

# IEEE Smart Village Delivers Solar Power to Nigerian COVID-19 Isolation Center



IEEE Senior Member Chief Tunde Salihu [third from left] and his employees successfully install a microgrid at the medical facility treating COVID-19 patients in Ilorin, Kwara, Nigeria. Photo Credit: Shaybis Nigeria Ltd.



When the coronavirus spread to Ilorin, the state capital of Kwara in western Nigeria, a medical center was built to isolate and treat the rapidly increasing number of COVID-19 patients. But like other communities in the country, the facility had limited access to electricity. That was until Shaybis Nigeria donated a SunBlazer IV solar-powered system. The system, which was designed by IEEE Smart Village volunteers, will provide electricity to the first wing of the four-wing facility. Shaybis Nigeria, also based in Ilorin, is one of three international manufacturers of the SunBlazer system. The company has been providing solar-power microgrids throughout the country for the past three years.

"These beds will be used to treat and provide care for those infected with the coronavirus

to help avoid spreading it to others," says Chief Tunde Salihu, the company's CEO and an IEEE senior member. "The solar-powered system will enable the medical team to power ventilators, monitoring machines, and sanitation equipment."

The facility was formally commissioned by the government in May. Since the installation, Salihu reports his company has been retained by the government to provide electricity for a number of doctor's offices and other medical facilities.

## SunBlazer History

A team of IEEE volunteers, as well as industry professionals, designed and developed the original SunBlazer to help Haiti after the country was devastated by an earthquake in 2010.

After feedback from field deployments, the system was enhanced over the years into a modular, adaptable configuration to flexibly meet the needs of each individual installation. Each base unit has six 300-watt solar panels that provide 1,800 watts total to charge portable battery kits, which can generate enough power to light rooms for several days. The unit has AC and DC outputs, which can charge cellphones and run small appliances. The SunBlazer IV can be assembled and expanded as needed.

IEEE Smart Village partners with entrepreneurs, such as Salihu, in underserved areas to set up micro utilities, bringing electricity to thousands while also creating jobs in the community. ■



Employees from Shaybis Nigeria set up the SunBlazer IV unit. Photo credit: Shaybis Nigeria Ltd.

Adapted from K. Pretz "IEEE Smart Village System Delivers Solar Power to Nigerian COVID-19 Isolation Center" *The Institute in Spectrum Online* 10 June 2020.

# EPICS in IEEE Puts the Spotlight on Future Engineers

## TryEngineering LIVE: Engineer Spotlight

This free virtual event series gives students a glimpse into the careers and lives of engineers.



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In the wake of COVID-19, schools around the globe began closing their doors and students were left to continue their education through distance learning. Though curriculum continued, through online learning, many of the extracurricular activities such as sports, clubs and career days were cancelled. To ensure that students still had opportunities to learn about careers in engineering, EPICS in IEEE launched the webcast: Engineering Spotlight.

Engineering Spotlight provides students with a glimpse into the careers and lives of engineers. It offers students who are interested in possibly becoming engineers, or who just want to learn more about the profession, an opportunity to hear from engineers and ask questions of those engineers.

The webcast features professional engineers, engineering students, engineering professors

and other technologists with experience in aerospace, biomedical engineering, oceanic engineering, quantum computing, engineering education and recent engineering program graduates. Inline with the vision of EPICS in IEEE, each episode highlights the work of engineers and how their work impacts their local communities and the rest of the world.

Episodes are free to students around the globe, and upon completion of each episode, students can obtain a 'certificate of completion'. There have been five full episodes thus far and a bonus shorter episode on Quantum Computing. Each episode has had about 130-200 views, and that number increases daily as they are all available on demand. If students are unable to attend the live broadcasts, they have the

option of watching them on-demand here: [tryengineering.org/news/tryengineering-live-webinar-series](https://tryengineering.org/news/tryengineering-live-webinar-series).

With the positive responses, and the growing audience, EPICS in IEEE plans to continue Engineering Spotlight with a new set of episodes releasing in mid-September 2020 if more funding becomes available. As the EPICS in IEEE team plans these episodes, we ask if you know of any students, engineers, companies and technologists doing amazing work for their community to please contact us and nominate them to be future guests on Engineering Spotlight.

If you would like to nominate a future guest, or become involved with EPICS in IEEE, please contact EPICS in IEEE at [EPICSinIEEE@IEEE.org](mailto:EPICSinIEEE@IEEE.org). ■

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# Donors John W. Estey and S&C Connect to the Future



John Estey and S&C Electric Company support the IEEE Power & Energy Society (PES) Scholarship Plus Initiative and the Scholars awarded the IEEE PES Scholarship Plus John W. Estey Outstanding Scholar Award, with their time, talent and treasure.

Every year, seven engineering students receive the IEEE PES Scholarship Plus John W. Estey Outstanding Scholar Award, distributed to the top IEEE PES Scholarship Plus Scholars in each of IEEE's six U.S. regions and Canada. "Those seven per year can be looked at as the top undergrads in IEEE in North America. Every year, these seven get a phone call from us," says Kevin DeWitt, Talent Acquisition Specialist for S&C. "We say congratulations. We tell them who we are and what we do—and we want to talk about their future. John Estey writes them letters."

S&C interviews candidates to find the perfect matches. Two former Estey Scholars, Gabrielle Madden (System Design) and Kaleb Spencer (Engineering Services), have joined S&C as full-time team members. According to Kevin, "Gabrielle and Kaleb both have very strong cultural fits. They have great personalities and are wildly intelligent. We're excited to have them here. It's a win-win!"

Since starting in September of 2019, Gabrielle's time at S&C has been meaningful. She says, "At S&C, I get to be a part of the power industry, a part of improving our society's foundation, by designing products that meet current and future needs of the grid. I'm excited to see how society advances 5, 10, 20 years down the road because of switching and protection designs S&C is developing today."

Kaleb points to the scholarship as an important part of his ability to complete school with a focus and determination that launched his career. "Receiving this scholarship, for me, was truly a blessing,"



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he says. "Being able to work less allowed me to become more active in the IEEE community. This scholarship also opened the door for me to work at S&C, which has truly been a wonderful experience."

Kevin works on the PES Scholarship program and considers it not only a great opportunity for students but an important recruitment tool. "With these Scholars working here, their talent should be and is enormous. We're hoping, ideally, that not only is John helping them, but they're helping the company because we're getting the top talent in North America here at S&C," he explains. "In a perfect world all Estey Scholars would come work for us," he adds.

Gabrielle's experience confirms the program's importance in keeping S&C's reputation and name alive for the next generation of innovators. "Prior to winning the Estey scholarship, I did not know S&C existed. I thought my only options to work in power were to work in generation, transmission, or distribution," she says. "The Estey scholarship opened my eyes to opportunities past traditional power engineering"

This year's group of Estey Scholars recently graduated or will graduate in 2021 with degrees in engineering, most specializing in electrical or computer engineering. There are five first-time PES Scholarship recipients, one two-time recipient and one three-time recipient. Soon enough, they'll receive their call from S&C and their chance to potentially join the S&C team. ■



Gabrielle Madden



Kaleb Spencer

# REACH Brings History to Life in the Classroom and Home



A tenth grader demonstrates how to make a light bulb with cardboard, pencil lead and batteries. Visit [reach.ieee.org/hands-on-activities/make-a-light-bulb-with-batteries/](https://reach.ieee.org/hands-on-activities/make-a-light-bulb-with-batteries/) to find a description of the hands-on activity and the materials needed to do this at home.



The donor supported IEEE History Center program, REACH (Raising Engineering Awareness through the Conduit of History) brings to life the relationship between science, technology and society through the lens of history. The free, online resources found on [reach.ieee.org](https://reach.ieee.org) help both teachers and parents engage students in the history of technology both in the classroom and while they are at home!

To share its resources more widely, IEEE REACH teamed up with TryEngineering in a new virtual series, TryEngineering Live: Hands-On Design Challenge. REACH was featured during the virtual event on 14 May. REACH Program Manager, Kelly McKenna and Senior Director of the IEEE History Center, Mike Geselowitz hosted the event as a student demonstrated how to make an electric light bulb with a cardboard tube and pencil lead, one of the hands-on activities from the IEEE REACH Electric



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Lighting learning inquiry unit. A video of the student demonstration may be found here: [bit.ly/EL\\_HandsOn](https://bit.ly/EL_HandsOn). There were 210 live attendees and more than 170 have watched it on-demand. This episode and other TryEngineering webinars and resources are available on-demand at [tryengineeringinstitute.ieee.org](https://tryengineeringinstitute.ieee.org).

This Hands-On Design Challenge alone increased traffic to [reach.ieee.org](https://reach.ieee.org) by 32% as people sought out additional resources. Explore other free IEEE REACH inquiry units which include: The Printing Press, Skyscrapers, Electric Lighting, Early Maritime Navigation, Radio, Drones, Greek Triremes, Electronic Music and the Refrigerated Railcar. ■

## Shop with a Smile



"I use smile.amazon.com to do all my purchases for my business and my personal needs through Amazon," said Thomas M. Coughlin, 2019 President of IEEE-USA. "I have smile.amazon.com set up to donate money to one of my favorite charities, the IEEE Foundation. If you have an Amazon account it is easy to set up smile.amazon.com and designate that Amazon should donate 0.5% of all your purchases to the Foundation. I have found that smile.amazon.com is an easy way to contribute to the IEEE Foundation by just ordering what you would ordinarily order on-line and letting Amazon make the contribution."

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This feature is available at smile.amazon.com on your web browser and now it can also be activated in the Amazon Shopping app for iOS and Android phones. When you shop at AmazonSmile, you'll find the same prices, selection and shopping experience as Amazon.com, with the added benefit that IEEE Foundation will receive 0.5% of your eligible purchases if you select us as your non-profit of choice. "It would be wonderful if more IEEE members picked us as their non-profit of choice," said Tom. ■

# IEEE-HKN Honors Its Graduates with Online Celebration



IEEE-Eta Kappa Nu sent off the industry's future leaders with a special celebration recognizing the accomplishments of the IEEE-HKN graduating class of 2020.

HKN, the honor society of IEEE, broadcast its first-ever online Graduation Celebration on 30 May. The program was created to celebrate the students, many of whom could not have traditional, on-campus ceremonies due to COVID-19 closures and quarantines. "It was imperative to us that our outstanding students be feted for their achievements," said Dr. Karen Panetta, 2019 IEEE-HKN President, who was the ceremony emcee.

HKN found the perfect partner when it decided to hold a celebration online: Dr. Henry Samuelli, a pioneer of broadband communication and HKN Eminent Member. Dr. Samuelli, Marconi Prize and Fellowship winner and Chairman of leading chipmaker Broadcom Inc., offered congratulatory remarks and also addressed questions collected from graduating students. Questions ranged from how electrical engineers can help prepare for future pandemics to when and how he decided to pursue entrepreneurship. "Every once in a while it's OK to take a risk," said Samuelli, who started his career at aerospace giant TRW, moved into academia when he became a professor of Electrical



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Engineering at UCLA and then built off his research to co-found Broadcom. "Do not be risk-averse. I was willing to take risks and willing to fail. Continue to learn, advance your knowledge. Take advantage of opportunities."

The 50-minute ceremony included remarks from 2019 IEEE-HKN Outstanding Student Olivia Hsu. She encouraged graduates to be responsible "not only for themselves, but to themselves" as the stresses of class, finding jobs or getting into graduate school could take a toll on their well-being.

The 26 Outstanding Chapters of 2019 were recognized during a video featuring photos from Chapter events, inductions ceremonies and community service

outreach. The program finished with an inspirational video featuring HKN graduates from around the globe.

The graduation celebration was the latest in a series of online events, classes, workshops and panel sessions HKN has offered to its members. As schools halted in-person learning due to COVID-19, HKN quickly delivered resources for its Chapters ensuring those who earned membership into HKN could still take part in the Honor Societies' rituals and events even though they may not be able to meet in-person.

Watch the 2020 IEEE-Eta Kappa Nu Graduation Celebration here: [hkn.ieee.org/class-of-2020-graduation-celebration-pictures/](http://hkn.ieee.org/class-of-2020-graduation-celebration-pictures/). ■

# Fellowship Recipient Shares His Professional and Personal Growth as a Young Scholar in Residence



The Elizabeth & Emerson Pugh Young Scholar in Residence Award provides research

experience for students and early-career scholars in the history of technology and engineering through a two-month residency at the [IEEE History Center](#) in Hoboken, NJ, U.S. For 2019 recipient Dr. Francesco Gerali, a native of Italy who holds a Ph.D. in the history of science and technology, the professional inroads he made during his residency as well as the bonds he forged with fellow IEEE and industry scholars in his field of interest have been life-changing.

Among other accomplishments, Francesco's residency resulted in his completion of 30 Wikipedia-style articles on the history of petroleum technology for use by other scholars and petroleum industry practitioners within the online encyclopedia Engineering & Technology History Wiki. Francesco also participated in the 'miniGeology' radio show aired by KPFT in Houston, TX, U.S. in July 2019, wrote two scholarly articles that will be published



*In a poignant letter of thanks to benefactors Elizabeth and Emerson Pugh, Dr. Francesco Gerali said that their endowment to the IEEE History Center, "gave me the opportunity to complete a successful and productive residency which greatly benefited my professional path."*

in the Proceedings of the IEEE, and provided a range of new materials for the IEEE History Center's Timeline within the 'Energy' category.

According to Francesco, "my residency at the IEEE History Center stands out from the research fellowships I was awarded in past

years in terms of the quality of the IEEE database and repositories I was granted access to, the teaching and attention received from the History Center staff, and the opportunity to improve my publication portfolio and develop a new network of professional connections."

Concluded a grateful Francesco, to whom the Pughs have extended a stipend to do further work in 2020, "the Pughs are funding a very important program that improves and shapes the skills of its beneficiaries and I could not have expected greater personal and professional reward from my residency."

For more than a quarter of a century, Emerson and Betsy Pugh have generously invested their time, talent and treasure to enable the IEEE History Center to preserve and promote the history of technology, the engineering profession, and IEEE. The Pugh's are Honored Philanthropists in the IEEE Heritage Circle. We are grateful to them for their visionary leadership and investment in the future of the IEEE History Center. ■

## Andrew Holmes-Siedle Invested in the Future of IEEE History



Though Dr. Andrew Holmes-Siedle passed in 2019, his impact will be felt for generations to come.

Born in Brighton, England, Andrew served in the UK Royal Air Force, graduated with a degree in chemistry from Trinity College, Dublin in 1954, and completed his Ph.D. and post-doctoral research at Cambridge University from 1954-1960 on the transfer of energy within biological and chemical systems. His career spanned decades, during which he worked in both industry and academia serving as researcher, entrepreneur, professor, mentor and author. Andrew joined IEEE in 1966 and at the time of his passing in 2019 had reached the level of IEEE Life Senior Member. He was an active volunteer and served for many years as a member of the IEEE Nuclear and Plasma Sciences Society Radiation Effects Committee. Janet Barth, 2020 Chair of the Radiation Effects Committee, called Andrew, "a true

gentleman whose contributions to the field of radiation effects will have lasting impact. The well-known "Handbook of Radiation Effects" he co-authored is essential to anyone starting out in the field. I continue to use it frequently." In 2001, Andrew was awarded the IEEE NPSS Radiation Effects Award for contributions to the field of radiation dosimetry and his encouragement of young researchers in the field of radiation effects.

Andrew generously remembered the IEEE History Center in his estate plans. His eldest child, Emma Siedle-Collins, recalls many fond memories of attending IEEE events during her childhood and believes it was her father's passion for "learning from history to inform the future" that motivated him to leave the bequest to the IEEE History Center.

The IEEE History Center truly benefits from Andrew's belief and investment in its efforts to preserve and promote the history of technology. To acknowledge his generosity,



*Andrew Holmes-Siedle. Photo Credit: Emma Siedle-Collins*

Andrew's name has been added to the roster of the **IEEE Goldsmith Legacy League**, IEEE's legacy donor recognition group where donors are *forever generous*.

Read more about Andrew in his biography on the IEEE History Center's Engineering &

Technology History Wiki [ethw.org/Andrew\\_Holmes-Siedle](http://ethw.org/Andrew_Holmes-Siedle).

Discover how easy it is for you to also include the IEEE History Center in your estate plan: [ieeefoundation.org/how-to-give/tomorrow/trust-provision](http://ieeefoundation.org/how-to-give/tomorrow/trust-provision). ■

# Recognizing Charitable Acts and Exemplary Leadership



One of Mary Ellen Randall's most well-known IEEE initiatives is the MOVE program which features a talented IEEE volunteer team and a disaster assistance vehicle (pictured) that deploy to crises throughout the U.S.



IEEE honorees are exemplary leaders who improve the world we live in everyday thanks to their technological innovations and charitable acts.

Mary Ellen Randall, recipient of the 2020 IEEE Haraden Pratt Award sponsored by the IEEE Foundation, donated a portion of her

cash prize to the IEEE-USA Mobile Outreach Vehicle (MOVE) Program. "It is a great honor to receive this award and to support the MOVE Fund of the IEEE Foundation. MOVE enables IEEE Volunteers to perform disaster relief and also enhances STEM education. Please join with me in supporting this worthwhile program," said Mary Ellen Randall

## Celebrating the 2020 IEEE Medal & Recognition Recipients



Celebrating the innovators whose ground-breaking technological advances shape our lives and the future of the profession is an honor, privilege and responsibility IEEE takes very seriously. The IEEE Honors Ceremony, an annual highlight for IEEE and its members which recognizes the accomplishments and contributions of "Technology Giants," has been shifted to a social media celebration. Join IEEE Foundation and IEEE Awards on social media through September (and beyond) as we honor, through online promotions, 23 diverse 2020 IEEE Medal and Recognition recipients from around the world and across the broad spectrum of engineering disciplines that embody the theme of Immersive Technology.

Our ability to energize innovation through the celebration of those that push the



boundaries of thinking, break new ground and improve lives takes the dedication and commitment of many individuals and organizations. We extend our gratitude to the 24 Medal and Recognition sponsors, the 38 sponsors that made the 31 IEEE Technical Field Awards possible and our donors who enable the IEEE Foundation to support IEEE Medal of Honor, IEEE Founders Medal and IEEE Haraden Pratt Award. ■

as to why she donated a portion of her honorarium to the IEEE Foundation. Randall was bestowed this honor for outstanding volunteer service to IEEE.

Leah H. Jamieson received the 2020 IEEE James H. Mulligan, Jr. Education Medal sponsored by Math Works, Pearson and the IEEE Life Members Fund, for contributions to the promotion, innovation and inclusivity of engineering education. Jamieson donated a portion of her cash prize to EPICS in IEEE, a service-learning program that connects teams of engineering students with community organizations to define, design, build, test, deliver and support engineering projects that address community needs. She co-founded the Engineering Projects in Community Service (EPICS) program at Purdue University. Jamieson's contributions to IEEE technical activities through leadership, strategic planning, public advocacy and effective new programs were recognized when she was bestowed the 2013 IEEE Richard M. Emberson Award.

To date, three other honorees have also made the decision to donate their cash prize in support of IEEE Foundation, EPICS in IEEE and the IEEE William E. Newell Power Electronics Award. Thank you to those who chose to turn their award into a good deed and congratulations to all of the recipients.

Award Recipients and Conference Speakers who receive cash prizes or speaker fees may choose to donate the prize to one or more of the many IEEE Programs supported through philanthropy to help **REALIZE THE FULL POTENTIAL OF IEEE.** ■





Acting on the need for response

# IEEE Programs Benefit from Donations to IEEE Foundation COVID-19 Response Fund



These are unprecedented times, and IEEE Foundation is proud to be helping by enabling IEEE programs that improve access to technology, enhance technological literacy, and support technical education and the professional community. In April, The IEEE Foundation established the COVID-19 Response Fund to support IEEE programs and initiatives that are helping members weather the pandemic.



To date, concerned and generous individual donors and philanthropic organizations worldwide have contributed more than US\$27,000. Here is a selection of IEEE activities that have been funded thanks to our donors:

- The **IEEE Humanitarian Activities Committee** (IEEE HAC) and the **IEEE Special Interest Group on Humanitarian Technology** (IEEE SIGHT) will receive a \$5,000 contribution to the groups' IEEE SIGHT #COVID19 Special Project Funding. "IEEE HAC and IEEE SIGHT are grateful to the IEEE Foundation donors who are making it possible for grassroots IEEE volunteers to combat COVID-19 through innovative solutions in their own communities," says IEEE Senior Member Sampath Veeraraghavan, chair of the IEEE SIGHT steering committee.
- **IEEE Spectrum** will receive \$10,000 to support its IEEE COVID-19 News & Resource Hub. The Hub is helping drive COVID-19 innovation through collaboration and sharing of knowledge, by serving as a centralized location for articles and IEEE resources that focus on the pandemic. "The Hub provides valuable COVID-19 news and information to IEEE members and the wider technology community," says Susan Hassler, the editor in chief of IEEE Spectrum. "To date, 1 million unique visitors have used the content the Hub provides. And thanks to donors' generous support, we are also planning a special print report, Preparing for the Next Pandemic, which will appear in the October issue of IEEE Spectrum."
- **IEEE Technical Activities** will receive a \$5,000 contribution to IEEE DataPort's COVID-19 data competition, which is expected to launch later this year. IEEE DataPort is a data platform that enables users to store, search, access and manage standard or Open Access datasets. This donation will be used to fund the first-place prize. "The competition will engage researchers and technical experts from

across the globe with the goal of yielding data analyses that can provide benefit to all who are seeking to mitigate the impact of COVID-19 on society," says IEEE Senior Member David G. Belanger, chair of the IEEE DataPort steering committee.


- **IEEE Educational Activities** and the **IEEE Education Society** will receive \$5,000 to support the next installment of their online, remote-instruction event for university faculty members around the world, called "Effective Remote Instruction: Reimagining the Engineering Student Experience," the week of 27 July. Register here for this event: [bit.ly/2Z3pilq](https://bit.ly/2Z3pilq). "Thanks to this grant from the IEEE Foundation COVID-19 Fund and the generosity of the donors that made it possible, we will be able to provide this high-quality event taught by experts at no cost, potentially impacting thousands of students globally during the course of the pandemic and beyond," says Stephen M. Phillips, VP of the Educational Activities Board of Directors.

Donations to the IEEE Foundation COVID-19 Response Fund are still needed and welcomed: [bit.ly/IEEECOVIDFund](https://bit.ly/IEEECOVIDFund). ■

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# New Opportunities to Celebrate IEEE Day



IEEE Day commemorates the first time in history when engineers worldwide and IEEE members gathered to share their technical ideas in 1884. Now engraved in its essence, the IEEE Day's theme is: "Leveraging Technology for a Better Tomorrow" and is celebrated on the first Tuesday of October. Accordingly, IEEE Day 2020 will be celebrated on Tuesday 6 October 2020.

Worldwide celebrations demonstrate the ways thousands of IEEE members in local communities join together to collaborate on ideas that leverage technology for a better tomorrow.

Last year, more than 1,000 events were held around the world, including technical talks, panel discussions, events, and humanitarian projects. This year, social distancing will not stop the celebration! There are contests for the best photos and videos in many categories including the IEEE Foundation. The winning photo and video from IEEE organizational units win cash prizes and will be displayed on the IEEE Day website, [ieeeday.org](http://ieeeday.org).

There is also a new social media crowdfunding opportunity to support the **REALIZE THE FULL POTENTIAL OF IEEE** Campaign. Consider a virtual celebration to help raise funds for IEEE programs through a social media campaign. Visit [bit.ly/IEEEDaySocialCampaign](http://bit.ly/IEEEDaySocialCampaign) for more information or contact us at [Donate@ieee.org](mailto:Donate@ieee.org).

We are very excited to partner with IEEE Day and you in celebrating yet another record-breaking IEEE Day in 2020 and discover how IEEE members will mark the 11th Celebration! ■



*"Light for Humanity" is a Humanitarian Program in which Energy Efficient LED Bulbs were distributed in the rural areas to Below Poverty Line (BPL) families in the Karunagappally village as part of the IEEE Day Celebration 2019. Submitted by IEEE SB College of Engineering Karunagappally*



*"No matter what you are facing, no matter what you are fighting against, always remember to FOLLOW YOUR DREAMS!"*

This photo was submitted by Ajman University Student Branch, UAE to increase awareness during breast cancer awareness month for IEEE Day 2019.

# Matthias Eberlein Honored with the IEEE Brokaw Award for Circuit Elegance

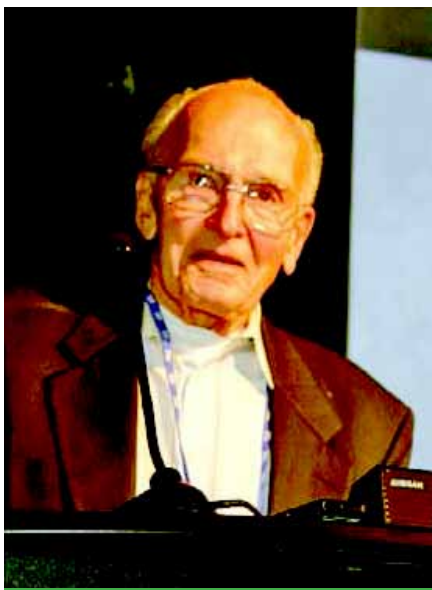
By Abira Altvater



Matthias Eberlein of Intel Germany/Johannes Kepler University, Linz, Austria, was honored with the first-ever IEEE Brokaw Award for Circuit Elegance. Eberlein was presented the award at the 2020 International Solid-State Circuits Conference (ISSCC), San Francisco, CA, U.S.

The IEEE Brokaw Award for Circuit Elegance was established in 2019 to honor the legacy and contributions of Paul A. Brokaw, thanks to a generous philanthropic gift to the IEEE Foundation. "Although rarely listed in the specifications—for me—elegance and beauty are very important properties of electronic circuits," said Bram Nauta, IEEE Solid-State Circuits Society (SSCS) past president. "I felt so excited when Paul Brokaw offered to sponsor this award, to highlight and celebrate these."

This award was created to enhance appreciation for and encourage innovation of simple, smart, and elegant circuit design and is presented to a design created during the previous decade that has demonstrated its viability.



Paul Brokaw was recently awarded the 2021 IEEE Donald O. Pederson Award in Solid-State Circuits.



Matthias Eberlein is presented the IEEE Brokaw Award for Circuit Elegance at ISSCC 2020 (from left): SSCS President Kenneth O, Eberlein, and Paul Brokaw.

"I feel not only showered with honor, for winning this award right after its first presentation, but I am, in particular, excited about the move to recognize the artistic aspect of circuit design," said Eberlein. "In my professional context so far, I experienced little reward for simple yet elegant solutions, but rather a weary smile or even demotion. It's high time to promote again the beauty of simplicity, as done here in memory of Paul Brokaw's contribution."

Integrated circuits have evolved into very complex systems that can contain many millions of small elementary circuits constructed using a handful of transistors. Many of these circuits utilize known basic circuit techniques that often were invented decades before, such as bandgap reference, class-AB amplifier bias stages, analog multipliers, various oscillators, and even simple switches with bootstrap or charge-canceling techniques.

Each of these circuits exhibits an "elegance" wherein several critical functions are combined into just a few components, resulting from a highly creative process. One could compare this elegance to a short yet beautiful poem in the world of books or even movies.

While the focus in IC design has shifted to complexity and functionality, the goal of the IEEE Brokaw Award for Circuit Elegance is to stimulate and celebrate the invention of elegant small circuits, "a few transistors doing a big job." "Our Society is truly blessed to have a pioneer and a role model like Paul Brokaw," said Kenneth O, SSCS President.

For more information on the IEEE Brokaw Award for Circuit Elegance and instructions on how to nominate a deserving colleague, visit [sscs.ieee.org/membership/awards/ieee-brokaw-award-for-circuit-elegance](https://sscs.ieee.org/membership/awards/ieee-brokaw-award-for-circuit-elegance). ■

***"Our Society is truly blessed to have a pioneer and a role model like Paul Brokaw."***

— Kenneth O, SSCS President

# Leadership Shares Program Impacts

## 2019 IEEE FOUNDATION ANNUAL REPORT



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If you have a suggestion for a future session or would like to volunteer to be a panelist, contact us at [donate@ieee.org](mailto:donate@ieee.org). ■

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As the philanthropic partner of IEEE, the IEEE Foundation inspires an engaged community and leverages the generosity of donors to enable IEEE programs that enhance technology access, literacy, and education and supports the IEEE professional community. The IEEE Foundation works across IEEE to invest in more than 200 funds that bring the promise of technology, and the knowledge to use it, to the world. We categorize the IEEE programs supported by your donations under four main topics: Illuminate, Educate, Engage and Energize, though their benefits actually span multiple categories.

The IEEE Foundation, a tax-exempt 501(c)(3) organization in the United States. Charitable contributions to the IEEE Foundation are tax deductible to the fullest extent allowed by law in the United States. For other countries, please check with your local tax advisors. Together we **REALIZE THE FULL POTENTIAL OF IEEE**.

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