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Future

October 2023 | Issue 36

Life Members Remain Active through Local Groups



IEEE's more than 38,000 Life Members are encouraged to remain active in IEEE activities and engage with students and young professionals by mentoring the next generation of technologists. This is one of the primary objectives of the IEEE Foundation Life Member Fund, managed by the IEEE Life Member Committee.

One way to accomplish this is by supporting the 144 Life Member Affinity Groups (LMAGs) throughout the world. Dedicated to life-long learning and giving back, Life Members come together through their LMAG to learn, contribute ideas, mentor students and participate in IEEE events. Here are a few examples:

STEM Outreach Activities

Life Members actively support STEM activities. The Central Texas, USA, LMAG worked with Central Texas Discover Engineering, a local non-profit, to give K-12 students science and engineering experiences through hands-on experiments and STEM activities at the Bullock State History Museum. Life Members staffed four activities, including a Van de Graaff generator, Electric Pickle, Mars Lander shock absorber, and Mars helicopter and parachute origami project. Six different student groups attended the events totaling approximately 180 students and teachers.



Student Competitions

Mentoring and supporting student events provide an opportunity to share knowledge and experiences with the next generation. One of the major events financially supported by the North Macedonia LMAG is a pre-university competition organized by IEEE student branches and student branch chapters. The RoboMac competition was held for the 11th time in May 2023 with participants from several surrounding countries. Approximately 80 students were engaged in the final competition.

LMAGs Interact with Local IEEE Members

LMAGs hold interesting technical talks and tours throughout the year for their membership and are active in their local IEEE Sections and Societies. North Macedonia's LMAG Chair, Goce Arsov, gave an invited talk on "Celebrating 75th Anniversary of the Transistor" at the Summer Symposium on Electronics and Signal Processing held in Krushevo on 24-25 June 2022. Arsov also repeated the talk on IEEE Day for the local IEEE Section.

Technical Tours

The Lone Star LMAG in San Antonio, TX, USA ran a Texas Technical Tour for 42 Life Members and spouses—visiting several significant technical sites in Houston, Austin, Waco and Dallas over several days. Below, a Texas Instruments staffer explained three IEEE Milestones in front of the Texas Instruments headquarters in Dallas: one for the [Development of the First Integrated Circuit](#), the second for the [first application of a digital signal processor to speech synthesis in the TI Speak and Spell](#), and the third for the [development of the first 16-bit DAC](#).



Learn more about LMAG activities and find local LMAG groups on life.ieee.org. You can also petition to help to form a new LMAG. The IEEE Life Members Fund was moved into the IEEE Foundation portfolio of funds in 1973, making it a staple of the Foundation's 50 year history. Helping IEEE Life Members expand its programs is a core objective of the IEEE Foundation 50th Anniversary Celebration. To discuss how you can support this initiative, contact Rich Allen, CFRE at richard.allen@ieee.org or +1 732 465 5871. ■

Thanks for Sharing in Our Celebration of 50 Years of Collective Impact

16 Feb 2023 marked the IEEE Foundation's 50th Anniversary. Throughout the year, we have celebrated this important milestone in our history with fun and immersive activities to engage the IEEE community and by collaborating with strategically selected IEEE programs, each designed to celebrate the past, lift the present, and build the strong future we all need.

The IEEE Foundation's 50th Anniversary Celebration will continue through February 2024, allowing for 12 months of 'Reflecting on 50 Years of Impact.'

Read about the IEEE Foundation's history at ieeefoundation.org/history and the 50th Celebration at ieeefoundation.org/50.



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Celebrating with Tech Pioneers

The 50th Anniversary Celebration launched on 16 Feb 2023 with an in-person event at the IEEE Meeting series in New York, NY, USA. One of the event highlights was when engineering pioneers emerged from a time capsule. Of course, they were actors posing as the great: [Marie Skłodowska Curie](#), [Thomas Alva Edison](#), [Lewis Latimer](#) and [Nikola Tesla](#). They were summoned by the great-great-great grandson of [George Westinghouse](#) (also an actor) who coordinated the "time travel." The icons mingled with attendees and talked about how the technologists' inventions changed the world.



A Virtual Celebration for All

Also well-attended was the IEEE Foundation 50th Anniversary Virtual Reception on 1 March. This event echoed the in-person launch. Guests were once again greeted by the actor portraying the great-great-great grandson of George Westinghouse. George introduced Marie Skłodowska Curie and Nikola Tesla who spoke with IEEE Foundation President Ralph Ford and 2023 IEEE President Saifur Rahman respectively. Below, Ralph Ford has the honor to speak with Marie Curie. View the full event here: vimeo.com/804330277/6f46378ccc.



Enhancing the Donor Recognition Program

During the virtual event, it was announced that the Foundation had added six giving levels to the [IEEE Heritage Circle](#) in celebration of our 50th Anniversary. The cumulative-giving donor-recognition program has various giving levels named for innovators in the fields of science and technology. The six new levels reflect groundbreaking engineering work by women, people of color, and members of the LGBTQ+ community: [Hertha Ayrton](#), [Lewis Latimer](#), [Marie Skłodowska Curie](#), [Jagadish Chandra Bose](#), [Alan Turing](#) and [Edith Clarke](#).



Promoting the 50th on Social Media

Since February 2023, the Foundation has reflected on our impact through a series of 50th Anniversary posts on our social media channels. The most popular posts in the series are those featuring program founders. Another great addition to the social media lineup is Bruno, IEEE Foundation's recently appointed Chief Canine.



You can read about Bruno on the Foundation website here ieeefoundation.org/bruno-interview and look for him to show up in other IEEE Foundation related materials. Follow IEEE Foundation on [LinkedIn](#), [Facebook](#) and [Twitter](#) for more exciting 50th posts, polls and contests through February 2024.

Investing in the Education of IEEE Leadership

The Foundation continued its proud history of investing in IEEE's leadership once again sponsoring [IEEE Sections Congress](#) in August. The Foundation spotlighted its 50-year history in a pavilion on the exhibit floor, which featured 14 donor-supported IEEE programs. Director Emeritus and *Forever Generous* member of the [IEEE Goldsmith Legacy League](#), David Green (pictured) visited the IEEE Foundation pavilion. Learn more about the Foundation and the programs featured for our 50th celebration and represented at the pavilion by visiting our Sections Congress Resource page: ieeefoundation.org/impact/sectionscongress2023.

In addition, the Foundation hosted a reception to celebrate the 50th Anniversary with IEEE leadership from around the world, presented sessions on philanthropy, and reconnected with old friends and made new ones.



Meeting with Supporters



In April, Michael Deering, Senior Development Officer for IEEE Foundation was onsite at IEEE SoutheastCon to lead our celebration activities. Thank you Enrique Tejera (pictured on the left with Michael) for lending Michael a hand at the display table. The Foundation Board, 50th Celebration Committee and staff participated in many other events and meetings too numerous to mention, all to promote the donor-supported programs featured during its 50th Anniversary Celebration.

Celebrating with Worldwide Staff

IEEE staff joined in on the 50th Anniversary celebration through a worldwide staff contest and display tables at the two NJ offices and the NY office at the end of April. Below, Michael N. Geselowitz, Ph.D., Senior Director, IEEE History Center pointed out when the History Center was added to the Foundation in preparation for the IEEE Centennial in 1984, on the IEEE Foundation 50th Anniversary timeline display.

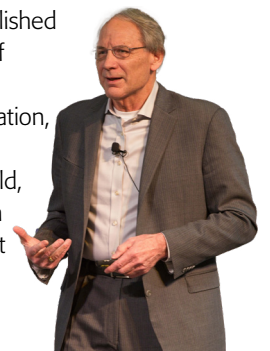


Spreading the Word at IEEE Events

During the [IEEE Power & Energy Society General Meeting](#) in July, the Foundation featured the success of the PES philanthropic initiatives like [PES Scholarship Plus Initiative](#) and [IEEE Smart Village](#). While there, the Foundation hosted its first-ever in-person Estate Planning Session, celebrated three elevated Heritage Circle members and the PES Awardees including Vice President, Programs for IEEE Foundation Marko Delimar (above right). IEEE Foundation Executive Director, Karen Galuchie (center) manned the display table with Babak Enayati (left), IEEE PES Vice President, Education.

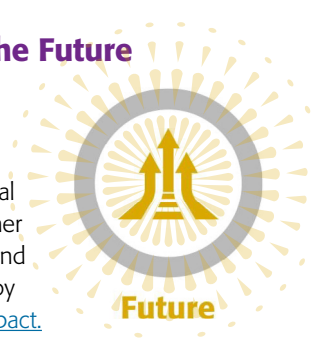
IEEE VIC Summit & Honors Ceremony

The IEEE Foundation, which initially was established to accept and manage donations in support of the [IEEE Awards Program](#), highlighted its 50th Anniversary throughout the IEEE Vision, Innovation, and Challenges Summit (VIC) and Honors Ceremony in May. Shown right, John McDonald, IEEE Foundation 50th Anniversary Celebration Chair, reflects on the IEEE Foundation's impact during the Welcome Reception. Learn more about the event here: ieeefoundation.org/celebrating-the-2023-ieee-awards-honorees.



Guiding Pillars Enhanced for the Future

Another way the Foundation marked its anniversary was to add a fifth pillar, to help guide the philanthropic focus. The Future Pillar represents inspirational and foundational programs for upcoming generations. The other four pillars are: Illuminate, Educate, Engage and Energize. See all of the programs impacted by your donations here: ieeefoundation.org/impact.



Word of Mouth: IEEE's Oral Histories Program

IEEE's Oral Histories Program celebrates 55 years of conversations with the field's greatest pioneers



On top of the milestone 50th anniversary of the IEEE Foundation in 2023, another landmark achievement deserves equal recognition – the 55th anniversary of the IEEE History Center's unique and powerful Oral Histories Program (ieeefoundation.org/about/history-center/programs.html).

Conducted in July 1968, the interview of Harold Beverage, a pioneer of early radio and the former director of radio research for RCA Laboratories, represented the very first IEEE Oral History (#001) recorded. This landmark activity launched a new and important program and collection for IEEE, which would subsequently be followed by hundreds of iconic interviews with other leaders and influencers in the engineering, computing and technology arenas.

While coverage of noteworthy individuals and their achievements is often documented in the form of written articles within the world of media, "oral histories" are historical narratives that feature commentary from the individuals themselves captured through the informal recording of a dialogue between interviewer and interviewee.

Considered one of the largest oral history collections of electrical engineers and related technologists in the world, IEEE's Oral Histories collection contains interviews with pioneers across many industry segments. In the computing field, for instance, the collection features interviews with such noted leaders as Konrad Zuse, developer of the electromechanical computer (the "Z3") in the late 1930s, Eleanor Ireland, one of the operators of the Colossus computer, which was used for code-breaking during World War II, Jacob Ziv, co-creator of the Lempel-Ziv compression algorithm, Tim Berners-Lee, inventor of the World Wide Web, and Masatoshi Shima and Federico Faggin, two of the developers of the 4004 microprocessor.

Across other fields, visitors to the IEEE Oral Histories collection will find such notable figures as Gordon Teal, a pioneer in the development of the transistor, inventor George E. Smith, who advanced modern digital imaging, and Vladimir Zworykin, whose iconoscope was central to the development of electronic television. Other captivating interviews include those with Amos Joel, Irwin Jacobs, John Pierce, Raymond

Pickholtz, and Andrew Viterbi, whose work helped advance cellular phone and communications technologies, as well as interviews with robotics pioneers Ruzena Bajcsy, Ayanna Howard and Lydia Kavradi.

The IEEE History Center boasts a robust collection of 898 oral histories; of these, 766 are posted on the [Engineering and Technology History Wiki \(ETHW - https://ethw.org/Main_Page\)](https://ethw.org/Main_Page), the IEEE History Center's main platform for publishing its oral histories. The Oral Histories program has made profound impacts on the world over the past 55 years – from providing source material for scholarly journalists, authors, professors, researchers, corporations, and public and government policymakers to being used in prominent television and radio programs and spawning dozens of dedicated books and documentaries.

Offering a "stimulating window into the creativity and thought(s) of fascinating people," according to one Oral History interviewer, IEEE's Oral Histories Program recently added several new interview sessions to its collection on the ETHW. These include oral histories of Dr. Jessica Elzea Kogel, Director of the Office of Mine Safety and Health Research at the National Institute for Occupational Safety and Health, Dr. Donald H. Kraft, whose indelible contributions have advanced the field of text retrieval via fuzzy set theory and genetic algorithms, and Dr. Arogyaswami Paulraj, whose development of multiple input-multiple output antenna technology for wireless communications has revolutionized both local area and mobile broadband communications, enabling high-speed access to multimedia services.

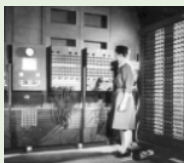
Congratulations to the IEEE History Center's Oral Histories Program for 55 years of riveting, revealing, and historic interviews with the industry's most notable leaders. These remarkable reflections are official and unprecedented conversations for field professionals, the individual's own family members, and posterity to treasure.

Helping the IEEE History Center grow this valuable collection and its use is a core objective of the IEEE Foundation 50th Anniversary Celebration. To discuss how you can support this initiative, contact Danny DeLiberato, CFRE at d.deliberato@ieeefoundation.org or call +1 732 562 5446. ■

Pioneering Oral History



The IEEE Oral Histories collection began with the first oral history, a dual interview featuring **Harold H. Beverage and H. O. Peterson** on 1 July 1968. The interview began with a conversation with Dr. Harold H. Beverage. Later Beverage's associate, H.O. Peterson, joined the interview. The History Committee conducted this first oral history before the existence of the IEEE History Center, which took leadership of the program in 1980.



Jean Bartik was one of the original programmers of the ENIAC (Electronic Numerical Integrator And Computer), the world's earliest electronic digital computer. Along with a team of "**female human computers**," Bartik's work would completely change the face of computing.



Sir Tim Berners-Lee is the inventor of the World Wide Web. He constructed two rudimentary computers in his home from spare parts and broken television sets in the 1970s, starting the growth of the Internet and Berners-Lee's vision of its future. In addition to being a technological fascination and one of the most influential people of our age, he is a real-life knight and the 2008 recipient of the IEEE/RSE James Clerk Maxwell Medal.

IEEE Smart Village

Supporting Underserved Communities



IEEE Smart Village (ISV) is a unique program within IEEE. ISV provides seed money with the intent to empower people through productive use of technology, expanded educational opportunities and enterprise development. With nearly 200 projects established across sub-Saharan Africa, India, Latin America and Southeast Asia, the program has benefited more than 1.4 million people. Here we share the highlights of a few of those projects. For more details and other project highlights, visit <https://smartvillage.ieee.org>.

Gemstones to Electric Infrastructure in Zambia



How do you close the gender gap in an economic sector that women are excluded from? This was the puzzle that Kanekwa Kachinga sought to solve when she began working on the direct participation of women in the gemstone industry in Zambia (the world's second largest producer of emeralds).

Since the majority of locally-employed labor were direct mining workers, men were the preferred gender. Today, KSV-Zed, founded by Kanekwa, trains women to acquire technical and business skills to process gemstones and sell the market-ready precious stones locally and internationally. ISV has supported KSV-Zed's vision by funding the installation of electrical machinery for gemstone cutting, and by installing a solar system for cutting centers in off-grid locations. The profits from the sale of gemstones, after paying the cutters and polishers a fair wage, are invested in the infrastructure in their villages. This infrastructure will create a village where all people have access to electricity, internet, water, sanitation, health care, housing, transportation, education, jobs and entrepreneurship.

Nepal School Solar Electrification and Water Heating Project



Education is one of the three key pillars of ISV. Educational interventions that can improve the future of children and youth in underserved communities are highly prioritized. In 2021, Dr. Morgan Kiani, professor of engineering at Texas Christian University, Texas, USA, learned about Shree Batase Secondary School, Nepal, which caters to the education of students from 50 nearby villages, approximately 225 students. Due to its remote, off-grid location, the school lacked reliable electricity, and yet is recognized for its high performance with final year students' pass percentage of 82% for the year 2021. Morgan mobilized financial support from ISV and IEEE Industrial Electronics Society (IES), and arranged the technical partnership of Global Himalayan Expedition (GHE)—an award-winning India-based ISV-funded humanitarian organization—for its local installation team. During Spring 2023, Morgan and her team installed an 11-kW solar PV system with battery storage for uninterrupted electricity and a 200-liter solar water heater for cooking and bathing in the dormitory. The school's staff (including women), were trained on maintenance of the system, which may also be monitored remotely.

The solar set up now provides 24/7 reliable power to the school. As a result it is feasible to hold classes regularly, host reliable computer labs and after school activities, for both students and the community, even during monsoon season when landslides and flash flooding can cut power for weeks.

Cameroon Renewable Energy Innovators



Imagine what it is like to grow up without electricity. [Jude Numfor](#) woke up every morning of his childhood with swollen eyes strained by the smoke and dim lights from a kerosene lamp. Today, Jude is the CEO of Renewable Energy Innovators—Cameroon (REIc), a leading off-grid electricity developer in Cameroon working on electrifying more than 700 villages. ISV was the first external funder to recognize the potential of REIc, and has provided several tranches of seed-funding to help them scale starting in 2017, 11 years after REIc was founded.

In 2022, REIc secured US\$1million in support from the United States Trade and Development Agency (USTDA). To be eligible for the USTDA grant, ISV provided financial and technical support to develop a 10 kW pilot project as part of the plan to electrify 760 villages across 5 regions in Cameroon. This 10kW project is the basis for expansion by REIc into the initial 134 villages, and ultimately into 760 villages with a total of 21 megawatts of electricity for approximately 52,700 potential connections which will transform more than 500,000 lives.

Learn more about how ISV supports the world's energy-impooverished communities at smartvillage.ieee.org. Helping the IEEE Smart Village grow local enterprises based on livelihood training, and the productive use of technology in underserved communities around the world is a core objective of the IEEE Foundation's 50th Anniversary Celebration. To discuss how you can support this initiative, contact Michael Deering, Sr. Development Officer, at m.deering@ieee.org or +1 732 562 3915.

Philanthropy Dictates the Scale of TryEngineering's Impact



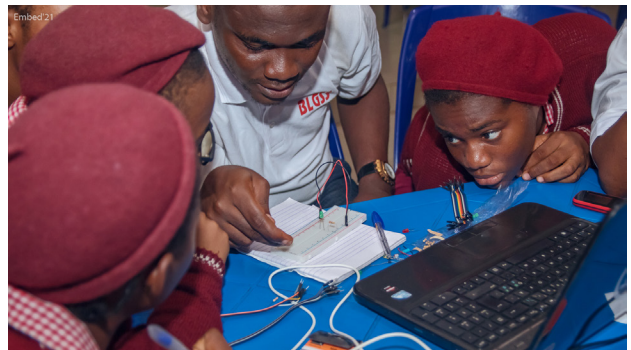
IEEE TryEngineering inspires educators, parents and students around the world to embrace engineering education and foster the next generation of technology innovators. TryEngineering does this by providing indispensable resources for educators, parents and students including lesson plans and activities that engage and inspire.

TryEngineering resources for educators, parents and IEEE volunteers are completely free, thanks to donor support, and strive to inspire the engineers of tomorrow. Launched in 2006 as a collaboration of IEEE, IBM and the New York Hall of Science, TryEngineering offers a variety of resources to engage and excite students about engineering and technology careers. One resource, the STEM Portal for IEEE Volunteers, serves as a one-stop shop for all things related to Pre-University STEM programs and activities. To date, more than 18,000 dedicated volunteers have organized more than 1,500 events across 60 countries. These efforts have reached nearly 130,000 students, engaged more than 20,000 teachers, and involved 18,000 parents to date.

The global impact of TryEngineering inspired volunteer and TryEngineering donor, Lorena Garcia. "By investing in these amazing programs," Lorena confidently states, "I am actively contributing to advancing STEM education, promoting diversity and inclusivity, and nurturing the next generation of engineers and technologists." You can read more about Lorena's inspiration for donating to TryEngineering in her donor profile here: ieeefoundation.org/garcia.

Lorena's gift, combined with the generosity of other individual donors, has allowed TryEngineering to expand programs and add new resources. This includes the recent partnership with the IEEE Foundation and IEEE Educational Activities to launch a grant program that supports local IEEE groups hosting STEM events in their communities. In 2023 alone, [forty-three IEEE groups received more than \\$76,000](#) in funding, enabling IEEE volunteers from six different regions to deliver STEM initiatives in their local communities.

Efforts like TryEngineering's STEM web portal and the STEM Outreach Grant program will have ripple effects across the globe and through generations. All of this impact is made possible by the philanthropic generosity of individuals who believe in our vision of inspiring the next generation of technology innovators. Interested in supporting TryEngineering? Visit our online giving page to [make a donation](#). To discuss how you can support this initiative, contact Eileen Heltzer, CFRE at e.heltzer@ieee.org or +1 732 799 4431. ■



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28 November 2023

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Reflecting on 50 Years of Impact

IEEE
Foundation

Make it Monthly

Join our community of monthly donors who compound their philanthropy for year-round impact.

ieeefoundation.org/monthly

IEEE

Larger Than Life



Launched in August 2023 and catalyzed by a generous estate bequest, the new Humanitarian Technologies Board (HTB) Endowment Fund is a gift that will keep on giving

Though individuals eventually pass away, their actions can have a far-reaching impact on others around the world long after they're gone.

Such is the case for Dorothy Percival, widow of late IEEE Life Member Alan Percival, whose generous bequest to the IEEE Foundation upon her passing in October 2021 enabled the establishment of the new Humanitarian Technologies Board (HTB) Endowment Fund, that will allow an expanded number of beneficial humanitarian projects to be undertaken by IEEE globally.

"The [IEEE Humanitarian Technologies Board](#) inspires and empowers IEEE volunteers around the world to engage in impactful humanitarian technology activities at the local level," shared Lwanga Herbert, IEEE Humanitarian Technologies Board Chair. Herbert further explained, "this donation will enable future engineers and technologists to utilize their knowledge to design and deploy technological solutions that solve existing global humanitarian challenges faced in local communities around the world."

The mission of the HTB (previously known as the IEEE Humanitarian Activities Committee) is to support impactful, ethically informed volunteer-led initiatives and mutually beneficial partnerships. HTB also strives to inform policies that harness technology and innovation to address societal challenges, including disaster recovery, in a responsive, effective and sustainable way.

The IEEE's HTB and its Special Interest Group on Humanitarian Technology (SIGHT) Program have awarded nearly US\$3.3 million to 507 humanitarian technology projects and events since 2013 so that IEEE Members can implement them in their local communities. Per eligibility requirements, these projects address one or more of the United Nations' 17 Sustainable Development Goals, which involve everything from hunger, poverty, health and education to gender equality, clean water and sanitation, economic growth, climate action, clean energy, peace, justice and more. Volunteer teams partner with local governments, NGOs, schools and universities, neighborhood associations, or companies to deploy solutions effectively.

Making An Indelible Difference

Through the new Humanitarian Technologies Board Endowment Fund, launched in August 2023, US\$1 million of Percival's generous estate will augment the HTB's previous project budget and support the growing demand for and importance of humanitarian initiatives within the IEEE community by enabling the HTB to fund approximately 4-6 more humanitarian technology projects annually.



IEEE HTB & SIGHT awards funding for grassroots IEEE member projects that use technology to address local challenges. The team pictured, from the IEEE Kenya Section SIGHT Group, is installing a solar powered system in a secondary school in a rural area of the country.

"On behalf of the HTB, we are grateful for this bequest, which will allow us to continue driving humanitarian activities and creating positive social and humanitarian impact through technology," said Mariela Machado Fantacchiotti, Senior Director, IEEE Humanitarian Technology Activities. Looking ahead, "our hope for the HTB is to continue to thrive and achieve tangible results in terms of increasing awareness of the roles of engineering in humanitarian work, providing training, and supporting grassroots projects that contribute to sustainable development goals globally," Fantacchiotti added.

According to IEEE Foundation President Ralph Ford, all donations to the HTB and IEEE Foundation will make an indelible difference in the lives of others. "Donating to any of the IEEE Foundation's donor-supported programs is a way to align your personal values with meaningful initiatives that further IEEE's mission of advancing technology for the benefit of humanity," said Ford.

As for the far-reaching impact of Percival's generous estate gift, Sampathkumar Veerarahavan, Past HTB Chair said, "we're excited about the establishment of the Humanitarian Technologies Board Endowment Fund, which is a major milestone in the partnership between the IEEE Foundation and the HTB. As a longtime IEEE volunteer and donor, this Fund will empower the HTB to deliver key opportunities to inspire, connect and engage IEEE members on impactful grassroots programs for years to come."

For more information on the IEEE Humanitarian Technologies Board, visit <https://htb.ieee.org>. Learn how you too can leave a bequest to the IEEE Foundation to make your lasting impact at: <https://www.ieeefoundation.org/how-to-give/tomorrow/trust-provision>. ■

IEEE REACH: Celebrating the Information Age



IEEE REACH's new Information Theory Unit helps honor the 'Father of Information Theory' Claude E. Shannon and the importance of information theory in today's digital era



Antikythera Mechanism: Joyofmuseums, CC BY-SA 4.0, via Wikimedia Commons

Former U.S. President Ronald Reagan famously said that "information is the oxygen of the modern age." But while data and information drive today's fast-paced society, the very definition of information and its transmission through computers and other electronic devices actually harks all the way back to July 1948. That's when a groundbreaking concept in the realm of communications engineering was introduced by Claude E. Shannon, who played an instrumental role in ushering in the current Information Age.

In honor of the 75th anniversary of Shannon's seminal paper on the topic and through the generous support of Ray and Carmen Vargas and the IEEE Information Theory Society, IEEE's Raising Engineering Awareness through the Conduit of History (REACH) Program has launched the [Information Theory Unit](#), an informative capsule on Information Theory designed for STEM educators and students.

Through IEEE REACH's new Inquiry Unit on [Information Theory](#), STEM instructors will be able to take a deep dive into the fascinating field of Information Theory, from the very definition of "information" to how Information Theory enables signals to be compressed and transmitted through electronic mediums. The unit's primary resources and engaging hands-on activities will enable teachers to bring Information Theory to life in the classroom and help students connect to its relevance in their everyday lives.

IEEE REACH, a program of the IEEE History Center, provides pre-university teachers with free, open educational resources that situate science, technology, and engineering in social and humanistic contexts. Teachers have access to ten learning inquiry units, including such technical topics as Early Maritime Navigation and Electrical Lighting, and the newest unit: Information Theory. Ray and Carmen Vargas have donated generously to the IEEE REACH program over the years. When asked why, Ray shared, "By teaching the social and practical implications of these technologies, we have another means of driving students towards STEM fields, and we're excited to help inspire the next generation of engineers."

To learn more about the new Information Theory Unit or the other nine learning inquiry units and how you can bring this compelling STEM program to your local school system, contact the REACH Senior Program Manager, Kelly McKenna at k.mckenna@ieee.org or +1 732 562 2687. ■

Claude Shannon: Father of Information Theory

Born in Michigan in 1916, Claude Shannon received a B.S. degree in Electrical Engineering and Mathematics from the University of Michigan and a Ph.D. in Mathematics from M.I.T. Recipient of the Alfred Noble Prize of the American Society of Civil Engineers for his work in switching theory, and the Institute of Radio Engineers' Morris Liebmann Award for his communication theory work, Shannon's concepts have since become fundamental to modern digital information technology.

Specifically, in his 1948 paper entitled "A Mathematical Theory of Communication," published when he was a young engineer and mathematician working at the Bell Telephone Laboratories, Shannon proposed that information be quantified through a unit of measure known as a "bit" and explained how data could be compressed electronically for error-free communication -- revelations which officially launched the dynamic field of Information Theory.

In July 1982, the IEEE History Center and interviewer Robert Price conducted the only known [oral history with Shannon](#), a revealing exchange upon which the celebrated 2019 documentary "*The Bit Player (Claude Shannon: Prophet of Information)*," a film by Mark A. Levinson, was based. The film was commissioned by the IEEE Information Theory Society and funded in part by donations to the IEEE Foundation. ■

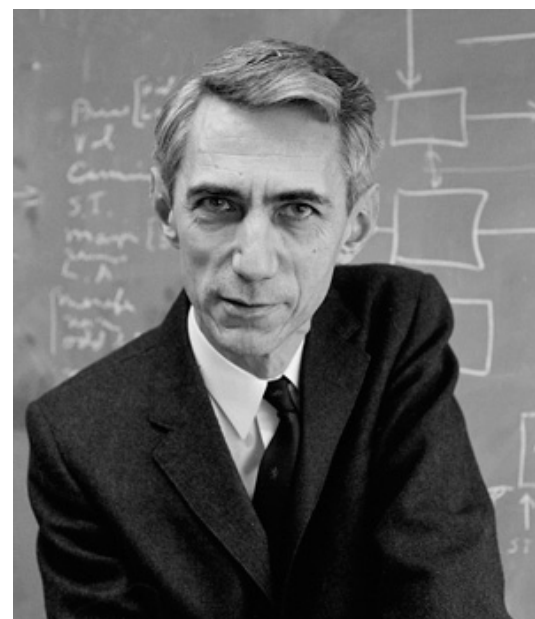


Photo: Claude Shannon, courtesy of Getty Images

EPICS in IEEE Project Spotlight: Smart Toilets for Accessible Use Within Ugandan Communities



The United Nations Sustainable Development Goals (SDGs) provide a pledge to “leave no one behind.” This pledge brings visibility to the idea that individuals with disabilities or differing abilities should have accessible services and accommodations to be able to participate in community activities.

Many people with disabilities in Ugandan communities face challenges accessing and using sanitation and toilet facilities in schools, workplaces and community spaces. The main challenge is that most toilets used in Ugandan communities are communal pit latrines, whose surfaces are difficult to clean and do not allow users to sit down. This puts people with disabilities at increased risk of diseases like dysentery and candidiasis, among others.

The EPICS in IEEE Uganda team is working on a smart-toilet technology project that will enable people with disabilities to access toilets in a hygienic manner and reduce the spread of disease. The smart toilet will automatically adjust itself to the user’s height and position with a press of a button before use. The technologies used to create the smart toilet include electronics design and testing, metal fabrication and joinery, mechanical design and fabrication, and the systems integration of the above-stated technologies.

This project is supported by the EPICS in IEEE program, and it involves a team of high school students, engineering students, IEEE Uganda Section members/volunteers, and The Uganda National Association of the Blind (UNAB).

“The participating team and volunteers have found the project quite interesting and [the project] has inspired them to continue with science and technology career paths,” said Project Lead Nakayenga Lilian. “The team has learned the value of teamwork in bringing together different skills to apply practical knowledge to design solutions for their community.” In addition, the volunteers and students working on the project have found that the opportunity



EPICS in IEEE project team carrying out the metal/mechanical design and fabrication during the project implementation.

to meet and interact with the community members is a useful way to find better solutions to problems in the community. The local community benefits by having a chance to work closely with the students and volunteers to identify how technology and engineering solutions can address the real challenges they face.

The project team is grateful to the EPICS in IEEE program for supporting this project with a grant of US\$4,050. This project is one of the [23 service learning projects](https://www.ieeefoundation.org/23-new-service-learning-projects-launched-through-the-epics-in-ieee-access-and-abilities-competition) (<https://www.ieeefoundation.org/23-new-service-learning-projects-launched-through-the-epics-in-ieee-access-and-abilities-competition>) selected as part of the EPICS in IEEE Access and Abilities Competition. The Competition was made possible thanks to funding from the Jon C. Taenzer Memorial Fund established by the IEEE Foundation through a generous bequest from the Estate of Jon C. Taenzer, an IEEE Life Senior Member, who passed away in 2019.

The team hopes that once the project is complete, the results can be replicated in other communities, especially where people have limited mobility or other disabilities. ■

IEEE Foundation
Unlock Your IEEE Legacy

Leaving an after-life gift to the IEEE Foundation will ensure your name lives on as part of the **IEEE Goldsmith Legacy League**.

Members are *Forever Generous*.

Join the League today! Visit [ieeefoundation.org/goldsmith](https://www.ieeefoundation.org/goldsmith)

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Making Waves

The 2023 IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting helped celebrate diversity and upcoming leaders in the field



On 23-28 July 2023, industry professionals from around the world convened in Portland, OR, USA for the 2023 IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting, an international forum promoting the exchange of information and state-of-the-art research on antennas, propagation, electromagnetic engineering and radio science.



The annual symposium represents one of the most important conference and networking opportunities for the IEEE Antennas and Propagation Society (IEEE AP-S), a hub for engineers, educators and students in that field ever since the Society's founding in 1952.

In addition to presenting updates on the field's most prominent topics, including advances in the use of antennas in the spacecraft, medical, and wireless communications industries, this year's Symposium recognized a number of industry giants and next-generation leaders alike, thanks to giving to the IEEE Foundation.

Among other awards, IEEE Fellow Christos Christodoulou, distinguished Professor of Electrical and Computer Engineering at the University of New Mexico in Albuquerque, NM, USA and Director of the school's Computational Electromagnetics and Antennas Lab (COSMIAC), was presented with the 2023 IEEE Chen-to Tai Distinguished Educator Award, which annually recognizes outstanding career achievement by a distinguished educator in the field of antennas and propagation. Christodoulou graciously donated his award cash prize to the IEEE Women in Engineering (WIE) Fund, sharing that, "providing support to WIE is greatly needed to fund educational activities that help advance women in engineering and science."



Christos Christodoulou, 2023 IEEE Chen-to Tai Distinguished Educator Award recipient, poses with Serene Abu-Sardana, one of the recipients of the AP-S C.J. Reddy Travel Grants for Graduate Students at the 2023 IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting.

IEEE Senior Member Asimina Kiourti, Associate Professor in the Department of Electrical and Computer Engineering at The Ohio State University in Columbus, OH, USA and Senior Editor of IEEE Transactions on Antennas and Propagation, was presented with the 2023 IEEE APS Lot Shafai Distinguished Achievement Award, which honors the technical accomplishments and future potential of an outstanding woman of mid-career status in the field of antennas and propagation. Considered a pioneer in the field of electromagnetics, Kiourti's research in bioelectromagnetics, wearable and implantable antennas, sensors for body area applications, and flexible e-textiles have indelibly advanced those industry applications.

"The Lot Shafai Award recognizes one woman across the world each year, which makes it extremely competitive and highly prestigious," shared Kiourti of her recognition. "In addition to evaluating the nominees' research achievements, the award highlights the accomplishments of women in AP-S and inspires young female professionals to pursue and persist in this career path. This award encourages me to continue to expand my work, grow both professionally and personally, give back to the AP-S, and serve as a role model for other young women in the field," she added.



Stefano Maci, AP-S President (left), C.J. Reddy (second from right), and Branislav Notaros, AP-S President-Elect (right) pose with C.J. Reddy Travel Grant Award recipients Youngno Youn, Christopher Ryu, Serene Abu-Sanfana, Ilir Gashi and Christina Origila - award recipient Ravikanth Thanikonda not pictured.

Serene Abu-Sardana, Cristina Origila, Ilir Gashi, Youngno Youn, Christopher Ryu and Ravikanth Thanikonda were recognized as recipients of the 2023 IEEE Antennas and Propagation Society C.J. Reddy Travel Grant for Graduate Students, which annually awards travel grants to help M.S. or Ph.D. students in the field attend the annual IEEE International Symposium on Antennas and Propagation. According to Reddy, an IEEE Fellow who established and funded the Travel Grant program in 2019, "I'm excited and proud to provide qualified young students with the same opportunities to attend the AP-S conferences that I was afforded and to set an example for other IEEE members as to how they can turn their philanthropy into impact. It's been a real joy for me to see the excitement of the grant awardees attending the conference and taking advantage of their interactions with their peers as well as the leaders of the society." ■



Asimina Kiourti (left), recipient of the 2023 IEEE APS Lot Shafai Distinguished Achievement Award, poses with Professor Jennifer Bernhard of the University of Illinois at Urbana-Champaign, Urbana, IL, USA who helped to establish the Award through IEEE AP-S and the IEEE Foundation.

IEEE Foundation Happenings

Welcome to Our Newest Board Members

Lorena Garcia (left) and Sarah Spurgeon (right) will become important additions to the IEEE Foundation Board beginning in January 2024. Join us in welcoming them.



Meet Our 2024 Ex-Officio Board Members

The IEEE Foundation Board welcomes the following Ex-Officio Board members for 2024.

- IEEE Life Members Committee - Rajendra Asthana (left)
- IEEE History Committee - Enrique Tejera (center)
- IEEE Eta Kappa Nu (HKN)- M. Ryan Bales (right)

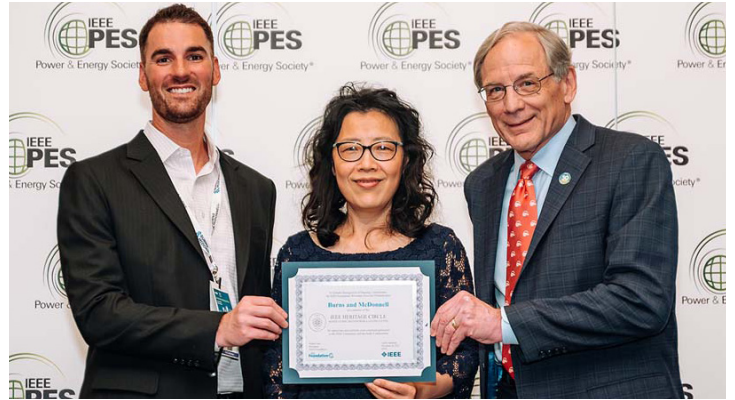


Congratulations to Karen Panetta

Congratulations to Karen Panetta, IEEE Foundation Director, for being elected to the National Academy of Engineering (part of the National Academies of Sciences, Engineering, and Medicine) in February 2023. As one of the highest professional distinctions awarded to engineers, members are elected based on outstanding contributions to the field. Karen was elected for “empowering females in STEM, and for contributions to computer vision and simulation algorithms.”



Burns & McDonnell Support The IEEE Heritage Circle



The 2023 IEEE Power & Energy Society (PES) General Meeting, held in July in Orlando, FL, USA is the premier power engineering conference bringing together practicing power engineers and academics from all over the world. Pictured here, John McDonald, IEEE Foundation Director (right) and Jessica Bian, IEEE PES President (center) presented Burns & McDonnell, represented by Stephen Brogan (left), with the IEEE Heritage Circle recognition at the Marie Sklodowska Curie Level (\$150,000 to \$249,999) in appreciation of their generous support of the IEEE PES Scholarship Plus Initiative.

Marko Delmar Receives IEEE PES Honor



Marko Delimar, IEEE Foundation Vice President, Programs, received the IEEE PES Robert Noberini Distinguished Contributions to Engineering Professionalism Award for contributions and leadership to IEEE and PES professional activities in support of Student Members and Public Policy during the PES General Meeting in July 2023 from Jaime Cepeda PES Awards Committee Chair (left) and Jessica Bian PES President (right). Join us in congratulating Marko.

Kudos to Mary Ellen Zellenbach



Mary Ellen Zellerbach, IEEE Foundation Director, was recently named one of the top 65 Influential Women in Institutional Investing by Pensions & Investments (P&I), a premier investment publication. Congratulations Mary Ellen! The selection process considered career accomplishments, development of others, leadership, industry impact and philanthropic involvement. P&I invited recipients to join them in ringing the closing bell at the New York Stock Exchange on 11 Sept. in celebration of P&I's inaugural awards. ■

50th Anniversary Celebration Launch Party

50
YEARS

The 50th Anniversary Celebration launched on 16 Feb 2023 with an in-person event at the IEEE Meeting series. With the flip of a switch, engineering pioneers emerged from a time capsule. Of course, the time travelling icons were actors, who mingled with our guests creating a memorable evening to reflect on our rich history.



IEEE
Foundation 50
YEARS



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