THE BRIDGE

The Magazine of IEEE-Eta Kappa Nu

IEEE-Eta Kappa Nu

HKN

BEYOND ENGINEERING

Atypical careers for and contributions by engineers.

◆IEEE

IEEE-HKN AWARDS PROGRAM

As the Honor Society of IEEE, IEEE-Eta Kappa Nu provides opportunities to promote and encourage outstanding students, educators and members.

Visit our new website to view the awards programs, awards committees, list of past winners, nomination criteria and deadlines.

ALTON B. ZERBY AND CARL T. KOERNER OUTSTANDING STUDENT AWARD (OSA)

Presented annually to a senior who has proven outstanding scholastic excellence and high moral character, and has demonstrated exemplary service to classmates, university, community, and country.
(Deadline: 30 June)

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Presented annually to electrical engineering professors who have demonstrated, early in their careers, special dedication and creativity in their teaching, as well as a balance between pressure for research and publications.
(Deadline: Monday after 30 April)

DISTINGUISHED SERVICE AWARD

Recognizes members who have devoted years of service and lifetime contributions to Eta Kappa Nu (or IEEE-HKN), resulting in significant benefits to all of the Society's members.
(Deadline: Monday after 30 April)

OUTSTANDING CHAPTER AWARD (OCA)

Recognizes chapters for excellence in activities and service at the department, university and community levels. The award is based on the content contained in their Annual Chapter Report for the preceding academic year.
(Deadline: Monday after 30 September)

OUTSTANDING YOUNG PROFESSIONAL AWARD (OYP)

Presented annually to an exceptional young engineer who has demonstrated significant contributions early in their professional career.
(Deadline: Monday after 30 April)

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Presented annually to a practitioner in the IEEE technical fields of interest who has distinguished himself or herself through an invention, development or innovation that has had worldwide impact.
(Deadline: Monday after 30 April)

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THE BRIDGE
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2020 ISSUE 2 | BEYOND ENGINEERING: Atypical careers for and contributions by engineers.

The Bridge, May 2020
Letter from the Editors-in-Chief

Dr. Sahra Sedigh Sarvestani
Beta Chapter

Dr. Steve E. Watkins
Gamma Theta Chapter

Dear Eta Kappa Nu Members and Friends,

The theme of this issue is "Beyond Engineering," and it aims to highlight careers for and contributions by engineers who ventured outside the boundaries of what is typically associated with engineering. The COVID-19 pandemic makes this theme especially timely. Engineers of all stripes are playing a critical role in mitigating the crisis—from modeling contagion to rapid prototyping of personal protective equipment and infection testing devices. Social distancing measures have led to online teaching, learning, socializing, and even medical examinations. The technology enabling this transition is an obvious example of direct and tangible contributions made by engineers.

In our first feature article, Mr. Russ Harrison, the Director of IEEE-USA Government Relations, describes other ways in which engineers can change the world. It serves as an engaging and enlightening reminder of how engineering expertise can serve as the foundation for leadership and prominence in the crafting of public policy, legislation, and international standards. In each of these activities, an engineer can be tasked with charting the course for developing new technologies and understanding associated constraints. Our student profile introduces Mr. Mike Lau, a young engineer whose education in electrical engineering is complemented by political science.

Our second feature article discusses intellectual property—an aspect of engineering careers that individual engineers often overlook, at our own peril. Mr. Orin E. Laney, the owner of Atwood Research and former member and chair of the IEEE-USA Intellectual Property Committee, writes from first-hand experience, as he underscores the importance of understanding and striving for fairness in intellectual property clauses in employment agreements.

Outstanding exemplars of "engineering society" are found in the Eminent Member category of IEEE-HKN, who are by definition "great benefactors of their fellow men." This issue's history spotlight describes this designation within IEEE-HKN. See the IEEE-HKN website for the full list of these remarkable engineers.

Reading about excellence is an inspiring antidote to the gloom that can accompany these challenging days. We hope you share the joy that we take in honoring excellence as you read about the winners of our Senior Design Poster Competition, Outstanding Chapter Awards, and Outstanding Student Award.

We wish each of you health, fortitude, and resilience and look forward to the brighter days that are certain to follow. Enjoy this issue!

IEEE-HKN Pivots to Online Programming and Resources to Support Members and Chapters

As closures, quarantines, and online university classes became the norm, IEEE-Eta Kappa Nu quickly delivered resources for its Chapters ensuring those who earned membership in HKN could still take part in the Honor Society's rituals and events even though they may not be able to meet in-person.

A page was added to our website to inform our members of resources, recommendations and virtual options for Chapter operations and member experiences. We created a Remote Induction Ceremony that holds fast to the Induction Ritual that has been in use since 1904.

A tutoring initiative and ideas for community service and social event opportunities are helping Chapter members stay connected with one another and their communities. The worldwide IEEE-HKN Tetris Tournament has proven quite successful in bringing the global HKN community together; as has a series of web-based workshops led by industry and academic leaders that are free and open to all HKN members worldwide.

HKN will hold an Online Graduation Celebration honoring the members of the Class of 2020, many of whom will not have on-campus Commencement Ceremonies. All graduating seniors and their families will be invited to participate in the ceremony on 30 May, which will feature a Commencement Address

from Dr. Henry Samueli, an HKN Eminent Member and the Chairman of Broadcom Inc.

Our HKN family is strong and supportive, and we thank you for being a part of it. Our resources are impacted by the protective measures currently in place. If you would like to make a donation to support HKN and our Chapters, please visit HKN's donation page (organized through the IEEE Foundation) and choose the Operational Fund from the drop-down menu.
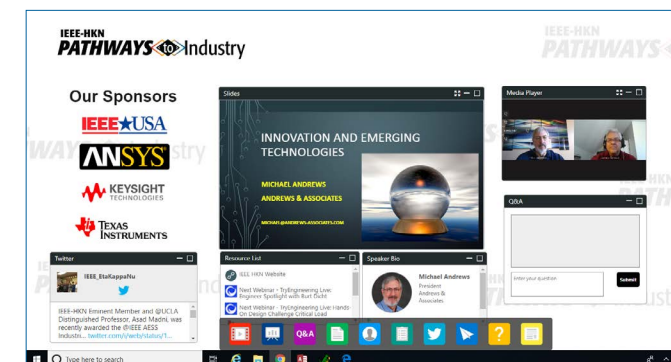
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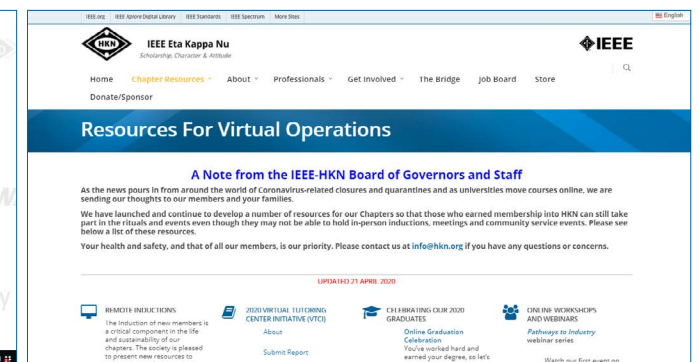
Virtual Operations Webpage

HKN Chapters Meet the Challenges of COVID-19 with Technology and Ingenuity

HKN students worldwide rapidly shifted gears to meet the needs of their members during this unprecedented crisis. They scheduled online meetings, held virtual social events, asked for resources to complete community service projects and are inducting new members using the new Remote Induction Ceremony deployed by headquarters in early April.

Our students are living up to the values that define all HKN inductees: Scholarship, Character and Attitude. The leadership experience and professional development skills they gain by being members and officers of HKN Chapters have served them well as they navigate the new waters in which the world finds itself. We are proud to share with you a few of the many innovative programs our Chapters have developed to maintain the HKN community and live up to their commitment.

The Mu Nu Chapter at Politecnico di Torino (Turin, Italy) moved operations online quickly when the Italian Government imposed a nationwide lockdown. Not being able to have weekly chapter meetings, the Chapter switched to virtual meetings on Webex, setting the example for US Chapters, many of which would soon find themselves in the same position. Mu Nu used the meetings to discuss further steps they took and how to get the most interaction during these difficult times. Last but not least, they used some of the meeting time to have fun together. The officers held a trivia game hosted on Kahoot, so new members could learn, in a fun way, a little bit about HKN and Mu Nu Chapter history. The members appreciated the idea, which proved to be fun and a fairly easy team-building activity.

The Beta Eta Chapter at North Carolina State University (Raleigh, USA) developed programs to continue its popular tutoring sessions and to inform underclassmen about IEEE-HKN and all the benefits society membership offers. First, HKN Beta Eta moved its tutoring sessions online. Thanks to Zoom, the Chapter has been able to keep its twice-weekly tutoring sessions going for the entire 8-week period it was scheduled to run. By having a master Zoom meeting with individual breakout rooms for different classes, all students in 100- and 200-level ECE courses received much needed help in these difficult times. According to the Chapter's activity report: "Although it was very difficult to switch tutoring to a virtual event, the students who are attending don't have many other resources that

can help them. This makes HKN Beta Eta much more important for the university now than it ever has been." About 70 students were helped. Beta Eta held an "HKN Casual Sophomore Workshop," using Zoom. Upperclassmen presented slides on their specialty area of study within the ECE department to underclassmen who are interested in ECE or have just matriculated into the department. Presenters gave an in-depth description of classes from their own personal experiences, offering an honest look at the department and future job and academic opportunities for ECE students.

The Mu Chapter at the University of California (Berkeley, USA) moved its student-led, one-credit course online as most courses at Berkeley transitioned rapidly to an online lecture format. Almost all students registered for the in-person class tuned in, remained engaged, and asked questions, over voice and through chat. The class is administered by seven members of the Mu Chapter and is intended to provide an overview of the different paths and specializations within the EE/CS department and inform students' course selections in future semesters. The biggest challenge faced was adapting the interactive component. Members addressed this in two ways: first, committee members are active in live chat during class so individual questions can be answered without interrupting the presenter's flow. Second, members adapted interactive components of the class to distance learning, either by providing "soft labs" (for example, simulation-based activities), or by doing live demonstrations. As an example of the latter, the Chapter used a simulation program for an activity on digital circuits that runs on a legacy version of Java, which some students could not run on their personal computers. In the absence of having campus computers available to run the simulation, one member set up the program ahead of time and did a live demo of the activity, pausing to encourage student feedback. The course is typically graded based on a combination of attendance and short written assignments. Standards of grading have been maintained, but in light of the consequences of campus closure, the Chapter opted for more leniency in grading. The Chapter has granted extensions or excused absences on a case-by-case basis. Fortunately, this has not been affecting student engagement: attendance has been consistently good, and the quality of written assignments is excellent, according to one of the facilitators. ◈
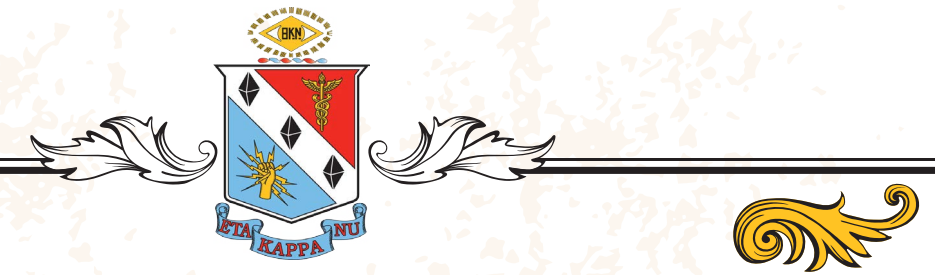
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Saturday, 30 May 2020 ◈ 2 p.m. (EDT)

COMMENCEMENT REMARKS TO BE GIVEN BY

Dr. Henry Samueli, Iota Gamma Chapter
Co-founder of Broadcom Corporation, Chairman of the Board of Broadcom Inc.,
Marconi Society Prize and Fellowship Winner and HKN Eminent Member

Graduates, we ask that you submit a photo of yourself so that you can be a part of the Virtual Graduation Procession.
PHOTOS ARE DUE BY 20 MAY 2020.

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PUBLIC POLICY:
A Different Way to Change the World

Russ Harrison

Why did you decide to become an engineer? Was it to change the world, or perhaps just to create something tangible to make the world a better place? Both are noble goals, and common among engineering students who dream of designing life-saving medical devices, building robots for Mars or programing the first truly autonomous vehicle.

But creating things isn't the only way that engineers can change the world. The reality is that new medical devices, Mars rovers and self-driving cars require more than just technology and computer programs. These innovations will also require changes to our nation's laws and regulations. In fact, the more genuinely innovative a product is, the more laws usually need to be changed to accommodate it.

Someone has to draft those accommodating laws. That someone could be (and frequently should be) an engineer.

Take autonomous vehicles. Currently, U.S. laws (and the laws in every other country I am aware of) require that a human driver be in control of the car at all times. The laws just assume this, which means the laws effectively prohibit vehicles being driven by a computer.

Current law also fails to clarify who is responsible when an autonomous vehicle gets into an accident. (This is America after all—we always need to know whom to sue!)

No matter how well-engineered your autonomous vehicle is, no matter how easy it is to drive or how much it improves safety, nobody is going to drive it on public roads until our traffic and liability laws are updated. That is the work of Congress, state legislature, and agencies such as the National Highway Traffic Safety Administration (NHTSA).

And within each of those organizations (yes, even Congress) are engineers, programmers and other technology professionals putting their skills to work crafting the policies needed to allow other engineers, programmers and technology professionals to innovate.

Take the National Institute of Standards and Technology (NIST). It is one of the world's premier measurement and standards organizations. Among many, many other things, NIST's work was crucial for the development of the atomic clock, earthquake-proof buildings, and the smart grid. Back in 1959, NIST even proved that curveballs actually curve. Today, NIST plays a central role helping the U.S. government coordinate its cybersecurity efforts, develop AI, and build quantum computers.

Dr. Walter Copan

NIST is usually not led by a lawyer, but rather a scientist or engineer. The current Director, Dr. Walter Copan, has a Ph.D. in Chemistry. Engineers and other technology professionals can be found throughout the organization. Past IEEE-USA and IEEE President Gordon Day spent most of his career at NIST, where he founded and ran its Optoelectronics Division. Other IEEE members can be found in most departments doing cutting edge work for the country.

Some of these experts are engineers and scientists doing work that is not that dissimilar to work done at corporations or universities. But others are administrators, directors and other policymakers. Rather than doing the research, these engineers decide what research will get done, and how. Their role in the innovation process is every bit as important as the folks doing the research—and the process works better if the policymakers understand the science and engineering behind the projects they are leading.

"Policy" are the rules that determine how society functions. They include laws and regulations, but also less formal rules such as guidelines, procedures and administrative actions. The men and women who develop and implement policy play an enormous role in deciding how technological innovation will happen, even if they do not develop the technology itself.

Doing this properly—crafting the rules that govern how technology can be used, built, sold or developed—can be done by people who don't understand technology, but that is often a bad idea. Lawyers and accountants are, of course, important, but we need people who understand technology to understand how society should, can, and will use technology. The country needs people with technical backgrounds to peer into the future, see how technology could develop, recognize institutional or legal obstacles preventing that development, and then creatively create paths around those obstacles.

Actually, lawyers are really good at this last step, but engineers are better at all the rest.

In the early 1980s we had a great example of what a talented engineer can do in the policy world.

In 1985 the Federal Communication Commission (FCC) adopted new rules for spread spectrum modulation, allowing unlicensed users access to three chunks of electromagnetic spectrum. This decision sparked development of new short-range systems for data transmission that did not need to ask the FCC for detailed review before commercial introduction. Ultimately it resulted in Wi-Fi, Bluetooth technologies, and hundreds of billions of dollars in economic activity.

None of these technologies existed in 1985, and may not have ever existed had the FCC not made this policy change.

> The country needs people with technical backgrounds to peer into the future, see how technology could develop, recognize institutional or legal obstacles preventing that development, and then creatively create paths around those obstacles.
>
> RUSS HARRISON

It is not surprising that the person within the FCC who realized the promise of emerging wireless technology is an engineer, IEEE Fellow Dr. Mike Marcus. Many of the lawyers and bureaucrats at the FCC could not see the promise of a technology that did not yet exist. But an engineer could—and did.

Almost every federal department has a research department. Almost every federal department deals with technology, and the issues involved in deploying it. And, therefore, almost every federal agency needs skilled engineers and technologists who understand technology enough to chart an innovation path forward for the agency.

But perhaps you are thinking bigger than merely running a national lab or government agency. What about Congress, the top policy making body in the United States? Currently there are several engineers in Congress, including Reps. McKinley (R-WV) and Houlahan (D-PA). Congressman Thomas Massey (R-KY) has a bachelor's degree in electrical engineering

and a master's in mechanical engineering from MIT. The American public has become increasingly willing to elect leaders from non-traditional backgrounds, including scientists and engineers, in part because they are so good at solving problems. As one of the most trusted professions in America, engineers may even have an electoral advantage over more traditional political backgrounds.

Once in Congress (or a state legislature or city council), engineers certainly have an advantage as policy makers. An increasingly large number of challenges facing society require an understanding of engineering or science. AI, cybersecurity, crypto currencies, transnational pandemics, and global climate change are difficult to understand, and therefore difficult to manage, without knowing the science and technology behind them.

Moreover, engineers are skilled at building systems. They (you) are good at understanding, not just the component parts of a system, but how those parts fit together. That is important when building a quantum computer, but it is also important when designing a

highway system, or a school system, or a healthcare system. And this is exactly what policy makers do: Create, refine and run complicated societal systems.

Engineering is about more than just creating things. Fundamentally, engineering is about solving problems, and the problems you can solve extend way beyond technology. ◈

Russ Harrison puts his 25 years of experience working on behalf of professional societies, companies and trade associations in Washington, D.C. to work as the Director of Government Relations for IEEE-USA. Over his 18-year career with IEEE-USA, he has represented IEEE members on dozens of policy issues. In addition to directly engaging with policy makers, Russ frequently speaks about public policy and the need for regular citizens to interact with their elected leaders. He has a Master's in Public Management from the University of Maryland and a B.A. in political science from Allegheny College. Russ is a Certified Association Executive (ASAE) and Planning Commissioner (Virginia Tech).

INTELLECTUAL PROPERTY:
What's Mine is Mine and What's Yours is Mine

Orin E. Laney

There are two competing visions of the purpose of intellectual property law. At one pole is the constitutionalist view that intellectual property laws are a tradeoff between the desire of society for such things as inventions, books, and songs, and the general (though not universal) unwillingness of inventors, authors, and musicians to provide them for free. In this conception, creators have rights but we, the people, have ours as well. For instance, U.S. copyright includes a fair use concept that allows partial copying and quoting sans permission, the doctrine of first sale that allows unrestricted use, lending, and resale of legally-purchased copyright-protected products, and free speech rights including criticism and parody.

At the other pole is the industry conception of IP law as a protectionist, mercantilist tool to shield industry business models and revenue streams from disruption. The maximalist version is illustrated by the historical example of 17th century French weavers and button makers:

"The question has come up whether a guild master of the weaving industry should be allowed to try an innovation in his product. The verdict: 'If a cloth weaver intends to process a piece according to his own invention, he must not set it on the loom, but should obtain permission from the judges of the town to employ the number and length of threads that he desires, after the question has been considered by four of the oldest merchants and four of the oldest weavers of the guild.' One can imagine how many suggestions for change were tolerated.

Shortly after the matter of cloth weaving has been disposed of, the button makers' guild raises a cry of outrage; the tailors are beginning to make buttons out of cloth, an unheard-of thing. The government, indignant that an innovation should threaten a settled industry, imposes a fine on the cloth-button makers. But the wardens of the button guild are not yet satisfied. They demand the right to search people's homes and wardrobes and fine and even arrest them on the streets if they are seen wearing these subversive goods."[1]

In our modern, enlightened age, we suppose that we would not tolerate such control, yet we routinely and unblinkingly accept it in the sphere of employment. Creative professionals, including engineers, are nearly

universally required to sign agreements drafted in the privacy of an attorney's office without the benefit of any negotiation with those who will be offered the agreement. Corporate lawyers interpret their jobs as that of protecting the corporation. By training and inclination, they will do this even in areas where they lack insight or expertise. Absent the restraining hand of enlightened C-suite executives, they are natural intellectual property maximalists, blind to adverse effects upon recruiting, employee morale, employee retention, and rate of innovation. Here is an example of what you get:

"The employee agrees: That all inventions and improvements made, developed, perfected, devised, or conceived by the Employee--either solely, or in collaboration with others during the Employee's employment by [corporate name], whether or not during regular working hours, relating to the business, developments, products, or activities of [corporate name], or its subsidiaries, shall be and are the sole and absolute property of [corporate name]; and to disclose promptly in writing to [division name]'s Legal Department, or to such other person as [corporate name] may designate, such inventions and improvements."

This sweeping, open-ended language not only attempts to capture home projects but even claims anything related to work at far-flung subsidiaries of which an employee might be unaware, let alone what work they perform. As we probe into the bowels of the machinery the question is, what are the practical effects of such IP terms in an employment agreement? As the following examples hopefully make clear, they are not without consequence.

Case History: An IBM Software Story

In 1981, IBM entered the personal computer business with the original IBM PC, followed by the XT and later the AT models. The product line was wildly successful for a number of years, and spawned a vibrant aftermarket in third-party hardware and software. IBM's own employees in the Personal Computer Division were in a unique position to understand these products in detail and had the necessary skills to create aftermarket software.

Rather than turning a blind eye to entrepreneurial aspirations or stipulating a right of first refusal, the employment agreement simply forbade employees from independently marketing such creations.

In the face of rising discontent, IBM inaugurated a software submissions program. The essence was that employees could use their own resources to independently create whatever software they wanted and submit it to the company for review. If the submission passed muster, the company itself would market the software in a catalog periodically mailed to registered PC owners, with a share of the proceeds handed back to the employee. Unsurprisingly, submissions varied from masterpieces to botched or trivial efforts that were refused. Royalty rates were reasonable but sales were low. Some felt that IBM marketing had inadequate experience with direct sales.

> My new supervisor walked me through the employment agreement, showing me certain places where he had modified his own agreement. He helped me strike through various things and rewrite mine until it made sense for me. This was certainly not the usual take-it-or-leave-it approach (and the interview process is a story of its own), but it illustrates why this particular company was able to attract the best, and why employee loyalty was extraordinarily high.
>
> ORIN E. LANEY

A larger problem was category saturation. After two or three of the most suitable checkbook balancing programs, directory tree viewers, and disk defragmenters were accepted, it was hard to justify the inclusion of more. There was evidence that employees became discouraged when they saw that

their ideas had already been implemented. A new, superior version could displace an older one, but this was rare. Remaining opportunities required addition of new categories, an increasingly difficult task.

On the whole, except for select individuals, employee dissatisfaction was not reduced. One cynical view was that the program was little more than an executive "shush mechanism" to quell discontent rather than a real business. It became apparent that not only was it ineffective in draining employee resentment, but probably fostered it. The final nail in the coffin was rapidly declining financial results in the face of superior products created by full-time, funded projects at outside companies. Perhaps some of these took their inspiration from the IBM direct sales catalog.

Case History: The Offer That Almost Was

Running a small, high-tech business is like being in a rowboat in the middle of the ocean. One moment you're up at the top of a huge wave and can see the horizon. The next moment the waves loom over you and you feel like you're about to be swallowed. All you can do is keep pulling at the oars.

In 1983, I had to concede that my electronics consultancy was experiencing a temporary cash trough. It was, after all, a time of recession. I decided to seek full-time employment. The plan was to let my business partner (my wife) deal with the quotidian tasks of the business, while I would use evenings and weekends to handle the creative demands.

After some searching, I found a research position at a nearby aerospace company. The work seemed not only financially viable but potentially quite interesting. I submitted an employment application and was invited to an interview which went rather well. Upon their expression of interest in hiring me I asked for copies of whatever documents I would be required to sign upon start of work.

A few days later I received the paperwork. Upon inspection, I discovered that the employment agreement claimed essentially all intellectual property generated during the term of employment. This was problematic, given that I had responsibilities to existing clients who could not ethically be cut off cold turkey.

I explained this in a thoughtfully prepared, professional letter, pointing out that the needs of my clients did not overlap the business of the aerospace company, and that in any instance, I was obligated to protect their proprietary interests to the same extent as for work performed as an employee. To accommodate this, I requested a reasonable interval, say six months, in which to transition my clients to other arrangements.

The letter ended by mentioning that the state legislature had passed certain limitations on the scope of employer claims, which placed the offered intellectual property assignment terms in conflict with California law. I hand delivered this letter to the HR department.

Several weeks passed without a response. When I eventually telephoned to inquire about the status, my HR contact told me that the offer was dead. When I asked for an explanation, he dropped his voice to a whisper and asked me to stop by in person. When I arrived he ushered me into a private room, then after extracting a promise that our conversation would never be attributed to him, he told me the story.

My letter had been duly forwarded to the attorney for the division. In the course of working through his in-basket, he pulled out my folder and read the letter. Then things became interesting. The attorney was so incensed that any engineer would attempt to stand on his hind legs and speak that he jumped up, grabbed the folder, ran down the hallway and out the door, then hustled across the parking lot and into the next building, where he burst into the office of the head of HR, slammed my folder on his desk, and declared, "This is the sort of person who wouldn't be happy working here!"

When I heard this, I agreed with the attorney. It wasn't hard to deduce the general atmosphere inside the company. I walked to my car and drove away deep in thought. On that breezy spring afternoon, I parked at the top of a large hill overlooking the campus, got out, and gazed back at the buildings in wonder. I felt empathy for the wage slaves who worked there. Then the thought struck me: "I just became a case history!"

Rather than continue my search for employment, I soldiered on with my own business and went on to have a record year.

Case History: A Laughing Matter

A few years before launching my own enterprise, I interviewed with a small, agile aerospace company. Suffice to say that this company was still run by the engineer founder and was highly competent. They specialized in solving problems that major aerospace companies not only didn't know how to solve, but sometimes weren't sure even had solutions. For instance, one product line was microphones for rocket nozzles (hint: you have to include a bend in the monitoring passage so the heat flux doesn't melt the microphone).

My new supervisor walked me through the employment agreement, showing me certain places where he had modified his own agreement. He helped me strike through various things and rewrite mine until it made sense for me. This was certainly not the usual take-it-or-leave-it approach (and the interview process is a story of its own), but it illustrates why this particular company was able to attract the best, and why employee loyalty was extraordinarily high.

Because of the company's reputation for excellence, we were a frequent target of recruiters. I received my share of calls. The occasional engineers who succumbed to their blandishments were often back in about six weeks to ask if their old job was still available, which served as an object lesson for the rest of us. If the company hired someone accustomed to the more pedestrian work demands elsewhere and they did not adapt quickly enough, they would be bounced within six weeks. You might suppose that the reaction to this Darwinian approach might be "Oh crap! I could be next", but staff morale was so high that the general reaction was "Why did it take so long to get rid of that clown?"

One afternoon I overheard another engineer answer his telephone; "Hello?" (pause), "Yes." (pause), "No, not really." (at this point you could sense a recruiter pitch), (pause), "Tell you what. Hold on and I'll ask." Then from his hallway you heard the loud question for the rest of us: "Anybody here looking for a job?" The answer the recruiter heard rolling back was… collective laughter.

> Executive-level responsibility is not about allowing individuals or departments to dictate policy, but about molding them into an optimal working whole even at the expense of discomfort and grumbling among those who lack the unifying vision. When corporate executives default on their responsibility to implement even-handed, balanced policies more suggestive of the constitutionalist approach, the result is predictable.
>
> ORIN E. LANEY

Discussion

A few years ago, the IEEE searched for examples of employees whose employers had claimed personal intellectual property, be it a hobby design, an invention, software created at home, or anything similar. The response was the sound of crickets. IEEE members are at the forefront of technological innovation, so the result does not suggest that members are not intellectually prolific. Rather, it points out that they are not naïve. When corporate attorneys attempt to cast a net wide enough to capture personal projects, they get nothing. The refusal to participate has been termed a "Dilbert boycott". [2] Employers are not better off for requiring overreaching terms, but rather the poorer for attempting to do so.

During my career I have contributed many innovative, creative solutions, at times resulting in capturing a million dollars in business, at times avoiding a million dollars of expense. This never resulted in bothering corporate staff about a potential patent or trade secret. There was little incentive to do so. My reward would be distraction from the business at hand and a distant possibility of some low dollar award that might not amount to minimum wage for the time involved.

Of course, there are occasional employers who have enlightened policies, actively encourage submissions, and offer reasonable rewards for doing so. For the rest of us, the norm is absence of active management and lack of participation. The typical corporate IP collection system is moribund, comprising a few lines in the employee handbook and someone officially tasked to handle the paperwork who has to think hard to remember how it is done.

A maxim in systems engineering is that an optimal system is rarely attained by optimizing components individually. It is important to balance the performances of individual components lest one overdrive the next or operate faster than can be compensated for by another. Lesser performance in specific components can enhance the overall performance.

Here, excessive deferral to subject matter experts is not the same as actual leadership. Executive-level responsibility is not about allowing individuals or departments to dictate policy, but about molding them into an optimal working whole even at the expense of discomfort and grumbling among those who lack the unifying vision. When corporate executives default on their responsibility to implement even-handed, balanced policies more suggestive of the constitutionalist approach, the result is predictable.

My error in dealing with the big aerospace company was not waiting until I had a written offer before asking to review the documents. Nevertheless, I was still better off than those who quit an existing job, break a lease or sell the house, move the family across the country, sign a lease or buy a another house, enroll the kids in a new school, show up on the first day of work at their new job, and then discover what is in the documents they are required to sign. [3] Only an active interest in employment terms by present and prospective employees can remind employers that the bedrock of excellence is fairness. ◇

References
[1] History Repeats Itself: How The RIAA Is Like 17th Century French Button-Makers
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Orin E. Laney is the owner of Atwood Research in Silicon Valley. He earned a BSEE degree at the University of Maryland, and an MSEE at San Jose State University, California. He is a registered professional engineer in California and an iNARTE certified electromagnetic compatibility (EMC) engineer. As a former member and chair of the IEEE-USA Intellectual Property Committee, he participated in activities that include amicus briefs, advocacy of intellectual property legislation, community outreach and education. Mr. Laney has presented on intellectual property and career growth at more than 100 college campuses.
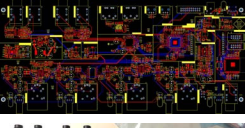
Senior Design Poster Competition

Congratulations to the winner of the Senior Design Poster Competition, Matan Silver, the President of the Gamma Beta Chapter at Northeastern University. Matan and his team developed a "Wireless Audio Control Interface" as part of their capstone project.
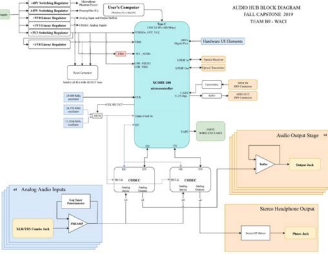

Matan Silver
Andrew Whitaker
Jess Bardio
Joshua Berlin
Louisa Beckwith
Philip Del Signore

ABSTRACT:
Musicians are increasingly utilizing digital effects to create unique sounds during live performances. In a band with many performers, a dedicated technician will typically operate the audio system; a portable, customizable system allowing all musicians to fine-tune their effects in real time does not currently exist on the market. To bridge this gap and introduce a lower-budget solution, the Wireless Audio Control Interface (WACI) system implements a new method for controlling and mixing audio using conventional performance software. The WACI system consists of a central Hub that can connect to many wireless Modules to suit users' needs. The system doubles as a 6-input, 8-output audio interface with MIDI support. In this system, each musician can have a Module to control their own effect models, while the Hub provides a central processing link for all instruments. The Hub is a circuit board developed by this capstone group that contains all electronic subsystems necessary for live audio processing. Four XLR/TRS combo jacks allow instruments or microphones to be plugged directly into the board. The Hub also includes circuitry to power devices such as microphones that require a 48V "phantom power" supply. These analog signals are converted to high-resolution digital representations at up to 194kSPS/24bit and sent to a computer over USB for effects processing. The commands to apply and alter these effects are sent to the Hub, and then to the computer over USB-MIDI, from wireless Modules via an 802.11 WiFi connection. Finally, processed digital audio streams are sent from the computer to the Hub over USB, where the Hub converts them back to analog signals and outputs them to speakers or an amplifier. The USB connection is managed by the main microprocessor, whose firmware implements USB Audio Class 2 over a Type C connector for native operation in Windows 10 or MacOS. The Hub is powered by a standard 12V DC wall adapter. The Modules are wireless control panels resembling guitar pedals or control panels that musicians can use to remotely adjust audio parameters on the computer. Each Module is battery-powered and has re-assignable physical controls. Module hardware configurations include pushbuttons, sliders, knobs, and foot pedals, allowing for various modes of adjustment that feel natural to a musician. Each Module has a display to show status information. The Module circuit boards were developed during the capstone term. Finally, the WACI system is managed by a custom cross-platform desktop application with the ability to connect Modules and manage settings, such as Module names and MIDI commands. The desktop application also displays critical Module status information, including battery charge level and wireless signal strength. Based on configurations made in the desktop application, the Modules can wirelessly update effects running in any audio processing software. ◈

Steve Wozniak, co-founder of Apple and pioneer of the personal computer revolution, with a student at the University of California, Berkeley, during a special ceremony for his elevation to HKN Eminent Member.

HKN Eminent Members

Steve E. Watkins

The IEEE-Eta Kappa Nu (HKN) honor society **"promotes excellence in the profession and in education through an emphasis on scholarship, character, and attitude."** This objective and these ideals have always guided the election of members as students and as professionals and have given direction to its activities. Early on, the organization understood the value of honoring those whose career accomplishments merited higher recognition. HKN sought to promote professional excellence with specific awards and a higher membership category. The Eminent Member category is for professionals who are among the most influential within electrical engineering and related fields. Only 143 individuals have been so recognized.


Henry Samueli (pictured with 2019 IEEE-HKN President Karen Panetta) is the Chairman of leading computer chip maker Broadcom Inc.

Vint Cerf (pictured with IEEE-HKN Director Nancy Ostin) is recognized as one of "the fathers of the Internet."

The Eminent Member category was added in the HKN constitution of 1941, and election required the approval of the governing board. (This category replaced a less rigorous designation of honorary member.) The constitution defined the category as such:

"Eminent Membership may be offered only to those individuals who by their technical attainments and contributions to society have shown themselves to be outstanding leaders in the field of electrical engineering and great benefactors of their fellow men."
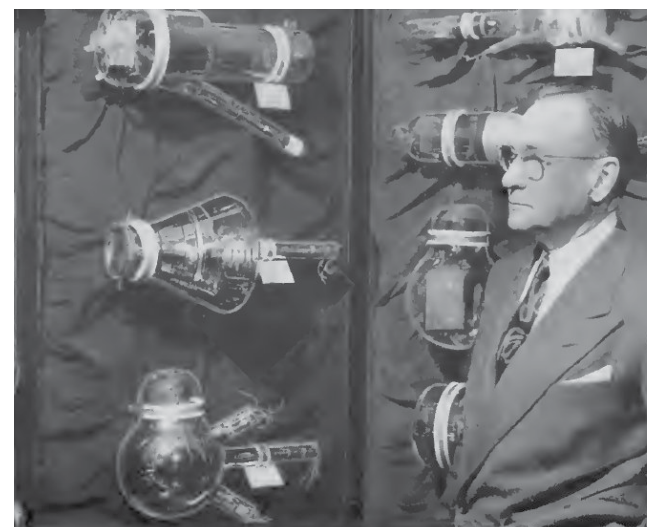
Vladimir K. Zworykin was one of HKN's first Eminent Members.

The membership process was developed and three members were elevated in 1950. Those elected were Vannevar Bush, computer pioneer and educator; Royal W. Sorensen, power educator and inventor; and Vladimir K. Zworykin, television pioneer and inventor. In 2004, *Profiles in Engineering Leadership: Eta Kappa Nu's First Century Eminent Members* was published by the IEEE History Center and the Eta Kappa Nu Association. This centennial book gives brief biographies of over 100 Eminent Members and is available at the Engineering and Technology History Wiki search for Profiles of Engineering Leadership.
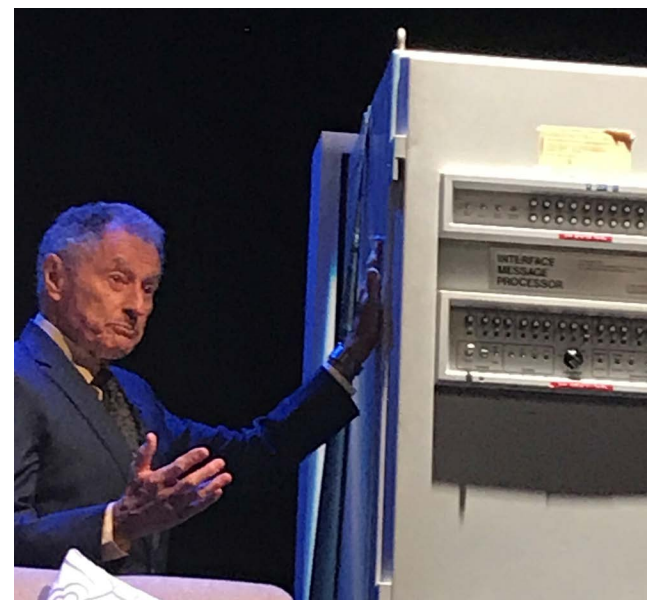
Leonard Kleinrock, developer of the ARPANET, the precursor to the Internet, became an Eminent Member in 2011.
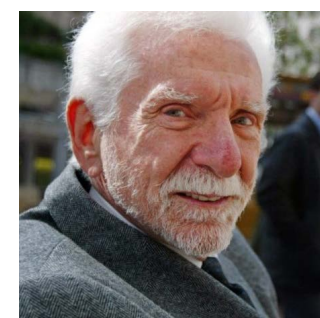
Marty Cooper is widely considered the father of the cellular phone.

Hermann W. Dommel pioneered the foundation for EMTP software, which has become an indispensable tool in the power industry.
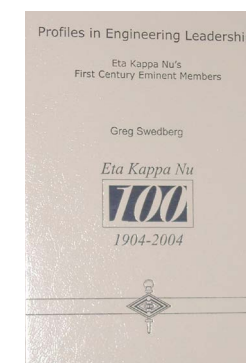
Profiles in Engineering Leadership: Eta Kappa Nu's First Century Eminent Members was produced for the 100th anniversary of HKN in 2004.

The Eminent Member recognition is maintained in the IEEE-HKN governing documents. The category is defined with "… Eminent Member is reserved for those individuals who, by their technical attainments and contributions to society, have shown themselves to be outstanding leaders in an IEEE-designated field of interest, and great benefactors to society."

Only the Board of Governors, with a supermajority vote, may elevate someone to this member category. Only living individuals may be elevated. An additional 10 individuals have been designated Honorary Eminent Members since they were not considered during their lifetimes. The February 2020 issue of THE BRIDGE reported on the ceremonies elevating the latest Eminent Members: Henry Samueli, G. David Forney Jr., and Robert Metcalfe.

The tagline for IEEE is "Advancing Technology for Humanity." The list of IEEE-HKN Eminent Members remembers the individuals behind our modern technologies and reflects the impact of our profession on society. The current list of Eminent Members is available on the HKN website.

Job searching while employed should be conducted stealthily.

8 Tips for Handling a Job Search While Working Full-Time

Marie Donlon

Job searches tend to be stressful no matter what the circumstances, and this is no less true for those looking for a job who already work full-time.

Conducting a job search while gainfully employed requires a certain amount of stealth and precision to keep a current employer from finding out that a valued employee is looking for employment elsewhere. Worst case scenario is that a current employer might view the search for employment elsewhere as an act of deception or disloyalty to the company; and such an act may encourage that employer to begin his or her own search—for a replacement.

Following is a list of dos and don'ts to consider when conducting a job search while already employed.

1. Avoid advertising it

A job search should be conducted discreetly when an applicant is already employed. That means those in search of a new job should not announce it on LinkedIn or on any other social media platforms where it could get back to a current employer. Likewise, applicants should not post their resumes on job boards in their industry. The internet can be a very small world; treat it as such.

2. Do not use employer time or equipment to search

While it might be difficult, avoid conducting a job search during work hours as much as possible. Likewise, avoid conducting a search using company equipment. Job searches conducted using a work-issued laptop or other device will undoubtedly be tracked by the IT department of a current employer.

3. Interview outside traditional work hours

An attentive boss will notice an uncharacteristic spate of mid-day appointments and potentially unearth what an employee is up to. As such, it makes sense to schedule job interviews either before the start of a workday or at the completion of the workday. Prospective employers may also be willing to accommodate requests for lunch time interviews. Also consider taking a personal or vacation day for such interviews as well or to schedule several interviews for one day.

4. Dress for the job you have, not the one you want

If feasible, avoid going to a current job dressed for a job interview if those clothes are not typical of what is worn day-to-day in the current office. Dressing more professionally than usual might attract the attention of coworkers or supervisors. To avoid detection by a nosy co-worker or supervisor, wear standard attire to work and change elsewhere ahead of an interview.

5. Use references from previous jobs, not from a current job

Do not list a current coworker, boss or anyone else at a current employer as a reference. Regardless of intention, word could get out that a valued employee is preparing to leave, which could trigger a host of unexpected—and potentially unwanted—events to unfold.

6. Ask for discretion

Most prospective employers will understand that an employee requires a certain amount of discretion during a job search. Do not hesitate to ask a prospective employer from keeping that information from a current employer and anyone else associated with that employer.

7. Keep at it

Regardless of what else is going on with the job search, try to maintain previous levels of workplace productivity. There is no telling what could happen by not completing current work-related tasks around the timing of an interview. Inevitably, being passed over for a new job will leave an employee in their current one. Employees should avoid jeopardizing future reviews, recommendations and any goodwill built up during their employment history by maintaining the status quo.

8. Do not badmouth

Badmouthing a current or previous employer is never a good strategy and prospective employers tend to take notice, perhaps envisioning that same conversation being had about them at some future date. Such behavior will reflect more on the candidate than on the candidate's previous employer. Avoid badmouthing them at all costs.

Summary

Perhaps what is most important to keep in mind while looking for a new employer while maintaining employment at a current one is to realize that not every job interview ends in a job offer. As such, it is critical to keep this information as private as possible.

John D. McDonald, P.E.

IEEE Fellow
Beta Chapter

John D. McDonald, P.E., is Smart Grid Business Development Leader for GE's Grid Solutions business. John has 46 years of experience in the electric utility transmission and distribution industry. John received his B.S.E.E. and M.S.E.E. (Power Engineering) degrees from Purdue University, and an M.B.A. (Finance) degree from the University of California-Berkeley. John is a Life Fellow of IEEE, and was awarded the IEEE Millennium Medal, the IEEE Power & Energy Society (PES) Excellence in Power Distribution Engineering Award, the IEEE PES Substations Committee Distinguished Service Award, the IEEE PES Meritorious Service Award, the 2015 CIGRE Distinguished Member Award and the 2015 CIGRE USNC Attwood Associate Award. John is Past President of the IEEE PES, the VP for Technical Activities for the US National Committee (USNC) of CIGRE, the Past Chair of the IEEE PES Substations Committee, and the IEEE Division VII Past Director. John was on the Board of Governors of the IEEE-SA (Standards Association). John received the 2009 Outstanding Electrical and Computer Engineer Award from Purdue University. John teaches a Smart Grid course at the Georgia Institute of Technology, a Smart Grid course for GE, and Smart Grid courses for various IEEE PES local chapters as an IEEE PES Distinguished Lecturer. John has published one hundred fifty papers and articles, has co-authored five books and has one US patent.

John speaking in Sao Paulo

How has Eta Kappa Nu (IEEE-HKN) impacted your life? Your career?

I was initiated into Eta Kappa Nu on May 2, 1971 at the Beta Chapter at Purdue University. This was the end of my second year at Purdue. Eta Kappa Nu was the first validation for me that I was doing well in Electrical Engineering and gave me tremendous confidence. I had a very challenging curriculum with being in the Honors Program, beginning to take graduate courses in my third year, getting my BSEE in four years, and my MSEE in just one additional year with a thesis in addition to course work. In addition, I was in the Delta Sigma Phi social fraternity, living in the fraternity house and had an active social life! The confidence Eta Kappa Nu gave me in my own abilities was what I needed to do well with this challenging curriculum. This confidence has stayed with me for my entire life and positively impacted me to accept challenging assignments and to work hard and do well.

John at work—1975

What inspired you to choose the engineering field?

In fifth grade I became interested in electricity. I read, learned to solder, built a short-wave radio, walkie talkies, and a code oscillator, among others. By high school I took courses and built a superheterodyne AM/FM radio, and replaced the picture tube in a black and white TV.

What do you love about engineering?

I love using my knowledge and experience to solve problems. We learned in engineering how to solve problems. I also love helping others. After 46 years of full-time engineering work, my love today is to use my knowledge and experience to help others. With engineering, I can combine my love for problem solving with my love for helping others. I mentor many young professionals, both within GE and outside GE, which I enjoy doing very much.

John leading breakfast roundtable—DTECH 2020

Whom do you admire and why?

With my love of solving complex problems, I admire astronaut Jim Lovell. He commanded the 1970 Apollo 13 lunar mission which, after a critical failure en route, circled around the Moon and returned safely to Earth through the efforts of the crew and mission control. Using the Lunar Module as a "lifeboat" providing battery power, oxygen, and propulsion, Lovell and his crew re-established the free return trajectory that they had left and swung around the Moon to return home. Based on the

flight controllers' calculations made on Earth, Lovell had to adjust the course twice by manually controlling the Lunar Module's thrusters and engine. He and I participated in Boy Scouts and are both Eagle Scouts. I had the opportunity to meet and talk with Jim Lovell one-on-one at a GE customer event. Solving these complex problems with your life and your crewmates lives at stake is the ultimate engineering challenge!

In your opinion, what has been the greatest change in engineering since you were a student?

The greatest change in engineering since I was a student in 1969 to 1974 is digitization, or the application of computers. There were no HP or TI calculators when I was a student. We used slide rules. My Masters thesis in 1973-1974 was two and one-half boxes of computer cards that the Purdue University computing center would only run overnight because it put too much load on the campus computer system! We had to walk to the computing center, submit the deck or box of computer cards, and wait or come back for the output. We didn't know how long it would take to get the output. When my son studied Electrical Engineering at Georgia Tech in 2003-2007, he would run complex computer programs from his laptop while in his fraternity house and get the results back quickly! Today, with the coronavirus, my granddaughter, who is in 3rd grade, and my grandson, who is in kindergarten, are using their own laptops at home for virtual class using the Zoom application. The change from when I was a student to today is surreal!

John moderating panel session in Sao Paulo
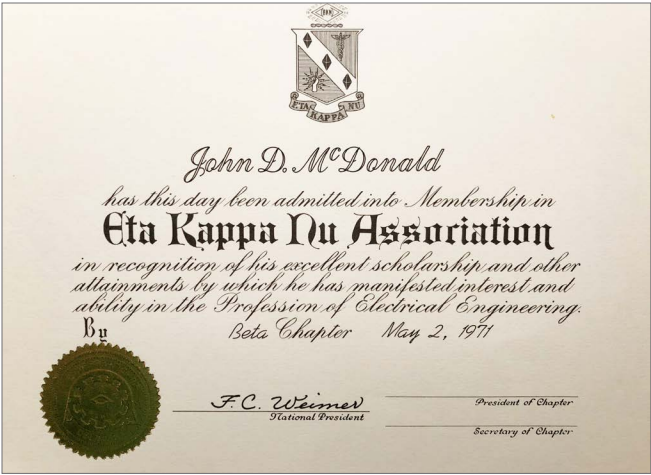
Eta Kappa Nu membership certificate—Purdue 1971

John speaking at Canada Protection Symposium—2019

I wish I had known…

I wish I had known the importance of being fluent in a second language. I give talks and teach courses frequently worldwide, and in Latin America my local host provides simultaneous translation. Knowing what I know now, I would have taken four years of Spanish in high school, taken at least two elective courses in Spanish at Purdue, and spent time in a Spanish-speaking country to be fluent.

Best advice for new graduates…

Much of our work is art rather than science. One must master the science, but it takes many years of working with very experienced people to learn the art – the application of the science. New graduates should find at least one mentor and spend at least one hour with each mentor each month. I gave a webinar one year ago for the IEEE PES on "Key Insights to Career Management". It was recorded and is available at no cost to everyone. This talk is designed to discuss managing your career. There are 12 important things to keep in mind when living and managing your career to achieve your goals. These are explained and explored with examples and photographs based on my 46 years as an engineer, manager and executive managing people's careers, and 49 years as an IEEE member. Your career is your career and understanding your priorities (which can change) and your company's objectives can help you have a rewarding and fulfilling career.

From your perspective, what's the next BIG advance in engineering?

The one big advance that has many potential benefits is managing big data, developing new analytics to provide new value streams, and creating a user experience (more than user interface) for effective conveyance of the data and the results of the analytics. This involves machine learning, artificial intelligence and use of the digital twin. When this is applied to power systems, one application is moving from time-based maintenance to condition-based maintenance, or from reactive maintenance (wait until it breaks) to predictive maintenance. This application is called Asset Performance Management (APM). Both manufacturers and electric utilities are now hiring data scientists for the first time. We have barely scratched the surface of the potential benefits of APM or other similar applications. There is so much more we can do! I wrote the first chapter, titled "A Holistic Approach to Becoming a Data-Driven Utility", in the book Big Data Application in Power Systems, published by Elsevier in 2018.
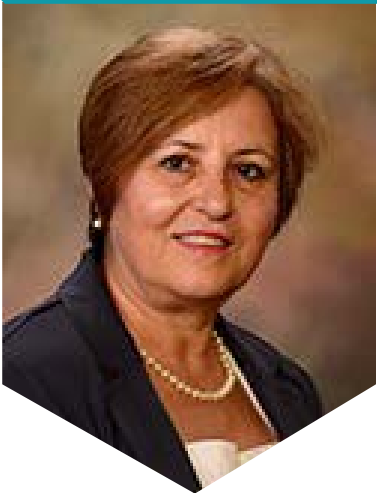
Hulya Kirkici
IEEE Fellow
Xi Chapter

Recognizing Student Achievement Through a New IEEE-HKN Award

Hulya Kirkici is an IEEE Fellow, and an officer of IEEE recently serving as the 2019 Vice President, Publications Services and Products. She's also the founder of an important new award designed to recognize technical achievement by IEEE-HKN students.

In search of a worthy target for proceeds of a non-profit initiative called the Power Modulator Conference, Hulya approached the IEEE Foundation to discuss ways to put it to good use in recognizing technical achievement by students within IEEE Region 3. Working with IEEE-HKN, the IEEE honor society, Hulya donated the proceeds to the IEEE-HKN Power Modulator Fund in 2019 and created a new award called the 'IEEE-HKN Best Technical Conference Student Paper Award' at IEEE Southeastcon. Scheduled to be presented for the first time during the 2020 IEEE Southeastcon in Raleigh, NC, USA, the new award will recognize the best student paper presented at the technical conference portion of Southeastcon, IEEE Region 3's major annual event.

"I'm proud to invest in IEEE," Hulya said, "and hope that this new award will help enable IEEE-HKN to nurture the next generation of technology leaders for years to come."

You can choose to directly support IEEE-HKN or any of the strategically identified IEEE initiatives that help meet the world's most pressing challenges and help us to realize the full potential of IEEE.
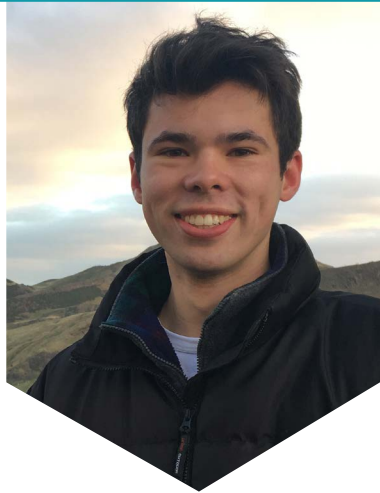
Michael Lau

Michael (Mike) Lau, is a recent graduate of Santa Clara University in Electrical Engineering, with a minor in Political Science. During his undergraduate career, he has balanced a dual focus on Electrical Engineering and Politics at both Santa Clara University and the University of Oxford, specializing in power systems, international relations, and energy policy for accelerated renewable integration and energy system decarbonization. He has held summer internships with Lawrence Livermore National Laboratory, working on the integration of magnetic and inertial confinement in nuclear fusion, and the Latimer Energy Laboratory at Santa Clara University, which he credits with directing his interest in decarbonization toward renewable integration. Outside of coursework and internships, he enjoys volunteering with a variety of organizations focusing on green activism and sustainable international development, including Santa Clara's BLEGIT environmental advocacy and divestment group, Bronco Urban Gardens, and the Cambridge Development Initiative. During his time at university, he also worked part-time tutoring fellow students in a variety of math, science and engineering topics. His primary interest going forward is in the development of technologically informed policy for accelerated implementation of grid-scale storage to aid in decarbonizing efforts in the energy sector, and he is applying to several master's programs in hopes of further pursuing this interest. He enjoys a variety of leisure activities, including cooking, chess and exploring the outdoors.

Do you have a best IEEE story to share?

Back in January 2019, a group of IEEE members from my chapter in Santa Clara and I got together to volunteer at a community center nearby – providing an interactive science experience for elementary and middle school students from a nearby neighborhood. We arrived early, setting up the required materials for our presentation and 'experiment' while the students all trickled in to the classroom. On that particular day, we were building mini-hovercrafts made from a CD, the nozzle of a plastic water bottle, and balloons. After setting up and explaining the principles involved to the kids, we put them into groups and told them to try making the hovercrafts. Five minutes later, no one had successfully managed to make a working hovercraft even with the help of the IEEE volunteers. Eventually we figured out that instead of buying normal balloons, we'd accidentally purchased twisting balloons for making balloon animals! After much trying, the room had descended into chaos—kids running around and making the balloons fly everywhere—but we had one successful hovercraft! We called it a day after that. In the end though, I think we had a positive impact, teaching the kids a lesson they'll never forget about the importance of the testing phase in engineering design.

Why did you choose to study the engineering field?

I actually came into my undergrad declared as a Political Science major, fully intending to focus on international environmental policy specializing in the reduction of carbon emissions. After my first two quarters though, I had realized that in order to make the impact I wanted to on this issue, I had to have a deep understanding of the technologies available and the technical obstacles to substantially decreased emissions in the energy sector. This realization led me to internally transfer to the School of Engineering at the end of my first year, and I'm grateful that I made that decision. I believe that having a comprehensive (or as close to comprehensive as one can possibly have) understanding of the various technical, political, social, and economic factors at play in any field is key to determining how best to deal with any issue in a considered way. While this is never fully possible, having an engineering background helps substantially in providing working scientific and technological knowledge of your area of specialization – as well as providing the skills necessary to decipher technical papers and documentation to further expand that knowledge going forward.

What do you love about engineering?

I very much enjoy the problem-solving process and watching mathematical approximations translate directly to the real world.
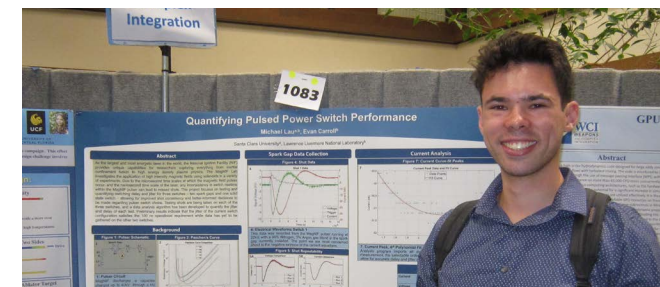
Michael Lau showcases his work at poster competition.

What is your dream job?

I aim to meaningfully contribute to international efforts to reduce greenhouse gas emissions by reducing obstacles to grid transition through policy on any scale. Within this field, I specifically aim to impact two areas: the adoption of grid-scale storage and system net load adjustment through demand-side manipulation. Both of these, I believe, are ideally influenced through policy adjustments and incentives. Furthermore, I aspire to contribute to international cooperation on decarbonization within the energy sector. Thus my dream job would be as a policy analyst and researcher with either an energy policy think tank, like E3G or Element Energy, or a governmental agency to bring an interdisciplinary engineer's perspective to energy policy development and grid transition incentivization.

What made you interested in public policy/volunteer work?

For a long time, I've been passionate about making a difference in climate change. When I was deciding which field would best allow me to make the greatest impact, I was torn between engineering and policy. I realized that if I continued down the path of engineering, I may be making the tools that allow us to reduce emissions, but I had no way to ensure that they would be used correctly or as efficiently as I would like; technical innovation is, after all, essentially the creation of more and better tools. Thus, I turned to policy, where I could help decide how the tools available are used to counter climate change – with an understanding of the limitations and advantages of the tools given by my time in electrical engineering. Essentially, I see policy as the best way to make the greatest difference I can.

What is the next BIG advance in engineering?

In my field, at least, I think the next big advance in engineering will be in the reduction in cost and rare earth metals consumption of renewable energy sources and storage technologies, which would both increase the adoption of renewables and aid in solving the associated resource problem.

What is the most important thing you've learned in school?

Probably that no single narrative or picture is ever complete. Especially in engineering, we have a tendency to believe that our study of one topic or subject provides the "truth." But, especially when we step out of the pure calculations of engineering and into the human world where our work is needed and applied, truth is complex. In light of this, I think that the most important skill I've learned in school is to listen, critique and incorporate the lived experience and theoretical understandings of diverse people and fields in my own worldview and academic perspective.

What advice would you give to other students entering college and considering studying your major?

I would advise other students, especially engineers, to seriously study the humanities and social sciences in addition to their engineering degrees. While engineering provides important design skills, it doesn't and can't tell you how to apply them in a considered fashion to the world around us – nor does it provide the political and social understandings we need to make well-informed judgements. So, diversify. Pursue your passions, and learn as much about the way the world works as you can.

IEEE-ETA KAPPA NU AWARD ANNOUNCEMENT:
26 Chapters Earn 2018-2019 Outstanding Chapter Award

Nancy Ostin

The IEEE-Eta Kappa Nu (IEEE-HKN) Board of Governors has conferred upon 26 student Chapters the distinction of Outstanding Chapter for 2018-2019. This represents the top 10 percent of all HKN Chapters worldwide.

The Outstanding Chapter Award (OCA) recognizes excellence in IEEE-HKN Chapters for their activities. The award is based on the content and description of Chapter activities that are contained in the Annual Chapter Report, which summarizes the Chapter's activities from the previous academic year.

For the purposes of this award, emphasis is on service activities to the department, school, community and Chapter. Equally important is promoting the goals of IEEE-HKN by inducting as many eligible undergraduate students, graduate students and faculty in the IEEE designated technical fields of interest as possible and by participating in IEEE-HKN student Chapter projects. Each recipient Chapter receives an engraved plaque. ◇

The Chapters recognized as 2018-2019 Outstanding Chapters are:

- Arab Academy for Science and Technology–Alexandria
- California State University, Chico
- G.H. Raisoni College of Engineering
- Georgia Institute of Technology
- Illinois Institute of Technology
- Missouri University of Science and Technology
- North Carolina State University
- Politecnico Di Torino
- UCSI University–Kuala Lumpur

- University of Illinois at Urbana-Champaign
- University of California, Berkeley
- University of California, Los Angeles
- University of California, San Diego
- University of Florida
- University of Hawaii at Manoa
- University of KwaZulu-Natal
- University of Michigan–Ann Arbor
- University of Minnesota
- University of North Texas

- Carnegie-Mellon University
- Manhattan College
- Purdue University
- Rose-Hulman Institute of Technology
- South Dakota State University
- University of Dayton
- Valparaiso University

Ph.D. Candidate at Stanford University Named IEEE-HKN Outstanding Student of the Year for 2019

Olivia Hsu, who was inducted into the Mu Chapter of IEEE-HKN at the University of California, Berkeley, has been selected as the 2019 Alton B. Zerby and Carl T. Koerner Outstanding Electrical or Computer Engineering Student Award recipient. She currently is pursuing her Ph.D. in Computer Science at Stanford University.

Olivia is the Co-Founder, President and Lead Electrical Engineer for Space Technologies at Cal (STAC), where she designed and wrote firmware for a PCB satellite with radio, solar cell power tracking, and altitude control capabilities. She also implemented electronics in a High Altitude Balloon (HAB) with a successful launch in partnership with NASA Ames and JPL, and won a free payload launch sponsored by Blue Origin. She co-authored abstracts accepted by the American Society for Gravitational and Space Research (ASGSR) conference and the Next-Generation Suborbital Researchers Conference (NSRC).

Olivia also was an undergraduate researcher at Berkeley Wireless Research Center, Berkeley, Calif., conducting tests that measure the sensitivity and bandwidth of silicon photonic devices that detect ultrasound. She is a co-author of a paper titled: "Ring Resonator Based Ultrasound Detection in a Zero-Change Advanced CMOS-SOI Process," in Conference on Lasers and Electro-Optics, OSA Technical Digest (Optical Society of America, 2019)

She held internships at Apple Inc., and the NASA Jet Propulsion Laboratory and was Head Undergraduate Student Instructor at UC Berkeley Electrical Engineering 16A.

"Olivia Hsu has set an outstanding example of excellence in academics, teaching, outreach and leadership in service to the EECS community and to society, to instill a sense of pride in IEEE-HKN members and promote the Berkeley EECS program as well as HKN," said Tsu-Jae King Liu, Ph.D., Dean and Roy W. Carlson Professor of Engineering for the College of Engineering at the University of California at Berkeley.

IEEE-HKN's Alton B. Zerby and Carl T. Koerner Outstanding Electrical or Computer Engineering Student Award recognizes outstanding scholastic excellence and high moral character, coupled with demonstrated exemplary service to classmates, university, community, and country. This program is administered by the Los Angeles Area Alumni Chapter of IEEE-HKN.

Olivia will receive a US$1,000 award honorarium and engraved plaque. ◇

The finalists for the award were:

Matthew Belz
Gamma Chapter
The Ohio State University

Joshua Heidecker
Epsilon Eta Chapter
Rose-Hulman Institute of Technology

Greta Kintzley
Epsilon Omicron Chapter
University of Delaware

The Chapters of Eta Kappa Nu:
Directory Pages

Chapters of IEEE-Eta Kappa Nu (IEEE-HKN) are showcased on the Chapter Directory page of the website. Over 260 Chapters have been chartered worldwide since the society's founding in 1904. These Chapters contribute to the profession and to their local communities as they provide recognition and service activities. Each one has an important role to play within its host institution. In addition to basic Chapter information, the directory pages show the scope of HKN and the distinctiveness of each Chapter.

The IEEE-HKN Chapter Directory lists key chapter information along with other customized content including photographs. An online update portal facilitates the submission of new or updated content. The main directory page consists of the update portal and Chapter thumbnail images. The list can be arranged by institution or filtered by IEEE region. For example, the thumbnail image for Kappa Psi Chapter at the University of California San Diego is their main building for the Jacobs School of Engineering.

Jacobs School of Engineering at the University of California, San Diego

Kappa Psi photo gallery examples.

Eta Kappa Nu (HKN) at UCSD is highly active in Jacobs School of Engineering community, hosting 80+ events an academic year. We strive to develop the technical, academic, and professional skills of the engineering community. Members and alumni form a tight knit community where we help each other grow and give back to the broader engineering community. Our member base goes back to 2005, and has been rapidly growing. We are now inducting over 80 members a school year, and hope you can join us soon!

Chapters typically choose campus landmarks, school symbols, or HKN images for this gateway image which links to their individual page.

The individual chapter pages allow Chapters to highlight their institutions and activities. Basic information about the Chapter's charter date and IEEE region and section affiliation are given. Chapters that have received the HKN Outstanding Chapter Award are given the OCA tag. A unique statement of about 100-200 words describes the local activities, culture, and history for the Chapter. (See information in blue box above.)

Other content includes a description of the Chapter location, a location image, social media links, a photograph gallery, and quotes from Chapter members. The photograph gallery and the quotes sections are especially valuable means to highlight significant Chapter events and to record student and department perspectives on HKN.

The Chapter Directory shows the international HKN community and is an information source, an institution promotion, and a Chapter archive. Each Chapter has a unique story to tell, and the directory page gives a platform.

Thanks to the Kappa Psi Chapter at the University of California, San Diego for being our directory example. Kappa Psi is the host of the 2020 Student Leadership Conference during 6-8 November.
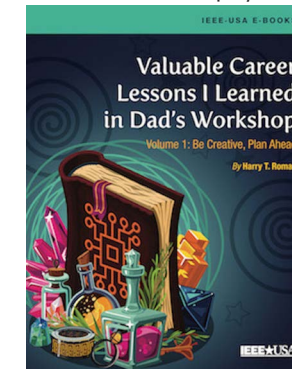
Make sure your Chapter has a presence and is current on the IEEE-HKN Directory Page. An updated chapter page is a core essential requirement toward Key Chapter recognition!

Sage Advice and the Adventures of the Slate Twins Top IEEE-USA's Latest Offerings

Georgia C. Stelluto

IEEE-USA is offering free to members its new audio book, Valuable Lessons I Learned from Dad's Workshop--Vol. 1: Be Creative—Plan Ahead.

Author Harry T. Roman's father loved to solve problems, and invent things on the spot. And in IEEE-USA's new, free audio book for members: Valuable Career Lessons I Learned in Dad's Workshop—Vol.1: Be Creative; Plan Ahead—Roman pays tribute to his father by gathering vignettes from more than 40+ years of sage advice from his dad. His audio book talks about how these lessons are very relevant to modern-day engineering.

Always inspiring and often humorous, in Volume 1 of this two-volume series, Roman concentrates on what he learned from his father about creativity and planning. Describing his boyhood as his "wonder years," the author relates, with both admiration and insights, how he learned valuable engineering career lessons—all while helping his father in the large basement workshop of their home.

IEEE members can get their free, new IEEE-USA Audio Book, by going to: https://ieeeusa.org/shop/careers/valuable-career-lessons-learned-dads-workshop-vol-1-creative-plan-ahead/ Follow the instructions to download your free audio book in MP3 format. No Promo Code required!

IEEE-USA's March New Digital Comic Book Introduces IEEE-USA's Two New Engineering Superheroes!

Move over, Thor! Skedaddle, Spider-Woman! And take your psionic energy with you!

There's a new duo of superheroes in town, ready to battle the Forces of Evil, and they come from a long line of geniuses. One of them, quite conveniently, is one of the most prolific inventors and futurists in the history of engineering. His identity—and how the current generation of his imaginary descendants manages to save the day—is just one of the compelling and action-packed aspects of the first IEEE-USA e-comic book with superheroes who are engineers.

Dedicated fittingly to "All engineers—and all engineers to come," IEEE-USA created The Slate Twins: Caught in the Currents with several audiences in mind. According to Georgia Stelluto, IEEE-USA Publishing Manager and Manager/Editor, IEEE-USA E-BOOKS, "Getting kids—young and old—excited about engineering is our main goal. But we also wanted to put the fun back into engineering for Young Professionals, as well as for mid-career and more experienced engineers."

All the technology—real and fantasy—is designed to help fuel imaginations, and to stimulate readers' creativity, no matter their ages. Much like other superhero comic books, The Slate Twins: Caught in the Currents, also offers the benefits of stress reduction, social representation and intellectual stimulation for all age groups. Get your comic book today to add it to your collection!

A limited quantity of full-color, print copies are available for IEEE members to take to local elementary, middle and high schools, as well as colleges and universities, or other engineering events, conferences and activities. To obtain copies, contact Georgia Stelluto, g.stelluto@ieee.org and Marnie James, m.c.james@ieee.org.

You can get IEEE-USA's new engineering comic book online by going to: https://ieeeusa.org/shop/fun/the-slate-twins-caught-in-the-currents for only $2.99 for members. Non-members pay $4.99.

Georgia C. Stelluto is IEEE-USA's Publishing Manager; Manager/Editor of IEEE-USA E-BOOKS; InFocus Department Editor for IEEE-USA InSight; and Co-Editor of the IEEE-USA Conference Brief.

IEEE Eta Kappa Nu Launches IEEE-HKN Career Center

IEEE Eta Kappa Nu

IEEE Eta Kappa Nu is proud to announce its new IEEE-HKN Career Center-the premier resource to connect career opportunities with highly qualified Engineering talent.

LOG ON TODAY!

IEEE-HKN Career Center will allow you to:

Manage Your Career:
- Search and apply to more Engineering jobs than in any other job bank.
- Upload your anonymous resume and allow employers to contact you through IEEE-HKN Career Center's messaging system.
- Set up Job Alerts specifying your skills, interests, and preferred location(s) to receive email notifications when a job is posted that matches your criteria.
- Access career resources and job searching tips and tools.
- Have your resume critiqued by a resume-writing expert.

Recruit for Open Positions:
- Post your job in front of the most qualified group of Engineering talent in the industry.
- Promote your jobs directly to candidates via the exclusive Job Flash email.
- Search the anonymous resume database to find qualified candidates.
- Manage your posted jobs and applicant activity easily on this user-friendly site.

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