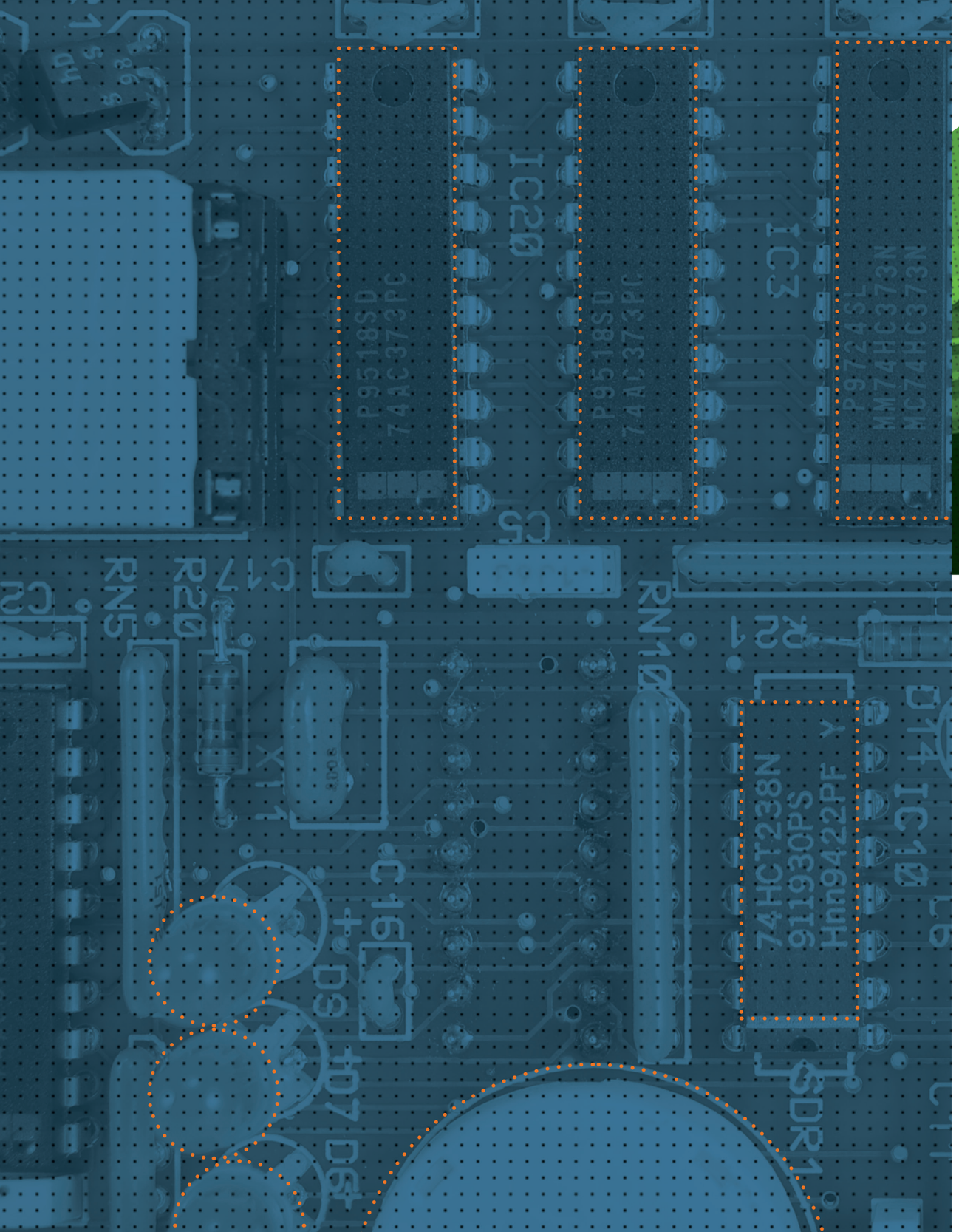
EPICS IN IEEE

TRANSFORMING LIVES, INSPIRING CAREERS

IEEE Foundation

IEEE



Technology changes lives. So does learning to apply it in the real world.

Around the world, EPICS in IEEE is transforming lives with a unique blend of technology and education. Since it was launched in 2009, the program has become a leading global resource for engineers and engineering students seeking to provide critical technological support for communities in need. An IEEE Foundation Signature Program managed and steered by the IEEE Educational Activities Board, EPICS in IEEE embodies the IEEE mission: Advancing Technology for Humanity.

EPICS in IEEE is also a vital tool for recruiting girls and young women to technological careers; one third of all students working as volunteers in this program are female, an underrepresented group in the STEM professions.

The concept for partnering students with community service agencies to solve engineering-based problems began with Engineering Programs in Community Service (EPICS) at the Purdue University College of Engineering. Today, EPICS in IEEE is a proven platform to deliver immediate impact and long-term sustainability by building intellectual capital, human resources planning and technological literacy.

There is much more to do. The need is great for many more such humanitarian initiatives, and we are seeking more volunteers and donors to be our valued partners. Our goal is $2 million in philanthropic investments by 2021; this will support an additional 20 projects a year.

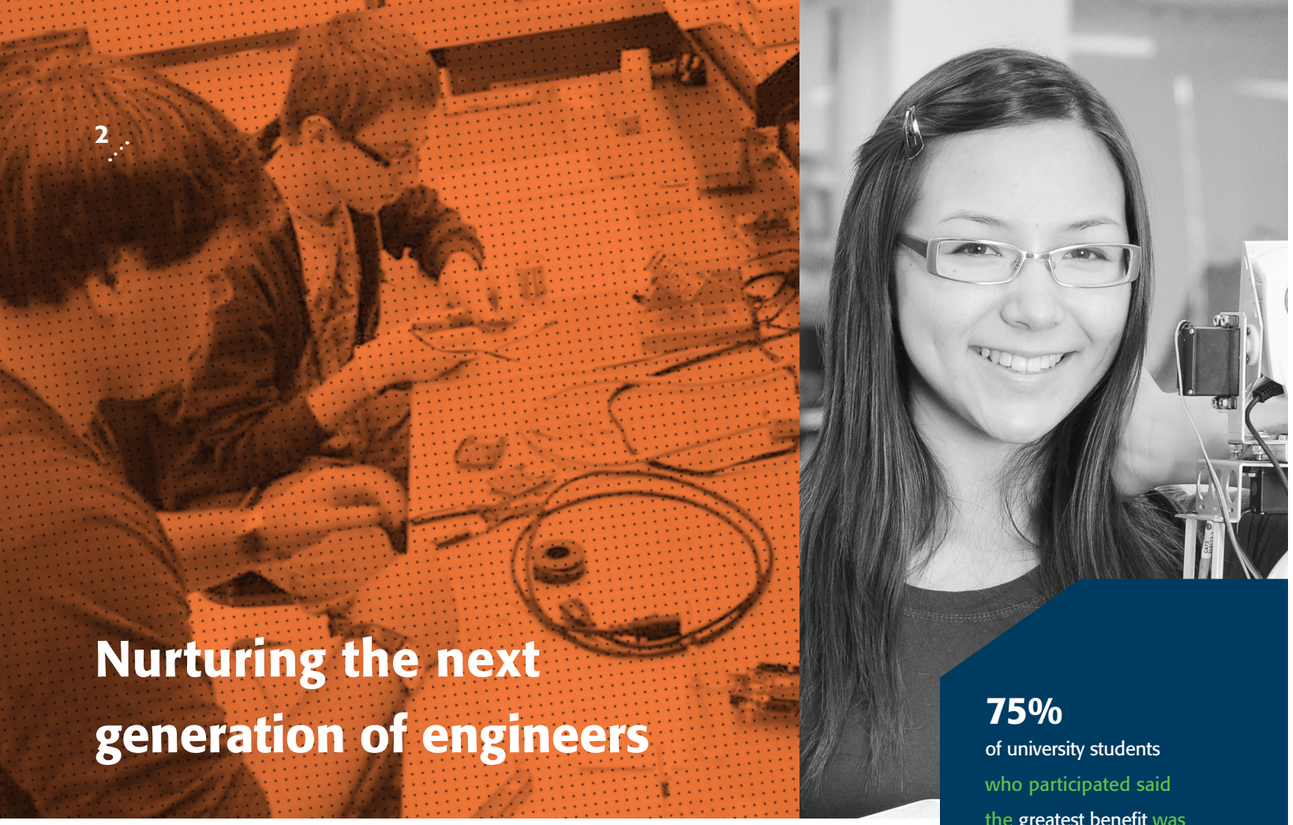
These pages describe how donors, as well as students and members, gain from supporting and involving themselves in EPICS in IEEE. We invite you to join us as we change lives though technology.

76 PROJECTS APPROVED

150,000+ PEOPLE IN OVER 5 CONTINENTS HELPED BY AN EPICS IN IEEE PROJECT

LOCAL TEAMS INCLUDE:

- **250+ IEEE VOLUNTEERS**
- **550+ UNIVERSITY STUDENTS**
- **1,100 PRE-UNIVERSITY STUDENTS**
- **DOZENS OF REPRESENTATIVES FROM NON-PROFIT ORGANIZATIONS**



Nurturing the next generation of engineers

75%
of university students who participated said the greatest benefit was learning engineering can solve real-world issues.

Because they're at a key phase in their development, young people who volunteer with EPICS in IEEE stand to benefit from a priceless, life-shaping experience.

Students participating in the program – whether they're university undergraduates or high school students – gain a first-hand appreciation for how technology improves lives in their own communities. This is also almost certain to stimulate a lifelong interest in community engagement.

But more immediately, what students learn as EPICS in IEEE volunteers can nurture and help to enhance their future careers. The process to define, design, build, test, deploy and support an engineering-based solution offers undergraduate students significant opportunities to broaden their skills. This is critical for the next generation of engineers, who will enter a professional world where they'll need even more to succeed besides expertise in their discipline.

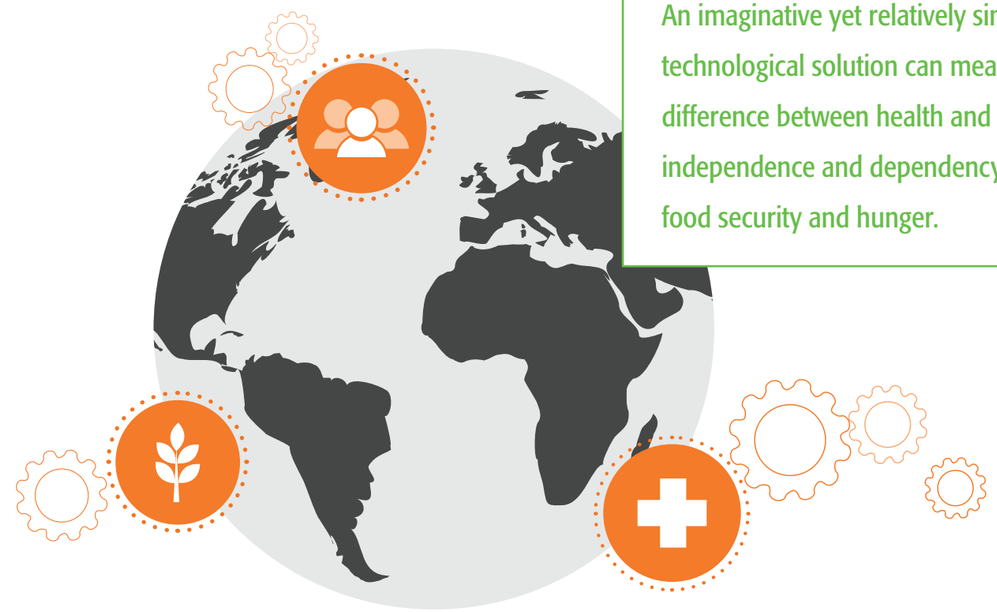
Proficiencies such as project management, leadership, teamwork and communication generally aren't the focus in engineering curricula – but these important skills are vital for career success. Students who volunteer for an EPICS in IEEE project receive abundant opportunities to develop these tools.

In much the same way, high school students also benefit from participating in EPICS in IEEE. The program helps them build knowledge and self-confidence, while at the same time, receiving a stimulating, hands-on introduction to technology as a career.

In a 2014 study* that evaluated the impact of five EPICS in IEEE projects, 75 percent of the university students who participated in them said the greatest benefit of taking part was learning how engineering can solve real-world issues. Every university student agreed that EPICS in IEEE had helped to enhance their ability to understand the needs of end users, as well as enable them to put theoretical knowledge into practice.

THE IMPACT STUDY ALSO OFFERS INSIGHTS INTO HOW THE PROGRAM AFFECTED HIGH SCHOOL STUDENTS; THANKS TO THE REAL-LIFE INTRODUCTION THEY RECEIVED TO AN ENGINEERING-BASED SOLUTION, THESE STUDENTS DEVELOPED A HEIGHTENED INTEREST IN ENGINEERING AS A FIELD OF STUDY.

*McKinley Advisors Impact Study, April 2014



> An imaginative yet relatively simple technological solution can mean the difference between health and illness, independence and dependency, and food security and hunger.

Exemplifying the IEEE global mission

Fostering technological innovation and excellence for the benefit of humanity is the purpose of IEEE – and nothing comes closer to delivering on that promise for future generations than EPICS in IEEE.

By empowering students to work with local service organizations in implementing support for communities in need, the program provides two critically important essentials: an engineering-based solution that helps to achieve specific humanitarian goals, and encouraging talented young people to pursue engineering careers that benefit others. EPICS in IEEE enables university and high school students to work with local partners to achieve a meaningful benefit for their communities – and at the same time, receive real-world engineering experience, and appreciate the need for project sustainability.

Projects range from bringing technology to remote, rural schools to monitoring air quality in densely populated urban areas – but every project made possible by EPICS in IEEE has one common characteristic: It is a locally sustainable solution that improves lives. It also establishes among students the value of a career to help others.

An imaginative yet relatively simple technological solution can mean the difference between health and illness, independence and dependency, and food security and hunger. Since 2009, EPICS in IEEE has been making a difference in communities around the world. At the same time, we've been inspiring students to pursue engineering careers and become the next generation who will continue to advance technology for humanity.

Encouraging education must be a fundamental activity of engineers at all levels and at all times; indeed, this is an IEEE Core Value. Together with donors, volunteers and community partners, we are diligently working to ensure a continuing pipeline of students who choose engineering as a career path. This will both preserve the profession and continue to address local humanitarian needs.

Responsive, responsible solutions for humanity

The ability to enhance people's quality of life through technology is a humanitarian service we take very seriously. Consequently, every aspect of the EPICS in IEEE program reflects the highest principles for integrity and responsible, ethical conduct.

Donors, whose contributions make possible every project we undertake, can expect that their money will be handled respectfully, sensibly and fairly – as well as in compliance with the laws in all countries where EPICS in IEEE has a presence.

As the embodiment of the IEEE mission – to advance technological innovation for the benefit of humanity – EPICS in IEEE operates in a manner that reflects the same trusted standards that IEEE has maintained for almost 125 years. Moreover, as a Signature Program of the IEEE Foundation, we strictly adhere to the principles and values that have made the Foundation a leader in transforming lives through the combined power of technology and education.

Importantly, organizations and individuals whose contributions support our humanitarian efforts also enable significant and meaningful service-learning opportunities for students participating in the program. Not only do they have a role in applying technology to improve lives in their own community, but they also benefit from a life-shaping experience that will help to ensure the next generation of engineers.

DEFINE
DESIGN
BUILD
TEST
DEPLOY
SUPPORT
EDUCATE
EMPOWER

DONORS TO EPICS IN IEEE CAN BE CONFIDENT THEIR GIFTS WILL BE APPRECIATED, USED WISELY, AND CONTINUE TO INSPIRE TECHNOLOGICAL INNOVATION THAT BENEFITS HUMANKIND.

Acquiring a world view

Members of the IEEE STEM (iSTEM) Club at New Jersey's Bridgewater-Raritan High School became aware of the global digital divide while helping students in Paushi, a rural village in India. Partnering with IEEE volunteers and Kreeya, a non-profit, the iSTEM Club used EPICS in IEEE grants to develop a basic library, help install computers, and plan and design a new cyber classroom. A teacher provides basic computer training so Paushi children can prepare for India's employment market. They're learning both digital literacy and English – and iSTEM Club members have new engineering and project management skills.

Building ecological understanding

The University of New Hampshire Oyster Restoration Program worked with the Nature Conservancy to help restore the oyster population in New Hampshire's Great Bay. Oysters are a critical part of the ecosystem, filtering out pollutants to help other organisms survive. A team of UNH students and high school students developed a network of electronic water flow meters for measuring the sedimentation rate – key to cultivating new oyster beds. In a win-win for all, the UNH students received real-world experience, the high school students learned basic engineering concepts, and a local cause received important help.

Collaborating for educational opportunities

The lights are on for 600 students at the primary school in rural, isolated Kasiluni, Kenya. Because the school isn't on the national power grid, a partnership between IEEE Kenya Student Members, student groups at the Jomo Kenyatta University of Agriculture and Technology and a sustainable energy provider engineered solar-powered electricity. Now, the school is open for longer hours, electronic devices can be used, and overall educational quality is greatly improved. Also important, the Student Members got practical experience installing solar technology, and secondary school students who helped out learned about renewable energy and electrical engineering careers.

Innovating for food security

In La Paz Centro, Nicaragua, a center of drought and hunger in Latin America, students from Vassar College, the University of Managua and a local high school STEM group are developing an innovative approach to agriculture. Working with the non-profit Artists for Soup, the multi-disciplinary team is creating 70 bio-intensive garden beds at the high school. Using simple, inexpensive components, the students also are inventing new strategies for water collection and slow-drip irrigation. Once the system is operating, the students will have a better way to produce food – while also growing their knowledge of engineering.

Developing environmental awareness

Since 2009, a partnership in densely populated South Philadelphia has provided its residents with vital air-quality information. Natural gas extraction in the nearby Marcellus Shale region had raised concerns about the environmental effects of drilling, and few monitoring solutions addressed air quality. The collaboration between IEEE Student members at Drexel University, North Penn High School and the Clean Air Council, comprised of 11 local lung associations, is an ongoing effort. Student teams continually enhance the design and effectiveness of the sensor networks they created, and the Council has a stronger voice in air-quality regulatory policies.

Helping others achieve independence

An inexpensive, handheld device promises new dignity and confidence for the speech and hearing-impaired, thanks to IEEE Student Members at RNS Institute of Technology in Bangalore, India. Since 2012, student teams have worked with educators at a local school for hearing and differently abled children on a system to simultaneously translate sign language into text and audio. When completed, it will bridge the gap between who those cannot speak or hear to those who do – and hopefully open up employment opportunities for users. Meanwhile, the Student Members have gained valuable insights about innovation, teamwork and the satisfaction of helping others.

Improving quality of life

In Kathrada Park, home to some of the poorest in Johannesburg, South Africa, University of Johannesburg (UJ) students used the Liter of Light solution to bring safe nighttime lighting. With high school students, the UJ students designed a system to charge batteries using solar energy; a solar cell is attached to a plastic bottle functioning as a daytime skylight and inserted into a thin, tin roof. Now, instead of devastating fires caused by overturned kerosene lamps, safe, sustainable lighting is making life a little better in Kathrada Park – and students have learned that engineering can also be about caring. The student leader also developed a scholarly paper.

THE POWER OF TECHNOLOGY CAN GENERATE IDEAS CAPABLE OF ADVANCING CRITICAL THINKING, CONNECTING LOVED ONES, AND ILLUMINATING OUR WORLD.

One unique organization has the ability to marshal the manpower, expertise and resources necessary to turn these ideas into action: the Institute of Electrical and Electronics Engineers (IEEE).

As the philanthropic arm of IEEE, the IEEE Foundation inspires the generosity of donors to enable IEEE programs that improve access to technology, enhance technological literacy, and support technical education and the IEEE professional community.

The IEEE Foundation, a tax-exempt 501(c)(3) organization in the United States, fulfills its purpose by

- SOLICITING AND MANAGING DONATIONS
- RECOGNIZING THE GENEROSITY OF OUR DONORS
- AWARDING GRANTS TO IEEE GRASSROOTS PROJECTS OF STRATEGIC IMPORTANCE
- SUPPORTING HIGH IMPACT SIGNATURE PROGRAMS
- SERVING AS A STEWARD OF DONATIONS THAT EMPOWER BRIGHT MINDS, RECOGNIZE INNOVATION AND PRESERVE THE HISTORY OF TECHNOLOGY

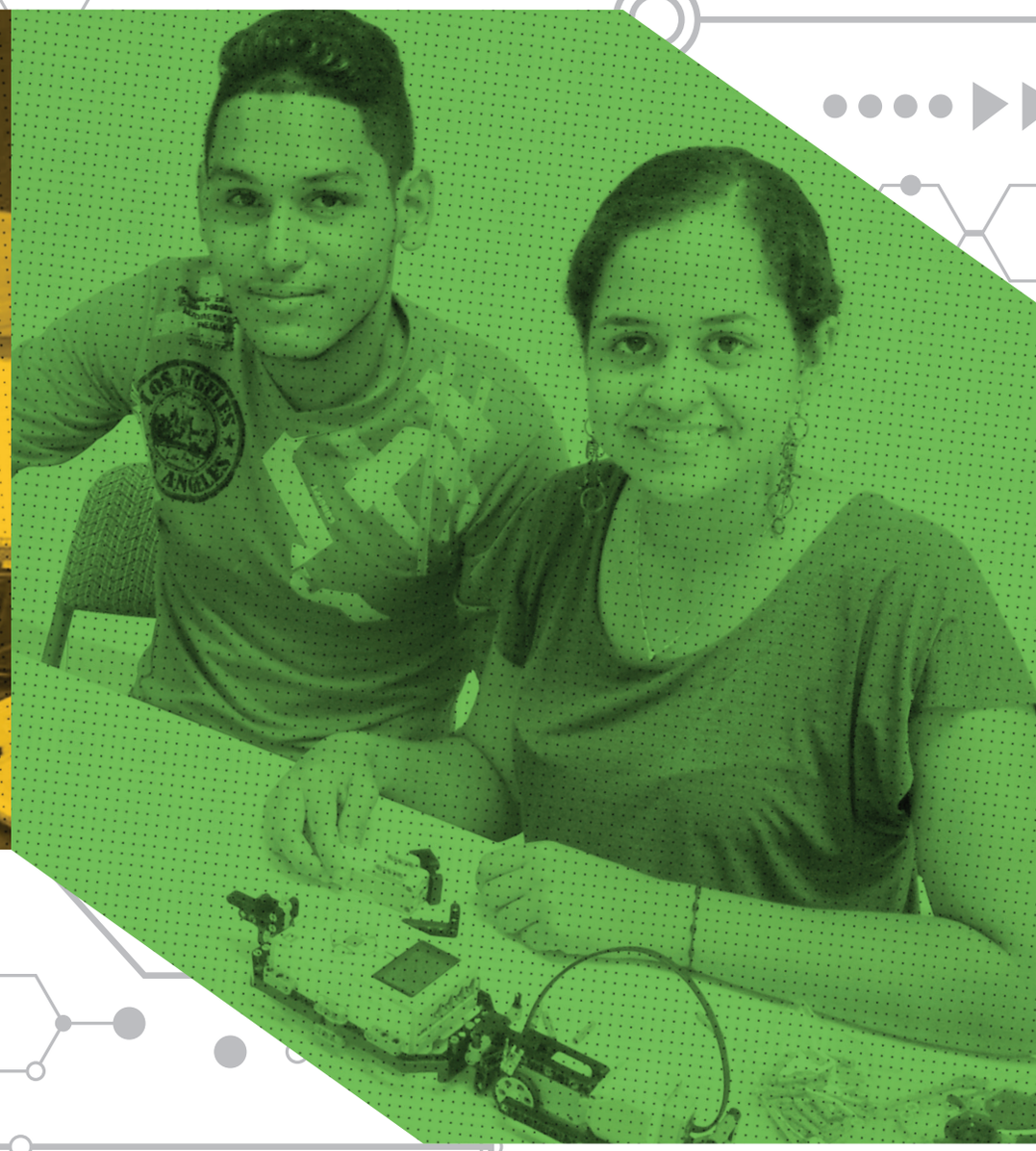
With your support, as well as the support of thousands of like-minded members and friends, the IEEE Foundation is making a significant impact through high-performing IEEE programs and strives to be a leader in transforming lives through the power of technology and education.

IEEE Foundation collaborates with IEEE to engage members and friends of IEEE in a partnership that transforms the knowledge and reach of IEEE into tangible and effective solutions to bring technology to people in need.

In addition to supporting long-established **IEEE PROGRAMS**, such as **IEEE LIFE MEMBERS**, **IEEE-ETA KAPPA NU**, **IEEE-USA**, **IEEE AWARDS**, the **IEEE HISTORY CENTER**, and the **IEEE FOUNDATION GRANTS PROGRAM**, the Foundation is committed to advancing IEEE initiatives in the educational and humanitarian spheres through Signature Programs, such as EPICS in IEEE.

LEARN MORE: ieeefoundation.org
DONATE: ieee.org/donate

Photos and captions available upon request.



EPICS in IEEE

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