



IMPORTANCE OF CULTIVATING INVENTORS THROUGH UNDERGRADUATE PROGRAMS

Student Prize Case Study

For more than two years, Eric Chiang and four fellow biomedical engineering undergraduates, Kali Barnes, Stephanie Cai, Akash Chaurasia and Conan Chen at Johns Hopkins University's Center for Bioengineering Innovation & Design (JHU CBID) worked to develop a device aimed at improving a surgeon's ability to perform Descemet's Membrane Endothelial Keratoplasty, a corneal transplant surgery that can restore a patient's vision to 20/20.

Their invention, Treyetech (also the name of the company the students founded), prepares and transports the donor cornea graft from an eye bank to surgeons, eliminating a complicated step that involves unrolling the graft, and enabling more effective insertion of the graft into the eye.

The invention was awarded the 2018 \$10,000 "Cure it!" Lemelson-MIT Student Prize for the undergraduate teams' inventiveness in developing a technological solution to a pressing problem in the healthcare field.

Chiang and his Treyetech teammates noted that there are few programs that nationally recognize young inventors. The Lemelson-MIT Student Prize

is awarded based on a variety of factors, including the overall inventiveness of the students' work, the invention's potential for commercialization or adoption, and youth mentorship experience.



Chiang argues that the Lemelson-MIT Student Prize fills a gap in the inventor recognition pipeline for undergraduate students. Incubators like JHU's CBID do a phenomenal job of creating a framework for invention, helping undergraduate students identify the most challenging and important healthcare problems in the world, and then support students developing solutions to solve them.

"It's nice to see a competition that does value this old-school type of inventing, where you work from a prototype. That's something that fit very well with the way we designed our product."

– Eric Chiang

Chiang says, which was in direct contrast to other awards that focused more on business plans. "Over the past four years we found a big growth in the development of software and the development of quick flip apps – that's been the sort of competition we face."

Kali Barnes, Chiang's teammate on Treyetech, says having options for competitions outside of Johns Hopkins was a boost to the team. "Hopkins, compared to an MIT or Stanford, isn't necessarily known for an inventor culture," she says, adding it's good to be able to compete with institutions where the reputation for invention is well-known.



Melissa Austin, a JHU CBID undergraduate student whose team AssistENT also won a 2018 \$10,000 "Use it!" Lemelson-MIT Student Prize for the creation of a commercially viable nasal dilator, says invention at Johns Hopkins is particularly difficult because graduate students are the competition and undergraduates are the underdogs.

"Hopkins is a very med-heavy program so the inventions that are put on pedestals or are getting into competitions are those that cure cancer or find shunts that cure a complex condition such as hydrocephalus or encephalitis," she says. "We are taught to create pitches that gear towards

doctors and engineers, and find ourselves at a disadvantage at business competitions that are looking for simple and straightforward pitches."

AssistENT's device, N-Stent, is a discreet nasal dilator designed to improve breathing for those who suffer from nasal obstruction. N-Stent stands apart from competitors in that it can be inserted into the nose, making it undetectable and comfortable to wear during the day or night. "My team's project might seem a little bit simple at first because it is a simple problem and it is a simple solution but it's not something people have done before," she says.

Both Treyetech and AssistENT were under the direction of clinical advisors who helped guide students throughout the invention process. In addition to problem identification and definition, the JHU CBID program helps students through clinical immersion, concept development and evaluation, prototyping and testing, and verification. Students work with clinicians, engineers, and experienced industry advisors to design, build, and test their devices. Over the past few years, the CBID's undergraduate program has completed 66 medical device projects and has filed nine provisional patents.

Akash Chaurasia, a member of Team Treyetech, says at EurekaFest, he felt a kinship with the other inventors he met. EurekaFest is the Lemelson-MIT Program's annual event that brings together young inventors to celebrate the inventive spirit, including 15 teams of high school student inventors who won InvenTeams grants and the undergraduate and graduate Student Prize winners.

"Meeting other like-minded people and getting into an environment where everyone has that spirit of invention really excites us. It's always great to get that fresh perspective. When you look at all the prizes and the videos of all the winners, it reminds you how much hard work – and even failure – goes into those successes. It's nice to have something like this that recognizes how far we've come."

– Akash Chaurasia