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# Findings from the UL Innovative Education Award:

**Seeking Excellence and Spreading Innovation**

By **Kate Flinner**, M.A., Editor and Researcher, Knology

**Uduak Grace Thomas**, M.A., Writer, Knology

**Kelly Keena**, Ph.D., Director, Communications and Education, Underwriters Laboratories

# Opening letter

## To date, an impressive list of winners includes:

University of Idaho College of Natural Resources — McCall Outdoor Science School

Trent University School of the Environment — Trent Aboriginal Cultural Knowledge and Science Program

The Academy of Natural Sciences of Drexel University — Women in Natural Sciences

Florida Atlantic University — Pine Jog Environmental Education Center

University of Montana and Montana Natural History Center — Wings Over Water

Chicago Botanic Garden — Science Career Continuum

WGBH Boston — Design Squad Global

Underwriters Laboratories has been dedicated to creating a safer, more sustainable world as part of our mission for over 125 years. The Communications and Education team is dedicated to building innovative content, developing strategic interventions, creating partnerships, facilitating delivery channels and producing high-profile events to help solve some of the most persistent and difficult global safety challenges. We do this by implementing, inspiring and supporting educational solutions across a broad range of focus areas.

The Underwriters Laboratories Innovative Education Award (ULIEA) grew out of our dedication to our work and a deep study of the environmental science, technology, engineering and math (E-STEM) landscape to discover the needs of organizations and professionals. Rather than creating a new educational program, the ULIEA identifies and rewards organizations already doing exceptional work in E-STEM. The evaluation of this program suggests that we are not only achieving the goals set out more than five years ago but exceeding them. The findings shared in detail in this paper illustrate the power of network and increases in audience and capacity.

The purpose of this white paper is to inspire other large nonprofit, nongovernmental organizations (NGOs) and corporations to invest in this type of model — one that supports excellent work in the field of innovative STEM education and, at the same time, creates a powerful network among these professionals that breed further innovative approaches.

ULIEA supports the community education work of stellar organizations building the next generation of problem solvers and leaders, who may also become the next generation of Underwriters Laboratories scientists and engineers.

For more information on this program and the breadth of work done by the Underwriters Laboratories Communications and Education team, visit [education.UL.org](http://education.UL.org).

Cara Gizzi

**Vice President, Communications and Education**  
**Underwriters Laboratories**

Kelly Keena, Ph.D.

**Director, Communications and Education**  
**Underwriters Laboratories**



# Introduction

For 125 years, Underwriters Laboratories has been a leader in safety science, a multifaceted endeavor involving science, technology, engineering and math. Each facet of STEM is critical for understanding and advancing safe home and work environments. For Underwriters Laboratories in the 21st century, the idea of safety has grown to encompass much more than the traditional definitions of products. Safety now means thinking about system-level impacts on the environment, human health and societal well-being. This critical work features Underwriters Laboratories' nonprofit efforts in standards, research and education.

In 2013, Underwriters Laboratories' Education and Outreach team set out to develop an initiative

to spread their fresh approach to safety, beyond the companies and organizations already partnering with Underwriters Laboratories. They wanted to shine a spotlight on E-STEM, which highlights the many ways to use the environment as a pathway to STEM for a safer world. Concepts from E-STEM can help communities accomplish their safety goals in environmentally friendly ways that simultaneously support human well-being. Underwriters Laboratories also wanted to connect with the broader network of rising safety leaders and educators already engaged in E-STEM practices.

The challenge then became how to most effectively use Underwriters Laboratories's existing resources and people to accomplish this ambitious goal. As a first step, the

team assessed the landscape of the E-STEM community to identify gaps and come up with potential strategies for handling them. What they found was that there were several disparate organizations and community programs working independently on their own initiatives. Groups engaged in E-STEM work without realizing it. Underwriters Laboratories decided to use its position as an authority in the safety space to create a centralized forum for showcasing exemplary programs and activities. Besides connecting the different nodes in the safety and E-STEM network, Underwriters Laboratories could share its knowledge and expertise through mentorship as well as provide much needed support for smaller, more grassroots initiatives.

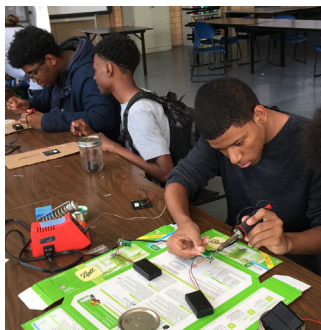


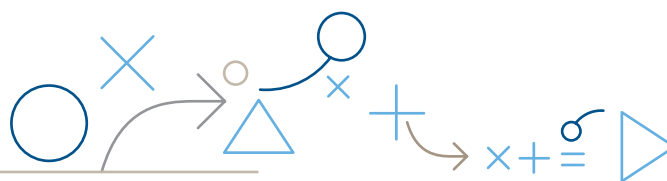
Clockwise from top left:  
Ocean Discovery Institute, 2018

Hurricane Island Center for Science  
and Leadership, 2017

Women in Natural Sciences  
(WINS) at the Academy of Natural  
Sciences of Drexel University, 2015

CareerCLUE, 2019





## Studying the landscape and developing a strategy

Underwriters Laboratories partnered with two organizations to develop a strategy for studying the E-STEM landscape. First, they brought in the North American Association for Environmental Education (NAAEE), a network of professionals devoted to a sustainable future through education. Underwriters Laboratories also worked with Knology, formerly NewKnowledge, a think tank that uses social science to study complex issues and develop solution-focused systems. Together, this team had the skills and resources necessary to envision and kick-start a new initiative.

With guidance from Underwriters Laboratories, the group performed a gap analysis to map the topography of community programs that feature safety and any part of E-STEM, as well as identify opportunities for Underwriters Laboratories to advance a new vision of safety. The gap analysis was a multipronged study that featured an online review of existing E-STEM and safety programs, a crowd-sourced survey to identify innovative community program techniques, workshops to identify barriers to innovation and a panel of experts to determine priorities. A series of interviews and surveys of experts within Underwriters Laboratories and at other organizations validated what was found in the gap analysis and helped the team further refine their understanding of innovation in E-STEM.

A critical component of the Underwriters Laboratories study was identifying innovation in the community. Specifically, the

team wanted to understand what innovative approaches to safety-focused E-STEM learning looked like, where it was being done and what barriers stood in the way of success. The analysis showed several bright spots of grit and creativity in communities throughout the world, particularly in the United States and Canada. People were already investigating safety issues in their communities and developing novel ways to solve those problems, often with limited resources. These creative programs included neighborhood revitalization initiatives, marine research and cleaning clubs, and networks designed to support and provide resources for localized environmental solutions.

The study also showed that existing barriers to innovation were mostly systemic. Community- and university-based programs often lacked funding to take their ideas to the next level or found that their creativity was restricted by grant

requirements. A weak understanding existed between the nature of safety and E-STEM. Across communities, organizational leaders had little access to professional development and other opportunities to learn and grow.

With these findings in hand, Underwriters Laboratories realized a critical piece of the puzzle was missing: a platform for finding and elevating existing innovation in E-STEM and safety science education. This revelation turned out to be the key to Underwriters Laboratories' success. Underwriters Laboratories could serve as a thought leader, providing the connective tissue for good ideas and the communities who need solutions to E-STEM and safety issues. With a reputation as an international leader in safety, UL had the authority to garner attention and direct dialogue around E-STEM and safety topics.





## An equitable and supportive application and judging process

The team developed a multiphase application and judging process that focused on inclusion and equity for the wide array of nonprofit programs that were anticipated to apply. Gathering feedback each year, the team continuously refined the process to maximize accessibility and streamline the time requirements for applicants and judges.

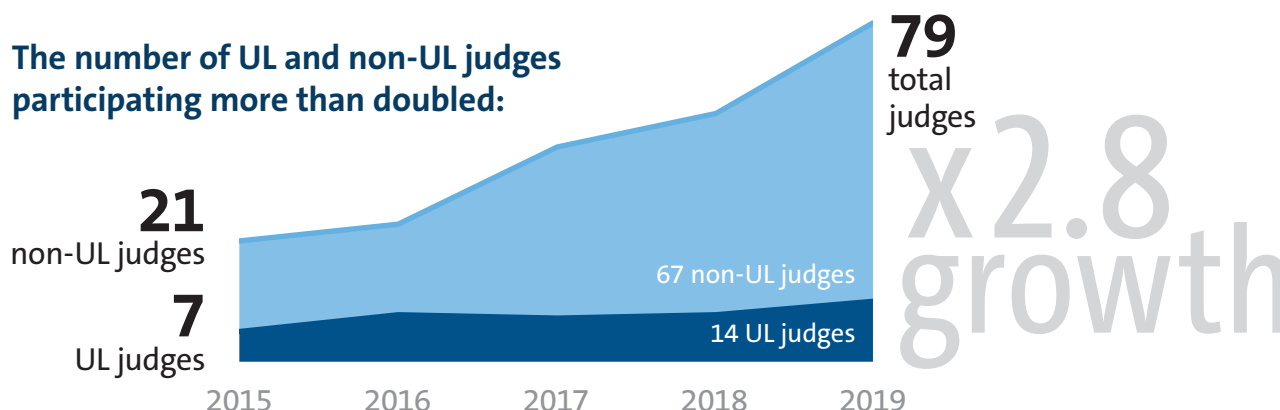
The ULEA required nonprofit organizations to submit a written application using an online form on the initiative's webpage. Applicants were not required to develop new materials, aside from their written responses to the questions. The judging unfolded in multiple phases, using the same scoring rubric across each phase: a desk review, semifinals judging and final judging. Judges were trained to consider certain aspects of accessibility and inclusion, such as whether an organization has a professional grant writer on staff, to help ensure their decisions were fair. To avoid bias, each application was reviewed by multiple judges, with no two judges reviewing the same set of applications. In the finals round,

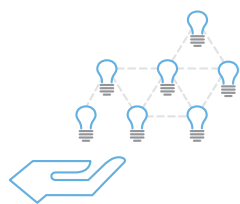
all judges reviewed the entire set of finalists' applications. Across all rounds, judging panels consisted of a mix of UL employees and leaders, as well as E-STEM experts from universities, communities, nonprofits, businesses and government agencies across the country. Groups who advanced to the finals created a short, informal video and were video-interviewed by judges to introduce program leadership and answer critical questions.

A key component of the program is providing feedback for the applicants. Each judge provided written feedback for programs that were not selected to advance to the final round, and finalists who did not receive an award were

offered opportunities for in-depth conversation about their projects after the judging. In providing input, judges prioritized positive appreciation of the innovations and strengths demonstrated by each applicant and offered recommendations for improving on existing strengths and filling in gaps. Additionally, the judging panels provided statements of appreciation — publicly shared on the award's website — for all finalists and award winners. These appreciations, as they are called, highlighted bright spots of innovation as a way to inspire other community and university programs that offer similar programs or are thinking of doing so.

**The number of UL and non-UL judges participating more than doubled:**





## Designing a mission-focused initiative

With the research results in mind, the team saw their challenge as locating far-flung, innovative programs, many of which did not describe their work as E-STEM for safety. A second challenge for the team was figuring out how to best support these programs and help them spread their good ideas.

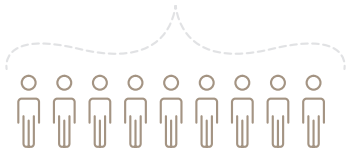
To meet these objectives, the team conceived an award competition. The competition, named the UL Innovative Education Award, was the first of its kind to offer recognition awards for innovative accomplishments in the field of safety-focused E-STEM. The initiative had these key components: a monetary award rather than a grant model, a multiphase judging process, mentoring support that draws on UL's capabilities as a global company, a focus on communities' and universities' E-STEM programs, and the creation of a network of winners. What follows is an explanation of the motivation behind each of these components. It illustrates the ways that strategy has driven this initiative.



## An award model, not a grant

The team's highest priority was to create an award rather than a grant competition. The team felt an award model would provide similar amounts of funding to different organizations and give them broad latitude in deciding how to expand learning around safety and E-STEM. Winners could use funds to do what they felt necessary to level up their innovation. This was an important shift in the traditional approach to funding in the E-STEM space. The gap analysis had revealed that organizations spend inordinate amounts of time jockeying for grants that require substantial administration and confine work to prescribed categories. At the same time, these organizations found themselves competing for the same small grants that couldn't sustain their work.





## Investing in nonprofit organizations in the United States and Canada

In the first iteration of the initiative, the team recognized that they had to confine who to design the award for, to help ensure a level playing field for all who apply. Though the team knew that innovation emerges in all types of settings — including schools, businesses and nonprofits — they felt that community programs facilitated by universities and nonprofit organizations were well-positioned to both demonstrate existing innovation and capitalize on award funds. Nonprofit organizations, which typically operate on restricted funding, also stood to benefit substantially from receiving award funds. As another way to maintain equity, the team decided to focus the award on organizations in the U.S. and Canada, which have mostly uniform funding structures.



## The prizes: cash, mentoring and the winners network

After the team decided to create the award program, they selected the denominations for the cash awards. They conducted focus groups to determine worthwhile amounts for community and university programs to pursue. Each year, the initiative awarded five cash prizes at three levels in U.S. currency: a grand prize of \$100,000, two second-tier prizes of \$50,000 each and two third-tier prizes of \$25,000 each. All winners were mentored by E-STEM and safety experts at the company, and awardees became part of a network of ULIEA winners. They participated in in-person summits at UL's headquarters, conversed with other winners from their cohort and had opportunities to informally connect with other winners.

While no one feature of the ULIEA was unique, the initiative so far has exceeded the sum of its parts.



## Lift-off and refining the award initiative

The ULIEA officially launched in the winter of 2014-2015 and immediately resonated with the E-STEM community. In the first year, the team received over 100 applications from diverse organizations throughout the United States and Canada. Organizations represented a wide range of sizes, geographies, types of innovation and leadership styles. In its first year, the team hosted two rounds of judging: a general review and the finals. The applicants who advanced to the finals were asked for written clarifications and elaborations on their original application.

**After extensive — and spirited — deliberations in the finals round, the judges selected five organizations to receive the awards. These inaugural winners embodied the diversity and quality of the entire applicant pool. They included:**

- A competition program for students to design safe and sustainable cities
- A plastics research and waste prevention program for school cafeterias
- A natural sciences research mentoring program for girls through a U.S. museum-university partnership
- A university-based outdoor science school in a rural area
- An education program through a Canadian university linking traditional ecological knowledge with Western science

Over the next few years, the team continued to refine the initiative and process. These changes improved the judges' experiences, the application process and help the most innovative safety-focused E-STEM programs rise to the top.

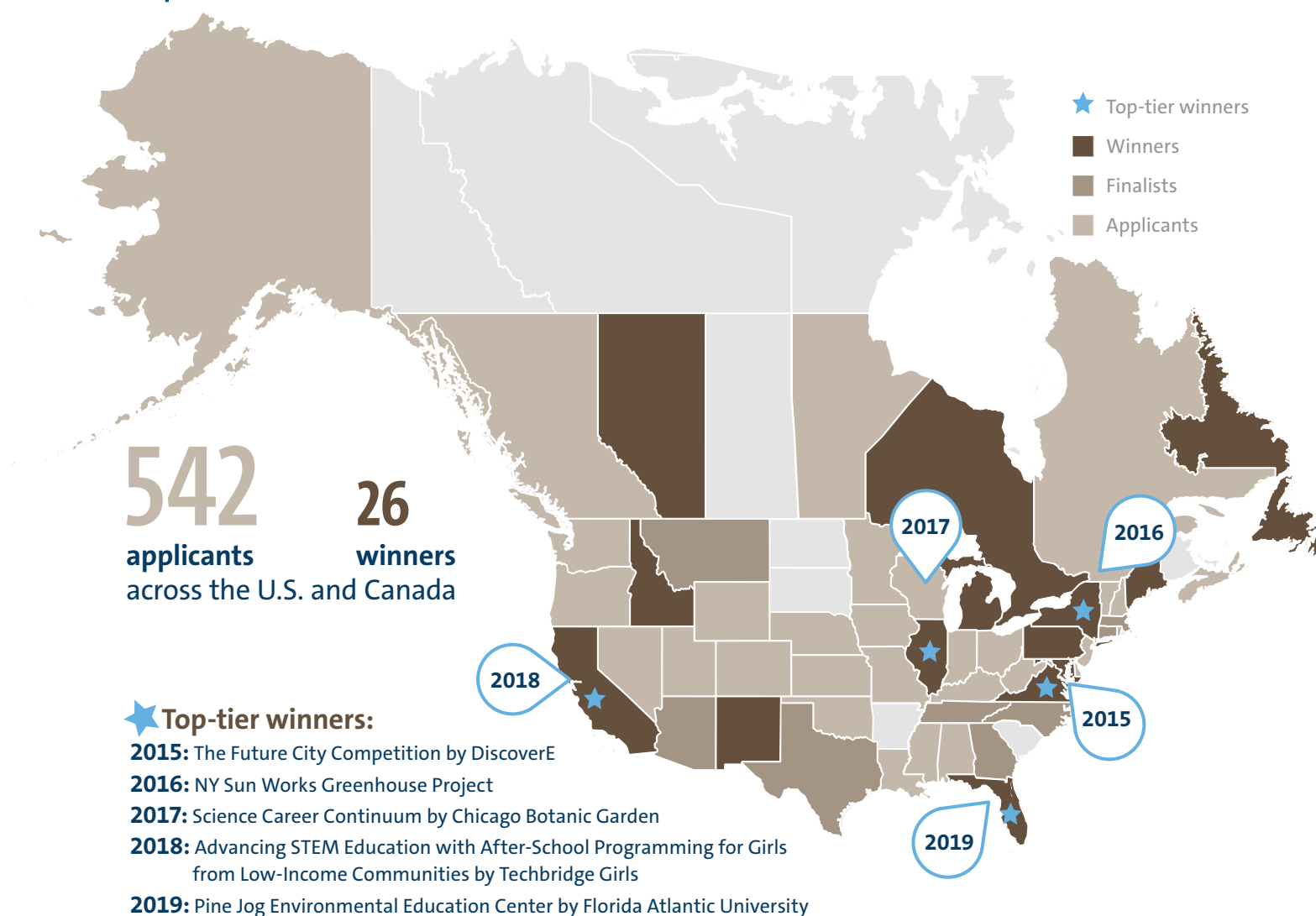
For instance, Underwriters Laboratories Communications and Education incorporated another round of judging into the application review process. The new judging phase called the desk review, was designed as the first step in winnowing the number of applications. The Desk Review judges assessed applications with the same rubric judges used in the other rounds, but they completed all of their scoring online. This change reduced the number of applications the semifinals judges needed to review and enabled them to stay focused on identifying the strongest applications for the finals.

The team also updated the requirements for the finalists. Previously, finalists were asked to supplement their original application with additional written materials. These extra written supplements proved onerous for applicants, many of whom were not trained in grant writing, and often did not provide a deeper level of information for judges. Instead, the award team requested that finalists submit a short video to introduce the program leaders and respond to questions from judges in previous rounds. This helped the judging panel better determine the top innovations in safety-focused E-STEM programs.

Collectively, these changes have helped to improve the UL competition for both applicants and judges. The next section explores the impact of the award on the E-STEM community in the four years of its existence, including how it has fostered a growing network of programs that are creatively confronting critical challenges.



## The diverse geographies and specialties of the ULIEA initiative:



The 26 winners from 2015 to 2019 specialized in:

University-Based    Advocacy    Collaborative Network    Applied Research  
 College Readiness    Community-Focused    Career Development  
 Youth Leadership    Species and Habitat Protection  
 Climate Resilience    Sustainable Energy    Economic Sustainability  
 Traditional Ecological Knowledge    Food Systems    Design and Engineering Challenge

\*size denotes frequency

# The impact study

After four years of running the ULIEA initiative, 20 organizations had received an award and joined the network of award winners. Hundreds of organizations had applied, and scores of UL employees and experts had served as judges. The program had also matured with increasingly smooth-running systems and a growing reputation.

Throughout those four years, the team heard stories of success but were not yet sure of the extent and kinds of impact the initiative had produced. In 2018, UL worked with researchers and evaluation experts to study the impacts of the initiative on organizations that have won the award. Because of the initiative's focus on innovative E-STEM program design, the researchers focused their study on the leaders of organizations that won the award to better understand if and how the initiative has elevated innovation in safety-focused E-STEM.

Using a multipart study design, the researchers interviewed and surveyed leaders from the 20 winning organizations. The interviews and surveys were designed to address different aspects of impact; the survey measured quantifiable information, while the interviews assessed the nuanced experiences of receiving an award. To validate the results and get a sense of the youth experience, the researchers also interviewed a selection of program participants. Together, these methods presented a detailed picture of the impact of the award initiative.



Leaders of ULIEA winner organizations at a Winners Summit in Northbrook, Illinois. Left to right: Beatriz Cañas (Chicago Botanic Garden), Jennifer Kretser (The Wild Center), Manuela Zamora (NY Sun Works), and Betsy Payne (Academy of Natural Sciences).





# Spreading innovation

## The ULIEA propels innovation among award winners and their collaborators.

An important outcome of this award is the activation of further innovation in the E-STEM community. The community and university-based organizations that have received awards have always pushed the boundaries in collaboration with one another. And their efforts have been amplified by the ULIEA network. We know, for example, that at the time of the impact study, two-thirds of the award winners had collaborated with one another or Underwriters Laboratories by creating new uses for technologies or connecting students around mutual topics for study. The award provided freedom for recipients to experiment with innovative programs and community outreach as well as structure their programs in more inclusive ways.

The evidence suggested that the initiative both rewards and sustains innovation and encouraged interdisciplinary collaboration within the E-STEM field (Fraser et al., 2013). Through the annual summits and ULIEA networking avenues, ULIEA program leaders from various backgrounds came together to share ideas and form new collaborations. Leaders found these collaborations both personally and professionally valuable and positioned them to provide new, creative and geographically expansive learning experiences through their programming.

The program is also a boon for established programs seeking fresh funding for long-standing yet underfunded work. According to one leader of an established program, “the direct impact on the students is that it gave everybody — the regional coordinators, the volunteers, the funders, the partners — a shot in the arm and a reason to continue.” The leader added that,

*“To get the award was validating because programs with infrastructure can be continually reinventing themselves and can be continually improving, but we don’t need to constantly throw out programs and then start new programs.”*

Since the UL award is not a grant, recipients have flexibility in the ways they choose to use the funds to cultivate ideas and develop their programs. Results from the impact study indicated that program leaders are taking this award as an opportunity to experiment with new ideas, resurrect ideas shelved for lack of resources and try riskier permutations of existing ideas.

The impact study revealed a range of creative ideas and approaches to achieve awarded program goals. Some recipients added new components to their programs. This included launching citizen science initiatives to involve more youth and community members in collecting data for E-STEM research projects. Another recipient used the funding to involve sustainability professionals and

experts from other green fields in their national programs. Meanwhile, other program leaders used the funds to provide professional development training for staff and reinforced teaching practices with research.

Award recipients also experimented with new technologies and updated curricula. For example, one program added coding and machine learning to their program offerings while another used the funds to pilot Arduino technology — an open-source electronics platform that can be programmed with inputs and produce outputs — with youth participants. Another program introduced new curricula on sustainable entrepreneurship to help young people cultivate businesses that also benefit their communities. One program invested their award funds in developing their mission, values and vision around diversity and inclusion to expand their community’s access to programming.

Award recipients also experimented with changing their program designs and instructor training. For example, one award winner experimented with

*“including young people in all aspects of the program development, which in turn deepens students’ emotional connections as they learn.”*

Another group trained staff to better understand and support students’ self-efficacy. Some awardees opted to focus their funding on developing and testing culturally responsive strategies — where students’ multicultural backgrounds are included in pedagogy and learning materials. One awardee said these experiments helped their program better match students and instructors who share cultural identities or experiences. Another awardee developed a culturally responsive curriculum for their program. These modifications in program structure had a twofold impact. Awardees that adapted their programs in this way felt that the culturally responsive approach strengthened their existing infrastructure — they reached a much wider pool of young people — and offered opportunities for young people to share their work with others.



Quilen Blackwell  
(Chicago Eco House) and  
other program leaders at a  
ULIEA Winners Summit at  
UL Global Headquarters in  
Northbrook, Illinois.

## A formidable network

**The ULIEA created a forum for a highly driven network of elite peers to inspire and collaborate with each other.**

Recipients of ULIEA awards joined a network of previous winners that participate in periodic meetings and workshops. Those gatherings offered meaningful professional development experiences, which are often lacking for leaders pushing the field in excellence. This outcome is filling the lack of training opportunities identified in the gap analysis and in other studies (Fraser, et al., 2013; Freeman, Dorph and Chi, 2009; Wever Frerichs, Pearman Fenton and Wingert, 2018).

The evaluation indicated being part of a community of thoughtful leaders was highly valuable to award recipients in many ways. Based on interview responses from program leaders, the network of award winners includes diverse programs and geographies that offer multiple perspectives. The network also brought in a variety of expertise, including how to address global issues through local action, evaluation and assessment, workshop facilitation, social justice, empowering girls and women, social enterprise, and participant-driven civic engagement. The program leaders identified some of these topics as strengths and others as needs. They said the network provided space and time for peer mentoring and broadened learning.

Program leaders also reported a rejuvenation of their passion for and refinement of their skills for E-STEM education. One recipient described the opportunity to be part of the ULIEA network this way:

*“We’re all winners, so we’re not competing for anything else so we’re all there to think and share and grow”.*

*“I think it’s very important to continue having the summits with winners because it’s a select group of people who went through a lot of work to get there. It’s ... an extension of the award because it is very rewarding to be able to have those kinds of conversations.”*

Another recipient highlighted the importance of the network for discussing ideas, sharing resources and drawing on the expertise of others. Exposure to programs with shared values, yet diverse approaches, offered an opportunity to pool skills and resources and expanded the E-STEM learning experiences for communities.

“A lot of the programs face similar barriers,” they said. “Knowing that you’re not alone, and the work is still very important, and that people have the same challenges, I think, has been really impactful for me.”

In a survey filled out by award recipients, about two-thirds said they had collaborated with another winner in some way. Some recipients presented their work at other winners’ sites and during events that created opportunities for shared learning. In one instance, one winner invited the community from another winning organization to visit their program site and observe real-world examples of environmental justice in action. Another organization asked a winning group to present their work at a community event. Lastly, some winners have advised on specific topics or products for other ULIEA programs.





The leaders of the 2019 ULIEA Winners. Back row, left to right: Anne Henderson, Ray Coleman, Jenelle Dowling, Erick Greene, Nyaruot Nguany, Olivia Griset, Cristina (Tina) Danforth, Leslie Elgood, and Bryan Lewis. Kneeling: Paige Nygaard. Front row, left to right: Karen Alsen, Sarah Pidgeon.

## Growing audiences and capacity building

**The ULIEA helps award-winning programs increase audience reach and growth capacity.**

ULIEA's award program empowered leaders in E-STEM through organizational support and offered critical opportunities for professional development and learning. Past ULIEA recipients represent a wide range of audience sizes, from 60 to over 40,000 participants each year. Evaluation showed that UL's support stimulated E-STEM leaders' abilities to find new funding sources, improved outreach capacity and provided a community of practice for like-minded professionals.

Importantly, this award clearly addressed a lack of funding for operations among nonprofit E-STEM programs and a dearth of relevant professional development opportunities (Fraser et al., 2013). Many award winners pursued and experimented with programming and projects they may not otherwise have explored.

*One award winner said, "The award was really transformational for us. We could not have done the work that we did over the last year without that support, and we would not have had the reach that we had."*

An important outcome of the ULIEA initiative is that it helped winning organizations grow their programs for young people. Survey data showed that most programs increased their youth participants by 10-30% after receiving the award money. One program doubled their number of youth participants, while another reported a sixteenfold increase in its youth audience after winning the award.

Today, ULIEA recipients reach over 60,000 youth combined. This outcome is all the more laudable, given the staff size of typical ULIEA awardees. At the time of the evaluation, most winners had a 1-2 ratio of full-time staff and about half had 1-4 ratio of part-time staff.

Moreover, evidence from surveys and interviews with recipients showed that Underwriters Laboratories' reputation had a measurable effect on organizations' abilities to fundraise because it signaled the program's quality to philanthropies and federal agencies. One recipient said that receiving the award boosted their organization's credibility, so they secured grant funding from the Delta Institute and are now positioned to get additional funding from organizations such as Springboard Foundation and Engineers Without Borders. Another winner said the award was instrumental in building relationships and partnerships with funders.

*"We ended up getting funding through NOAA through their Environmental Literacy Grant Program, and we were one of two sites in the country that received funding in 2017."*



## Reflecting on achievements

As we reflect on the ULIEA, we are struck by what this initiative has accomplished. The unrestricted nature of the awards freed winning organizations to take risks and elevate their innovation. The value of this freedom cannot be overstated in a system where experimentation is often not supported. The emphasis on community organizations and universities has cultivated a network of powerful leaders and programs across the United States and Canada who are learning from each other and growing together. The award has put a spotlight on remarkable initiatives nurturing the next generation of problem-solvers and opened up opportunities for young people to learn new skills and be part of safety solutions.

It's clear that, in combination, these pieces have made the ULIEA more than the sum of its parts. This success is not a coincidence. The ULIEA team drew on their diverse expertise, carefully studied a complex landscape and continuously refined its approach over multiple iterations of the award.

This investment in the research and the overall initiative has yielded impressive results for UL and helped move the field forward in ways that had not been done before. The Underwriters Laboratories nonprofit affiliate has become a thought leader in the E-STEM space in terms of fostering new dialogue around the critical role of safety, environment, research and solutions. Furthermore, this work has strengthened the Underwriters Laboratories' Education and Outreach team by increasing its profile as an educational expert, a convener of stakeholders, and an influencer for policy makers, professional associations and university faculty.

The ULIEA also serves as a model for nonprofit organizations and corporations. With the right combination of expertise, research and flexibility, other nonprofit corporations can create their own novel programs that advance their corporation's mission and benefit stakeholders. We hope the ULIEA and what it has accomplished inspires others to similarly identify and support promising programs in their respective fields.

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