



2022 Issue 1 // Volume 118

THE BRIDGE

The Magazine of IEEE-Eta Kappa Nu

2021 YEAR IN REVIEW

MEMBERS' AND VOLUNTEERS' Innovation and Dedication Lead to Growth

**Members' and
Volunteers'
Innovation and
Dedication Lead
to Growth**
IEEE-HKN 2021
Year in Review

In Memoriam:
Dr. Richard Gowen

IEEE-HKN's New
Website Showcases
the Society's Best
Asset: Its Members

Meet the
IEEE-Eta Kappa Nu
2021 Awards
Program Recipients

Graduate Research
Spotlight

IEEE-Eta Kappa Nu



2150
INDUCTIONS

1870
ACTIVITIES

65,757
HOURS IN
SERVICE

91
STEM OUTREACH
EVENTS

4920
STEM OUTREACH
HOURS





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)

C. HOLMES MACDONALD OUTSTANDING TEACHING AWARD (OTA)

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 (DSA)

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: 31 July)

OUTSTANDING YOUNG PROFESSIONAL AWARD (OYP)

Presented annually to an exceptional young engineer who has demonstrated significant contributions early in his or her professional career.

(Deadline: Monday after 30 April)

IEEE-HKN ASAD M. MADNI OUTSTANDING TECHNICAL ACHIEVEMENT AND EXCELLENCE AWARD

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 Magazine of IEEE-Eta Kappa Nu

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Sarvestani

Beta Chapter



Dr. Steve
E. Watkins

Gamma Theta Chapter


The Bridge, February 2022

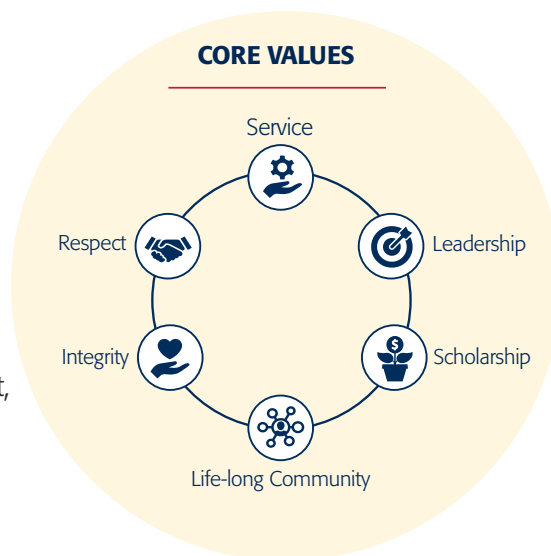
Letter from the Editors-in-Chief

Dear IEEE-Eta Kappa Nu Members and Friends,

This issue of THE BRIDGE magazine contains the 2021 Annual Report, chronicles our recent awards, and highlights activities which engage our graduate and alumni members. The organization continues to “promote excellence in the profession and in education through an emphasis on scholarship, character, and attitude.” Despite the difficulties brought on by the pandemic, Eta Kappa Nu has inducted members, provided service to others, and contributed to the profession. We are particularly grateful for the growing number of volunteers, donors, and sponsors that support established and new activities. This issue describes our “Grad Lab” webinars that are one initiative aimed at our Graduate Student Members, reports our efforts to better engage our alumni members, and continues our spotlights on student research activity. These activities reflect our objective of HKN as a lifelong community which connects students and professionals.

The volunteers that are responsible for the 2021 work, follow a long tradition of service. Founder Maurice L. Carr observed, “Eta Kappa Nu grew because there have always been many members who have been willing and eager to serve it loyally and unselfishly.” HKN volunteer Roger L. Wilkinson is an example of one who offered lifelong service to HKN. He was inducted by the Nu Chapter in 1924. He was HKN President in 1933-34, was a frequent author for THE BRIDGE, and was the Founder of the HKN Outstanding Young Electrical Engineer Award, now the Outstanding Young Professional Award. His lifetime of HKN service is described in the History Spotlight of this issue of THE BRIDGE.

HKN strives for effective communication with members through our [HKN website](#), our HKN [YouTube channel](#), our [Facebook](#) and [LinkedIn](#) pages, the magazine, etc. Please check out the refreshed website and the newest online resources and news. Remember that the current, as well as recent, issues of the magazine are available on the [IEEE App](#). 



In Memoriam: Dr. Richard Gowen

HKN Eminent Member 2002, HKN President 1998-2000 and IEEE President 1984

Richard (Dick) Gowen, 1984 IEEE President and 1998-2000 HKN President, died on 12 November at the age of 86. Dick, an HKN Eminent Member, was instrumental in the 2010 merger of HKN and IEEE and left an indelible mark on the organization. In addition to HKN President, Dick served as Vice President in 1997, HKN West Central Region Governor from 1995 to 1997 and chaired the Eminent Member Committee after he was awarded the designation in 2002.

At the time of death, he was president and CEO of Dakota Power, a company in Rapid City, S.D., that develops lightweight electric drive systems for military and civilian use.

Gowen was born in New Brunswick, N.J., and received his bachelor's degree in electrical engineering in 1957 from Rutgers University. While at Rutgers, he participated in the school's ROTC.

After graduating, he joined RCA Laboratories in Princeton, N.J., as a researcher but was called to active duty by the U.S. Air Force. He was a communications electronics officer at Yaak Air Force Station, in Montana. While there, he joined the electrical engineering faculty at the Air Force Academy, in Colorado Springs, CO. Sponsored by the Academy, he did his postgraduate studies at Iowa State University, in Ames, earning a master's degree in electrical engineering in 1959 and a Ph.D. in biomedical engineering in 1962.

For his doctoral research, he developed an engineering model of the cardiovascular system. His project led to the development of a device worn on a person's finger that measures blood pressure during physical exercise. He was granted his first U.S. patent for the technology. In 1966, he was selected to be an astronaut in NASA's Apollo 1 program but withdrew after suffering a back injury that left him unable to walk. Surgery restored his ability to walk, and he returned to the Academy.




In addition to teaching, he led a research team to develop technology that could help NASA study the effects of weightlessness on astronauts' cardiovascular systems.

Gowen's research led to the development of the lower body negative pressure device, which can vary the transfer of fluids from the upper body to the lower body. The device is now on display in Washington, D.C., at the Smithsonian National Space and Air Museum.

Gowen served as a consultant for the U.S. Department of Defense while at the Academy. He retired in 1977 with the rank of lieutenant colonel.

He then became vice president and dean of engineering at the South Dakota School of Mines and Technology in Rapid City, and then served as president of Dakota State College, now Dakota State University, in Madison, S.D. He later returned to South Dakota Mines as its president. Under his leadership, engineering programs were created, and graduate research projects were expanded. He also increased the number of projects conducted in collaboration with NASA and the U.S. military.

After he retired from the school in 2003, he was appointed as a member of the South Dakota Department of Education. In that role, he was active in encouraging more Native Americans to pursue careers in science, technology, engineering, and math.

After retiring, he led the conversion of the Homestake gold mine, in Lead, S.D., into a scientific laboratory in 2003 at the request of the U.S. National Science Foundation. The Deep Underground Science and Engineering Laboratory opened in 2009. 

Before his death, Dick and his wife, Nancy, made a generous gift to IEEE-HKN to help the Society reconnect with and engage HKN Alumni to build the organization. A series of Alumni Receptions will debut this year, a direct result of this gift. If you would like to make a gift to IEEE-HKN in Dick's memory, please [follow this link](#) to the IEEE Foundation page and choose the Eta Kappa Nu fund from the dropdown menu.

Editors Note: Sections of this article originally appeared in The Institute

IEEE-HKN Welcomes New Members of the Board of Governors

The 2022 IEEE-HKN Board of Governors welcomed four new members, and a fifth member was elected to a second term as Student Governor. James M. Conrad will lead the society as President in 2022.



Dr. James M. Conrad, former IEEE-USA President and current Professor and Associate Chair of the Department of Electrical and Computer Engineering at the University of North Carolina, Charlotte, will serve as 2022 President. He is a member of the Beta

Eta Chapter and previously served as President-Elect and the MGA Governor At-Large on the HKN Board.



Joseph Greene, Kappa Sigma Chapter, will serve his second one-year term as Student Governor. He is pursuing a Ph.D. in Computational Imaging at Boston University with the support of a NSF Neurophotronics Research Trainee Fellowship and a

BU Nanotechnology Innovation Center Cross-Disciplinary Fellowship.



Ronald Jensen, Nu Chapter and IEEE Life Senior Member, serves as Past President for 2022. Jensen served as President in 2021, President-Elect in 2020, IEEE-HKN Treasurer from 2015 to 2020, and Region 3-4 Governor from 2016-2018. He

has led numerous HKN committees, including Journey Mapping, Finance, Strategic Planning, MGA Alignment, Faculty Advisor, Membership, and PR & Communications.



Ashley Kuhnley, Lambda Beta Chapter, was elected to a one-year term as Student Governor. She is pursuing a bachelor's degree in electrical engineering at California State University, Northridge (CSUN). Her emphasis is in biomedical engineering.

She is applying to biomedical and electrical engineering doctoral programs where she can contribute to the field of implantable cardiac devices. She was inducted into the Lambda Beta Chapter in Spring 2021, when the Chapter was reactivated. She is the Lambda Beta Chapter President.



Jennifer Marley, Beta Eta Chapter, will serve a three-year term as Region 3-4 Governor. She currently holds the Frederick F. Jenny, Jr. Professorship of Emerging Technology at Valparaiso University, where she serves as faculty advisor of the Mu Rho Chapter. She is

the 2020 recipient of the IEEE-HKN C. Holmes MacDonald Outstanding Teaching Award. Since 2019, she has served on the board of the Calumet Section of IEEE in the following capacities: Student Activities Chair, Publicity Chair, and Secretary.




Russell Meier, Eta Chapter, was elected to a three-year term as Governor At-Large. He is a Professor of Electrical Engineering and Computer Science at the Milwaukee School of Engineering (MSOE), where he mentors future engineers in digital

logic, computer architecture, digital electronics, and computer networking. Meier is a member of the IEEE Computer, Education, and Professional Communications societies. He helped the Education Society create multiple workshops, conferences, and online seminars for engineering and computer science professors.

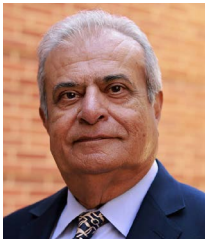


Sampathkumar Veeraraghavan, Epsilon Delta Chapter, was elected to serve as 2022 President-Elect. He is best known for his technological innovations in addressing global humanitarian and sustainable development challenges. He has

successfully delivered cutting-edge technologies in areas of conversational Artificial Intelligence (AI), Natural Language Understanding, cloud computing, enterprise systems, infrastructure technologies, and assistive and sustainable technologies. 

IEEE-HKN Congratulates 3 Members for Notable Achievements

HKN Eminent Member Receives IEEE Medal of Honor



HKN Eminent Member **Dr. Asad M. Madni** is the 2022 IEEE Medal of Honor recipient "For pioneering contributions to the development and commercialization of innovative sensing and systems technologies, and for distinguished research leadership."

The IEEE Medal of Honor, established in 1917, is the highest IEEE award. It is presented when a candidate is identified as having made a particular contribution that forms a clearly exceptional addition to the science and technology of concern to IEEE.

Dr. Madni served as President, COO & CTO of BEI Technologies Inc. from 1992 until 2006. His major contributions with worldwide impact include the Extremely Slow Motion Servo Control System for the Hubble Space Telescope's Star Selector System, which provided the Hubble with unprecedented accuracy and stability, the revolutionary MEMS GyroChip® technology, used worldwide for Electronic Stability Control and Rollover Protection in passenger vehicles, and RF and microwave systems and instrumentation, which significantly enhanced the combat readiness of the US Navy (and its allies).

The IEEE-HKN Board of Governors established the Asad M. Madni Outstanding Technical Achievement and Excellence Award in 2019 as its highest award.

The award is the first-ever endowed award for IEEE-HKN, made possible through a generous donation from the Madni family and a matching gift campaign.

2016 IEEE-HKN President Elected President-Elect of Accreditation Organization



2016 IEEE-HKN President **S. K. Ramesh**, Ph.D. was elected the 2021-2022 President-Elect for the Accreditation Board for Engineering and Technology (ABET) by the ABET Board of Delegates.

ABET is a nonprofit organization that accredits college and university programs in applied and natural science, computing, engineering, and engineering technology.

Dr. Ramesh is an IEEE Fellow and founding Director of California State University, Northridge's (CSUN) internationally recognized [AIMS2](#) program that mentors and supports Latino/Latina students and underrepresented minorities in engineering.

Dr. Ramesh is a professor of Electrical and Computer Engineering at CSUN, established programs to serve industry practitioners in renewable energy, assistive technology, and advanced manufacturing. As 2016-2017 Vice President of the IEEE Educational Activities Board, he championed collaboration, diversity, and inclusive excellence, through innovative programs like the IEEE Learning Network (ILN).

Dr. Ramesh has served on the Boards of IEEE, ABET, and HKN.


2019 IEEE-HKN President Elected a 2021 Fellow of the National Academy of Inventors (NAI)



Dr. Karen Panetta, 2019 IEEE-HKN President and founder of Nerd Girls, was elected a Fellow of the National Academy of Inventors (NAI).

The honor recognizes her "prolific spirit of innovation in creating or facilitating outstanding inventions that have

made a tangible impact on the quality of life, economic development and the welfare of society," according to the announcement from the NAI. Election to NAI Fellow status is the highest professional distinction awarded to academic inventors.

Dr. Panetta is the Dean of Graduate Education and Professor of Electrical and Computer Engineering, Computer Science, and Mechanical Engineering at Tufts University, Medford, MA. Her research focuses on developing efficient algorithms for simulation, modeling, and signal and image processing for security and biomedical applications. Under her leadership, Panetta and her team have developed artificial intelligence (AI) software that has the potential to improve medical and dental diagnostics. Recent work by the lab includes AI software that can identify cases of COVID-19 pneumonia from x-rays and CT scans, and an AI program that reviews panoramic dental x-rays and alerts clinicians of results that require closer inspection. 

Members' and Volunteers' Innovation and Dedication Lead to Growth

We are proud to present to you the IEEE-Eta Kappa Nu (IEEE-HKN) 2021 Year in Review. As the Honor Society emerged from the shadow of quarantine and closures brought on by the pandemic, its membership grew, and its impact expanded. The work completed in 2021 held fast to the IEEE-HKN's 2020-2025 Strategic Plan. Last year, 2021, was a year that saw increases in student and professional member inductions; nearly 66,000 hours of service from our student members; and an invigorated and reimagined [HKN.org website](https://www.hkn.org).

The Board of Governors and Committee members enhanced programming for Graduate Student Members and alumni and reorganized its committee structure to support activities for these members. HKN developed and continues to add content to the [IEEE-HKN YouTube channel](#). The channel has become a great resource for watching professional development webinars, tech talks, and podcasts focused on the young professional experience as well as the Society, its members, and its partners.




The IEEE-HKN Student Leadership Conference (SLC) attracted record-breaking attendance with representatives from 85 Chapters from 22 nations. Apple Co-founder and HKN Eminent Member Steve Wozniak kicked-off the conference as

the keynote speaker. Some 52 other sessions and a recruitment fair were held virtually over four days to train and engage our Chapter leaders and members. The Conference was funded in part by a generous grant from the Samuelli Foundation. This marks the first time the SLC received a grant.

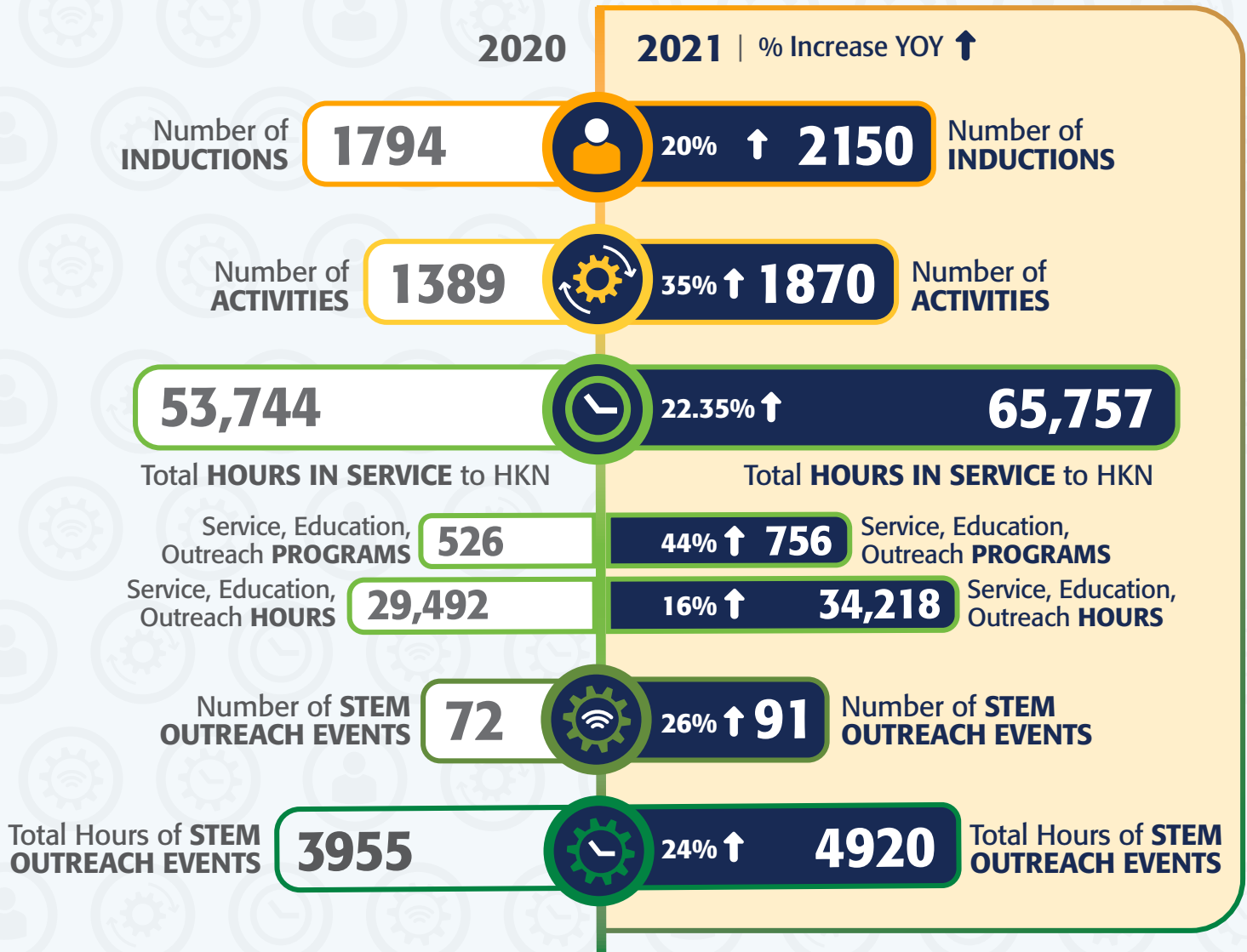
The Board's focus on the future sustainability and growth of HKN resulted in not only program enhancements, but also increases in annual giving and major gifts. A generous gift from HKN Eminent Member and HKN President (1998-2000) Richard Gowen and his wife, Nancy, paved the way for Alumni Receptions. HKN members in all stages of their careers will gather at small events held in conjunction with IEEE events and conferences. Through these gatherings, we hope to connect members with each other and the society at large. We mourn the loss of our friend, Dick (*pictured below*), who passed away in November. He was a gentleman and scholar and was integral to HKN's merger with IEEE. [Read more about Dick and his legacy here.](#)



Richard Gowen signed the merger agreement between IEEE and HKI in 2009.

We encourage you to read the articles and review the statistics on the next several pages that illustrate HKN's growth and impact. We hope they energize you to engage and re-engage with the Society. 

2021 Year in Review



5 NEW CHAPTERS

A total of 5 new chapters, including 2 in Spain, despite the pandemic.

85 CHAPTERS AT SLC

Record **number** in 2021

SLC ATTENDANCE 301

Record **attendance** in 2021

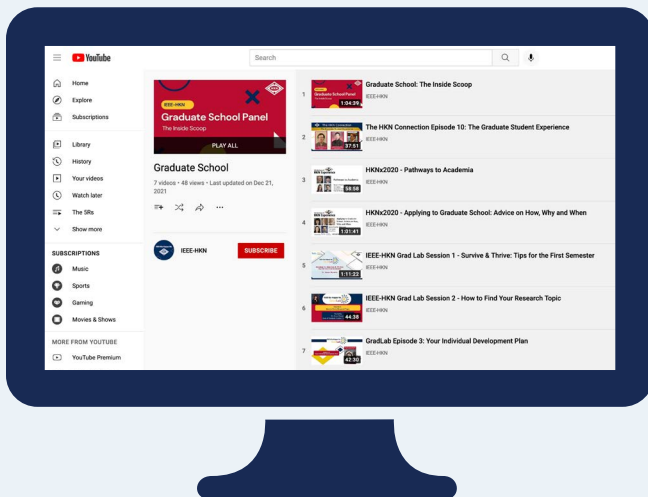
(SLC—Student Leadership Conference)

In 2021, the IEEE-HKN Board of Governors restructured the organization to better serve all members, no matter what stage of their career they are in. Two Ad Hoc Committees were formed: Alumni Engagement and Professional and Graduate Activities. As of 1 January 2022, the two became full committees of the Board charged with enhancing programming and opportunities for these audiences.

In this issue of THE BRIDGE, we will focus on the programming created for Graduate Student members. These students are at a pivotal point in their engineering journey, some deciding to go into industry, others into academia, and others trying different paths.

A core group of HKN Graduate Students has begun a monthly newsletter focused on topics of interest to this demographic. [IEEE-HKN's YouTube Channel](#) is growing weekly with professional development sessions, podcasts, and tech talks focused on this group.

The following is an example of the new Grad Lab series of webinars developed and coordinated by Dr. Karen Panetta, 2019 IEEE-HKN President and Dean of Graduate Education for the School of Engineering, Tufts University.



Grad Lab Webinar Series

by Karen Panetta, 2019 IEEE-HKN President, Dean of Graduate Education for the School of Engineering, Tufts University

IEEE-HKN has created a series of Grad Lab webinars that discuss topics to help graduate students survive and thrive in graduate programs. The sessions are free and designed with the input and topics proposed by IEEE-HKN student members and from the many lessons learned advising and supervising graduate students from my years as a faculty member and Dean. Some of the topics are summarized here and we are always seeking more ideas for future sessions.

The Secrets of Graduate School No One Ever Told You

Pursuing a graduate degree is a wonderful way to further one's career and build new skills and competencies that can propel a career and boost salaries. The process of applying for a graduate degree program differs significantly from applying to undergraduate programs, yet no one ever tells students this! As a Dean of Graduate Education, I have learned all these insider details of the graduate application process and want to share these with students to help them navigate the process easier and have a much more successful experience.

Graduate school is about building a partnership between faculty and students. For Ph.D. programs and other thesis programs, it is not all about the student just taking courses. This is especially important if the student is going to receive a stipend and tuition scholarship.

Let's review all the stages of navigating a graduate program and reveal the recipe for succeeding in graduate school.

First, applications for graduate programs are reviewed by the faculty members in the program and department to which the student is applying. Thus, the faculty whose classes students will be taking and conducting research with, will be providing input on a student's application. Faculty members on the graduate review committee are looking for applicants who possess good scholarship, but they are also considering whether they think they can work with the student and if the candidate would work well with

others. Therefore, it is important that if there are specific faculty a student wishes to work with, the student should note this and give details in a personal essay detailing the most appealing aspects of their work as well as what they can contribute to the team.

To Be or Not to Be a Ph.D.?

Students graduating with a bachelor's degree, who are applying to a Ph.D. program, have the most to consider because they have little experience compared to applicants who may already have earned a master's degree. Many students apply to Ph.D. programs because they know these programs come with the best probability of receiving tuition aid or funding and a stipend. If funding is the priority, students must investigate which programs and degrees have the possibility of tuition scholarships and stipends.

This is a major difference from undergraduate financial aid, where students receive aid based on their scholarship potential or financial need. One can be a stellar student, but if a program does not include aid, it is not magically going to appear. For instance, many master's programs do not come with any aid or stipends, yet students apply, get admitted, and then appeal for funding in vain. I always wonder why a student would pay an application fee, which is not cheap, when they know funding is not an option. Don't waste your time!

Students tend to pursue "brand name/designer" institutions, even if the institution doesn't match the student's goals. Oftentimes, this means the student has not really thought about what their goals are or what kind of program and environment is conducive to their success. There is an abundance of other exceptional small institutions that do provide funding and are often providing a better fit for the student. In the U.S., there are many fine institutions, not just the ones on the coastlines, that are producing impactful leaders and experts.

Many schools are offering combined BS/MS programs to undergraduate students that expedite the student's path to earning an MS degree with significant tuition discounts, fewer application requirements, and waived application fees. These programs are great options because they don't require the student to move and navigate a new campus, new policies, and new environments.

My favorite option, when money is an issue, is to get a full-time job and continue part-time if the company offers tuition reimbursement. This option allows students to learn about real-world problems in industry, which can help focus their graduate studies. Since the pandemic, many institutions are

offering their courses online, which provides great flexibility for people who have full time jobs.

So many IEEE-HKN students have an entrepreneurial spirit and question whether another technical degree is needed or whether an MBA is the more suitable choice.

I say, "why not both?"

Institutions are offering dual MS/Engineering Management/MBA programs that are addressing this need. Pursuing two degree programs independently could be astronomically expensive and take years, so these programs offer expedited and lower-cost options that overlap/double-count program requirements to get students both the technical and business skills to satisfy both degree programs.

Deciding on pursuing a Ph.D. program should not be considered lightly. Desiring people to address you as "Doctor" is not a good reason to pursue a doctoral degree. Research laboratories, educational institutions, higher-level administration, and leadership roles in institutions and companies may require doctoral degrees.

Ph.D. programs are rigorous, can be stressful, and take five to seven years to complete. When one enters a Ph.D. program, they should be in good health, both physically and mentally. Too often, students come to Ph.D. programs thinking it will be a good environment for them to do things at their own pace and not be held to the rigid 9-to-5 cubical life of a full-time industry job. Graduate school is a fast-paced, dynamic environment that requires resiliency and patience.

Funded Ph.D. positions come from a grant awarded to the adviser who wrote that grant and is committed to fulfill the work promised in the grant. They have deadlines and milestones, and the money is not just for the student to study what they want at their own pace. It's a job with expectations -- just like an industry position. If the student decides they don't want to be in that faculty member's research group or work on that specific project anymore, the obligation of finding a new position with funding is on the student. The funding does not follow the student.

Think of it this way: The faculty member is paying to support their Ph.D. students from their own bank account at their discretion. If a student decides to leave the job or wants to change topics, even within the same group, and those goals are not part of the faculty member's awarded contract, they can't pay the student to do that work. As a matter of fact, it's illegal for faculty members to pay students from a

funded grant if the student hasn't worked on tasks related to that grant.


Some programs allow PhD students to only take courses their first year and then find a faculty match at the end of the first year. Students must be proactive in engaging with faculty and building relationships. This is best done through the classes the student may take with the faculty member, attending department seminars, and completing projects with faculty members. Do not expect that this matching is an automatic process. If at the end of the year, a student hasn't found a willing supervisor, then the student may have to exit the program permanently!

Teaching assistant positions come with responsibilities for supporting undergraduate classes and laboratories. It is imperative to prepare long before a lab or assignment is given to the students. Prompt feedback to students is essential. Teaching assistants are evaluated on their timeliness.

Juggling research and teaching assignments requires truly exceptional organizational skills. Meeting with the instructor

of the class before classes begin and performing the labs to ensure the materials and equipment are in good working order is essential. If something goes wrong in a lab, rescheduling labs can be time-consuming and require significantly more hours for the Teaching Assistant to resolve. Thus, early preparation and backup plans are key.

Teaching assistants tend to perform much higher on Ph.D. qualifying exams because of their intimate knowledge of subject detail. However, teaching assistants answer to multiple bosses, namely the faculty whose classes they are serving and the graduate student's own research supervisor. This may seem like an intimidating organizational structure, but teaching assistants are the students the faculty get to know best and become the most respected in the department. They are often first in line for wonderful opportunities because of the broad exposure for their abilities and work ethic.

Regardless of the program one chooses, it's the student who really makes the institution successful for themselves. One can forge their own pathway and a graduate degree can help get them there. 

17 MS programs to
choose from, plus 4 new
100% online programs

Learn more:

go.tufts.edu/engmasters

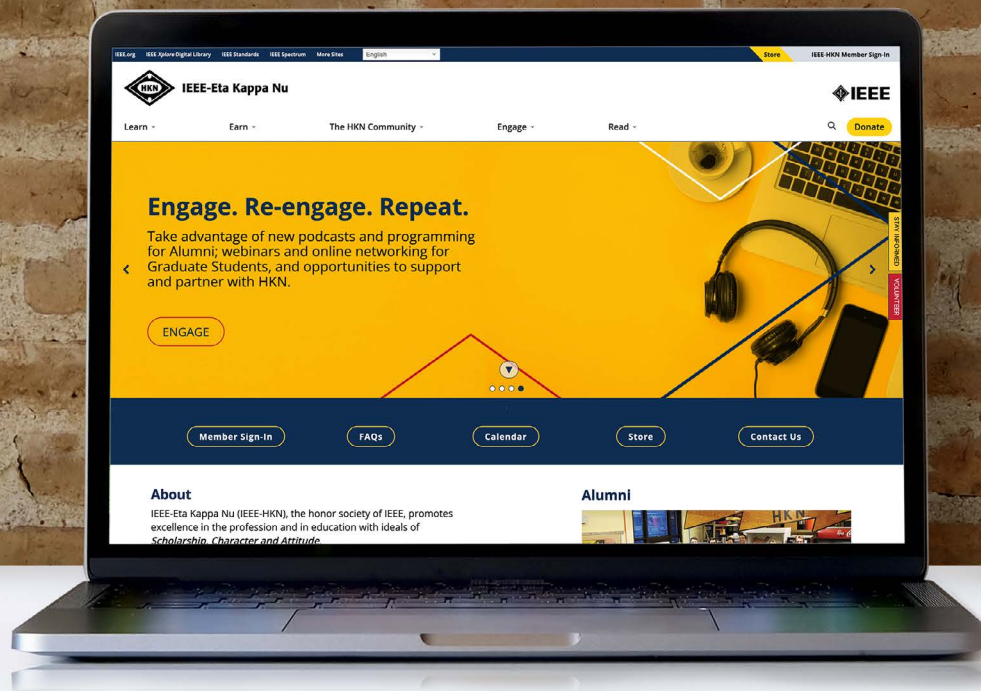
PhD, certificate, and postbac programs also available

Tufts
UNIVERSITY

School of
Engineering

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in as little as one year or at your own pace.



IEEE-HKN's New Website Showcases the Society's Best Asset: **Its Members**

What started out as a project to refresh and update the HKN.org website, turned into a much more comprehensive endeavor that resulted in a dynamic, exciting, and comprehensive new website for HKN.

The website is now truly a home for all HKN communication and information. It's presented in a way that is more attractive and brings a human element to the site, so that frequent and casual users learn more about HKN.


The HKN story is better told through the addition of photos, videos, and testimonials from our members and partners added throughout the site.

This volunteer-led and staff-supported project began in 2019 with a deep dive into what HKN's varied audience members would need and expect from the site. Groups studied included: student members, potential members, early, mid- and senior career

professionals, retirees, volunteers, donors, Chapter advisors and officers, and university department heads.

Based on the findings of that exercise, the Public Relations and Communications Committee in 2020 and 2021, assessed every page for its effectiveness. Top and lower navigation was renamed and realigned to better serve our various audiences. Content was created for all top-level and second-tier pages with an emphasis on letting members tell their HKN stories.

A new members-only site was also created to better serve the volunteers and assist the members in transacting business with IEEE-HKN.

[Take a tour](#) of the site. Or, better yet, [go check it out](#) for yourself! 

The culture of philanthropy is baked into the DNA of IEEE-HKN as it is embodied in our guiding tenets of Scholarship, Character, and Attitude. IEEE-HKN relies on donor support to strengthen chapters, connect any member, anywhere with other members and the global society, and offer programming that serves all members at any stage in their career.

IEEE-HKN is grateful to the individuals and organizations that have started us on a path to invest in professional development and networking events, launch programming that young to senior-level professionals have long been asking for, and create and enhance the resources, training, and programs every Chapter needs to reach their full potential. Simply put, HKN could not exist or grow without our members' generosity and their belief in our mission.

The story below demonstrates one way that our members' financial support is strengthening the entire HKN organization and nurturing members who are prepared and motivated to enhance the HKN experience throughout their lives and careers.

John and Jo-Ann McDonald Pledge to Seed HKN Student Chapter Support and PES Scholarship Fund

With 47 years of experience in the electric utility transmission and distribution industry, John D. McDonald's role as an IEEE Foundation Director, and his 150 published papers and articles, it may be hard to imagine John as an undergraduate student at Purdue University. Yet, in 1971, it was coed John who first joined both IEEE and the Power & Energy Society (PES), and was inducted into HKN, initiating vital relationships that have spanned five decades. Throughout these past 50 years, John has remained a steadfast supporter (as a mentor, donor, and volunteer) of IEEE and the IEEE Foundation. John's unwavering dedication to sharing his time, talent and treasure continues to nurture the next generation of innovators and advancements in technology for the benefit of humanity.

In celebration of his 50-year anniversary as an IEEE and HKN member, John and his wife, Jo-Ann, made two significant four-year gift pledges to the IEEE Foundation. The first gift seeds the [IEEE-HKN](#) Student Chapter Support Program, which is scheduled



Join John and Jo-Ann as HKN strives to give every student the chance to be part of a strong, well-supported Chapter. **Give to the [Student Chapter Support Fund](#).**


to launch in March and is designed to fuel the innovation and ingenuity of IEEE-HKN, its Chapters and its members.

The second gift, to the [IEEE Power & Energy Society Scholarship Plus Initiative](#) (PES S+), will help promising students become successful practitioners in the field of power and energy, many of whom are HKN student members.

John says, "When I was inducted into HKN as a second year Electrical Engineering student at Purdue, it gave me confidence that I was doing well in Electrical Engineering in a tough, competitive curriculum. This confidence has remained with me for over 50 years since my induction on May 2, 1971. The PES Scholarship Plus Initiative has influenced many undergraduate Electrical Engineering students to take power engineering courses and to have internships and co-op work sessions in the power and energy industry. Both IEEE PES and HKN have helped my career so significantly that Jo-Ann and I wanted to 'give back' to show our appreciation. I've been an IEEE member for over 50 years, and Jo-Ann and I have been married 42 years, so Jo-Ann has been an important partner with me in IEEE!"

Throughout his years in the electric utility industry, John has pursued his passion for encouraging young people to become involved in power engineering. Last October, he presented two sessions for the IEEE-HKN Student Leadership Conference. The first discussed 12 things to remember when living and managing a career. The second dove into building a successful, long-term mentor-mentee relationship. He presented this session with one of his current mentees, Sabrina Helbig, Beta Delta, University of Pittsburgh.

In 2011, John volunteered to participate in the scholar selection process of the IEEE PES Scholarship Plus Initiative, wherein he evaluated and scored applications in the first five years of the initiative from 2011 through 2015. He would have continued, but he was term-limited after five years! "I was impressed with the quality of the student applications and encouraged that these motivated, exceptional students were the future of IEEE PES and our industry", John explained.

John served on the IEEE PES Governing Board for 12 years, where he held elected positions as Secretary and President. He served on the IEEE Board of Directors as IEEE Division VII Director and the IEEE Standards Association Board of Governors. During the five decades John has been a part of the IEEE community, his generosity and commitment to the ideals of IEEE have become well known and we are grateful for all he and Jo-Ann do every day to make the community stronger and ready to face the next challenge! 

**IEEE PES S+ Scholarship application opens
1 March. [LEARN MORE](#)**



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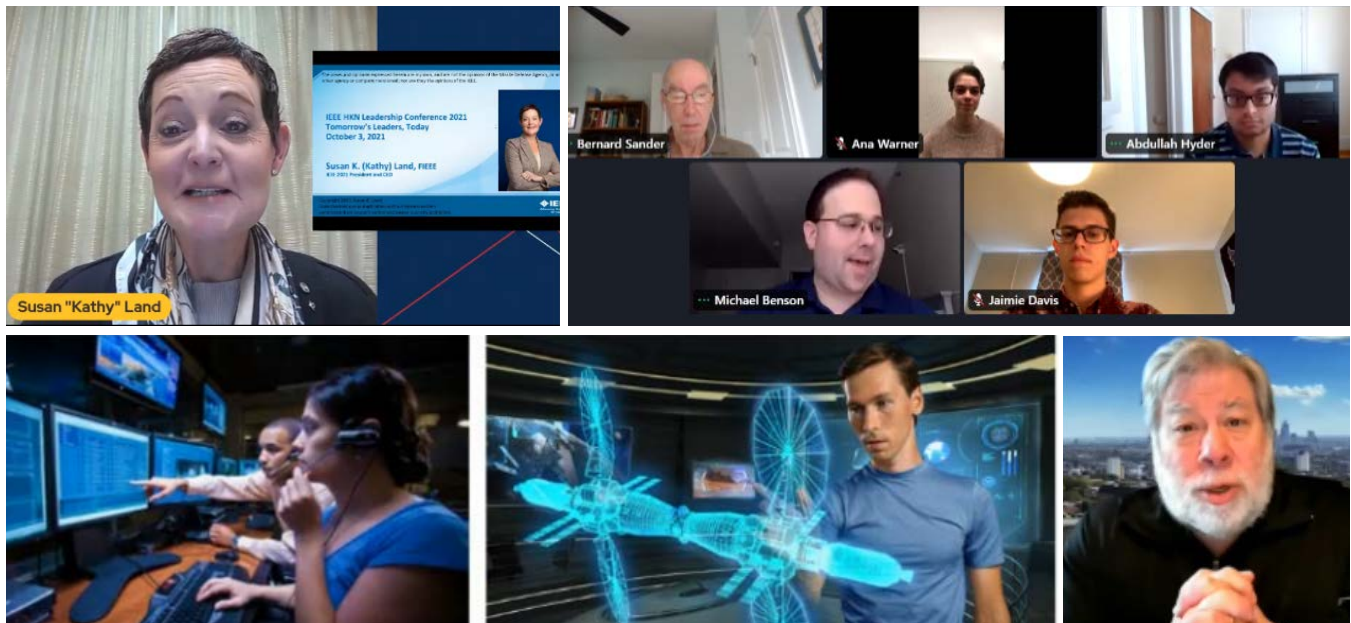
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IEEE-HKN SLC: Record-Breaking Attendance



The IEEE-HKN Student Leadership Conference was held on 2, 3, 6 and 9 October 2021 where IEEE-HKN received its first ever grant from the Samueli Foundation.

301 Registrations ■ 92% Attendance ■ 85 Chapters ■ 53 Sessions ■ 22 Countries

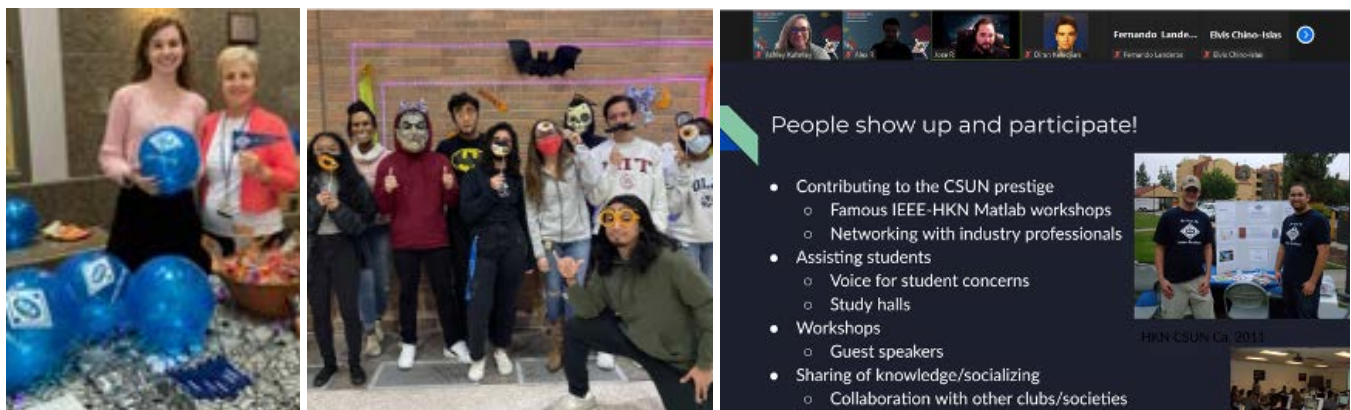


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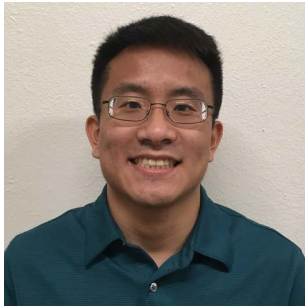
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Ph.D. Student at CalTech and Former Secretary of IEEE-HKN Theta Rho Chapter is Named 2021 HKN Outstanding Student of the Year



Frank Yuan-Shaw Yang, a 2021 National Science Foundation Graduate Research Fellow and 2021 Phi Beta Kappa Honor Society (Rice University Chapter) inductee, has been selected as the 2021 Alton B. Zerby and

Carl T. Koerner Outstanding Electrical or Computer Engineering Student Award recipient.

He is currently pursuing a Ph.D. in Applied Physics at the California Institute of Technology, Pasadena, CA.

Frank served as Secretary of the IEEE-HKN Theta Rho Chapter at Rice University, where he earned a Bachelor of Science degree in Electrical Engineering and a Bachelor of Art in Physics. He graduated Summa Cum Laude in May 2021.

His was a Summer Undergraduate Research Fellow (2021), Quantum-SURF Fellow at Atwater Group: Quantum Optics/Nanophotonics, researching coupling hexagonal boron nitride quantum emitters with dielectric metasurfaces. He also served as an Undergraduate Research Assistant at Naik Group: Nanophotonics from 2017 to 2021, at the Department of Electrical and Computer Engineering, Rice University, researching non-Hermitian nanophotonics in the visible, depth sensing with optical metasurfaces.

Frank is the recipient of numerous awards, including the Rice University Electrical and Computer Engineering Best Senior Design Project (2021); Rice University Distinction in Research and Creative Work Award (2021); Rice Engineering Alumni Senior Merit Award (2021); Rice Engineering Alumni Distinguished Research Excellence Award (2021); and the James S. Waters Creativity Award (2021), which recognizes unusual creativity in independent work.


One of Frank's nominators Gururaj V. Naik, Assistant Professor of Electrical & Computer Engineering, Rice University, said: "(Frank's) dedication, inspiration, hard

work, and creativity have enabled him to transform into a fine scientist-in-the-making. He has lead research projects in my group, presented in international conferences, won the best presentation award at Materials Research Society (MRS) conference in 2020, authored four papers (one currently under review), and is currently preparing another."

Frank served as an Academic Fellow for Brown College, where he lived while on-campus living was permitted. He tutored students in Physics.

Benjamin J. Fregly, Ph.D., Professor and CPRIT Scholar in Cancer Research, and Brown College Magister, said: "To become an Academic Fellow, not only does a student need to have a strong GPA, but the student also has to have a demonstrated ability to teach and help others learn. Frank is a rare breed in that he is both brilliant intellectually and able to communicate well with other students who need academic assistance."

Frank will receive a US\$1,000 award honorarium and an engraved plaque.

[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. 

The Outstanding Student Award Finalists for 2021 were:



Alexander Bushinsky
Epsilon Omicron Chapter
University of Delaware



Hannah Schroeder
Epsilon Epsilon Chapter
University of Houston



JOHN DEERE

We run together.

We live up to the legacy our founder forged nearly two centuries ago by creating a culture that brings out the best in all of us. A culture where great ideas thrive because every voice is heard. We run so life can leap forward.

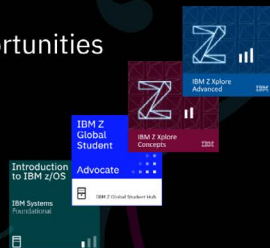
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Meet the IEEE-Eta Kappa Nu 2021 Awards Program Recipients

[IEEE-Eta Kappa Nu](#) (IEEE-HKN), the honor society of IEEE, is thrilled to announce the recipients of the 2021 IEEE-Eta Kappa Nu Awards and Recognition program.



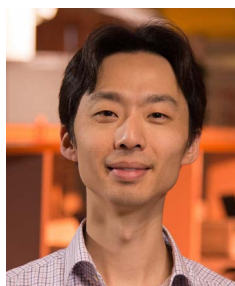
Dr. Krishnendu Chakrabarty, the John Cocke Distinguished Professor and Department Chair of Electrical and Computer Engineering at Duke University was named the recipient of IEEE-Eta Kappa Nu's highest honor, [IEEE-HKN Asad M. Madni](#)

[Outstanding Technical Achievement and Excellence Award](#), for 2021. He was recognized "for impactful research contributions in micro-fluidic biochips, technology transfer, and student mentoring."



Dr. Steve E. Watkins, 2018 IEEE-HKN President and Interim Chair & Professor, Electrical & Computer Engineering Department, Missouri University of Science & Technology, has received the 2021 [IEEE-HKN Distinguished Service Award](#) "for

a career of outstanding contributions and sustained service to IEEE-HKN."



Dr. Hayden Kwok-Hay So, Associate Professor, Department of Electrical and Electronic Engineering at the University of Hong Kong, is the recipient of the 2021 [C. Holmes MacDonald Outstanding Teaching Award](#) "for innovation and dedication

in improving undergraduate engineering education through project-led learning experience."



Dr. Vineetha Menon, Assistant Professor, University of Alabama in Huntsville, received the [Outstanding Young Professional Award](#) "for exemplary contributions that uphold the core values of IEEE-HKN: through scholarship in

multidisciplinary Big Data applications research, with impactful leadership, mentoring, and empowerment of women and minorities in STEM."

All four accepted their awards at IEEE-HKN's Awards and Recognition Ceremony held 9 October 2021 and were also recognized at the IEEE Educational Activities Board Awards Experience held virtually on 11 November 2021.

The 2021 IEEE-HKN Awards program was extremely competitive, having received a total of 70 nominations. In fact, the nominees for the Outstanding Young Professional Award were so strong that the subcommittee also named two honorable mentions for the award, the first honorable mentions ever conferred for this award. The honorable mentions are Dr. Amy K. Jones, Engineering Supervisor – Operator Station Module and Systems for John Deere, Construction and Forestry Division, and Dr. Achuta Kadambi, Assistant Professor, UCLA Department of Electrical and Computer Engineering.

Madni Award winner Dr. Chakrabarty has a sustained record of research contributions, student mentoring, and exemplary technical leadership.

He was elevated to the IEEE Fellow for contributions to design-for-test (DfT) of core-based SOCs. Subsequently, he pioneered the design of microfluidic biochips, including first optimization methods to manipulate nanoliter droplets. He was elevated to ACM Fellow and AAAS Fellow for these breakthroughs.


According to his nominator, Dr. Chakrabarty is recognized as a thought leader in bridging experimental microfluidics and biochemistry with algorithms and chip design. He is acclaimed as the “father” of design optimization for microfluidic biochips, according to his nomination.

Dr. Watkins, the recipient of the Distinguished Service Award, has been involved with Eta Kappa Nu and later IEEE-Eta Kappa Nu throughout his professional life. He was inducted as an undergraduate in 1982 through the Gamma Theta Chapter at Missouri S&T (then University of Missouri-Rolla), and was selected as HKN's Alton B. Zerby Outstanding Student for 1983. He is the longest-serving faculty advisor in the Gamma Theta Chapter's 69-year history.

Dr. Watkins was IEEE-HKN President in 2018 and currently serves as co-Editor-in-Chief of its flagship publication, THE BRIDGE, for which he spearheaded the transition from print to electronic format. THE BRIDGE has won eight consecutive [Apex Awards of Excellence](#) under his supervision.

Outstanding Teaching Award recipient, Dr. So, contributed immensely to engineering curriculum design at the University of Hong Kong through his project-led learning pedagogy, according to his nomination. He redesigned the introduction to electrical and electronic engineering course for all first-year engineering students at the University of Hong Kong (HKU). The new course placed a strong emphasis on the design thinking process.

Outstanding Young Professional award recipient, Dr. Menon, strives to constantly expand the horizons of Big Data analytics research at the University of Alabama in Huntsville through impactful multidisciplinary applications. Dr. Menon and her Big Data analytics lab collaborated with Dr. Jerome Baudry (UAH), Oak Ridge National Laboratory, and others on a COVID-19 drug discovery project. This collaborative project garnered international attention for its use of AI techniques to accelerate the drug discovery process using supercomputers for rapid healthcare response.

For more information on the IEEE-HKN Awards Program, please [visit our website](#). 

Recognizing Excellence

Nominations are now being accepted for the 2022 IEEE-HKN Awards Program. Nominate a colleague for HKN's top professional awards, including the Asad M. Madni Outstanding Technical Achievement and Excellence Award, the Distinguished Service Award, the Outstanding Young Professional Award, and the C. Holmes MacDonald Outstanding Teaching Award.

NOMINATE SOMEONE TODAY

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REGISTER NOW

New to [IEEE-HKN's YouTube channel](#): Sessions from the 2021 Student Leadership are being made available for on-demand viewing. While you are there, check out our Career Conversations and HKN Connection podcasts!

IEEE-HKN Member Benefit

18 and 19 March 2022

Registration is now open:

- US \$10 for IEEE-HKN members
- US \$20 for IEEE members
- US \$30 for non-IEEE members

Early Bird Discount:

*Register by 4 March
to receive a US \$5 discount*



Celebrating the Research Contributions of Our Graduate Student Members

Graduate Students, an important and growing part of the IEEE-HKN global community, are performing groundbreaking research. We have developed a new section in *THE BRIDGE* intended to celebrate and elevate their research contributions. The HKN Graduate Student Research Spotlight will be a standing feature in *THE BRIDGE* through 2022. The profiles of the students and their work will also be shared on our social media networks.

Each profile will showcase the intellectual merit and broader impact of HKN graduate student members' research, and will provide information about the student's background and where people can learn more.

We will spotlight these achievements while also showing potential graduate students what is possible!

Would you like to be featured?

[Fill out our submission form](#). Submissions will be reviewed, assembled into a profile template, and posted on HKN's social media pages. A select number of profiles will also be featured in *THE BRIDGE*.

New Advertising Opportunity

IEEE-HKN is the professional home to the world's top Graduate Students in Electrical and Computer Engineering, Computer Science and the allied fields of interest. Get your company or university in front of these students and HKN's undergraduate students who are considering their next steps by advertising in a special section in *THE BRIDGE*. Click [here](#) for more information and rates.

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Solar Villages Living



Demetris Anquez Coleman

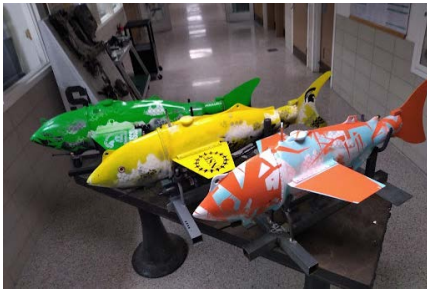
Xi, Michigan State University,
Ph.D. Student in Electrical Engineering



RESEARCH TOPIC

Control of Gliding Robotic Fish and Application to Environmental Sensing

Marine scientists study the ocean and other marine environments to help predict weather, maintain healthy ecosystems for marine life, test the safety of freshwater sources for human consumption, and much more. In the past, this work required time-consuming data collection by the scientist before analyzing the data. In my work, I develop robotic systems and algorithms to help automate data collection and environmental monitoring. The robots are designed to also be capable of real-time data analysis for informative/intelligent sensing, exploration, and long-term autonomy.



Team of Gliding Robotic Fish



Gliding Robotic Fish Swimming in Higgins Lake



Miniature Gliding Robotic Fish Testing Control Algorithms in Indoor Tank



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CONTACT

smlab.msu.edu



Colleen Josephson

Beta Theta, Stanford University, PhD in Electrical Engineering

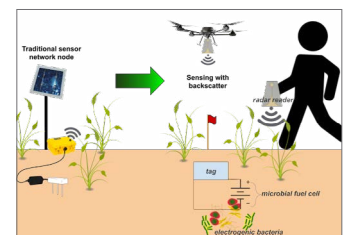


RESEARCH TOPIC

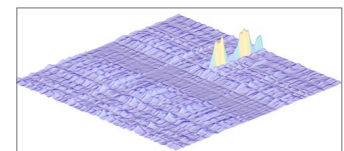
Enabling Low-power Ubiquitous Sensing with RF Backscatter

The goal of Colleen's research is to build scalable sensing systems for sustainability. Her work explores how RF backscatter can serve as a tool for designing low-power sensor networks. RF backscatter is the phenomenon of incident RF reflecting from the surface of a material back toward the source. This can be used to implement an extremely low-power communication system. Because backscatter communication consumes an order of magnitude less power than traditional wireless radios, backscatter-based sensor networks can be deployed in areas where there is insufficient power or communication infrastructure to support traditional sensor networks.

Colleen's contributions include designing novel sensors and sensing paradigms for agriculture, inventing techniques for ultra-low power communication for indoor sensor networks, and exploiting non-traditional energy sources, such as microbes. Her most recent work examines how to accurately sense soil moisture with RF using ultra-wideband (UWB) backscatter tags. Despite decades of research confirming the benefits, most farms do not incorporate soil moisture sensing into their irrigation practices because of the high costs, and the difficulty of deploying and maintaining the sensors. A backscatter-based approach, however, achieves the same accuracy as state-of-the-art commercial grade soil moisture sensors, but at a fraction of the projected infrastructure cost and maintenance load.



A comparison of traditional agricultural sensor networks vs. the future vision of using underground backscatter tags.



3D range-Doppler image after correlating an underground backscatter tag return signal.



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<https://cjosephson.net/>



CONTACT

cjoseph@alumni.stanford.edu



Samuel Talkington

Beta Rho, Georgia Institute of Technology, Ph.D. Student in Electrical and Computer Engineering
Ph.D. Candidate in Aerospace Engineering, NASA Space Technology Research Fellow



RESEARCH TOPIC

Physics-Based, Data-Driven Modeling of Solar PV and Smart Inverters

Utilities rely on software models of electric power systems for planning interconnections of new energy sources. These models are typically derived from the physical laws governing power system behavior. Today, private “behind-the-meter” installations of solar photovoltaics (PV) are expanding at a rapid pace, creating unpredictable changes in grid topology and increasing the risk that a system model may be inaccurate.

Samuel’s work, supported by Sandia National Laboratories, develops detection and estimation methods that meet the challenge of unreliable system models in an energy landscape with high levels of PV integration, helping to expedite society’s transition to a renewable energy portfolio.

Specifically, his most recent work develops new techniques to estimate the power factor control setting of a PV system’s inverter, which controls the ratio of active and reactive power supplied. In contrast with traditional approaches, the method reconstructs this setting without directly measuring the power injections. By integrating physical power system laws with high-dimensional statistical estimation methods, the inverter’s active and reactive power injections are reconstructed and separated using just voltage magnitude measurements from the grid, which are more readily accessible. These methods reduce the need for future deployment of expensive energy measurement devices on the electric grid, and can improve model accuracy in rural or underserved communities.

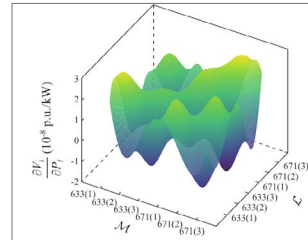


Figure 1: The real power voltage sensitivity matrix for a power system model. This matrix, based on power system physics, describes how the voltage measurements (M) respond to active power injections at different locations (L) in the system.

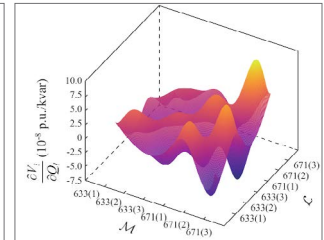


Figure 2: The reactive power voltage sensitivity matrix for a power system model. This matrix has subtle differences in comparison to the active power voltage sensitivity matrix in Fig. 1. Using them together allows for the power factor to be reconstructed.

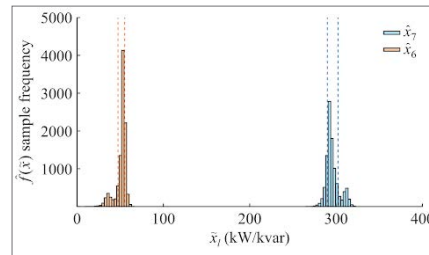


Figure 3: A visualization of reconstructing the power factor control setting of a distributed generator (e.g. Solar PV) using the voltage sensitivity matrices. (95% confidence interval bars shown). Injections of real (left) and reactive (right) power can be independently separated.



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CONTACT

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Jacopo Sini

Mu Nu – Politecnico di Torino, Politecnico di Torino, Italy

Ph.D. Candidate in Control and Computer Engineering, M.S. in Mechatronic Engineering, B.S. in Computer Engineering

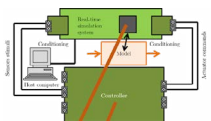


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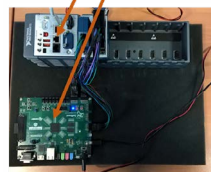
Novel Validation Techniques for Autonomous Vehicles

The development of highly dependable microprocessor-based embedded systems is a challenging activity. These systems are fundamental to making vehicles more flexible and efficient, less polluting and safer. Unfortunately, these systems raise functional safety issues since they have to react on time and appropriately, even if hardware failures affect their components. It is required that these systems be reviewed by two analyses: Hazard Analysis and Risk Assessment (HARA) to determine the risk levels associated with the hazards involved in the requested functionalities and Failure Mode, Effects, and Diagnostic Analysis (FMEDA) to investigate how the possible failure modes of their components affect functional safety.

Jacopo’s work examined how to implement novel approaches to perform the HARA and FMEDA analyses to improve their repeatability and objectivity. He proposes methods to aid these analyses thanks to the adoption of simulation systems and fault models. In particular, in FMEDA, it is possible to assess the effectiveness of the fault detection, isolation, and recovery (FDIR) mechanisms implemented, resorting to embedded software. Real-time software testing techniques are used to validate the implementation on the target platforms. Teaching activities aimed at university students and company employees is a fundamental part of his work to disseminate these techniques and safety culture.



A screenshot from CoppeliaSim during the FMEDA of a mobile robot.



Real-time software testing harness



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<https://scholar.google.com/citations?user=5gopV8QAAAAJ>



CONTACT

jacopo.sini@polito.it



Hari Sadasivan

Beta Epsilon, U Michigan Ann Arbor, PhD candidate, CSE

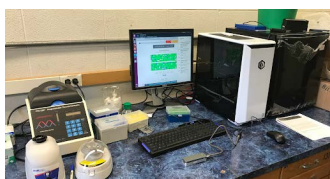


RESEARCH TOPIC

Accelerating Engineering Solutions for Healthcare

Hari helps architect rapid and accurate personalized healthcare solutions for the 21st century. Hari, being a computer architect with a deep passion for bioinformatics, does software-hardware co-design for healthcare, and more specifically for Precision Medicine. Hari's research has discovered faster solutions for portable and accurate DNA sequencing. Hari and his team's more recent work on a portable and programmable pathogen detector for future pandemics won the "functional" and "available" badges at the IEEE/ACM MICRO'21 artifact submission. The paper was presented at the MICRO'21 conference and selected for the ACM MICRO 2022 Top Picks with honorable mention. Hari is also working with NVIDIA to develop faster genome mapping solutions, which will have a direct impact on pathogen and cancer diagnostics.

Healthcare should start at home. Just like having a thermometer, every home should have an inexpensive, programmable device for testing for any infections, conditions, or diseases. Hari's research on rapid and accurate testing solutions on cheap and portable genome sequencing platforms takes us one step closer to this goal.



DNA sequencing wet-lab setup for rapid nanopore sequencing & data collection at EECS, U Michigan, Ann Arbor. Additionally, shown is the DNA sequencer to which we are building on-board compute power for rapid disease testing for personalized healthcare.



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<https://sites.google.com/umich.edu/hariss/home>



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Hannaneh Hojajji

Iota Gamma Chapter, University of California Los Angeles (UCLA),
Ph.D. Candidate in Electrical and Computer Engineering

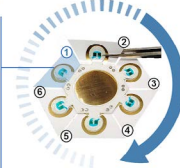
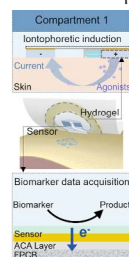


RESEARCH TOPIC

Autonomous Wearable Systems for Diurnal Sweat Biomarker Data Acquisition

Wearable biomarker sensing platforms are poised to catalyze the transition from point-of-lab and point-of-care to point-of-person health and wellness monitoring as they provide frequent, real-time, and contextually relevant measures of informative biomarker (health-marker) molecules. Among the potential wearable solutions, the sweat-based sensing modality particularly allows for accessing biomarker molecules non-invasively.

By engineering a programmable drug delivery system to control the body's biological response and designing and integrating electronically controlled electrochemical sensor arrays in a wearable format, Hannaneh has unlocked an unprecedented potential for noninvasive biomarker monitoring devices to reveal information about the body's dynamic chemistry. This way, the electronic modules used and integrated within wearables, such as smartwatches, can be transformed to devise the next generation of industrial healthcare and mobile consumer devices. These devices address the need and provide the engineering solution for personalized and precision medicine, enabling more customers to track their health information more frequently and autonomously. Additionally, the system she has been developing enables healthcare professionals to access the diurnal biomarker profiles for each individual to provide personalized care based on the specific biomarker traits of the patient. More importantly, it can reveal new sets of data to deepen understanding of health conditions and medical needs.



Presenting a hybrid-flex wearable system that enables autonomous sweat sampling — at programmable secretion rates — and analysis at intermittent timepoints for diurnal biomarker data acquisition and longitudinal personalized health monitoring.



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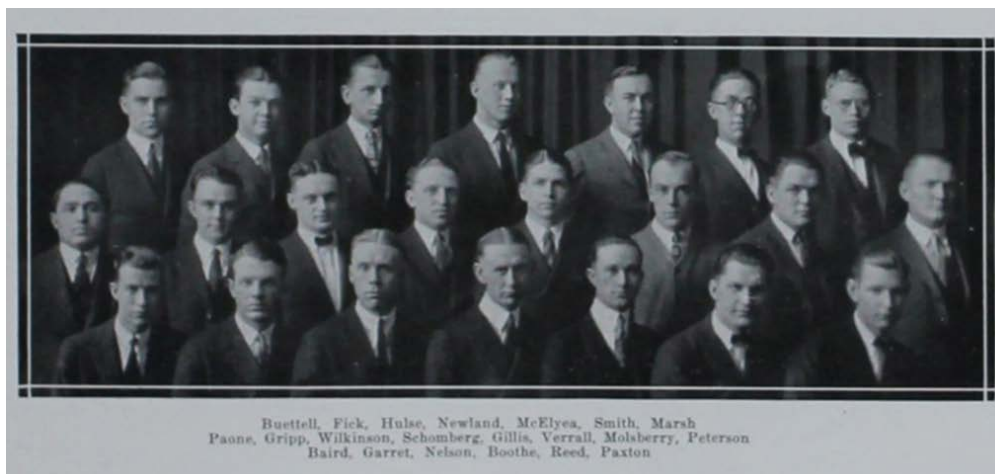
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HKN Outstanding Young Professional Award and Roger I. Wilkinson

by Steve E. Watkins, Gamma Theta Chapter and Co-Editor-in-Chief of *THE BRIDGE*

The Outstanding Young Professional (OYP) award is the oldest individual recognition given by IEEE-Eta Kappa Nu (IEEE-HKN). It dates back to 1936 as the Outstanding Young Electrical Engineer Award (OYEE). Only the Outstanding Chapter Award, established in 1932, is older. It was created to promote excellence among young electrical engineers in their technical accomplishments and in their service to others. The original award's judging formula was based on 50% technical accomplishments and 50% civic, cultural, community, and other activities. The current OYP award program continues this tradition with the purpose of recognizing "a young professional for meritorious service in the interests of humankind as evidenced by his or her past record and future promise, as well as for outstanding achievements in his or her chosen profession." To be eligible for the annual award, a nominee must have a degree in an IEEE-designated field of interest and must be younger than 35-years-old.

The OYEE award was organized by the New York Alumni Chapter with input from notable members, including E.B. Wheeler, one of the 10 founding members and the second HKN President. Past HKN President Roger I. Wilkinson was appointed as the chair of the planning committee and the chair of the formal OYEE Organization Committee. His efforts to create and implement the award in those first few years resulted in an innovative activity that raised the status of HKN within the professional community. From the beginning, the American Institute of Electrical Engineers (AIEE), a predecessor organization to IEEE, was involved. AIEE President Edward B. Meyer was a member of the first selection committee, and the award dinner was held for many years at the AIEE national convention. Wilkinson documented the award in "An Experiment in the Recognition of Engineers," *Transactions of the AIEE*, 56(8), 945-949, 1937. Currently, the OYP award presentation is part of the annual awards ceremony of the IEEE Educational Activities Board.



Roger I. Wilkinson, Founder of the HKN OYP/OYEE Award, is third from left in the middle row in this photo from *THE BOMB*, the yearbook of Iowa State University.

CREDIT: Iowa State University Library Special Collections and University Archives


This award program is a signature activity of HKN/IEEE-HKN. The records and career impacts of the recipients and honorable mentions demonstrate the value of a balanced life as presented in the initiation ritual.



Dr. Vineetha Menon

Dr. Vineetha Menon, University of Alabama in Huntsville, credits IEEE and IEEE-HKN with, "mentorship platforms that have a significant role in my professional success."

Menon, the 2021 OYP recipient, said, "The OYP award is a testament to my core

belief that 'no dream is too big, and no change is too small. So be bold and pursue your aspirations that'll leave a lasting impact on society.' It is a recognition of my efforts in dreaming big in all aspects of my professional life." 

Roger Ivan Wilkinson (1903-1985) was an electrical engineer prominent in the profession and in Eta Kappa Nu. In 1924, he graduated from Iowa State University and became an HKN member through the Nu Chapter. He held positions in the Bell System, which led to a 45-year career with Bell Telephone Laboratories. He received a Presidential Medal of Merit for his technical contributions to the war effort related to radar and was elevated to IEEE Fellow "for contributions to the application of probability and statistics in the engineering of communication systems." His estate established the Wilkinson Professor at Iowa State University.

Wilkinson was a life-long volunteer for Eta Kappa Nu. Highlights of his HKN service are: New York Alumni Chapter President 1928-29, National Vice President 1932-33, National President 1933-34, and Outstanding Young Electrical Engineer Committee member 1935-85. He authored articles in THE BRIDGE across several decades and contributed to many HKN developments, including the 1934 appointment of Alton B. Zerby as a salaried Executive Secretary. He is remembered as the founder of the OYEE Award for his work as OYEE Chair from 1935-42 and for his sustained OYEE committee support. HKN recognized him with its second Distinguished Service Award in 1972 and memorialized his lifetime of service in an article in THE BRIDGE, 82(2), 1985 [see issue archive at https://ethw.org/Eta_Kappa_Nu].



Steve E. Watkins was the 2018 President of IEEE-Eta Kappa Nu and received the 2021 IEEE-HKN Distinguished Service Award. He was inducted into the Gamma Theta Chapter at Missouri University of Science and Technology and currently serves as a Faculty Advisor for the Gamma Theta Chapter. He is the Professor and Chair of the Department of Electrical and Computer Engineering at Missouri S&T.

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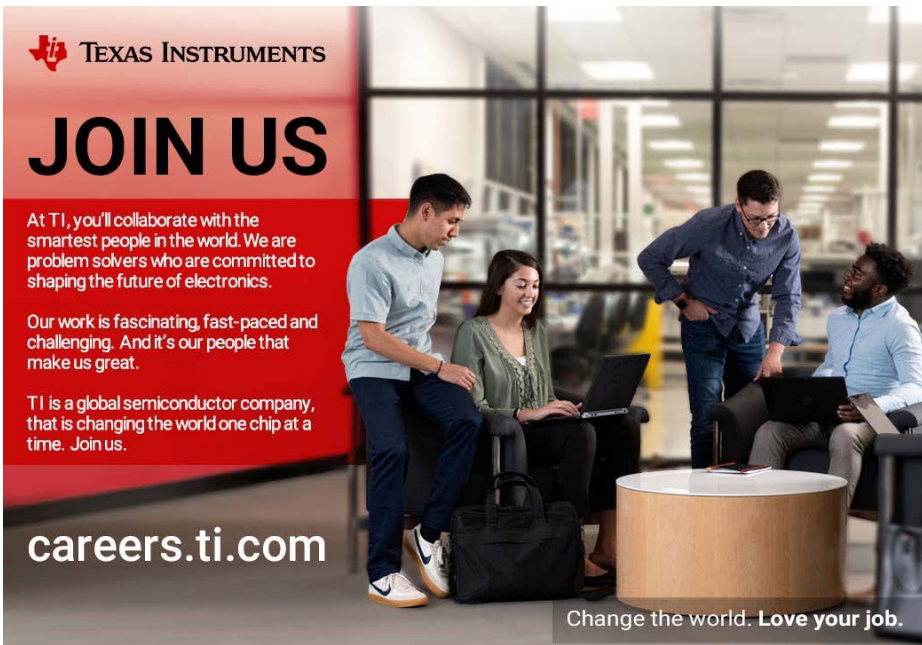
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Aaron J. Burke

Missouri University of Science
and Technology

Gamma Theta Chapter

Aaron Burke is a senior Electrical Engineering major at Missouri University of Science and Technology (MS&T). He has tried his hand at about everything there is to do on a campus, from being a student ambassador, to being a grader, to being a research assistant. He has also been a fundraising chair for the IEEE Student Branch, where he helped raise over US \$10,000 for operational expenses. While at IEEE, he and his team competed in the Region 5 Robotics and Ethics competitions. The team took first place in the Region 5 Ethics Competition. As Pledge Chair for the Gamma Theta Chapter, he presented at the ECEDHA/IEEE-HKN Town Hall and helped to induct over 10 members. In his limited free time, he enjoys playing chess, reading, and studying foreign languages. He married his high school sweetheart, Abigail, and they have three wonderful cats: Kits, Fish, and Beans.

Why did you choose to study the engineering field (or the particular field you are studying)?

When I was a kid, I thought electricity was magic. It simultaneously powered my home and shocked me on the carpeted floors. Electricity was the invisible force that provided me with my favorite forms of entertainment: movies, games, and gadgets. In high school, I competed in national robotics competitions and loved the process of programming autonomous systems. When choosing my field of study, I wanted

to pursue a degree where I could understand electricity and incorporate it into robotic design. Now, as a senior in Electrical Engineering, I can say with confidence that electricity is magic, and it is still shocking me today.

What do you love about engineering?

I love problem solving. The “Ah-Ha” moment when you realize what you need to do to solve a particularly challenging problem is always exhilarating. I especially love learning how to solve new problems. Whenever I learn something new, it feels like I have added a new tool to my toolbox. These new tools have immediate effects on the types of problems I can solve and how well I can solve them. The process of adding new tools and solving more problems is what constantly excites me about engineering.

What don't you like about engineering?

Engineering is hard. We can all see that engineering is used in our daily lives in a variety of ways, but learning about engineering is a challenge. You must have a good foundation in several other fields to be a successful engineer. You need to be good at math, communicating, and the specific science that you study. As a student or as an educator, it can be especially difficult to identify where in that process you have gone wrong and correct it. I enjoy engineering because of its ability to solve complex problems, but I think it can be a very discouraging field for those just beginning to pursue engineering.

What is your dream job?

Currently, I like the idea of becoming a professor. There are a lot of nice perks associated with continuing my education. I can continue to focus on my interest in robotics, share my knowledge with the world, and have a strong impact on the quality of the education of future students. In my opinion, there is no better field for someone with strong communication and technical skills. In addition, there is so much interesting, cutting-edge research, and I want to be at the forefront. Becoming a professor isn't just some far-off dream, it is the career I am actively pursuing. I am in the process of performing undergraduate research, in hopes that I can build a competitive resume for graduate school.

Whom do you admire (professionally and/or personally) and why?

I know it is somewhat of a trope to say that I admire my parents, but I really do. Now, I also have wonderful professors who are gifted with compassion, intelligence, and communication skills. They give me invaluable insight into what my future could look like. However, my parents gave me the foundation and skills I needed to be successful in the first place. I wouldn't be the hardworking, humorous, handsome man I am if I didn't take after my father. Nor would I be the kind, caring, intelligent man I am without my mother. They are my guiding lights in everything I do.


In what direction do you think engineering and other IEEE fields of interest are headed in the next 10 years?

Everything is getting smarter. We have so much data on every little thing we can find. I see our cars, power grids, and electrical systems becoming more intelligent. I see our batteries, distribution systems, and devices becoming more resilient and efficient. I think we are trending into a more integrated, electrical society every day. The need for electrical and software engineers is only going to continue to grow. My bold prediction in the next 10 years, which could be too soon, is about the growth of insertable embedded systems. Batteries and sensors that are powered by the motion, temperature, sweat, and stomach acid of our own bodies are actively being researched today. There is a real chance that we will start seeing commercially viable embedded systems literally embedded in our own bodies in the next 10 years. The real challenge will be dealing with the apprehension and safety surrounding such systems, but the technology is right around the corner.

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

From a technical standpoint, I think Ohm's Law has to be the single most important thing I have learned. However, I think the soft skills that school has taught me are much more impactful. My university has taught me to speak for myself, to be inquisitive, and to look for opportunities. I spent most of the early days of my internships training on the equipment and software that I would use. However, I received no training on the soft skills that were necessary for my jobs. Employers expected me to come with the soft skills that my education provided, and they trusted that I could learn everything else. Without my educational experiences, I could still teach myself how to program or how to calculate resistances. However, I don't think I would be able to communicate, cultivate, and pursue the opportunities around me.

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

Let someone else tell you no. If you want to perform research, join a design team, or pursue some creative endeavor, then you should do it. Don't be your own gatekeeper and tell yourself you need to be older, more experienced, or more creative before you can do those things. Just go try them because there is no better way to build the experience. Someone else will tell you no, so don't be self-limiting. There are many opportunities that you shut down, even though everyone else would let you pursue them. There is one caveat to this: It is easy to say "yes" to everything and spread yourself too thin. Make sure you are only pursuing the opportunities you wish to pursue. 

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William R Goodin, Ph.D.

Alumni Advisor for Student Groups
UCLA Samueli School of Engineering

Iota Gamma Chapter

Dr. William Goodin has more than 35 years of experience in alumni and corporate networking and partnerships, mentorship, and alumni relations. He currently helps alumni and corporate partners stay connected and involved with UCLA and UCLA Engineering and helps engineering students connect with alumni and corporate partners for career opportunities.

He was previously Associate Director of Alumni Relations at the UCLA Samueli School of Engineering. Prior to that, he was Director of the Short Course Program at UCLA Extension, where he was responsible for several hundred courses in computer and information systems, engineering, and technical management for customers around the world.

Dr. Goodin volunteers as an Alumni Advisor for IEEE-HKN at UCLA, as Chief Advisor for Tau Beta Pi, Counselor for the Society of Women Engineers, and as an Alumni Advisor for IEEE. He has been honored to receive the Rodney D. Chipp Memorial Award from SWE, the MacDonald Mentor Award from TBP, and the Outstanding Branch Counselor Award from IEEE.

Dr. Goodin holds a BA in mathematics from San Jose State University, an MS in computer science, a Ph.D. in environmental engineering, and an MEng in engineering management, all from UCLA.



UCLA Chapter officers and OCA plaques

Why did you choose to study the engineering field (or the field you studied)?

I was an undergraduate mathematics major, who moved into computer science for graduate study, as that field was expanding in the late 1960s. My interest in computational methods and numerical analysis evolved into computational fluid dynamics and environmental engineering in the early 1970s, specializing in modeling of atmospheric pollution.

What do you love about engineering?

I enjoy creative thinking and problem solving.

Whom do you admire and why?

I admire those who are experts in their fields and are also able to teach and mentor the next generation.

How has the engineering field changed since you entered it?

Engineers now have much easier access to current information through the web. Also, much more powerful computational tools for problem solving.

In what direction do you think the engineering and other IEEE fields of interest are headed in the next 10 years?

Artificial intelligence breakthroughs will have a dramatic impact on all fields of engineering.

What is the most important lesson you have learned during your time in the field?

The ability to communicate clearly and effectively is an important skill for all engineers.

What advice can you offer recent graduates entering the field?

Practice your writing and presentation skills. Seek opportunities to go beyond what is required.


What is your favorite Eta Kappa Nu memory?

I was initiated along with (HKN Eminent Member) Dr. Asad M. Madni in a special ceremony chaired by Professor Alan N. Willson, Jr., (IEEE-HKN Distinguished Service Award recipient and Iota Gamma founding advisor, 1984-2017). Prof. Willson has retired from UCLA, but I still see Dr. Madni frequently.

Why do you support IEEE-HKN?

I am honored to be a member of IEEE-HKN and believe in supporting organizations that provide so many educational and professional benefits to their members.

What are the greatest opportunities for IEEE-HKN over the next three years?

I hope that IEEE-HKN will use its influence and technical expertise to help fight climate change. 



Warren H. Nicholson

President/CEO/Founder
of N-Fina Technologies
Theta Lambda Chapter

Warren Nicholson earned a BSEE (1982) and the first MSEE (1989) from the University of South Alabama. He was the president of the IEEE Student Branch in his senior year.

Warren worked for RCA Sarnoff Labs in Princeton, N.J. from 1982 to 1984 (primarily in HDTV). From 1984-1994, he served as Executive Director of Product Development and of laser printers at QMS in Mobile, Alabama. He then served as CTO at RTP Corp. in Pompano Beach, Florida from 1994-1999, and was the CEO, President, and Founder of N-Tron in Mobile from 1999-2010. He is currently is the CEO/President/and Founder of N-Fina Technologies.

Warren established the University of South Alabama's first endowed chair in engineering and has made numerous scholarship gifts to the ECE Department and the School of Computing.

He is currently is the Chair for SoutheastCon 2022, to be held 31 March to 3 April 2022 in Mobile, Alabama. SoutheastCon is the annual IEEE Region 3 Technical, Professional, and Student Conference.

Why did you choose to study the engineering field (or the field you studied)?

To have a deeper understanding of electronics and circuits. I am a musician and had a yearning to better understand the electronics involved in that hobby.

What do you love about the industry?

EE is constantly evolving with new technology.

What don't you like about the industry?

I see politics creeping in. Science and engineering need to apolitical.

How has the engineering field changed since you entered it?

More specialized tools and automation and simulation are available. We can do things in minutes now that used to take us weeks.

In what direction do you think engineering and other IEEE fields of interest are headed in the next 10 years?

Software and programming are becoming a bigger part of every new project.

This trend will continue. I also believe we need to reverse the trend of outsourcing and manufacturing everything offshore, or we run the risk of losing core capabilities and a brain drain.


What is the most important lesson you have learned during your time in the field?

When you are applying new technology, you need to become a student again and learn everything you can about that technology and its nuances before you deploy it. When learning about new technology, one must immerse themselves in it and try to lessen the learning curve ASAP so you can maximize your productivity.

What advice can you offer recent graduates entering the field?

Don't use the force. It's probably not going to be with you.

What is your favorite Eta Kappa Nu memory?

The induction ceremony with my classmates and Dr. Hayes. 

Leading the Transportation Electrification Revolution



By Bruno Lequesne, Chair, IEEE Transportation Electrification Community

It is not a hyperbole to say that the world is undergoing another technical revolution, with electricity (again) at its center. A key pillar of this transformation is the move to electrify transportation, and IEEE members are leading this effort. The [IEEE Transportation Electrification Community](#) (TEC) was formed in 2015 to coordinate the numerous activities within IEEE on propulsion, communication, and autonomous driving that form the main thrusts of this sea change. Within TEC, we discuss the technologies, standards, and projects that will enable the clean, connected, and efficient transportation and vehicular systems of the future.

We are working on cars, of course, but innovative technologies are being developed to electrify ferries, off-road vehicles, farming and mining equipment, drones, and even airplanes! TEC has members in all of these industries. We have a presence in Asia, Europe, North and South America, and in developing nations, because this transformation is not happening in a few industrialized nations, but worldwide. Each region is doing it in its own way and with its own priorities.

As an IEEE group, TEC is fairly new, but we are capitalizing on past and on-going efforts within the many IEEE societies. We have a quarterly [newsletter](#), with the next issue open to all topics related to TEC, while future ones will each have a special focus. [Previous issues](#) are available on the [TEC website](#), and past articles have been indexed on Google Scholar.

We participate in a number of [conferences](#) covering the various aspects of transportation. For example, the ITEC series, with events in North America, Europe, Asia-Pacific, and India, focuses on propulsion, charging, and infrastructure. In June, [ITEC+EATS](#) will be held in California, ITEC Asia-Pacific is expected to be held in October in China, and a similar event, ESARS-ITEC, is planned for later in Europe. [ITEC+EATS](#) is a combined conference with the TEC-AIAA Electric Aircraft Technologies Symposium, a growing yearly

event addressing the new and exciting developments in electric aircraft propulsion. Check out events in [intelligent transportation systems](#) as well.

This field is expanding rapidly, and continuing education is critical for engineers working in this industry. TEC provides [webinars](#), [tutorials](#), [podcasts](#) and workshops for seasoned engineers, young engineers honing their skills, and engineers transitioning to electrical applications with a non-EE background. A focused group of “Women in Transportation” was started last year, and is organizing online roundtables. For students, TEC organizes or participates in a number of competitions, as highlighted in the [September 2021 Newsletter](#) and the [IEEE TEC Prize Ph.D. Thesis Talk - 3 Min Ph.D. Challenge](#), where emerging researchers are challenged to summarize their cutting-edge work within 3 minutes.

The year 2022 will see exciting changes for us. TEC is hoping to move to a next phase and increase its support base of IEEE societies, thereby providing a single place within IEEE for professionals in the transportation industry to learn, mingle with others, present the results of their work, and meet young individuals eager to join this technical revolution. We expect to have local groups and chapters (we already have one in Beijing and another being formed in India), help develop new standards, and expand our activities further in this cross-disciplinary area.

[Consider becoming a member of TEC.](#) Membership is free if you are already a member of one of our sponsors, which include the following IEEE Societies: AESS, DEIS, IAS, IES, ITSS, PES, PELS, and RS. For those that do not belong to one of our sponsors, our participation fee is US \$10 for individuals and higher-grade members of IEEE or US \$5 for students (IEEE membership is not required for membership).

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COMPSAC 2022 2nd Annual Student OER Contest



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OERs (Open Educational Resources) are Web-accessible entities that can be used by teachers to teach, or students to learn. Submissions are open to undergraduate higher education students, working alone or in teams of up to 4, who have developed a Web-based OER that can be used for teaching or learning at the undergraduate college or university level of Computer Science or Information Technology.

OERs that qualify for this contest include materials that may have been developed for class projects, including animations, case studies, video presentations, simulations, tutorials, workshop and training materials, etc. Examples are (i) video presentation (e.g., a 10-minute video for teaching a computing topic), (ii) animation (e.g., an animation explaining a sorting algorithm), or (iii) website (e.g., a website for a computing-related tutorial). Please refer to the 2021 winning submissions at: <https://ieeecompsac.computer.org/2021/oer-contest-results/> for reference.

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For every team member (\$50 value for each)

Submissions must be directly available on the Web with a public URL – for example on SlideShare, YouTube, Instagram, institutional open online repositories, etc. Submissions will be judged based on i) content quality, ii) ease of use, iii) teaching and/or learning effectiveness, and iv) the overall potential impact of the OER on Computer Science or Information Technology academic programs.

To learn more, visit: <https://ieeecompsac.computer.org/2022/oer-student-contest/>

Last Date for Submission: April 1, 2022

Notification of Winners: May 15, 2022

Complete Collection of Women in Engineering Series is Among New, Free E-Books and Audiobooks from IEEE-USA for Members

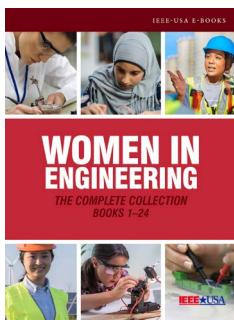
by Georgia C. Stelluto

IEEE-USA's New, WIE Compilation E-Book Offers Members the Complete Collection of Women in Engineering Series -- All 24 Books -- for free!

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This series is important for female engineers to read to compare and reflect on their own careers; to see the paths that women have taken before them; and to realize that a field that can, at times, seem like a sea of men—they are not alone. Other women before them have faced very similar struggles. But it is also a great read for any aspiring or young engineer wanting to explore the different paths a career in engineering can take—no matter their gender.



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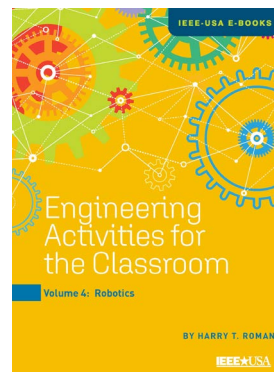
New Audiobook from IEEE-USA Explores Creative Career Approaches for Individuals, Groups

IEEE-USA has just released the third book in Sridhar Ramanathan's five-book series on Critical Thinking Skills for Engineers as an audiobook. Listen while exercising, during downtime at home, or in rush-hour traffic going to or from work.

In this audiobook/e-book, author Ramanathan builds further on critical thinking by exploring creativity, and looking at creative career approaches for individual engineers as well as teams or groups. People in the profession often consider creativity the core of engineering because, from it, engineers devise unique solutions to society's challenges. The World Economic Forum moved creativity up from No. 10 to No. 3 in its ranking of important attributes required for jobs of the future. LinkedIn's Learning Study ranked creativity No. 1 in its poll of critical job skills.

Download the new audiobook in [MP3 format here](#) or [from here](#).

The companion e-book is also available at no charge to members at the link above. Ramanathan's other e-books deal with analytical skills, communication, open-mindedness, and problem-solving.



Another New, Free IEEE-USA E-Book for Members Provides Practical Activities for Kids in the Classroom to Explore Robotics

Veteran educator Harry T. Roman's exciting new e-books offer teachers, students, and parents an educational series on engineering topics of timely

interest for the classroom. Teachers can use the activities in these books to develop lesson plans or assignments for students to engage them in the classroom or via distance learning they can do at home, with their parents, or by themselves.

In the fourth volume of the series, [Engineering Activities for the Classroom--Volume 4: Robotics](#), the author draws on his 50 years as an engineer and countless hours teaching students, to offer a steady stream of activities, project ideas, and discussion topics for teachers to use with students

from kindergarten to high school. He gives teachers a way to help their students of almost any age to explore robotics. The book provides practical activities to introduce students to robotics; and it gives them a better understanding of careers in the field. In addition, Roman offers an in-class design challenge to motivate and engage students.

The author of dozens of IEEE-USA e-books, Roman understands the value of teaching, and especially of teaching STEM to children. His love of engineering and an extreme desire to ignite a passion for engineering in future generations come through on every page, and in every suggested activity.

IEEE-USA is offering the new e-book, [*Engineering Activities for the Classroom—Volume 4: Robotics*](#), at no charge to members; and \$2.99 to non-members. Get [yours here](#).

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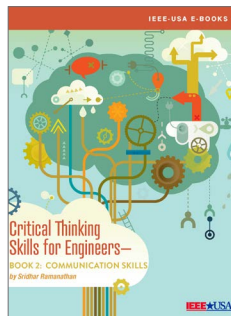
New E-Book Provides Critical Info for Researchers

In a new, informative IEEE-USA e-book, [*Good Research Practices in Academics: A Perspective for Developing Countries*](#), Dr. Abhishek Mahesh Appaji and Dr. Ramya Hariharan offer strong, practical advice for fostering and supporting researchers in developing countries.

While drawing on their varied and extensive research experiences in India, the book offers many tips, checklists, and guidance that can be valuable to researchers anywhere.

The authors outline the four main types of academic researchers: potential research scholars, research scholars, young researchers, and experienced/independent scholars. They stress how important it is to instill a curious mind, a desire for perfection, a clear research strategy, and strong research ethics and integrity in researchers at every level.

The book discusses how academic institutions can play a role in overcoming the four obstacles researchers face in developing countries: a lack of a well-defined research methodology; scarcity of research grants; difficulty in accessing experimental resources; and limited access to publications.



Download [*Good Research Practices in Academics: A Perspective for Developing Countries*](#), which is free to members and \$2.99 to non-members. No promo code necessary.

New Audiobook from IEEE-USA Offers Powerful

Tips for Improving Communication Skills

IEEE-USA recently released the second book in Sridhar Ramanathan's five-book series on Critical Thinking Skills for Engineers as an audiobook.

In his second audiobook on critical thinking for engineers, [*Critical Thinking Skills for Engineers—Book 2: Communication Skills*](#), Ramanathan delves into the importance of communication and the techniques an engineer can use to communicate with a team, a department, or with a larger organization.


Managing director and co-founder of Aventi Group (a high-tech product marketing firm), Ramanathan points out that for engineers, "Both oral and written communications are essential to group effectiveness, in achieving a specific goal." The audiobook covers eight key areas of communications critical for an engineer to master: asking important questions; active listening; expressing opinions and ideas; written communication; presentation; running a team meeting; collaborating on a project; and managing conflict. The author devotes a chapter to each of these areas, giving specific and helpful tips for better communication, as well as common pitfalls to avoid.

Download the new audiobook in MP3 format [here](#).

The companion E-Book is also available to members at no charge at the links above.

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Georgia C. Stelluto is IEEE-USA's Publishing Manager; Editor and Manager of IEEE-USA E-Books and Audiobooks; Department Editor of @IEEEUSA for IEEE-USA's flagship publication, *Insight*; and Co-Editor for IEEE-USA Conference Brief. 



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