



A YOUNG INVENTOR DEDICATED TO BUILDING MORE PATHWAYS FOR GIRLS IN STEM

Student Prize Case Study

When Kayla Nguyen was nine years old, her uncle took her to see physicist Sally Ride, the first American woman in space. Before then, Nguyen had thought of science as a male-dominated field from watching “Bill Nye the Science Guy” and other shows. If women were featured, they were usually outnumbered by men. Seeing Ride gave her a benchmark for what women in science could achieve. Now, as she settles into her post-doctoral work at the University of Illinois at Urbana-Champaign, Nguyen, a 2018 Lemelson-MIT Student Prize winner, considers herself an ambassador with the mission of welcoming women to STEM (science, technology, engineering, and math).

“When I was young, most representation in science, whether on TV and in real life, were men. To be honest, it’s still that way,” she says. She hopes becoming a university professor or research scientist at a national lab will help her open doors for other girls and young women.

Nguyen won the 2018 “Use it!” Lemelson-MIT Student Prize for her invention, the EMPAD (Electron Microscope Pixel Array Detector), a device that utilizes electrons to capture the deep detail in an image compared to previous designs. Nguy-

en co-created the EMPAD while pursuing her PhD at Cornell University. The EMPAD was licensed to ThermoFisher Scientific, a fantastic achievement for the young female scientist.



While most researchers who hit this moment in their career list the many mentors that helped get them there, Nguyen says she didn’t really have mentors growing up until she went to college. She did credit her mom as having played a key role in her development. Her mom brought her to the U.S. when she was four and then went back to school to get a degree in biochemistry at age 40. She led by example, according to Nguyen, but

was so busy with work and caring for the family that she wasn’t able to be a mentor in the traditional sense.

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However, when Nguyen entered university and graduate school, she found a group of female mentors who were senior PhD students, professors and outreach coordinators; these women not only taught her scientific skills, but the importance of equal access to education.

Nguyen was self-taught, graduating from childhood experiments such as soda bottle volcanos to studying the dynamics of skateboards and surfboards when she worked at a skate shop while in high school in southern California. She learned the scientific principles of the boards and developed optimized designs and components to improve their performance.

At the University of California, Santa Barbara, Nguyen found herself in a 12-person physics class, as part of the College of Creative Studies. “Since it was the 12 of us in this program for the first two years of college, and I was the only girl, I’d go up to people and introduce myself first,” she says of a tactic that helped her break the ice in the male-dominated environment. “They didn’t expect that and it was a way to show confidence.” She used this strategy in her doctoral program as well, and it’s a technique she shares with the young women she encounters as a peer and mentor, including the young girls she met at the Lemelson-MIT Program’s EurekaFest invention event last summer.

Nguyen is not shy about educating others on how best to mentor young girls. While at EurekaFest, she observed a high school team where the young women were not speaking up and seemed to have roles that were removed from the engineering side of the project, such as dealing with finances and outreach. She approached the team’s



teachers and encouraged them to have the girls participate in their presentation more and to take on the invention’s design and development work.

“One of the biggest barriers in STEM is the gender gap and women feel shy – society has put them down so much – and don’t speak out. I just want to give them encouragement and tell them not to be afraid,” she says.

Nguyen believes resilience is the number one attribute women need to thrive in STEM fields. Women must learn what men know instinctually, such as “it’s good to have thick skin and to show confidence even when you’re wrong,” she says. And those around them must realize that girls and young women should be challenged in their work and that failure is okay because the lessons learned will help them face obstacles. “I would tell young female students that it’s going to be hard, but it doesn’t mean you shouldn’t try.” This is the message she believes females should receive.

Her passion is helping underrepresented minorities and women learn about STEM and eliminating the barriers that they face. For instance, she recently applied for a post-doctoral fellowship that would allow her to help undergraduate researchers subsidize daycare. “There are other things that this population carry with them that are untraditional to what is expected in a successful scientist. What I want to do is make sure that these things are not perceived as limitations, but are unique and would diversify STEM,” she says.

She'd also like to help young scholars at low-income schools have exposure to research and labs, something she herself never had the opportunity to do as a refugee struggling with social, economic, and language barriers. Over the years, she has helped people outside of the science realm as well, including victims of domestic violence and elderly hospice patients.

And while she is adamant that mentors are important, she believes young girls can help themselves as well by being curious about the world around them. "I tell girls to go out there and uncover things. Learn how a soccer ball works so you can make a better soccer ball," she says. She also encourages girls and young women to make an effort to connect with their female peers. "Invention doesn't happen in a vacuum, it happens in teams. So, if you build up your knowledge together, together you can solve most problems," she says.



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