

HOOKED!

Meet Inventor Katelyn M. Sweeney

by Meg Chorlian

Katelyn M. Sweeney and Olivia Van Amsterdam are pictured with their former teacher, Douglas Scott, and their submersible rescue vehicle at the White House.

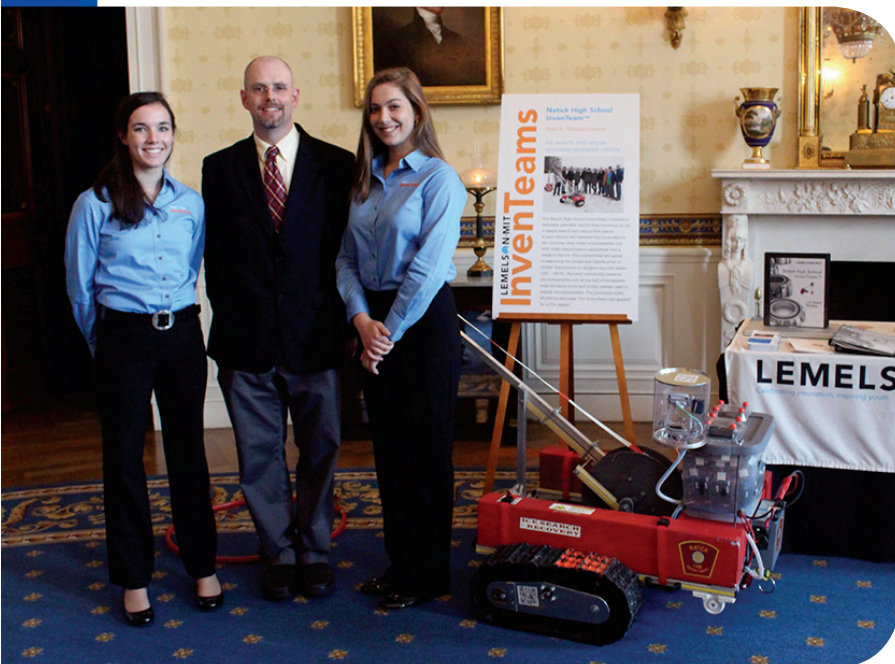
Katelyn M. Sweeney tapped into her inner inventor in high school. That's when the Natick, Massachusetts, native joined a Lemelson-MIT InvenTeam. She and her teammates designed a remote-control *submersible* rescue vehicle. They earned an invitation to the White House in 2014, and Sweeney

met President Barack Obama. In 2016, the team's project was issued U.S. patent number 9,511,833.

And Sweeney hasn't slowed down. She graduated from the Massachusetts Institute of Technology (MIT) in June 2018 with a bachelor's degree in mechanical engineering. She now works for OneWeb in California as a mechanical engineer. She is helping design a satellite-based communications network that will enable high-speed, low-*latency* broadband access for people around the world. Sweeney talked with *COBBLESTONE* about her invention experiences.

HOW DID YOU GET INTERESTED IN INVENTING?

When I got to high school, I thought for sure that I wanted to be an actress. But I was placed in a technology class instead of the theater class I had signed up for on the first day. I was so mad. My mom convinced me to stay in the class. Within a week, I was totally hooked. The teacher was



so engaging and the information was challenging and fun. I just kept getting involved in new technical projects. Before I realized it, I had turned into an inventor!

HAVE YOU INVENTED ANYTHING?

I've invented a lot of things over the years. It turns out that creative invention is a huge part of being an engineer. Some of my coolest projects have been a search-and-rescue vehicle for ice divers, a comfortable *prosthetic* socket, and a fire-detecting wrist-worn device for firefighters.

In each case, the process is similar. The first step is to brainstorm as many ideas as possible without thinking about whether they're possible or not. Then you narrow it down and start prototyping and testing. Once you've worked out the details, you put all of your prototyped parts and lessons learned together. Then you test your final, integrated prototype. That's a big simplification. The process requires you to go back and repeat steps until you get them right. But those tend to be the basic building blocks.

WHAT IS THE MOST INTERESTING PROJECT YOU WORKED ON?

That's such a tough question! I think each project presents its own challenges and interesting bits. Overall, I think it has to be my prosthetic project. I worked with a small team (five people) to design and build a more comfortable prosthetic socket liner for users in Kenya and Ethiopia. Our patients were often



using poorly fitted donated prostheses that hurt more than helped. We basically designed a way to cushion the limb so that the users can take control of their own comfort. A lot of cool technical challenges were associated with the project. It also was cool to be able to travel and actually see our product in action.

DO YOU PREFER GROUP INVENTING OR SOLITARY INVENTING?

I definitely prefer group inventing. When you try to invent by yourself it's too easy to get stuck on one idea or to hit a roadblock and run out of ideas. With a team, you can take advantage of a lot of unique skills and mindsets. One of my favorite sayings is "if you are the smartest person in the room, you're in the wrong room." That's a good mindset to have when inventing.

Katelyn, teammate Nick Schwartz, and a patient in Addis Ababa, Ethiopia, test the final prototype of the lower limb prosthetic.

Submersible describes something that functions under water.

In Internet connections, *latency* is the delay that is experienced as data is transferred from origin to destination.

A *prosthetic* is something that serves as an artificial limb for a missing body part.

Katelyn loves learning about how the universe works. For her 18th birthday, she toured the Large Hadron Collider near Geneva, Switzerland. It is a powerful particle collider and the world's largest machine.



When Katelyn visited the Kennedy Space Center as a child, she carried a yellow notebook, making notes and drawings about the ways she thought the satellites could be improved.



WHERE DO YOU SEE YOUR INTEREST IN INVENTING TAKING YOU?

Anywhere! I have some friends in inventive spaces at MIT that are going into engineering and business. Other friends are becoming

doctors, lawyers, and entrepreneurs. There really isn't anything you can't do. I personally would like to work on mechanical engineering projects that affect lots of people. It could be in consumer products (like computers or phones), healthcare (like prosthetics or medical tech), nonprofit engineering, or something entirely

different. I'm excited to see where my path takes me.

YOU INTERNEDED AT SPACEX FOR A SUMMER. WOULD YOU LIKE TO BE A SPACE EXPLORER?

I would love to be a space explorer! I think there is something really interesting about how little we know about space. I would love to learn more.

WHAT THREE TRAITS MAKE IT DIFFICULT TO BE A SUCCESSFUL INVENTOR?

I think pride is one of the quickest ways to make it harder for yourself as an inventor. I see it a lot in super-smart people. No matter how good your idea is, you have to be able to communicate with your team. You also have to be willing to accept that there might be other, better ideas that you can work with. *Pessimists* also have a hard time as inventors.

Being realistic is good, but if you're too hard on yourself, you might eliminate good ideas too early. Part of inventing is enjoying the unknown!

Building on that, I think the number one hindrance to invention is thinking, "I can't." One of the coolest things about engineering is that pretty much anything is possible with hard work and the right attitude. You might struggle, but the only thing that will really ensure defeat is thinking you can't do it. Another quote I really like is "whether you think you can or you can't, you're right."

WHAT THREE TRAITS ARE MOST IMPORTANT TO AN INVENTOR?

Creativity, drive, and resourcefulness are important traits for an inventor. Being able to think about problems and solutions in unique ways, being willing to work hard at developing skills, and being clever in taking advantage of any and all resources are three big ways to make something awesome and effective.

DO YOU HAVE A FAVORITE INVENTOR?

I think there are a ton of cool inventors out there, but my favorite has to be Margaret Hamilton. She is one of the pioneering women in computer science. She worked at MIT and helped write the code for the Apollo 11 mission [in 1969]. On her path to becoming an inventor, she pursued both math and philosophy. But she ended up becoming a coder! I think she's a great example of drive and

an innovative spirit. She definitely is leaving her mark on history. Fun fact, she actually coined the term "software engineering"!

IS THERE AN INVENTION THAT PEOPLE TAKE FOR GRANTED?

I don't think there are many inventions today that people *don't* take for granted. We don't think about how much work goes into everything we use. Most devices are the result of hard work that is done by tons of coders and engineers who think through every little detail *meticulously*. It's pretty marvelous when you think about it.

WHAT ADVICE DO YOU HAVE FOR YOUNG INVENTORS?

Work hard in school (not just science and math, although those are important), and never give up on your creative dreams, even if you don't know if they're possible. With the right skills, a good attitude, and willingness to work hard, anything is possible! I still carry a notebook most places I go and try to spend at least 20 minutes each day brainstorming new invention ideas! 💡

Pessimists are people who tend to take a negative or gloomy view of things.

Meticulously means extremely carefully and precisely.

Katelyn knows all about creativity, drive, and resourcefulness. She spent a lot of time in the lab working on her ideas.

