board.

ARTICLE IV

COLLEGE CHAPTERS

Section 1. Location. A College Chapter may be established at any school that awards the degree of Bachelor of Engineering or Bachelor of Science degree in electrical or computer engineering, or the equivalent, and that meets the requirements of a recognized regional or professional accrediting agency.

Section 2. Petition. A petition for the establishment of a College Chapter, or reestablishment of a Closed Chapter, may be made by no fewer than eight under-

graduate students who are qualified for membership. It shall be accompanied by written endorsements of the President or Chancellor, the Dean of Students, the Dean of Engineering, and the Head of electrical or computer engineering of the petitioning school, or their equivalents.

Section 3. Approval. The petition for a College Chapter, or reestablishment of a Closed Chapter, requires unanimous approval of The Executive Council.

Section 4. Installation. College Chapters shall be installed by the Eta Kappa Nu President, or by a deputy appointed by the President.

Section 5. Charter Members. Charter members of a new chapter shall include all the petitioners duly inducted and any other members inducted at the installation ceremonies that the petitioners desire to be distinguished as charter members.

Section 6. Faculty Advisor. The chapter shall request the head of the electrical or computer engineering department to appoint a faculty advisor for the chapter. The Faculty Advisor shall be a member of Eta Kappa Nu and a faculty member in electrical or computer engineering of the school in which the chapter is installed. The Faculty Advisor shall serve as liaison officer between the chapter and the college.

Section 7. Active Membership. Active membership of a College Chapter shall consist of its undergraduate and graduate student Eta Kappa Nu members at the school, regardless of prior chapter affiliation, who signify their intent of remaining or becoming subject to the bylaws of the College Chapter.

Section 8. Officers. Officers of a College Chapter shall be a President, Vice-President, Recording Secretary, Corresponding Secretary, BRIDGE Correspondent and Treasurer. If desired, any two of these offices may be combined by the chapter and assigned to a single member.

Section 9. Duties of the Chapter officers.

- A. The President shall exercise such jurisdiction over the chapter as is usually accorded the position. The President shall preside at all meetings and shall call special meetings at the request of not less than five members or whenever deemed necessary.
- B. The Vice-President shall, in the absence of the President, assume the President's duties. The Vice-President shall succeed to the presidency in case of resignation or disability of the President.
- C. The Recording Secretary shall keep a record of all meetings and shall issue notices of all special meetings.
- D. The Corresponding Secretary shall be responsible for all correspondence of the chapter, except that pertaining to the Treasurer and THE BRIDGE correspondent's office.
- E. THE BRIDGE correspondent shall submit reports of the chapter's activities to THE BRIDGE and perform all other duties pertaining to THE BRIDGE, including publicity for the chapter.
- F. The Treasurer shall collect all dues and be responsible for all chapter funds, which shall be paid out only upon order of the chapter and the signatures of the President and the Recording Secretary.

Section 10. Quorum. A quorum for the legal transaction of chapter business shall consist of at least one-half of the total active members of the chapter. Student members pursuing a cooperative program or off the campus on an industrial assignment at the time of balloting shall not be counted in the total membership for the purpose of determining a quorum.

Section 11. College Chapter Bylaws. Bylaws adopted by a College Chapter for its government shall not conflict with the Constitution. Such Bylaws and all changes

thereto, must be approved by each member of The Executive Council. In the event of enactment of any future amendments to the Constitution, with which the chapter Bylaws may become in conflict, such conflicting Bylaws shall thereby become void.

Section 12. Inactive Chapters. Whenever it appears that there will be an insufficient number of students on the campus to maintain an Active College Chapter, the chapter shall elect a trustee committee, consisting of three or more members of Eta Kappa Nu, who shall assume custody of chapter assets until reactivation of the chapter, and the chapter Faculty Advisor shall notify the Executive Director of their Inactive status. Absent such Inactive Chapter notification from a chapter, the Board shall declare as Inactive any College Chapter that has not inducted a new member in the most recent two year period. Chapters determined to be Inactive shall not have a vote in The Convention and shall not induct new members. An Inactive Chapter may be reactivated by submitting a letter request, signed by the Faculty Advisor or Department Chair, to the Executive Director requesting Active Chapter status. This letter may accompany a request to process new initiates.

Section 13. Closed Chapters. The Charter of any Chapter that has become permanently inactive (Closed) for reasons such as closure of the electrical or computer engineering department, loss of accreditation, college management decision to no longer host a chapter, etc., shall be withdrawn by action of the Executive Council. Said Closed Charter may be reestablished in accordance with Section 2 of this Article. Closed Chapter names shall remain in the records of the Association and shall not be reassigned to another chapter.

ARTICLE V ETA CHAPTER

Section 1. Purpose. To provide for membership of qualified undergraduate and graduate students of electrical or computer engineering in schools which meet the same degree of accrediting requirements as for College Chapters and where no College Chapter of Eta Kappa Nu exists, there shall be a chapter known as Eta Chapter.

Section 2. Location. A branch of Eta Chapter may be established by unanimous action of The Executive Council, with approval of the college concerned.

Section 3. Officers. The Executive Council shall function as the officers of the Eta Chapter. The Eta Chapter shall have no vote in The Convention.

ARTICLE VI ALUMNI CHAPTERS

Section 1. Purpose. To provide for strengthening and furthering the aims of Eta Kappa Nu by alumni members, an Alumni Chapter may be established in any locality, upon petition of at least five members, and subject to the unanimous approval of The Executive Council.

Section 2. Limitations. An Active Alumni Chapter shall have limited power to confer membership in Eta Kappa Nu as specified in Article VII Section 9, shall not be subject to any assessment or dues other than by a vote of its own members, and shall not have a Convention vote on questions involving the levying of assessments or the expenditure of money (Article VIII, Section 2).

Section 3. Active Chapter. An Active Alumni Chapter must consist of 5 or more active members, elect officers, and must complete and submit an Alumni Chapter Annual Report to the Executive Director. Failure to submit an Annual Report form each year shall cause the chapter to be an Inactive Alumni Chapter. An Inactive Alumni Chapter shall not have a vote in The Convention, and shall have no member induction authority. An Inactive Alumni Chapter may be reactivated to Active status by having a minimum of 5 active members, electing officers, and submitting a petition as defined in Section 1 of this Article.

ARTICLE VII MEMBERSHIP

Section 1. Classes of Membership. Induction to membership in Eta Kappa Nu Association shall be as either a Member or an Eminent Member.

Section 2. Eligibility. To be eligible for induction as a Member, a candidate must meet at least one of the following conditions:

- An undergraduate or a graduate student at an institution having an Active College Chapter or a Branch of Eta Chapter.
- Upon installation or reactivation of an Eta Branch or a College Chapter (not preceded by an Eta branch), there may be inducted graduates of

the institution who graduated less than two years prior to the induction or reactivation and would have been eligible for induction had there been a College Chapter or Eta Branch when the graduate was in attendance at the institution.

- Any member of the electrical or computer engineering faculty of any school that meets the same degree and accrediting requirements as prescribed herein for a College Chapter.
- An electrical or computer engineer who has done meritorious work in the profession and allied pursuits.

Section 3. Undergraduate Students. Undergraduate candidates shall be selected from those students in the Junior or Senior class who are pursuing courses leading to a Baccalaureate or equivalent degree in electrical or computer engineering.

- Juniors who have a cumulative scholastic rank in the upper quarter of their electrical or computer engineering class may be elected. A junior means any enrolled student in an accredited course in electrical or computer engineering who has completed one-half of the scholastic requirements for the bachelor's degree.
- Seniors who have a cumulative scholastic rank in the upper third of their electrical or computer engineering class may be elected. A senior means any enrolled student in an accredited course in electrical or computer engineering who has completed three-fourths of the scholastic requirements for the bachelor's degree.

Section 4. Qualifications. Candidates for membership to Eta Kappa Nu, in addition to having the required scholastic rank, must be of unimpeachable character, have ability to make use of the knowledge and information acquired, have capacity and willingness for hard work, and have a genial nature and ability to work in harmony with all types of people.

Section 5. Graduate Students. Graduate student candidates shall have graduated from a school of recognized standing and shall possess substantially the same scholastic and other qualifications required for undergraduate membership. Graduate students may be nominated to membership by any member of Eta Kappa Nu, provided they have completed the equivalent of one-half of one academic year of full-time study in the school wherein is located the College Chapter or branch of Eta into which the graduate student is proposed to be inducted, and further provided that such study is generally applicable to an advanced degree in electrical or computer engineering. Such nomination shall require endorsement by the Head of the electrical or computer engineering department of said school.

Section 6. Non-Students. In order for a non-student to be eligible for induction by an Active College Chapter, the faculty advisor of the nominating chapter and the Head of the department of the college shall give their approval.

Section 7. Period of Invitation. An invitation to membership is valid only for the specified term or semester in which it is offered. If it is not accepted the Active Chapter may tender a new invitation for a subsequent term or semester.

Section 8. Eminent Member. Induction as Eminent Member is reserved for those individuals who, by their technical attainments and contributions to society, have shown themselves to be outstanding leaders in the field of electrical or computer engineering, and great benefactors to society.

- Nominations to eminent membership may be made by an Active College Chapter, an Alumni Chapter, or by any member of Eta Kappa Nu. The Eminent Member Recommendation Committee shall review and prioritize nominees for submission to The Board.
- Election of an Eminent Member shall require three-fourths affirmative vote of all members of The Board.

Section 9. Conferring Membership. Active College Chapters may confer membership in Eta Kappa Nu. Alumni Chapters may confer membership in Eta Kappa Nu only as provided in Section 2.D. of this Article, and subject to the approval of The Executive Council. The Board may confer membership and Eminent Membership in Eta Kappa Nu.

Section 10. Diverse Classes of Membership. Members who have heretofore been elected to diverse classes of membership shall continue to hold their certificates as issued with all rights and privileges as heretofore.

Section 11. Discipline. Each chapter shall have the power to discipline its own members.

Section 12. Exceptions. Any exceptions to the provisions of this Article must be made on an individual basis and have the prior approval of The Executive Council.

ARTICLE VIII ANNUAL CONVENTION

Section 1. Types of Convention. Actions for the regulation of the Association, not in conflict with this Constitution, may be enacted or repealed by The Annual Convention (The Convention) in the exercise of its legislative powers. The Convention may be either a Mail Convention or an Assembled Convention. The Board shall determine the type of The Convention.

Section 2. Voting. Each Active College and Alumni Chapter shall have one vote, by delegate, at an Assembled Convention, or by ballot at a Mail Convention except Alumni Chapters shall not have a vote on questions involving the levying of assessments or the expenditure of money. Said Assembled Convention delegate shall be the Active Chapter President or the Active Chapter appointed alternate.

Section 3. Three-Fourths Majority. On matters in this Constitution which require approval or ratification by three-fourths of the Active Chapters voting, each said chapter shall require a two-thirds majority approval by the active members voting.

Section 4. Items to be Considered. In preparation for The Convention, the Executive Director shall communicate with all Active College and Alumni Chapters and with The Board, calling for the nomination of candidates, proposals for new legislation, and other matters to be submitted to The Convention for approval. The Executive Director shall set a reasonable deadline by which all nominations and proposals shall be received.

Section 5. Determination of Any Question. Except as otherwise specifically provided, a majority of votes cast shall be necessary for the determination of any question, including the election of officers and directors and repeal or enactment of contracts. In the case of a tie vote on any question, The Board, by plurality vote, shall cast the deciding vote.

Section 6. Mail Convention.

- A Mail Convention will be held annually by mail or equivalent electronic means. Dates for the Mail Convention shall be set by the Board.
- The Executive Director, after compiling all items to be considered by The Convention and receiving approval from the Executive Council, shall promptly transmit them to each Active College and Alumni Chapter with a ballot for voting, and shall set a date when the election closes, with due regard for the time required if a run-off ballot should be necessary.
- A special Mail Convention may be held at the discretion of The Board.

Section 7. Assembled Convention

- An Assembled Convention will be held when The Board determines that funds are available and that a need for an Assembled Convention is indicated. The cost of hosting The Convention shall be paid from the funds of the Association. This includes expenses for one official delegate from each Active College Chapter and the members of The Board.
- The Executive Director, after compiling all items to be considered by the Convention and receiving approval from the Executive Council, shall transmit them to each Active College and Alumni Chapter with sufficient time for consideration before The Convention.
- If an Assembled Convention is held, the time and place thereof shall be established by The Executive Council.
- The members of The Board, other than the President, shall be non-voting ex officio delegates. The President of The Board shall have one vote, which shall be cast only in case of a tie.
- A special Assembled Convention may be held on the petition of at least five Active College Chapters, including no less than one chapter from each geographic region, or at the discretion of The Board. Such convention shall be called by the Executive Director and the time and place shall be established by The Executive Council, provided that three-fourths of the Active College Chapters voting approve the holding of such a convention, and further providing that a means satisfactory to The Board has been provided to pay the expenses of The Convention.
- In order for an Assembled Convention to conduct business, a quorum of at least one half of the voting members must be present.

ARTICLE IX OFFICERS

Section 1. Officers. The Officers of the Association shall be the President and Vice-President, and such Other Officers as may be designated and selected by the Board pursuant to Section 6 of this Article.

Section 2. Duties of Officers.

- The President shall be responsible for the coordination of the work of the other members of The Executive Council and of all general executive duties. The President shall be responsible for the appointment of all committees, which are to serve during the President's term of office. The President shall have charge of and preside at an Assembled Convention and shall preside at all meetings of The Executive Council and of The Board. The President shall install new College Chapters, either in person or by official representation. The President shall sign all membership certificates and charters.
- The Vice-President shall assume any duties assigned by the President. The Vice-President shall preside in the absence of the President.

Section 3. Terms of Office and Election.

- The term of office for the President and Vice-President shall be one year beginning July 1 following their election. The election of President and Vice President shall be by vote of either a Mail or Assembled Convention. The President and Vice President may be re-elected.
- In the event the result of the annual election is not determined by July 1, the current President and Vice President shall continue to serve until their successors are elected.

Section 4. Nominations and Eligibility for Office.

- The candidates for President and Vice President must have previously served as a Director or member of the former National Advisory Board; such service may immediately precede service as President or Vice President.
- No one may serve simultaneously as both an Officer and a Director, unless a Director is selected as an Other Officer as specified in Section 6 of this Article.
- The Board shall nominate one candidate for each of the positions of President and Vice-President.
- Groups of at least five Active College Chapters including at least one chapter from each geographic region may also nominate candidates for the offices of President and Vice President.

Section 5. Vacancies.

- If the President becomes unable to serve or the position otherwise becomes vacant, the Vice-President shall assume the duties and responsibilities of the President. The Board shall appoint an individual, satisfying the eligibility of Section 4 above, to serve as Vice President until the next Convention.
- If the Vice-President shall become unable to serve or the position otherwise becomes vacant, The Board shall appoint an individual, satisfying the eligibility of Section 4 above, to serve as Vice President until the next Convention.

Section 6. Other Officers of the Corporation. The Board may designate and select such Other Officer positions that the business of the Association may require, each of whom shall have the title, hold office for the period, have the authority, and perform the duties as determined by the Board. These may include but are not limited to a Secretary and/or Treasurer. Other Officer positions shall not be members of The Board nor have a vote on the Board, unless an Other Officer is also a Director.

ARTICLE X BOARD OF GOVERNORS

Section 1. Membership. The Board of Governors shall consist of the following nine members of Eta Kappa Nu.

- The President, the Vice President, and the Immediate Past President (hereinafter called Past President). If the outgoing President is unwilling or unable to serve on The Board as Past President, then The Board, by majority vote, shall appoint another previous President to serve in this role.
- Six Directors, one from each of the four geographical regions, and two at-large.

Section 2. Terms and Election of Directors.

- All Directors shall serve for three-year terms and may not be reelected. Two Directors shall be elected each year.
- Regional Directors shall be nominated by the Active College and Alumni Chapters of that region or by The Board. The Board shall solicit nominations from the Chapters in the appropriate region(s).
- The Board shall nominate candidates for the at-large Directors positions.
- The election of Directors shall be by vote of either a Mail or Assembled Convention.

- E. In the event the result of the annual election is not determined by July 1, the current Directors shall continue to serve until their successors are elected.

Section 3. Officers of The Board. The President and Vice-President shall be the Chair and Vice-Chair of The Board.

Section 4. Vacancy.

- A. If a Director shall become unable to serve or the position otherwise becomes vacant, the remaining members of The Board shall appoint, by a majority vote, an individual to serve the remaining portion of the Director's term.
- B. If the Past President shall become unable to serve or the position otherwise becomes vacant, The Board shall appoint, by a majority vote, an individual to serve the remaining portion of the Past President's term. The individual so appointed shall have previously served as President.

Section 5. Interpretation of Constitution. The Board shall be responsible for the interpretation of the Constitution. The Board shall request an analysis and opinion on the matter in question from the Constitution and Bylaws Committee before rendering an interpretation. Any such interpretation by The Board shall, at the request of any Active Chapter, be subject to majority approval by the next Convention.

Section 6. Bylaws. The Board shall determine the Bylaws and the policies of the Association.

Section 7. Meetings. The Board shall meet at least two times a year at dates and locations to be selected by the Executive Council. The Board may meet at other times at the request of the Executive Council or two-thirds of the membership of The Board.

Section 8. Records. The Board shall have access to all records of the Association and may call at any time upon an Officer, Director, Committee Chair, or any Active or Inactive College or Alumni Chapter for a written report on any of their activities.

Section 9. Committees. The Board has the authority to create committees to address the needs of the Association.

Section 10. Removal. The Board, by a two-thirds vote, shall have the power at any meeting to remove any member from The Board for good and sufficient cause. A copy of the motion for removal must have been provided to all Board members, including the individual whose removal is proposed, at least two weeks before the meeting. The individual shall have the right of defense.

ARTICLE XI EXECUTIVE COUNCIL

Section 1. Membership. The Executive Council shall consist of the President, Vice-President, and Past President.

Section 2. Duties.

- A. The Executive Council shall be responsible for the administration and the execution of the Constitution, acts of The Convention, and of such Bylaws and policy as is established by The Board.
- B. The Executive Council shall manage the funds of the Association in conformity with fiscal policies established by The Board.

Section 3. Report of Actions. The Executive Council shall make a report of its actions to The Board.

ARTICLE XII EXECUTIVE DIRECTOR

Section 1. Duties. The duties of the Executive Director shall be defined by The Board.

Section 2. Appointment. The Executive Director shall be appointed by The Board for a term not to exceed three years. The Executive Director may be re-appointed.

Section 3. Bond. Before assuming office, the Executive Director shall give an

approved bond, the amount of which shall be fixed by The Executive Council.

Section 4. Compensation. The Executive Director may be compensated for his or her services. The Board shall set such compensation and related benefits.

ARTICLE XIII FEES, DUES, SUBSCRIPTIONS

Section 1. Induction Fee. Each Active College Chapter shall be assessed an induction fee for each of its inductees to defray the cost of a certificate, a copy of the Constitution and a three-year subscription to THE BRIDGE magazine for each inductee, for expenses of The Board, and for the expenses of chapter services, including conventions and visitations. The amount of the induction fee shall be approved by The Board with any changes ratified by The Convention.

Section 2. Chapter Fees. Any chapter may fix assessments, dues or fees by a majority vote of its members, except that any local induction fee of a College Chapter shall be subject to approval by The Executive Council.

Section 3. Per Capita Tax. The Convention shall have power to fix and levy a per capita tax on each inductee and/or active member of an Active College Chapter or a branch of Eta Chapter, for expenses in the conduct of the business of the Association.

Section 4. Eta Chapter. Any per capita tax of a member of the Eta Chapter shall be the same as that fixed for members of College Chapters.

Section 5. Eminent Members. Eminent Members will not be subject to assessments, fees or dues.

Section 6. Subscription Price. The subscription price for THE BRIDGE shall be set by The Executive Council.

ARTICLE XIV DESIGNATED FUNDS

The Association may establish designated funds separate from other funds, by legislative action of The Convention or by action of The Board. Such action must have the unanimous recommendation of the members of The Executive Council. Such funds must be used for one or more of the following purposes: charitable, scientific, literary, recognition, scholarship, or educational. If the action is to be taken by The Convention, approval must be received from at least three-fourths of the Active College and Alumni Chapters voting. If the action is to be taken by The Board, approval must be received from at least three-fourths of all of the members of The Board.

ARTICLE XV BYLAWS

The Board may adopt bylaws, not in conflict with this Constitution, for the governing of the Association.

ARTICLE XVI DISSOLUTION

The property of this corporation is irrevocably dedicated to charitable purposes and no part of the net income or assets of this corporation shall ever inure to the benefit of any director, officer, or member thereof or to the benefit of any private person. Upon dissolution or winding up of the corporation, its assets remaining after payment, or provision for payment, of all debts and liabilities of the corporation shall be distributed to a nonprofit fund, foundation or corporation which is organized and operated exclusively for charitable purposes and which has established its tax exempt status under Section 501(c)(3) of the Internal Revenue Code.

ARTICLE XVII AMENDMENTS

Amendments to this Constitution must be ratified by a three-fourths majority of the Active Chapters voting.

Elimination of Statutes – For most of its existence, the association has been governed by a set of three documents: Constitution, Statutes, and Bylaws. There was a great deal of duplication among these documents and in some cases confusing or even contradictory wording. The committee on the Constitution and Bylaws, with the concurrence of the Board, felt that the Association would be better served by a streamlined set of governance documents consisting of only a Constitution and Bylaws. This is typical of most other college honor societies, including Tau Beta Pi. All relevant material previously included in the Statutes has been incorporated into either the Constitution or the Bylaws, depending on where it should logically reside. The constitution includes the fundamental concepts of the organization, requiring chapter ratification to amend, and is expected to change infrequently. The bylaws include rules, procedures, committee and organization structures, and current operating policies for activities to be performed by the board and HKN headquarters, and is expected to change more frequently as operating conditions warrant. Bylaws must not be in conflict with the Constitution, and are amended and approved by a two-thirds majority of the Board.

Board of Governors – Based on years of experience with the previous Eta Kappa Nu organizational structure, the committee felt that it was desirable to make changes to make the Board more effective. This goal was achieved by increasing the number of Directors from four to six and increasing the term of office for Directors from two years to three years. The two new Board members will be elected at-large, while the existing four will continue to represent the existing geographic regions. The immediate past-president was added as a member of the Board and as a member of the Executive Council. There had been confusion in the past regarding the definitions of Directors, the Board of Directors, and Officers. As a result, it was felt to be desirable to change the name of the Board of Directors to the Board of Governors to eliminate this confusion. While it has been the tradition that a Director may be elected to be an officer immediately after serving as Director, this fact was not clear in the previous Constitution. Further, there was a lack of clarity regarding the reelection of officers.

Executive Director – In order to increase the professionalism of the Association, it was felt that the Executive Secretary (renamed Executive Director) should be an employee of the Association hired by the Board of Governors rather than being elected by the chapters. This change makes the organization of Eta Kappa Nu similar to other not-for-profit professional organizations. The Executive Director will not serve as either an elected officer or member of the Board or the Executive Council. Upon ratification of the new constitution, the current executive secretary would transition to the newly defined Executive Director role and would then report to the Board of Governors.

Compliance with Internal Revenue Service 501(c)(3) Rules—In order for members, friends, and companies to make tax-deductible contributions to Eta Kappa Nu, it is necessary for the Association to

comply with the IRS 501(c)(3) regulations. Article XVI regarding distribution of funds upon dissolution of the Association was added. It was also required to make modifications to the Preamble of the Constitution to place an emphasis on encouraging excellence in engineering education and eliminate the phrasing in the previous preamble which implied that the purpose of the association was simply to bring members together into closer union with themselves and by association with alumni for their own mutual benefit.

Amendments – The criteria for ratifying future changes and amendments to the constitution has been redefined slightly. Amendments to the new constitution must now be ratified by a three-fourths majority of the active chapters voting. Previous constitutions had specified a three-fourths majority of the chapters was required for ratification.

SUMMARY

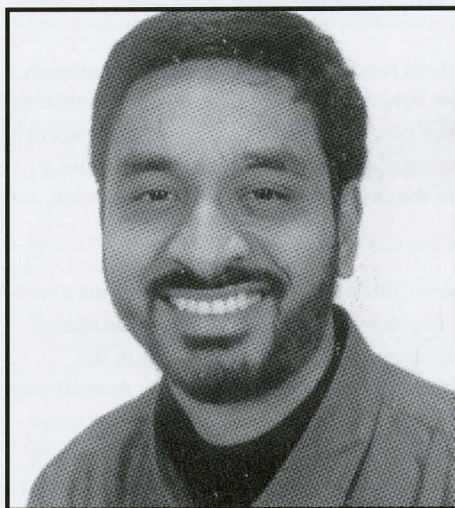
The ratification of the new 2002 HKN constitution represents a very important milestone in improving and modernizing the Association and sets forth a governance model to guide us effectively in the future. This new constitution will aid the Eta Kappa Nu Association in meeting the needs of its members in the 21st century. The constitution defines a strong platform from which to carry on the work of the organization in today's climate. The future may bring about even further changes and refinements to our constitution and governing documents as we continually strive to keep Eta Kappa Nu relevant to the electrical and computer engineering profession and to help it be the premier honor society for electrical and computer engineering that it deserves to be.

A copy of the complete text of the new HKN constitution is included in this issue of the Bridge. A copy of the previous constitution, statutes, and bylaws is available for reference on the HKN website www.hkn.org under Constitution and Bylaws. A copy of the current version of the Bylaws can also be found on the website.

Charter of Constitution and By-Laws Committee

The Constitution and By-Laws Committee will be responsible for continuing examination of the governing documents of the Society and for making recommendations to the Board of Directors for Certificate of Incorporation, Constitution, and By-Laws amendments as needed. The committee will also serve as an interpreter of the Certificate of Incorporation, Constitution, and By-Laws and make recommendations to the Board regarding amendments, which will make them consistent with desired practice, bring them up-to-date regarding language, or to clarify items of contradiction or ambiguity.

OUTSTANDING Young Electrical Engineer AWARDS



Kumar Ramaswamy

Winner of 2000 Eta Kappa Nu OYEE Award

BY VIRTUE OF HIS OUTSTANDING TECHNICAL CONTRIBUTIONS
AND TEAM LEADERSHIP IN DEVELOPMENT OF DIGITAL
COMMUNICATIONS PRODUCTS AND FOR ACTIONS THAT
EMBODY HIS CONVICTIONS TO HELP OTHERS.

Eta Kappa Nu held its spring awards banquet on April 29, 2001 in Princeton, NJ to honor the 2000 Outstanding Young Electrical Engineer recipients, the 2001 Karapetoff Technical Achievement award recipient, and the induction of several new eminent members.

Kumar Ramaswamy was previously named as honorable mention in the 1999 OYEE awards. Dr. Ramaswamy is currently General Manager, Corporate Research, Thomson Multimedia (TMM) Inc., in Princeton, New Jersey. Kumar joined Thomson after his Ph.D. and contributed to the Digital Satellite project (DSS/DirectTV) by developing a communication link integrated circuit for satellite reception, which has become a core element in over seven million of Thomson's DBS receivers.

Kumar continued IC development work on a mixed signal link IC with integrated A/D and D/A which introduced digital sample rate conversion. He defined the link layer specification for a generation of Multichannel Multipoint Distribution System (MMDS), and led a team on a Fiber to the Curb (FTTC)

and Digital Subscriber Loop (DSL) system development. Based on his work, TMM has created a new competitive local exchange carrier (CLEC) business entity called HomeFront DSL where Kumar is CTO.

Over the past two years he has had responsibility for the global coordination of Thomson's Digital Home Networking (DHN) activities. Since the summer of 2000, he has been involved in building a new research laboratory for Thomson in Princeton, of which he is General Manager, whose mission is to develop mobile multimedia technology.

Dr. Ramaswamy has co-authored numerous articles in professional journals, presented several conference papers and presented invited tutorial sessions at the International Conference on Consumer Electronics. He has nine granted US patents, and over thirty-five are pending.

Ramaswamy was born in Cuddalore, India in 1965 and received his Baccalaureate Degree with Honors in Electronics and Communication Engineering from the Regional Engineering College in Tiruchirapalli, India in 1986. He earned his MSEE in 1988 from Vanderbilt University and a Masters in Mathematics in 1992 and a Ph.D. in Computer Systems Engineering in 1993 from RPI. At RPI, he was elected president of the student chapter of IEEE Communications Society and was honored with the "Best Teaching Assistant" and "Master Teaching Fellow" awards.

Kumar is an ardent reader and enjoys Indian classical music. He has volunteered for the Veteran Administration Hospital as a nurse's aide and delivered food and clothing for the Salvation Army. In 1996, he co-founded a local chapter of Asha for Education ("Asha" is the Indian word for Hope), an organization established to promote primary education in India. He served as president of the chapter in 1998, and despite business demands, continues to be actively involved in all of Asha's activities.



HKN President
Mohammad
Shahidehpour
displays the OYEE
bowl with OYEE
winner Kumar
Ramaswamy.
The bowl is
engraved with
all past winners.

OYEE Honorable Mention

Teresa L. Olson, By virtue of her outstanding technical contributions to image processing techniques for defense and medical applications, for fostering interest in engineering among youth, and for her accomplishments as an artist.

Dr. Olson is a Senior Staff Engineer at Lockheed Martin Missile and Fire Control (LMMFC). She received her BSEE Magna Cum Laude from Wright State University and her Ph.D. from Pennsylvania State University in 1994.

Dr. Olson currently manages a team of engineers concentrating on image-based automatic target recognition (ATR) and tracker algorithm development. Her original contributions to the algorithms used by the team include the ability to differentiate a target from clutter and to "see" a missile and its target simultaneously. She has worked on registration techniques for LANDSAT imagery, global change detection using wavelet transforms, microcalcification detection in mammograms, electroencephalograph (EEG) classification, and ATR for underwater sonar. She has published over 25 papers and has one filed patent and four disclosures in progress. In 2000, she was a recipient of the Lockheed Martin Apex Award in recognition for her extremely significant individual technical contribution to the company.

Outside the company, she has served as session chair for SPIE's Wavelet Application Session, and as a reviewer for IEEE Transactions on Image Processing, Signal Processing and Biomedical Engineering. She mentors female students in an effort to encourage them to pursue mathematics, science or engineering careers in one of the most challenging middle schools in Florida. She is an accomplished artist in charcoal and pencil drawings and an amateur photographer.

2000 OYEE Finalists:

Isaac Chung
Michael W. Hansen
Christopher W. Hickman

The OYEE Award

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

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

Since 1936, 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

John Henderson
Mohammad Shahidehpour
Joel B. Snyder
Robert P. Slegelmilch
Arun Phadke
Kevin Carswell

2001 VLADIMIR KARAPETOFF AWARD



C. Gordon Bell (left) receives award from President Shahidehpour

Chester Gordon Bell is the winner of the Vladimir Karapetoff Award for Career Technical Achievement for the year 2001. He receives this major award of Eta Kappa Nu for his research and development in the computer industry.

Bell earned his BSEE and MSEE from the Massachusetts Institute of Technology (1956, 1957) and was subsequently a Fulbright Scholar (1957-58). Worcester Polytechnic Institute awarded him an honorary doctorate of Engineering in 1993. He got an early exposure to technology when, in high school, he worked in his father's electric

appliance and contracting business and became an electrician. At MIT, he was an engineering co-op student with General Electric and American Electric Power. Returning from the Fulbright, he joined MIT's Speech Research Laboratory, and wrote the first speech analysis-by-synthesis program.

In 1960, joining the Digital Equipment corporation, he directed the development of the first minicomputer (PDP-5) and served as architect, designer, and project leader for the PDP-6, the first commercial time-shared computer. In 1966 he became a professor of electrical and computer engineering at Carnegie Mellon University. He wrote *Computer Structures*, with Allen Newell, that posited notations for describing and analyzing computers. Returning to DEC in 1972 as vice president of research and development, he led the development of VAX computer architecture that was introduced in 1978.

In 1983 he founded Encore Computer Corporation, and developed architectures for one of the first multiple microprocessor computers – architectures that were subsequently adopted by all computer manufacturers. Bell served as the founding Assistant Director in the National Science Foundation Directorate for Computer Information Science and Engineering. He also led the cross-agency group that proposed the National Research and Education Network that became Internet. He was a founder of Startent Computer in 1987, where the first graphics supercomputer was developed.

Bell is currently a senior researcher at Microsoft's Bay Area Research Center and an advisor to and investor in high tech startups. He is also co-inventor of the Bell-Mason Diagnostics model for understanding high tech ventures, and a director of the Bell-Mason Group. His book *High Tech Ventures* (1991) describes the basis for successful startups.

He is a member of the National Academy of Engineering, the American Academy of Arts and Sciences, and a Fellow of the IEEE. In 1991, he received the National Medal of Technology. He has been awarded the ACM-IEEE Eckert-Mauchley Award, the IEEE's Computer Pioneer and McDowell Awards, and the IEEE Von Neumann Medal. He was a founder of the Computer Museum, Boston, that was to become the Computer History Museum, Moffett Field, California. Bell was elected to Eta Kappa Nu as an undergraduate at MIT in 1955.



The Vladimir Karapetoff Outstanding Technical Achievement Award

This major Eta Kappa Nu award for career technical achievement is made annually to an electrical engineering practitioner who has distinguished him 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.

2001 AWARD JURY

William F. Aspray
Jerrier A. Haddad
Donald R. Scifres

INDUSTRY SPOTLIGHT

Utilities Prepare for Engineer Shortage

by Deirdre Rafferty Cullen, PE, ©A '87

In 1995, the move to cut the power engineering degree might have made sense. It was a "low completer" program (had few graduates). But, a year after University of Louisiana at Lafayette (UL Lafayette) graduated its last power engineer the Federal Energy Regulatory Commission (FERC) kicked off wholesale competition in the electric power industry. Today, the area covered by Louisiana and its three bordering states is the most popular region in the U.S. to build a power plant.

The Louisiana Board of Regents based its decision on past production rather than future need. It didn't foresee that closing down the power engineering option was equivalent to cutting a link in the supply chain of what would soon become one of the area's most scarce technical resources. And this is just one reason there is a growing nationwide shortage of power engineers.

DEGREES DOWN

From 1988 to 1998, the number of all bachelor degrees awarded in the US rose by 20%. During the same period, the number of bachelor degrees in engineering fell by 19.5%, according to the American Association of Engineering Societies.

It is not only the students that are disappearing. There is also a downward trend in the availability of power professors and power courses. Thus, an increase in the supply of new electrical engineering (EE) graduates who have been exposed to power studies over the next few years appears unlikely.

MAJOR/JOB COMPETITION INCREASES

As UL Lafayette was training its last thirty power engineers, it was also educating students who chose competing specialties: 160 in computer engineering, 140 in telecom, and 80 in the basic EE curriculums. The glamour, high salaries, and good signing bonuses offered by the computer, dot-com, telecom, and software engineering fields pulled potential power engineers in these other directions.

Power engineers constitute a declining percentage of a declining percentage of engineering graduates, making the decline in power engineering students even more acute. Furthermore, utilities compete with power equipment and power systems suppliers, and with consulting engineering firms for engineers that have chosen a career in power.

FERC Orders 888 and 889 issued in 1996 lead to surges in reservations of transmission line capacity by power producers and marketers and requests to utilities for engineering studies to connect new generators to the grids, and in actual construction. The amplitude of demand for engineers to serve the wholesale

market has intensified due to the rapid turn-around expected by FERC and demanded by all potential power producers.

Companies involved in wholesale electricity sales and commodity trading are new customers in the market for talent and create additional demands for power engineers. Many such companies need engineers who understand the technical and pricing issues related to constraints on transmission systems.

A SOLUTION FOR RETIREMENT

Time is compounding the shortage. Some established utilities face the impending retirement of an unusually large percentage of experienced engineers.

At Entergy Services, the Transmission organization recognizes and is addressing this issue. Brian Gary, human resource representative, explains, "We also looked closely at specialized knowledge among our expert employees and factored into our staffing plan a prudent estimate of the turnover time that Entergy would need to transfer that knowledge." With this information, Entergy has been actively hiring and training engineers—not necessarily because they are needed right now. But, so they will be ready when they are needed.

And, Entergy has another card up its sleeve. Parviz Rastgoufard, Chair of Tulane University's Department of Electrical Engineering and Computer Science and holder of the Entergy Chair in Electric Power Engineering studies says to attract students to power engineering—focus on the faculty and students. He has found that the endowed chair at Tulane provides a high profile for power engineering and for the company.

When asked what other steps would be most effective in drawing students to utilities, Rastgoufard shares, "Named scholarships from the utilities requiring some power courses would be a very effective way for companies to attract students. The funds and the prestige of being chosen for one of the scholarships are very attractive to students. Students and certain faculty will be involved with the needs of sponsoring companies and such companies achieve a very high profile at the universities."

Overall, what does the future hold for U.S. utilities? It is likely that companies will have to change current hiring practices, begin offering aggressive salaries that beat the competition's offers, and offer salaries for advanced degrees that communicate appreciation for advanced study.

Deirdre Rafferty Cullen has an MBA and PE in electrical engineering and is twice a graduate of Tulane University. Employed by Entergy Services, Inc. as Manager, Regulatory Affairs Support, Fossil Operations & Transmission.

HKN OFFICERS AND DIRECTORS

THOMAS L. ROTHWELL—NATIONAL PRESIDENT

Thomas Rothwell most recently held the position of Group Vice President and Division Manager at Hughes Aircraft Company until his retirement in 1992. Mr. Rothwell served in the US Air Force from 1946-1949 and during the Korean War from 1950-1952. He received his BEEE (Cum Laude) in 1955 and the MSEE degree in 1959 from USC.

Mr. Rothwell is a member of Eta Kappa Nu, Tau Beta Pi and IEEE. He attended the Fall 1954 HKN 50th Anniversary Assembled Convention. Tom joined the Los Angeles HKN Alumni Chapter and currently serves as President. As alumni chapter VP, he was the originator of HKN's Outstanding EE Student Award Program and currently serves as secretary of the OEES award committee. Mr. Rothwell served as HKN National Director from 1963 to 1966. In 2000, HKN and the Association of College Honor Societies recognized Mr. Rothwell as one of the top five individuals who have made the greatest contributions to the organization. Mr. Rothwell is also active in civic affairs and is emergency communications officer for Los Alamitos, CA and a member of the city's Personnel Appeals Commission since 1984 and its Chairman since 1992. Tom has been active in amateur radio (K6ZT) for 54 years.

ERIC HERZ—NATIONAL VICE PRESIDENT

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

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

The 2002-03 HKN Board of Directors. Front: Paul Smith, Bruce Eisenstein, Eric Herz. Back: Tom Rothwell, Tim Trick, Dave Irwin, Ron Spanke. Not Pictured: Jim Melsa, April Brown, John Choma.



JAMES L. MELSA—PAST PRESIDENT

Dr. James L. Melsa is currently Dean of the College of Engineering and Professor of Electrical and Computer Engineering at Iowa State University. He has previously held positions as Vice President and General Manager, Data Communications Division, Vice President of Strategic Planning and Advanced Technology, and Vice President of Research for Tellabs. Dr. Melsa received his BSEE degree from Iowa State University 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 Electrical Engineering at the University of Notre Dame. He has published over one hundred papers and has authored or co-authored ten books.

Dr. Melsa is a member of Eta Kappa Nu, Tau Beta Pi, Pi Mu Epsilon, Phi Kappa Phi, and Sigma Xi. He has served as the West-Central Region Director on the HKN National Board from 1997-1999 and as national vice president and president from 2000-2002. Dr. Melsa is chair of the HKN Constitution and Bylaws Committee since 1998 and has contributed significantly to the current rewrite of the HKN constitution. Dr. Melsa is a Fellow of the IEEE and received the IEEE Third Millennium Medal.

J. DAVID IRWIN—EAST CENTRAL REGION DIRECTOR

Dr. Irwin received the B.E.E. degree from Auburn University in 1961, and the M.S. and Ph.D. degrees from the University of Tennessee in 1962 and 1967. In 1967, he joined Bell Telephone Laboratories and was made a Supervisor in 1968. He joined Auburn University in 1969 and is currently Professor and Head of the EE department.

Dr. Irwin has served as Education Editor of *Computer* and as Editor of the *IEEE Transactions on Industrial Electronics*. He has served as Chairman of the National Association of EE Department Heads, and is past president of both the IEEE Industrial Electronics Society and the IEEE Education Society and has also served as a member of the Secretary of the Army's Advisory Panel for ROTC Affairs. He is author and co-author of more than 50 publications, papers and presentations including seven textbooks. He is an IEEE Fellow and has received an IEEE Centennial Medal, the IEEE Undergraduate Teaching Award, the IEEE Millennium Medal and the IEEE Richard Emberson Award. He is a member of Sigma Xi, Phi Kappa Phi, Tau Beta Pi, Eta Kappa Nu, Pi Mu Epsilon, and Omicron Delta Kappa.

D. PAUL SMITH—WEST CENTRAL REGION DIRECTOR

Dr. D. Paul Smith is recently retired as the Director of Global Design Technology for Tellabs Operations, Inc., where his responsi-

bilities included software and hardware engineering development methodology and tools and global strategic planning. Prior to joining Tellabs in 1993, Dr. Smith worked for AT&T Bell Laboratories for 25 years. At Bell Labs, he held various management positions in the Switching Systems Division including supervisor and Department Head of various hardware development groups for the 5ESS switching system, Dept Head of 5ESS Software Quality Department, Dept Head of the FOA and Current Engineering functions of the 5ESS System and supervisor of switching system advanced exploratory development.

Dr. Smith received his Masters and PhD from Stanford in 1972 and his BSEE (Cum Laude) from Brigham Young University in 1967. He is a member of the IEEE, and ASQC. He has authored several papers on project management, software quality, and other topics related to quality management.

BRUCE A. EISENSTEIN—EAST REGION DIRECTOR

Dr. Eisenstein was a NASA/ASEE Fellow at Stanford University and the Ames Research Center and a Visiting Research Fellow in Electrical Engineering at Princeton University under the sponsorship of NSF. In 1980 he was appointed Professor and Department Head of Electrical and Computer Engineering at Drexel University and served in that capacity until 1995. He is currently a Professor of Electrical and Computer Engineering and he is organizing the Engineering Entrepreneurial Program at Drexel University. He has published nearly 50 papers in the areas of digital signal processing, pattern recognition, deconvolution, and biomedical engineering.

Dr. Eisenstein was the 2000 president of the IEEE. His other IEEE positions have included Chairman of the Philadelphia Section, IEEE Treasurer, Vice President for Technical Activities, Member of the Board of Directors, and President of the Education Society. Dr. Eisenstein received his BSEE from MIT in 1963, his MSEE from Drexel in 1965, and the PhD.EE from the University of Pennsylvania in 1970. He was the 1976 recipient of the C. Holmes MacDonald Award of Eta Kappa Nu given to the Outstanding Young Electrical Engineering Educator. He is a member of HKN, Tau Beta Pi, Sigma Xi, ASEE, and is a registered professional engineer.

JOHN CHOMA—WEST REGION DIRECTOR

Dr. Choma is Professor of EE at the University of Southern California. Prof. Choma's research interests include wideband analog and high speed digital integrated circuit design, behavioral analysis of electronic systems, integrated device modeling, and engineering education in the circuits and systems areas. Prof. Choma has authored or co-authored 120 journal and conference papers and has contributed several chapters to four edited electronic circuit texts, and he was an area editor of the *IEEE/CRC Press Handbook of Circuits and Filters*.

Choma has served the IEEE Circuits and Systems Society as a member of its Board of Governors, its Vice President for Administration, and its President. He has also been an Associate Editor and Editor-In-Chief of the *IEEE Transactions on Circuits and Systems, Part II*. Prof. Choma is an Associate Editor of the *Journal of Analog Integrated*

Circuits and Signal Processing, and a former Regional Editor of the *Journal of Circuits, Systems, and Computers*. A Fellow of the IEEE, he is the recipient of the 1999 IEEE Circuits and Systems Society Education Award and numerous teaching awards, and he is a Distinguished Lecturer in the IEEE Circuits and Systems Society.

APRIL BROWN—DIRECTOR-AT-LARGE

Dr. April S. Brown is currently the Department Chair of Electrical Engineering at Duke University. Formerly, she was the Petit Professor of Microelectronics at the Georgia Institute of Technology in Atlanta, GA. From 1999-2000, she was Associate Dean in the GIT College of Engineering, and since September 2001, she has served as Executive Assistant to the President. Dr. Brown has worked in industry at HRL Laboratories in Malibu, CA from 1986-1994, with a break, from 1988-1989, as a program manager in the Physics Division at the Army Research Office.

She received her BSEE from North Carolina State University in 1981 and an MS and Ph.D. from Cornell University in Electrical Engineering in 1984 and 1985, respectively. She is author or co-author of over 150 publications and presentations, and was elected Fellow of the IEEE in 1998. She has held numerous editorial and conference leadership positions, and has been actively involved in the IEEE Electron Devices Society and the newly-formed IEEE Nanotechnology Council. She has been involved in numerous activities aimed toward increasing opportunities for women in engineering, and was one of the first chairs of the IEEE Women in Engineering Committee. She is a member of the NSF Advisory Committee for Engineering.

TIM TRICK—DIRECTOR-AT-LARGE

Dr. Trick is currently Professor of Electrical and Computer Engineering at the University of Illinois at Urbana-Champaign and Director of the Anderson Laboratory for Global Education in Engineering. He served as Director of the Sloan Center for Asynchronous Learning Environments from 1995-98, as Head of the Electrical and Computer Engineering Department from 1985-95, and as interim Dean of the College of Engineering in Spring 2001. Dr. Trick has been elected as President of the National Electrical Engineering Department Heads Association, 1994; International Engineering Consortium (IEC) Board of Directors 1989-present; IEEE Board of Directors 1986-89; IEEE Vice-President for Publications 1988-89; and President of the IEEE Circuits and Systems Society 1979.

He was awarded the IEEE Centennial Medal and IEEE Millennium Medal, and the Meritorious Service Award, Van Valkenburg Award for outstanding technical contributions, and Golden Jubilee Medal for extraordinary contributions from the IEEE Circuits and Systems Society. Dr. Trick received the BEE from the University of Dayton in 1961, and the MS and PhD degrees from Purdue University in 1962 and 1966. Dr. Trick is a Fellow of the IEEE, the American Association for the Advancement of Science (AAAS), and the IEC. He is a member of Pi Mu Epsilon, Tau Beta Pi, and Eta Kappa Nu honor societies.

HOMEWORK

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

Current Assignment

1 Additional Complications: Jill wrote a random real number on an index card and a second random real number on a second card. She added these two numbers together and wrote the total on a third card. She continued to add the numbers on the last two cards together to generate the next card until 10 cards had been written. She accidentally dropped the seventh card on the floor and everyone saw that it had 301.6 written on it. Finally, she added up the numbers on all 10 cards. What was her final answer?

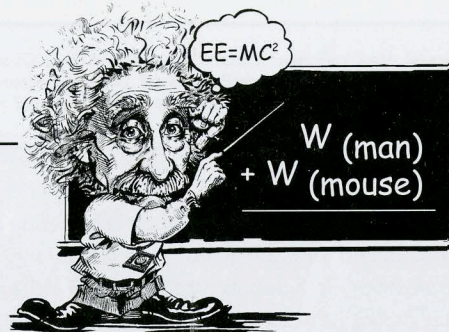
2 Of Mice and Men: Let x be the weight of a man, and y be the weight of a mouse. Let the sum of the two weights be $2z$, then $x + y = 2z$. From this, we can derive two additional equations: $x - 2z = -y$ and $x = -y + 2z$. Multiply these two together and we get $x^2 - 2xz = y^2 - 2yz$. Add z^2 to get $x^2 - 2xz + z^2 = y^2 - 2yz + z^2$ or $(x-z)^2 = (y-z)^2$. Taking the square root of both sides, we get $x-z = y-z$ or simply $x = y$. That is, the weight of the man (x) equals the weight of the mouse (y). What is wrong here?

3 Amateur Radio: Curious little Jimmy tore apart his mom's old AM radio and in the process damaged the tuning capacitor, such that it measured a dead short, and the markings could no longer be read. His brother, a clever EE student, tried to replace the component, but first had to figure out the range (min and max value required). He also couldn't read or test the broken variable capacitor, but was able to discern that the component connected to it was marked 2.39 mH, which allowed him to find a suitable part. What were the min and max capacitor values he looked for?

B Bonus: What is the name of the HKN member that should send in an original homework problem and answer for publication in an upcoming issue of the Bridge? Hint: Look for the clue in the address label block on the front cover.

Answers for Last Assignment

1 Defies Logic: A 2-input combinational logic gate has four possible states, corresponding to its inputs X and Y having values of 00, 01, 10, and 11. This means that the output Z will have four possible values, corresponding to each of the four states. Each type of gate will generate a different set of these output values corresponding to the same input conditions. An AND gate will generate 0001, while an OR gate will generate 0111. Since there are four different binary output values, the number of possible output combinations, and therefore the number of different gate types, is 2^4 or 16, which is the



number of logic gate types that Bob found. Obviously, not all of these possible gate types are in common use.

2 Basic Math: To solve $TEN + TEN + FORTY = SIXTY$, Both N and E must be either 0 or 5 to allow the sums to equal T and Y , but if N were 5 then there would be a carry and $E+E+T$ could not equal T , so N must be 0 and E must be 5. For S to be different from F there must have been a carry of 1 so $S=F+1$. The carry from $T+T+R+1$ (carry) must be 2 since when added to 0, it must generate a carry of 1 and 1 cannot be 0. Therefore, $O=9$ and $I=1$. For $T+T+R+1$ to have a carry of 2, since R cannot be 9 (taken) and X must be >1 (0 and 1 are taken), T must be 7 or 8. If $T=7$, then $R=8$ and $X=3$, but this solution cannot work because it fails to leave two consecutive unclaimed digits for F and S , (only 2, 4, and 6 remain), therefore $T=8$. If $T=8$ then R must be either 6 or 7. If $R=6$ then $X=3$ and again there are not two consecutive digits remaining, so $R=7$ and $X=4$. This leaves two consecutive digits 2 and 3 for F and S so $F=2$ and $S=3$. The only remaining unclaimed digit is 6 so $Y=6$. The solution is then ($I=1, F=2, S=3, X=4, E=5, Y=6, R=7, T=8, O=9, N=0$) or arithmetically, $850+850+29786=31486$.

3 Rhyme or Reason: For One Three Two plus One Two Three to equal Three Two One, we have to think outside of our normal base-10 number system. In this case, we must be operating in base 4. Now that we know that we are in base-4, it is easy to add One Two Three plus Three Two One to get the answer One Zero Zero Zero. Note that an answer of one thousand would have no meaning in a base-4 system.

4 Time to Think Again: The sum of the four process times $a + b + c + d = 1000\mu s$. Since $d = a + b + c + 182\mu s$, then $2a + 2b + 2c + 182 = 1000\mu s$, and $a + b + c = 409\mu s$, giving the process time for the fourth process $d = 591\mu s$. Since $a^2 = bc$, then $\sqrt{bc} + b + c = 409$. Let $b = x^2$, $c = y^2$, and $\sqrt{bc} = xy$. Then $x^2 + xy + y^2 = 409$, therefore $(2x + y)^2 + 3y^2 = 4 \cdot 409$. Let $2x + y = 2X$ and $y = 2Y$, so that $X^2 + 3Y^2 = 409$. Since 409 is prime, $19^2 + 3 \cdot 4^2 = 409$ is a unique solution when values are restricted to integers. Therefore $X=19, Y=4$, giving $x=15, y=8$, so that $b=225, c=64$ and $\sqrt{bc}=120$. The four process times were $225\mu s, 64\mu s, 120\mu s$, and $591\mu s$.

PERFECT SCORES

Several members submitted answers to last issue's homework assignment. Problem 1 proved trickiest, with many members only submitting the logic gates they knew of. Only four members got all four problems correct. Congratulations!

Stan Antosz, A '63, James Fung, Ψ '00,
Joe Long, KΞ '98, Ray Yeung, A '97

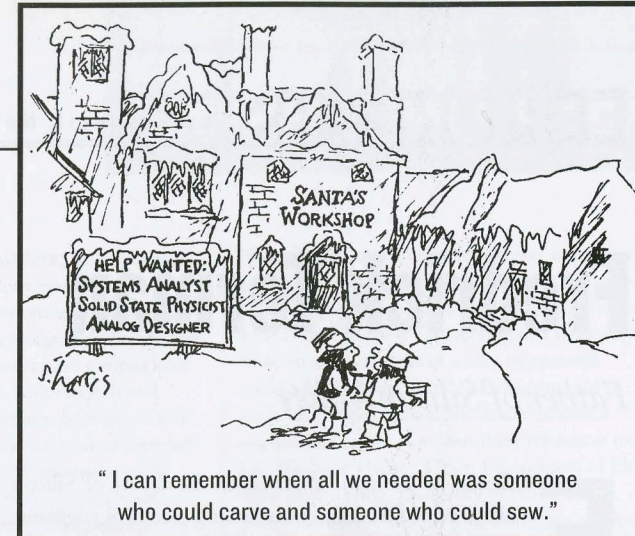
SHORTCIRCUITS

World's Funniest Joke

A large scale statistical study has recently concluded, which has identified the World's Funniest Joke. The LaughLab experiment set up a web-based environment to allow submission of jokes and allow individuals to rate how funny they found the jokes. Over 40,000 jokes were submitted and almost 2 million ratings were received. After a year of collecting responses and careful statistical analysis, LaughLab announced that they have determined the Worlds Funniest Joke, which received higher ratings than any other submission.... and here it is...

A couple of New Jersey hunters are out in the woods, when one of them falls to the ground. He doesn't seem to be breathing, his eyes are rolled back in his head. The other guy whips out his cell phone and calls the emergency services. He gasps to the operator: "My friend is dead! What can I do?" The operator, in a calm soothing voice says: "Just take it easy. I can help. First let's make sure he's dead." There is a silence, then a shot is heard. The guy's voice comes back on the line. He says "OK, now what?"

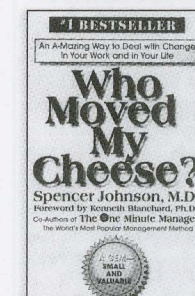
The winning joke was submitted by Gurpal Gosall from Manchester, UK. In an interview with LaughLab he commented: "I like the joke as it makes people feel better, because it reminds them that



there is always someone out there who is doing something more stupid than themselves." LaughLab was created by Dr. Richard Wiseman (University of Hertfordshire) in collaboration with the British Association for the Advancement of Science. More info on the LaughLab project and other runner-up jokes can be found at the laughlab.co.uk website

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

BOOK REVIEW A Nibble of Advice



WHO MOVED MY CHEESE?

By Spencer Johnson, M.D.
Hardcover, 94pp.
ISBN: 0399144463
1998 Putnam Publishing Group

A recent search of a quote database returned 873 quotes that included the word "change". These go back to Greek philosopher Heraclitus ("Change alone is unchanging.") to 20th Century authors such as Isaac Asimov ("It is change, continuing change, inevitable change, that is the dominant factor in society today. No sensible decision can be made any longer without taking into account not only the world as it is, but the world as it will be... This, in turn, means that our statesmen, our businessmen, our everyman must take on a science fictional way of thinking."). The common theme of all of these quotes seems to be that change happens and most do not deal with it very well.

Adding to this long list of insight is Spencer Johnson's book, *Who Moved My Cheese?* This 94-page, large-font book can be read in an hour, but can consume much more time as you ponder its advice. Many have done this, as over 10 million copies have been sold. The book has consistently been on various business bestseller lists since it was published in 1998. Why is this book so popular? For one, many

large organizations – businesses, colleges, governments – have used this book as the guide for training programs to help people deal with change. Also available for group training are videos, slide presentations, and interactive exercises.

So what is the message? What is the advice? Well the heart of the book is a story with four characters—two mice named Sniff and Scurry, and two "littlepeople" named Hem and Haw. The tale recounts their adventures in a maze, and yes, there is cheese. As the title alludes, the cheese does not stay put. How each of these four characters prepares for and reacts to this life-altering event provides examples that the reader can benefit from. When the characters learn from their experience, they write on the walls of the maze their findings, and this leads to seven items that make up the "Handwriting on the Wall". All of them include the word "change". To whet your appetite, the first two are "Change Happens—They Keep Moving the Cheese" and "Anticipate Change—Get Ready For the Cheese to Move".

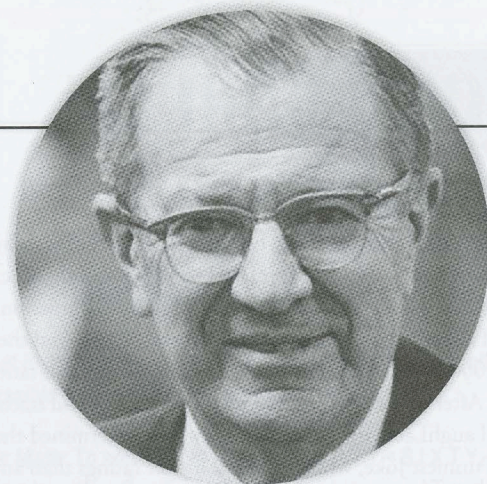
The advice presented by Dr. Johnson is particularly timely, given the changes that are occurring in the electrical and computer engineering fields. As engineers, adjusting to technical and business changes is vital for long-term accomplishment.

— Review by Michael R. Dedic, P.E., Δ '86

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

Fredrick Terman

Father of Silicon Valley



Frederick E. Terman, often called the father of Silicon Valley, helped build an outstanding electrical engineering program at Stanford University and fostered cooperation between academia and industry. He was born on 7 June 1900 in English, Indiana. In 1912 the family moved to California, when his father, the psychologist Lewis M. Terman, became professor at Stanford. Frederick Terman studied both chemical and electrical engineering at Stanford, then went to the Massachusetts Institute of Technology where he worked with Vannevar Bush (also an Eta Kappa Nu Eminent Member) and in 1924 received a doctorate in electrical engineering. The same year Terman contracted tuberculosis, and the disease nearly claimed his life. After a year of convalescence, he accepted a teaching position at Stanford.

ENGINEERING EDUCATOR

Terman was most interested in radio, and he introduced a course in radio engineering, something that few universities offered at that time. He himself made numerous contributions to the radio art, both in practical circuits and in scientific understanding of the technology. In 1932 he published *Radio Engineering*, an advanced text that taught how to calculate the performance of radio circuits "with the same certainty and accuracy that the performance of other types of electrical equipment, such as transformers, motors, and transmission lines, is analyzed." Distinguishing this book from others was Terman's constant concern for the user's needs: he included mathematical analysis only when it was useful for the practicing engineer, and he kept in touch with industry so that the design information he presented accorded with current practice. There was also a good deal of original material from Terman's own research. The result was a textbook that was adopted by universities in many countries (in the English version and several translations) and went through four editions, the last in 1955.

Terman wrote two other highly influential books on radio. *Measurements in Radio Engineering* (1935) focused on the apparatus and methods of measurement, and a subsequent, much enlarged edition, entitled *Electronic Measurements* (1952), had great impact on an even wider field. *Radio Engineers' Handbook* (1943) became the vade mecum for a generation of practicing radio engineers. Terman contributed much of the royalties from

his highly successful books to the engineering program at Stanford. In 1946 he became dean of engineering, and from 1955 to 1965 he served as provost of the university.

WARTIME WORK

Even before war broke out in 1939, engineers and scientists in several countries worked feverishly to develop the new technology of radar that came to play several vital roles in the war, including reconnaissance, early warning, fire-control, and navigation. In the United States, much of the work of radar-system design took place at the Radiation Laboratory at MIT. Slightly up the Charles River, at Harvard, the Radio Research Lab (RRL) was

formed to develop countermeasures to enemy radar systems. Terman was named as director of RRL, which developed jamming devices (both passive and electronic), search receivers, and many other countermeasures. The staff at RRL,

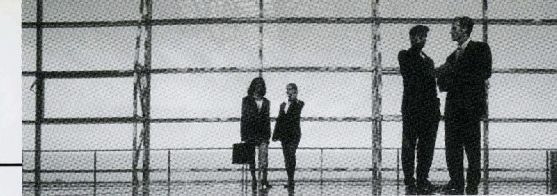
which numbered more than 800 by war's end, included many of the country's leading engineers and physicists.

Terman's work at RRL involved constant cooperation with industry, but this was not new to Terman. His doctoral research had been partly sponsored by Raytheon, and already as an instructor at Stanford he had formed ties to industry. He recommended that students gain practical experience in industry, and in 1939 he encouraged two of his students, Bill Hewlett and David Packard, to go into business for themselves. He secured funding from industry and the government for many research projects at Stanford, he supported the establishment of companies near Stanford that could benefit from the proximity of the university (Varian Associates, set up in 1948, is an early example), and he played a large role in setting up the Stanford Industrial Park in 1951.

Terman married in 1928 and had three sons. In 1950 he received the Medal of Honor of the Institute of Radio Engineers (which in 1963 merged with the American Institute of Electrical Engineers to form the IEEE). In 1951 he was named Eta Kappa Nu Eminent Member, and he was a founding member of the National Academy of Engineering. Terman died on 19 December 1982.

Radio Engineer's Handbook (1943) became the vade mecum for a generation of practicing radio engineers.

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ACADEMIA

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Nano Science and Technology serves as an incubator for interdisciplinary research across departmental and college boundaries. Applicants should have a Ph.D. in Electrical Engineering or a related field. Women and members of under-represented minority groups are particularly encouraged to apply. Interested individuals should submit a resume and names of at least three references to: Dr. Yih-Fang Huang, Chair, Department of Electrical Engineering, University of Notre Dame, Notre Dame, IN 46556. The University of Notre Dame is an equal opportunity employer that affirms the values and goals of diversity.

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