Designing for a Difference

By Michelle A. Monroe

Cryocooler manager Mei-Li Hey considers her work at Northrop Grumman just one part of her identity as an engineer. The other is the nonprofit that she co-founded to provide assistive devices to persons with disabilities in Uganda.

Mei-Li was a sophomore at the University of San Diego when she attended a speech by Margaret Orech, founder of the Uganda Landmine Survivors Association.

In 1998, Margaret lost the bottom half of her right leg when the bus she was riding detonated a landmine. She shared that learning to walk again was difficult, but the hardest part of adapting to her disability was using the bathroom.

Most Ugandans do not have access to a sewer system and instead rely on pit latrines, which are simple holes in the ground. Those who do not have full use of their lower extremities cannot independently use a pit latrine in a safe, sanitary manner.

Sitting in the audience, Mei-Li wondered if she could help.

Over the next few months, Mei-Li teamed up with a few students and professors to complete several prototypes to address the challenges of using a pit latrine, sharing the devices virtually with Margaret and others from the association to get feedback.

In January 2016, a little over a year after Margaret spoke on campus, Mei-Li went to Uganda with the prototypes.

"It was a bit overwhelming at first because many of the problems we observed felt much greater than what could be solved with our devices," said Mei-Li, who was in Uganda for nearly three weeks. "Spending a lot of time with people and building a connection with them really assisted in getting meaningful insight."

Building on Success

Mei-Li continued this work after graduating and co-founded a nonprofit, Atwero, which means "I'm able" in the local language of the Ugandan region the organization primarily serves.

Mei-Li's Northrop Grumman colleagues have been supportive of her nonprofit since the beginning, she said. When she was an intern, the company hosted an event at

Space Park's Fab Lab in Redondo Beach, California, where employees could make device designs.

Today, the 501(c)(3) organization has three board members and two employees and has earned several charitable grants — from the clothing company Aerie as well as a $10,000 charitable grant through the Northrop Grumman Difference Maker Award, which Mei-Li won in 2022.

"Through this funding, we've been able to do quarterly distribution events in Uganda where we make 50 to 100 of these devices, find beneficiaries through Margaret's network and then give the devices away," said Mei-Li, who previously worked on the James Webb Space Telescope and currently works on cryocoolers, the machines which keep satellite and spacecraft sensors at the extremely cold temperatures required for long-term missions.

With a growing interest in water and sanitation globally, Mei-Li hopes Atwero can be a network that increases the inclusion of people with disabilities. Engineering remains at the core of her solution, and she hopes that it helps others to drive change.

"Right now, we're filling a gap in the current solution landscape that marginalizes people with disabilities," Mei-Li said. "The solutions exist. It just takes more engineering."

Power of Connection

Connection is crucial to success as Atwero was formed to help people in remote areas.

"They're struggling the most," Mei-Li said. "We put all our emphasis on working with the association to reach those villages. It takes effort, but it's worth it."

Forming those connections and building trust is how Mei-Li and her Atwero team came up with their designs, which have been iterated over time.

"You can't just show up and attempt to solve a problem you know nothing about; you need to listen to what people need," she said.

Mei-Li said her drive to help people is what inspired her to become an engineer.

"Engineering is helping people. In my mind, they're one and the same, undoubtedly intertwined," Mei-Li said. "We're professional problem solvers and there are always a whole lot of problems that need solving."

Mei-Li in the Space Park Fab Lab.
Photo by Daniel Perales