

# FOCUS

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## Global Reach, Local Impact

*There are an increasing number of donors, like you, who recognize that philanthropic portfolios can be both local and international – and that by addressing problems in a cross border and comprehensive way, philanthropy is making a real difference. Together, we can solve local and global problems using philanthropy to drive successful programming.*

IEEE is uniquely qualified with the knowledge, skills and resources to address global technical challenges and deliver affordable, innovative programs and services that best address the needs of our global constituents. Your philanthropy is leading the **Realize the Full Potential of IEEE** Campaign to generate the funds required to expand and enhance IEEE programs that have global reach and local impact.

**To date, the Campaign is at 69.86% of its US\$30 million goal enabling IEEE Foundation Priority Initiatives to make global impacts.**

Bringing safe, clean, affordable and sustainable electricity to remote villages through the collaboration of IEEE volunteers, staff and the local benefactors is the mission of the **IEEE Smart Village** program. Solar-powered micro utilities have been established on 7 continents and serve 300,000 people in places like Cameroon, Haiti, India, Sub-Saharan Africa, Galapagos Islands and Vietnam. These Smart Village micro utilities play an important role in local health, education and economic development. Read more about IEEE Smart Village on pages 4-5.



Life-changing experiences for students and local leaders alike help bring new services to communities and inspire students to become engineers. **EPICS in IEEE** works with tens of thousands of students in high schools and universities around the world. Thus far, EPICS has identified, supported and nurtured 132 social innovation projects that used engineering, technology, plus the hard work and ingenuity of 960 college and university students and 534 IEEE volunteers to improve the lives of more than 244,695 people. Read about an EPICS project on page 4.

The need for engineers, STEM professionals, and engineering students is increasing globally as important work for technologists

increases. IEEE is uniquely positioned to help design and promote transformational scholarship programs such as the **IEEE Power & Energy Society Scholarship Plus Initiative**. This initiative has awarded 917 students with 1,556 scholarships since 2011. Imagine the benefit of providing new scholarships each year to ensure the success of remarkable students interested in crafting our technological future. Read more about PES Scholars on page 7.

Preserving and promoting the history of technology, the profession, and IEEE is the role of the **IEEE History Center**. Through targeted programs, the Center collects and disseminates resources that demonstrate

*Continued on page 2*

## Global Reach, Local Impact

*Continued from page 1*

the impact and influence of technology and its relationship, both past and present, to society. Historic innovations from around the world are recognized as IEEE Milestones, which celebrate IEEE's dedication to sharing engineering history as a conduit to engage global citizens, a key component of the Campaign. Read about the space-related Milestones recently dedicated, on page 3. The intertwined relationship between engineering and humanity is undeniable. Engineering and technology have influenced our world socially, economically, politically and culturally throughout history. **IEEE REACH** (Raising Engineering Awareness through the Conduit of History), illuminates the intersection of these relationships and makes the history of engineering accessible with educational resources through a free, web-based platform. Fostering technology literacy, REACH teaches how technology impacts our world. Learn more about REACH on page 2.

Innovations in engineering are required to meet many of the challenges facing our global family. Our Campaign goal is to continue to address those challenges, with your support. Think of how much more we can do.

Consider making your Campaign contribution in the enclosed envelope to support IEEE global initiatives today. Your gift will ensure the Campaign's success and enable us to **Realize the Full Potential of IEEE**.

**For updates and to become involved, visit [ieeefoundation.org/campaign](https://ieeefoundation.org/campaign)** ■

*Karen Galuchie is the IEEE Foundation Executive Director.*

## Leading the way in Education and Supporting the Workforce

IEEE REACH (Raising Engineering Awareness through the Conduit of History) is leading the way in the pre-university open education resource (OER) space, providing one of the only pre-university OER programs that focuses on the history of technology in its social context. With the program's free lesson plans, hands-on activities, and short videos, students learn to understand the role technology and innovation plays in the world around them.

When REACH resources are implemented in the classroom, students gain invaluable skill sets, from problem solving and research, to communication and collaboration. Critical thinking is also improved with tasks that require analyzing the impact of technology on society and, in return, the impact of society on technology. This social context of technology is a critical component of technological literacy, and to be a responsible citizen in today's day and age, all students need to be technologically literate. STEM employers also emphasize the need for these soft skills. Applicable technical skills require constant retraining as technology advances, while soft skills are invariable, and just as essential for the future workforce. IEEE REACH was the pilot

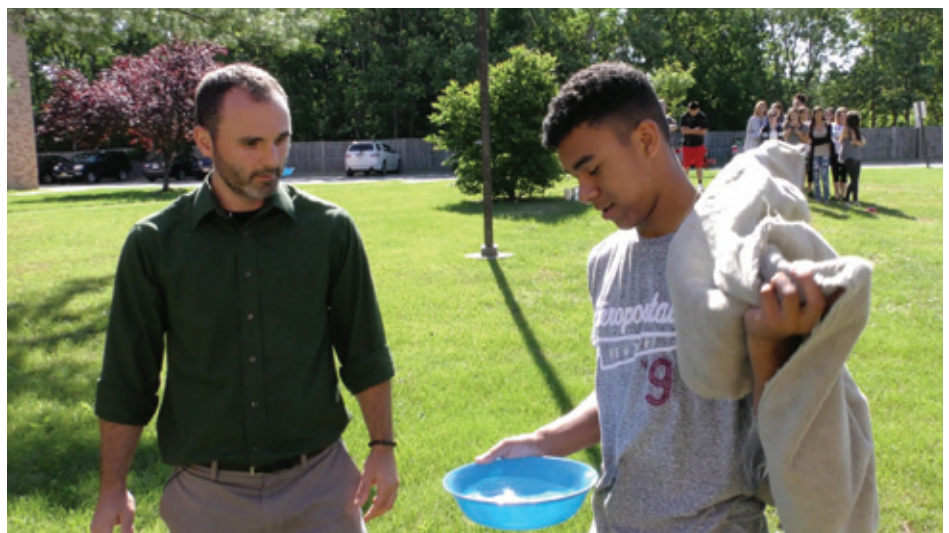
program of an IEEE initiative to explore the Social Return on Investment (SROI) of its Humanitarian and Philanthropic projects, and the report shows a significant SROI for REACH, and states the program is uniquely situated, to increase the students' levels of technological literacy and their interests in STEM-related subjects and careers.

Hajra Saeed, a California High School teacher, states, "I love your website...Teaching in a school that focuses on engineering and biomedical science, your website is really helpful." With 750+ subscribers, from 43 countries, and the potential to "reach" more than 500,000 students, REACH is advancing technological literacy skills and supporting the future workforce.

**Learn more at [reach.ieee.org](https://reach.ieee.org)** ■



Watch some highlights of the IEEE REACH Program: <https://vimeo.com/340709207/c38fc17ec9>



*Brian Sullivan, History teacher, Manalapan High School, NJ, US and one of his students observe a rudimentary compass they made during an IEEE REACH hands-on activity.*

# Donor Funded Intern Makes History



The 2019 Elizabeth & Emerson Pugh Young Scholar in Residence, Dr. Francesco Gerali, worked for eight weeks at the IEEE History Center, thanks to funding from the Pughs. Francesco hails from Italy, where he received his education, including a Ph.D. in the history of science and technology. He also holds an MLS degree from the University of Oklahoma.

He has worked or studied in Italy, Australia, and Mexico, as well as in Norman and in Philadelphia here in the US. "Elizabeth and I are impressed by the depth and breadth of his training and experience. The fact that he grew up in a European country is consistent with the fact that more IEEE members now live outside rather than inside the United States," said Emerson.

His research interest has been in the history of the fossil fuel industry. Recently, his interests have expanded to understanding the power and energy business in a broader context, bringing him increasingly in contact with IEEE fields of interest. The IEEE History Center was the ideal venue for him to pursue this professional growth. Watch for Francesco's "Scanning the Past" articles on electrical and electronic technologies for petroleum exploration to

be published in *The Proceedings of IEEE* early next year.

**Learn more at [bit.ly/SupportIEEE-HistoryCenter](https://bit.ly/SupportIEEE-HistoryCenter)**

*Danny DeLiberato, CFRE is the Development Officer responsible for the fundraising success of and REACH and other IEEE History Center programs.*



# Space Travel Celebrated through IEEE Milestones

Throughout 2019, IEEE is commemorating space travel, the technology behind it and the members who developed the technologies that made the achievement possible through Footsteps: IEEE's Commemoration of Human Space Travel, led by the IEEE History Center. One of the most publicly-visible ways IEEE recognizes the achievements of the profession is through the IEEE Milestones Program of the IEEE History Center.

In particular, IEEE has dedicated many milestones related to space travel: Electronic Technology for Space Rocket Launches, Mercury Spacecraft, Apollo Guidance Computer, Lunar Module and Radar Signals Reflected from the Moon (Project Diana) and LURE Lunar Ranging Experiment (reflection of laser from Moon surface).

Two more space-related Milestones: The first human rescue and life-saving enabled by space technology and the Parkes Radiotelescope, which received the signals from the Apollo 11 will be dedicated in October. Three space-related milestone proposals are in process: S-band Communications System, Space Shuttle Training Simulator Software, and Space Shuttle Remote Manipulator.

Not related to space travel, but an achievement worth mentioning, is that in August IEEE dedicated its 200th Milestone for the Conductive Polymer Self-Regulating Heat-Tracing Cable!

The Milestone Program and the IEEE History Center rely on donor support and member involvement. You can propose a technological achievement within IEEE's fields of interest as a Milestone.

**Learn more at [bit.ly/IEEEMilestonePropose](https://bit.ly/IEEEMilestonePropose)**



*A day-long celebration for the dedication of the IEEE Milestone — Apollo 11 Lunar Ranging Experiment (LURE) on 1 August featured a visit to the Lick Observatory and a reception hosted by the IEEE Foundation. With the Milestone plaque are, from left, Remington Stone, Anna Marie Spilker, James J. Spilker Jr., Hildreth "Hal" Walker, Jr.*

# Cutting-edge Prosthetic for Buddy

Excerpted from an article by: Michele Currenti,  
creative content intern for IEEE Educational  
Activities

## EPICS IN IEEE

Buddy the German Shepherd has gone bionic thanks to IEEE-HKN Iota Delta Chapter and EPICS in IEEE (Engineering Projects in Community Service) volunteers at the Stevens Institute of Technology in Hoboken, NJ, US.

One-year-old Buddy, was abandoned and his back leg became trapped and painfully infected. Buddy was forced to gnaw off his hind foot and part of his ankle. To save Buddy's life, his veterinary team opted to amputate the bottom half of his back leg, but lacked the technology to fit him for a prosthesis that would grant him full range of motion. That's when IEEE-HKN Iota Delta Chapter and student volunteers team came to the rescue, thanks to a US\$10,000 EPICS in IEEE grant, made possible by donations to the IEEE Foundation.

The team—consisting of graduate students, undergrads and professors applied for the grant from EPICS in IEEE, a program designed to empower high school and college students to use technical solutions to aid communities. The team plans to build a motorized transtibial—below-the-knee—prosthesis using 3D modeling and printing. This massive undertaking had never before been successfully completed due to lack



Faculty advisor Dr. Damiano Zanotto, top right, and his team pose with Buddy.  
Photo credit: Laurie Vazquez

of research, cost limitations and the weight of the prosthesis itself. Inspired by major advancements in wearable robotics for humans, the team set out to create an adaptive, rugged model that could be modified to fit different sizes of dogs and serve their unique needs.

Led by IEEE Member and assistant professor of mechanical engineering at Stevens, Dr. Damiano Zanotto, the team first created an alpha prototype that focused on the geometry and fit of the prosthesis. Rather than using traditional plaster casts, the team turned to a more efficient, high-tech approach: 3D-modeling which could be more easily customized and altered.

**The project is due to launch a fully-functional model in 2020, but its impact doesn't stop there.**

The project team is partnering with the Center for Innovation in Engineering and Science Education (CIESE) to expose teachers and K-12 students to robotics. They intend to collaborate with CIESE's NDF ITEST Scale-Up project, that uses robotics as a tool to reach between 6,000-111,000 high school students. They hope to engage students at every age, expose them to advancements in robotics, and demonstrate that STEM-centered careers are both exciting and attainable. The team will demonstrate the prototype prosthesis to K-12 students both in a classroom setting and in a 2020 hands-on laboratory robotics session.

This team challenged the notion that motorized canine prosthetics had to be exorbitantly expensive. They put great minds and collaboration to work, not only to help Buddy, but to finally create a customizable powered prosthesis for man's best friend.

**Learn more at [epics.ieee.org](http://epics.ieee.org) and IEEE-Eta Kappa Nu: [hkn.ieee.org](http://hkn.ieee.org)** ■

*Michael Deering is the Senior Development Officer responsible for the fundraising success of EPICS in IEEE and IEEE Smart Village.*

## Help Bring the Light to IEEE Smart Villages



More than 984 million people have little or no access to electricity, especially in remote areas of the world. Without sufficient access to power, these communities continue a cycle of economic impoverishment.

IEEE Smart Village (ISV) seeks champions to lead fund-raising teams using crowdfunding. The campaign, called **"Bring the Light,"** allows small groups to establish reasonable fund-raising goals and then contribute on-line with one-time or monthly donations.

Team Captains are the backbone of this campaign. Your efforts will help grow the global network of "Smart Villages." You lead the charge to empower the world's most vulnerable energy-poor citizens and establish a growing and vibrant socioeconomic community. Help ISV to establish reliable access to electricity, educational opportunities and economic development, customized to the needs of the local community. It is truly life-changing to have power for the first time!

As a Team Captain, you lead the creation of your team page (which is easily set up) and recruitment of your team of Ambassadors. Register as a Team Captain, join as an Ambassador or make a donation today. Through your team efforts, remote villages around the world will gain a foothold toward more prosperous lives.

## Bring the Light

**An IEEE Foundation Campaign**

**Learn more at [bit.ly/IEEE](http://bit.ly/IEEE)  
BringtheLight** ■

# Renewable Energy is Leading to Sustainable Development in India

In some parts of the world, electric grids are unreliable, operating for six hours a day and forcing villagers to rely on expensive and dangerous kerosene lanterns. As a further consequence of a lack of electricity, many of these places also have limited access to clean water.

To help improve the lives of people under these circumstances, IEEE Smart Village (ISV) works to empower marginalized communities through access to reliable electricity, broad-based education, women's empowerment and market-based business development.

To do this, ISV provides seed funding to carefully-selected community entrepreneurs on the merits of their business plans and 10-year vision for scale. The goal is to create the greatest impact on people through electrification, education and enterprise development. Many of the ISV volunteers are IEEE members.

**Since the inception of this work, 282 villages have been powered with more than a megawatt of clean energy.**

Shakti Empowerment Solutions (SES) is an ISV entrepreneurial project spinoff from United for Hope, a well-established non-profit already providing rich education, clean water service and women's programs.

Started in 2016 and located in India's state of Uttar Pradesh, SES has supplanted diesel power with a solar-powered water treatment facility and Wi-Fi enabled community center near the village of Tirmasahun.

With the SES addition of a 18.9kW solar power plant and an electric vehicle for delivering rental batteries (that can power small appliances and clean lighting), this development model works to improve living standards by identifying products and services that can be produced and distributed within local communities, bolstering vocational training, entrepreneurship, and leadership, and ultimately making development sustainable both socially and environmentally.

The center's computer lab supports digital literacy and, as an Internet café, helps support SES. United for Hope has been recognized by the UN for its work in bringing digital services to rural communities. Revenue is



*Brick Kiln customers enjoying electricity from a portable battery kit.  
Photo Credit: Shakti Empowerment Solutions*

also generated through the center's guest house, which gives tourists the opportunity to be a part of the community and observe the projects first hand.

In addition to these ventures, the United for Hope center is a hub for education – its classroom educates children from the poorest families, as well as women and girls with district-wide work around menstrual hygiene and gender sensitivity.

To IEEE Life Fellow Ray Larsen, IEEE Smart Village co-founder, the future is bright for SES: "SES recently won a competition for a donation of 20kW worth of solar panels from a company in Singapore with which it plans to set up a local business incubation center close to the town on several acres of leased land."

Once the pilot phase is complete, SES will look to scale to 10 villages in five years, and 41 communities by 2027. The social entrepreneurs trained through the project will be critical to this successful expansion.

"Ultimately," Larsen says, "this work is important to IEEE because although the electricity business potential for surrounding villages has yet to be reached, significant progress is being made towards all the major goals. We still have much to learn from this venture."

**Learn more at [smartvillage.ieee.org](http://smartvillage.ieee.org)** ■

*This article originally appeared on IEEE Transmitter on 7 June, 2019. [transmitter.ieee.org/renewable-energy-is-leading-to-sustainable-development-in-india/](http://transmitter.ieee.org/renewable-energy-is-leading-to-sustainable-development-in-india/)*

# HKN Students Develop Public Speaking and Leadership Skills

The IEEE-HKN Mu Pi chapter and the Student Branch at the GH Rasoni College of Engineering (GHRCE) in India joined forces for a successful program aimed at raising awareness of the importance of public speaking and the development of leadership qualities for a successful career.

The two groups worked with Brio, the Toastmasters International club of the college. Brio follows all the rules, regulations and structure governed by Toastmasters International. Toastmasters chapters develop leaders and one of the toughest skills leaders must develop is public speaking. Toastmasters also instills ethics and values in their message to future leaders.

The event was chaired by the club's president TM Karan Pareek and was coordinated by Chandan Yadav, representing IEEE-HKN and the IEEE Student Branch.

*Rich Allen, CFRE is the Campaigns Manager responsible for the fundraising success of HKN.*

By adopting the theme "We Are Stronger Together," the Brio collaborated with the IEEE Student Branch and IEEE-HKN to witness the strength of leadership and technology. The meeting included audiences of various age groups, though about 150 MBA students from the college served as the primary audience for the event.

Speakers completed icebreaker exercises by giving technical speeches. Audience members also participated by speaking about a random topic, which was provided on the spot. The speakers were evaluated on rubrics designed by Toastmasters International.

The goal of the meeting was to improve the participants' presentation techniques and public speaking skills and certificates were presented to the best Icebreakers.

"The two professional chapters joined together and had wonderful synergy and energy. This event can be repeated at other centers," says Preeti Bajaj, Governor At-Large for the IEEE-HKN Board of Governors. Mu PI is the youngest professional chapter of GHRCE. It is the third HKN Chapter in India and 245th in the world.

**Learn more at [hkn.ieee.org](http://hkn.ieee.org)** ■



*Karan Pareek, right, president of the Toastmasters club GHRCE, is presented with the Best Speaker Award.*

## IEEE TechEthics: Driving Conversation on the Ethical and Societal Impact of Technology

### IEEE TechEthics™

Launched in 2016, IEEE TechEthics is an institute-wide umbrella program led by IEEE Technical Activities that ties together, complements and amplifies activities on ethics and the societal impact of technology from across the organization.

Philosophers, ethicists, lawyers, policy makers, economists, sociologists, data scientists and even novelists have joined technologists in conversations curated by IEEE TechEthics. These sessions address matters such as algorithmic bias, the future of work, city planning for autonomous vehicles, social robotics, digital literacy and personal rights in the context of augmented reality. Through a combination of panel discussions at conferences, virtual sessions, public forums, livestreaming and on-demand recordings, IEEE TechEthics has made these conversations available to tens of thousands of members and non-members across the globe.

The IEEE Foundation has been a valued partner in enabling these conversations by providing grants to support the logistics associated with producing and distributing this content. In 2019, these grants have helped support IEEE TechEthics' presence at several conferences, including the IEEE Vision, Innovation, and Challenges Summit, the UN Multi-stakeholder Forum on Science, Technology and Innovation, the IEEE Symposium on Technology and Society and the Global Sustainable Technology & Innovation Conference.

**Learn more and find on-demand content at [techethics.ieee.org](http://techethics.ieee.org)** ■

# PES Scholarship Recipients in the Workforce



*Christopher Noah, PES Scholarship alumnus, works for SEL as a Project Engineer.*

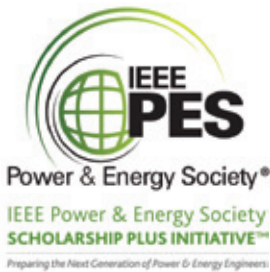
Being selected and receiving recognition as a PES Scholar is just the beginning. More than 550 PES Scholar Alumni are working full-time in a variety of roles which allow them to use the power-focused education they received at ABET-accredited schools across the United States and Canada.

Schweitzer Engineering Laboratories (SEL) is one of many companies which understand the benefit of hiring PES Scholars as either interns or full-time employees. 2016 PES Scholar and University of South Florida grad Christopher Noah is one.

"I've worked at SEL for nearly four years, though my familiarity began when they hired me as an intern. Currently, I am a Project Engineer I – Protection." Just recently, Chris sent an intern he supervises to SEL Headquarters in Pullman, Washington, US for *Intern Week*. This event is solely for interns and brings them from SEL locations to ensure they understand and embody the SEL values like Customer Focus and Quality. Interns also take tours, meet key leadership and gain a broader insight into SEL as a company.

SEL recognizes that identifying and rewarding talent early on is a key driver to generating the much-needed workforce of the energy future.

**Learn more at [ee.scholarship.org](http://ee.scholarship.org)** ■



*Two-time IEEE Power & Energy Society (PES) Scholar and University of Nebraska graduate, Jackson Cutor works in the utility consulting department of Burns & McDonnell, a company that has hired the most PES Scholars to date - more than 50. Jackson works on grid modernization, renewable energy, batteries and electric vehicles.*

## IEEE Volunteers Provide Disaster Relief

The IEEE-USA MOVE Program (Mobile Outreach Vehicle), is an emergency relief program committed to assisting victims of natural disasters with short-term communications, computer and power solutions. In early September, the MOVE vehicle and IEEE's highly-skilled volunteers were deployed during Hurricane Dorian to South Carolina, US. There they assisted with temporary emergency relief provisions so those affected could stay connected and access support. Services include phone charging, internet access, communications support and lighting.

**You can support this program and future deployments at [ieeefoundation.org/move](http://ieeefoundation.org/move)** ■



*IEEE volunteers Brian Greene and John Balsam are unloading communications equipment to support first responders.*

*Natalie Rae Krauser, CFRE is the Development Officer responsible for the fundraising success of the IEEE PES Scholarship Plus Initiative.*

# Building a Bridge to the Next Generation

One of the challenges for traditional industries today is attracting and retaining young engineering students who graduate from universities with plans to enter the workforce. In some regions there are not enough candidates to fill available positions and many of those that do graduate choose to pursue advanced degrees or begin their careers in emerging technologies.

The IEEE Pulp and Paper Industry Committee (PPIC), working together with the IEEE Foundation is finding ways to recruit and retain some of the best young engineers to the industry through the James A. Rooks Memorial Grant Fund. The PPIC is one of six technical committees in the Process Industries Department of the IEEE Industry Applications Society. In 2006, members of the committee approached the IEEE Foundation asking for help in establishing an honorarium for one of their past members, Jim Rooks.

**Jim was an IEEE Life Fellow with relentless compassion for young engineers, serving as a mentor by encouraging them to volunteer on the committee and to attend the annual Pulp, Paper and Forest Industries Conference.**

Jim personally sponsored dozens of young and experienced engineers, serving as a reference for them to apply to become IEEE Senior Members. He was active in his local IEEE IAS Chapter and often engaged with local universities to involve students

in chapter activities. A memorial fund was established through the IEEE Foundation that was initially funded by members of Jim's family. A matching fund challenge was approved by the IEEE IAS Board of Directors and this inspired giving from individual members and member companies who wanted to honor Jim. The fund was initially established to support the cost for student engineering interns to attend the annual technical conference. The Foundation account was set-up to reimburse all costs including travel, registration and hotel expense. To qualify for the financial support, the intern needed to apply, and identify a sponsor from the mill where they were working, typically an experienced engineer who would serve as a mentor.

In June of 2007, the James A. Rooks Memorial Intern Fund was active. Student interns from three different paper mills attended the annual conference along with their sponsors. The program was a success. In 2014, the PPIC worked with the IEEE Foundation to expand the scope of the program to also include travel cost and registration reimbursement for young engineering professionals already working in industry. This change in scope resulted in the creation of a new IEEE Foundation James A. Rooks Memorial Grant Fund.

Over the past several years, the IEEE Foundation/James A. Rooks grants have played an important role at the annual conference. Young students and engineers working in the industry, attend the technical sessions

and tutorials, learning about the latest applications to improve electrical workplace safety, productivity and energy efficiency. Many have established relationships with experienced mentors, some who have joined the committee and presented technical papers focused on the value of student interns working in paper mills. This year, two student interns and two young professionals attended the 2019 IEEE IAS Pulp, Paper and Forest Industries Technical Conference held in Jacksonville, FL, US, 23-27 June. Their costs to attend the conference were reimbursed by the active IEEE Foundation funds.

## James A. Rooks Memorial Student Intern Award 2019 Recipients

Rebecca Kobernat attends Georgia Institute of Technology in Atlanta, GA, US and works for International Paper Georgetown Mill in Georgetown, SC, US. Rebecca is planning to graduate with a Bachelor of Science degree in Electrical Engineering in December 2020.

Matthew Shaw attends the University of Wisconsin Madison and works for Verso Corporation at the Wisconsin Rapids, WI, US paper mill. Matthew is a Senior planning to graduate in May 2020 with a Bachelor of Science degree in Electrical Engineering and Computer Science.

## James A. Rooks Young Engineering Professionals Program 2019 Recipients

Brian Gronseth is an Electrical Engineer with International Paper Springfield Mill in Springfield, OR, US. He graduated with a Bachelor of Science degree in Electrical Engineering from Iowa State University, Ames IA, US in May 2017.

Cody Kaus is an Electrical Project Engineer in Training with Domtar at the Dryden Mill in Ontario, Canada. He graduated with a Bachelor of Science in Electrical Engineering from Lakehead University, Orillia Ontario, Canada in April 2018. ■



*Pictured, from the left are: PPIC Chair Todd Legette, Rebecca Kobernat, Matthew Shaw, Cody Kaus, Brian Gronseth and PPIC James A. Rooks Program Chair Emily Held.*

*Karen Kaufman is the Senior Communications Manager.*



# Summer Program Encourages Teens to Try Engineering

The 2019 TryEngineering Summer Institute welcomed 155 high school students from 17 states and 10 countries.

Thirty of those students attended thanks to needs-based scholarships through IEEE Foundation. The generosity of individuals, organizations and 12 IEEE societies and councils helped make attending the program a reality for students with varying socio-economic backgrounds. Recipients commented that attending this “eye-opening” and “life-changing” program would not have been possible without the scholarship.

This two-week, on-campus summer program (held in July) gives teens the opportunity to meet young engineering professionals, go on field trips to watch engineers in action, and learn from inspiring guest speakers with real-world experience. They explore a variety of engineering disciplines in a fun, hands-on environment engaging in projects including:

- Creating a light sculpture using CAD software and 3D printers
- Building a fully operational smart car from scratch
- Designing a hydraulic robot arm
- Engineering a bridge and testing for structural integrity

Teens who attended found it to be a valuable experience that prepared them for a future career in engineering. Jonathan Mesidor, now a senior at Northeast High School in Philadelphia, PA, US said, “I learned things here that we don’t have the chance to learn in school, or even in the engineering club I participate in.” He added, “I also learned to communicate better, work in groups, and interact with people I’ve never met before.” Jonathan knows that those skills are important to learn and transferrable when he joins the engineering workforce. Attending Redbank Middle School, NJ, US, Jacqueline Pena Gomez



*Jonathan Mesidor and Jacqueline Pena Gomez show off some of their TryEngineering Summer Institute Projects.*

said, “I wanted to learn more about engineering overall to help me decide what areas of technology interest me the most, and TryEngineering was the opportunity to do that.”

Throughout the program, teens learn how engineers can make a significant impact, while engaging with peers on one of three college campuses in New York, California, and Texas.

**Learn more at [tryengineeringinstitute.ieee.org](http://tryengineeringinstitute.ieee.org)** ■

# Earthworm-Inspired Robot Earns \$10,000 Scholarship

Teenager Ari Firester watched on television as members of a youth soccer team were saved from a flooded cave in Chiang Rai Province, Thailand. The two-week-long effort, which left one rescuer dead, inspired Ari to create a technology that might prevent such a tragedy from occurring again. Ari’s invention earned him this year’s IEEE Presidents’ Scholarship, presented at the annual Intel International Science and Engineering Fair (ISEF).

Ari, 16, a junior at Hunter College High School in New York City, created “Worm-bot,” an earthworm-inspired robot capable of maneuvering in narrow spaces. “I remember seeing on the news that a [Thai] Navy Seal had died navigating the narrow cave to rescue the soccer team,” Ari said. “This inspired me to create something that would navigate through dangerous places without putting human lives at risk.”

His project was displayed at the ISEF, held in May in Phoenix, AZ, US and earned him the US\$10,000 scholarship, payable over four years of undergraduate university study.

Established by the IEEE Foundation, the scholarship recognizes students for outstanding projects that demonstrate an understanding of electrical engineering, electronics engineering, computer science, or another field of IEEE’s interest. The scholarship, administered by IEEE Educational Activities, includes a complimentary IEEE student membership and an engraved plaque.

Melissa Woo, a junior at Greenwich High School, Greenwich, CT, US, was the second-place winner. Abigail Greenhalgh, a sophomore at Georgetown Visitation Preparatory School, Washington, DC, took third place for her project. ■



*Ari Firester says he taught himself how to design and build the robot. He plans to attend a university with a well-established engineering program.*

*Photo Credit: Lynn Bowlby*

*Stan Retif is the Chief Development Officer responsible for the overall success of our fundraising Campaign.*

# IEEE Honorees Provide Example, Impart Wisdom



*Kurt E. Petersen, IEEE Medal of Honor recipient.*

The IEEE Honors Ceremony is an annual highlight for the Institute and its members. The gala event offers an opportunity for members to come together to celebrate the best and brightest among their colleagues. This year was no exception as San Diego, CA, US served as the host city, as well as a dramatic backdrop to two days' worth of memorable events.

Leading up to the event, IEEE Awards facilitated a collaboration with industry giant Qualcomm and IEEE Foundation to celebrate a pre-Honors Ceremony gathering and panel discussion. The Honors Ceremony itself featured several highlights and memorable moments. Among them:

- 2019 IEEE Richard M. Emberson Award recipient, Marcel Kershner, offered remarks regarding his experiences and path to success. He noted that he couldn't help but credit his parents who had early on taught him that one could be best to himself by being good to others;
- David Green, 2019 Haraden Pratt Award recipient and IEEE Foundation Board Treasurer capped his remarks by indicating he would gift his cash prize in support of the **Realize the Full Potential of IEEE** Campaign. David is joined in this generous endeavor by Sir Robin Keith Saxby, David Jaggar and David Flynn. We are greatly encouraged by and grateful for these examples of confidence and support!
- The daughters of NASA Pioneer, Katherine Johnson, told the audience that, "Our Mother is just like your Mother. She taught us that we were no better than anybody else, but also that we were no less than anybody else."

Significant gender diversity as, in addition to Katherine Johnson, the following women were honored: Ursula Keller, Teresa Meng, Eva Tardos and Telle Whitney.

The culmination of the Honors Ceremony saw the Medal of Honor awarded to Dr. Kurt Peterson. His contribution is in the area of Microelectromechanical Systems (MEMS). Dr. Peterson launched himself down a new career path with the

popularization of tiny mechanical gadgets comprised of silicon. The evening had quite an impact as evidenced by Dr. Peterson's remarks thereafter:

"It was so humbling, at the IEEE Honors Ceremony, to be included among this group of incredibly accomplished and innovative award-winners. I am also grateful that IEEE has so honored the many workers in the field of MEMS who have devoted their careers to the advancement and the promotion of MEMS technology. I am indeed indebted to all of my MEMS colleagues, whose concerted achievements have made this Medal of Honor possible." ■



*At the 2019 Honors Ceremony are, from left, Dave Jaggar, 2019 IEEE/RSE James Clerk Maxwell Medal co-recipient, Sir Robin Keith Saxby, IEEE Founders Medal recipient, and David Flynn, 2019 IEEE/RSE James Clerk Maxwell Medal co-recipient.*

## Goldsmith Gift Creates New Opportunity for Women



The Goldsmith Lecturer Program was initiated thanks to the ingenuity from Dr. Andrea Goldsmith in 2019. Thanks to her generosity and donations from others,

The Goldsmith Lecture will be delivered by an early-career woman researcher at one of the ITSoc's Schools of Information Theory, held for the benefit of students and postdoctoral researchers. The award is used to defray the economy class travel expenses to the Goldsmith Lecturer. By highlighting technical achievements of

early career women, the ITSoc Goldsmith Lecturer Program helps the award recipients build their professional career and recognition. The lectureship contributes to the public visibility of the researcher and helps increase diversity of IEEE ITSoc and IEEE as a whole, as women are an under-represented group in both. The award recipient will also serve as a role model and inspiration to diverse students attending the Information Theory Schools.

The candidate must be a woman researcher, no more than 10 years from receiving her Ph.D. by the nomination deadline. The candidate must have achieved early career

excellence via her research and technical contributions to Information Theory and its applications. The candidate may be from any geographic region and any organization, such as academia, industry or government. The candidate must be able to deliver an excellent lecture at an Information Theory School. The candidate must not have been previously recognized as an ITSoc Goldsmith Lecturer. We look forward to the announcement of the first recipient in 2020. Nomination for the 2021 Goldsmith Lecturer may be submitted here: [itsoc.org/honors/lecturer-nominations](https://itsoc.org/honors/lecturer-nominations). ■

# Empowering A Billion Lives

IEEE Power Electronics Society (PELS), Empower a Billion Lives (EBL) global competition to crowdsource scalable energy access solutions for people who experience energy poverty is nearing the Global Final Event.

IEEE PELS began this global effort with the support of our partners: the IEEE Foundation and the Georgia Institute of Technology, Center for Distributive Energy; our Global Sponsors: On Semiconductor, Southern Company, Vicor, Sungrow Power Supply Company, Ltd., Texas Instruments and the regional round sponsors. With the recognition of the American Society of Association Executives 2019 "Power of A" Summit Award we anticipate increased interest.

Starting with 459 teams from 70+ countries, EBL's rigorous evaluation process at five regional competitions selected 23 global finalists. Selection of the final winners will be in Baltimore, MD, US on 28-29 September, 2019, followed by the IEEE Energy Access Workshop and EBL Prize Ceremony on 1 October, 2019 at the PELS Energy Conversion Congress and Expo. To read more about the teams please visit [empowerabillionlives.org/global-finalists](http://empowerabillionlives.org/global-finalists)

The IEEE PELS will continue this Challenge through successive rounds. If you are interested in enabling scalable solutions to achieve the goal of reaching a billion people.

Learn more at [empowerabillionlives.org](http://empowerabillionlives.org) ■



Developing Solutions for Energy Access



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# IEEE Foundation

As the philanthropic partner of IEEE, the IEEE Foundation is a leader in transforming lives through the power of technology and education. The IEEE Foundation enables IEEE programs that improve access to technology, enhance technological literacy, and support technical education and the 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 IEEE Programs that empower bright minds, recognize innovation and preserve the history of technology. 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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