



## Student Case Study

# LEMELSON-MIT INVENTEAMS KICK-STARTS A FEMALE STEM POWERHOUSE

Katelyn Sweeney had no interest in science, technology, engineering and math (STEM) until by accident she was placed in a technology class with an inspiring teacher who helped transform her into an InvenTeam leader, presenter at the 2014 White House Science Fair, and a U.S. patent holder.

**“ I first got interested in science my freshman year of high school. I was put into a technology class. It was kind of an accident. I wasn’t really interested in it. The teacher, Mr. Scott, who was the advisor for [the InvenTeam] project, was so energetic it got me interested and it has just kind of grown from there. ”**

When Katelyn Sweeney first attended Mr. Scott’s technology class at Natick High School, she had no interest in engineering. Katelyn wanted to be a lawyer or a doctor, a profession that she felt could fulfill her dream of helping people. However, she gave the technology class – and Mr. Scott – a chance and was hooked by his passion and enthusiasm.

Katelyn was instrumental in helping fellow technology students at Natick High find and research problems for a Lemelson-MIT InvenTeam grant. After months of research, the team applied for and received the \$10,000 award in 2012, to build a solution for EMTs who had to dive under breaks in ice as part of search and rescue efforts.

## DEVELOPING A PASSION FOR STEM BY INVENTING SOLUTIONS TO PROBLEMS

**“ My InvenTeam experience was absolutely incredible. It was the first real experience I had with engineering in all aspects of a project, and it taught me to deal with problems better than any other project could have because, with this project, there is a real-life application. We had to encounter problems in real time and solve them in real time. ”**

Katelyn and the InvenTeam students were deep into their project in the fall of 2012. They had met with the local EMTs at the fire department about their challenges with ice search and rescues and settled on a two-part project – a remotely operated vehicle (ROV) with a submersible camera that

could be sent out onto the ice and lowered into a break in the ice. They worked through possible solutions, started building prototypes, and were hard at work on a cost sheet for their budget.

Katelyn was quickly learning every aspect of invention, including determining project requirements, brainstorming design strategies, building proofs of concepts, testing prototypes, maintaining a budget, and communicating about their invention with the community. Just as important, she was learning to head a multi-functional team.

During the spring and summer of 2012, Katelyn honed her presentation skills, leading demonstrations of the ROV at several events, including a technical review of her InvenTeam project for the community at Natick High School, at the Lemelson-MIT Program's EurekaFest celebration, and as a guest presenter at the MIT Museum's Insight into Innovation night.

Katelyn and the team continued work on the ROV, taking it to the Massachusetts Fire Academy for a demonstration and feedback, as well as showcasing at the Massachusetts STEM Summit and at the Museum of Science in Boston for the movie premier of Underwater Dreams.

Katelyn's hard work on the InvenTeam project and other achievements landed her a spot in the Massachusetts Institute of Technology's (MIT) class of 2018. The girl who wanted to be a doctor or a lawyer completely changed her career path to pursue a STEM career and is majoring in mechanical engineering.

## SOARING TO NEW HEIGHTS

**“ Engineering's not an easy thing to do, and there are going to be problems. But the process of overcoming those problems and developing your own solutions is a really satisfying and fulfilling thing, and it really makes the process worth it. ”**

Before heading off to MIT, Katelyn spent the spring helping her team kick-start the process to obtain a patent for the ROV. She led everyone through

the laborious but critical tasks of determining and helping assign claims to the invention, properly documenting their path to the final design, and lobbying Natick High School administrators and town school committee to support their patent protection efforts. Katelyn also continued to participate in the hands-on work of updating the ROV.



Katelyn had the distinct honor of presenting, along with another InvenTeam member, Olivia Van Amsterdam, at the 2014 White House Science Fair, where they coached President Barack Obama how to operate the ROV.

## ENGINEERING THE FUTURE

**“ For me, invention is about creating a final product, but it's also about the process that goes into the final invention. It's about empowering the inventors to create something that is from their imagination they believe will change their communities. ”**

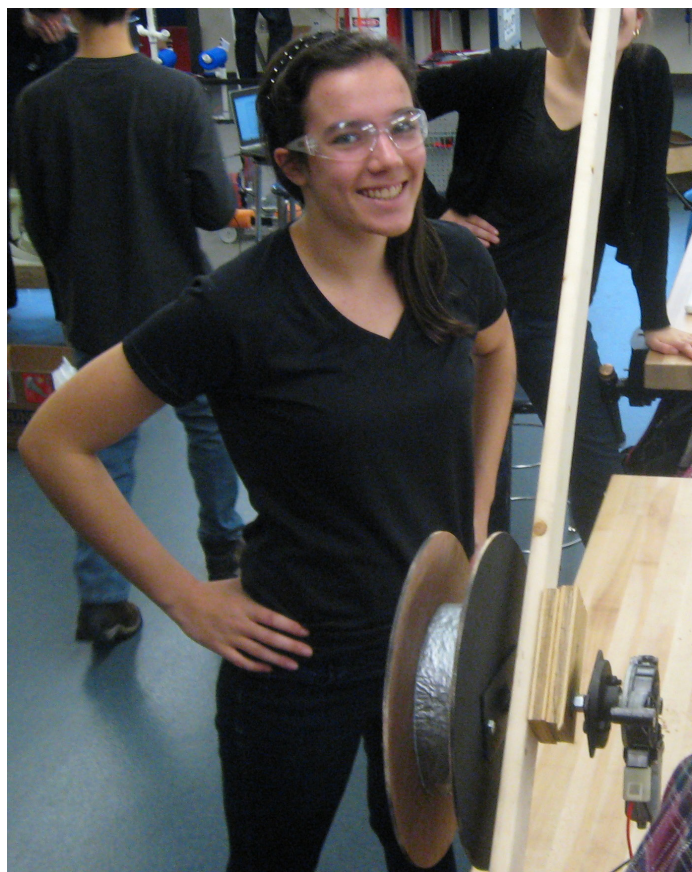
A third year student in the Department of Mechanical Engineering with an interest in developing biomedical and environmental devices for impoverished communities, Katelyn continues her leadership in STEM at MIT. She is part of MIT's D-Lab and a member of MIT's Society

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of Women Engineers. She is treasurer with the Baker Foundation, which provides funding for student initiatives to enhance their undergraduate experience at MIT. She paddleboards, runs, and sings in The Chorallaries, a competitive co-ed a capella group at MIT.

Most recently, Katelyn traveled to Kenya and Ethiopia to test a transtibial prosthetic liner, which she helped design. The liner provided a more comfortable interface between patients and their prosthesis. Katelyn received a \$1,500 Peer Impact Prize from MIT's Underclassmen Giving Campaign for this work.



Katelyn's experience as an InvenTeam leader has helped catapult her to tremendous heights in the field of STEM. Her focus on user-centric and efficient design was borne from the earliest days learning the challenges the Natick Fire Department faces in ice search and rescue to working with patients in East Africa.

With InvenTeams and her teacher, Mr. Scott, Katelyn had a unique, hands-on experience with the process of invention early in her life that has helped her build confidence to be a dominant

force in the exciting world of technological invention and innovation.

**“ I’m proud of Katelyn’s achievements, said Leigh Estabrooks, invention education officer at the Lemelson-MIT Program. Her personal experience with learning every aspect of inventing while in high school had a dramatic effect on her academically and has helped define her career trajectory. However, I’m most proud of Katelyn’s desire to improve the lives of others by applying her skills and knowledge of technology. She’s a role model not just for young people but for us all. ”**

### ABOUT LEMELSON-MIT INVENTEAMS™

Lemelson-MIT InvenTeams are teams of high school students, educators, and mentors that receive grants up to \$10,000 each to invent technological solutions to real-world problems. InvenTeams research intellectual property, exchange ideas, design parts, build models, and make modifications as they develop their invention prototypes. They learn to move forward through challenges and celebrate “Eureka!” moments, all while cultivating their technical leadership