

“Tick Stik”: Delaney Dixon & Binghamton University Students Guest Blog

LDA Guest Bloggers



*Chris and Delaney Dixon & BU students:
Jung Wok Oh, Justin Adamczak and Salvatore Mezzatesta*

Photo credit: Binghamton University / Jonathan Cohen

Delaney Dixon is a 6th grader from Windsor, NY, who contracted Lyme disease in 2017 following an undetected tick bite. Delaney came up with the idea for a device to check for ticks in hard-to-reach places on the body, and even remove them. She and her father developed a prototype called “Tick Stik,” a retractable wand with a flexible head, using an HD camera. Since bringing the project to Binghamton University for further development, they have worked on parts acquisition and smartphone app development.

Jung Wok Oh, Justin Adamczak and Salvatore Mezzatesta are undergraduate seniors, majoring in mechanical engineering, at Watson College of Engineering and Applied Science, Binghamton University. The Tick Stik idea became one of the senior mechanical engineering projects during the 2021-22 school year. The three seniors, with faculty advisor, Professor Peter Huang, helped to brainstorm ideas with the Dixons, and worked on the technical aspects of the project. The Binghamton U.

seniors have started the manufacturing phase using 3D printing and are looking to complete the project by mid-May.

Prevent Lyme Disease: Cooperation is the Key

Lyme Disease: A Family Affair



Delaney Dixon and her dog, Oliver

My name is Delaney Dixon. I am a 6th grader from Windsor, NY, and I contracted Lyme disease in 2017 following a tick bite that went undetected. My family and I were good tick checkers but as I began to grow older, I became less comfortable with having another person inspect me for ticks every night, and instead I began trying to do it myself. When I got bit by a deer tick, the location of the tick bite was such that I never saw it, and by the time I found it, the damage was already done, and I had to undergo treatment for Lyme disease.

One of the personal lasting effects of contracting Lyme disease from a tick bite for me was dealing with anxiety. I couldn't even go outside without feeling the need to check myself for ticks, and when something would happen that was even as simple as my dog bringing in a tick from outside – I found it hard to remain calm.

This caused some pretty serious emotions for me, since I felt

the strong need to check myself for ticks, but I wasn't comfortable with having to have another person constantly inspecting my body, especially if I wasn't at home.

It really was because of this concern and conflict that I came up with the idea for a device that would allow people to locate and remove ticks from their bodies all on their own if they are alone or are uncomfortable with asking someone for help. The idea for the Tick Stik was launched at my dinner table when I told my idea to my mom and dad and they said "Wow – that could work".

We developed the first "prototype" Tick Stik about 18 months ago, with a small camera that we bought online and a variety of household items. We decided that the product also needed to include a way for people to remove ticks from their bodies, which required a level of engineering that was a little bit outside of my dad and my abilities.



*Delaney Dixon
and her
parents, Chris
and Nancy Dixon*

At the encouragement of some friends, my dad Chris reached out to Binghamton University in early 2020 to see if they would have any interest in helping us work on a prototype. The University became very interested in the idea and made the prototype one of their senior mechanical engineering projects

during the 21-22 school year. It has been a great experience for me to be a part of all the Zoom calls and design sessions, and I have learned a lot about how products get developed.

I get asked a lot about my vision for this tool. I think that I am very clear in my vision for what the Tick Stik is – a tool to help fight against tick borne illnesses and that this is a responsibility I do not take lightly. For me, the goal is and always has been to fight Lyme disease and other diseases, and if my Tick Stik helps even one person find a tick before it bites and infects them, then all of the hard work will have been worth it.

Lyme Disease: A Community Project



From left: Justin Adamczak, Jung Wok Oh and Salvatore Mezzatesta. Photo credit: Binghamton University / Jonathan Cohen

We are a team of three undergraduate seniors from Binghamton University. The members are Jung Wok Oh, Justin Adamczak and Salvatore Mezzatesta, and we are all majoring in mechanical engineering.

The Tick Stik project was the Dixons' idea, which had been

brought to the Watson College of Engineering and Applied Science for further development. Then it became one of the senior design project ideas for Watson seniors. We all signed up for the project individually, and we did not know each other back then. Once the members were finalized, we were assigned to a faculty advisor, Professor Peter Huang, who is an associate professor and a director of undergraduate studies in the Mechanical Engineering Department.

When the team first assembled in September 2021, all of us (including our faculty advisor and the Dixons) met once a week over Zoom. We spent most of our meeting time brainstorming ideas to effectively remove ticks and improve user experience.

Since the brainstorming phase, we have worked on the technical aspects of the project, while the Dixons are focused on parts acquisition and smartphone app development. Additionally, the students meet at least once a week separately to make progress using our knowledge and skills. We also received technical assistance and advice from the lab technicians of Watson College Fabrication Laboratory.

We just began the manufacturing phase of the project using 3D printing. We are looking to complete the project by mid-May.

The device still needs to be tested once the assembly finishes. This is the part we may find challenging. There are school regulations regarding human-subject testing that would not let us intentionally embed a tick to a human body to test the equipment. The Dixons and our faculty advisor are aware of this situation. As of right now, we are looking for ways to perform a "mock test" that will resemble a tick removal scenario.

Tick Stik is a very meaningful project for all of us, not only because it can be a device to prevent dangerous tick-borne diseases, but it also is our first real-world team project. In the beginning of the semester, we did not expect it to be

something more than just a project assignment from the school. However, as we have progressed through the project, we are all realizing how our knowledge can be applied to help others. We find it wonderful that our work has the potential to benefit the people in need, which motivates us to work harder.

LDA Note: *Listening to Lyme patients' concerns, including children's, can often lead to significant developments to help stop the spread of this debilitating disease. The LDA salutes Delaney and her family and Binghamton University and the 3 seniors for their role in moving this project forward. Cooperation is the key to success in preventing Lyme.*

News Releases on Tick Stik

Spectrum News 1

2/11/2022

Southern Tier 6th grader invents tool that could prevent Lyme disease

By Vince Briga

News 12

2/11/2022

Windsor 6th grader, with help of college students, develops 'Tick Stik'

By Kayla Madison

Windsor Central School District Website Page

From Sick to Tick Stik

Binghamton Homepage

2/11/2022

6th grader, BU students team up to fight Lyme disease

By Jackie Gillis

Photo Gallery:

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