



Cornell University
Graduate School

Cornell University Three Minute Thesis (3MT) Competition

Michelle Duong, Food Science & Technology: “Franken-phage to Save the Day”

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>> Narrator: Cornell University 2019 Three Minute Thesis finalist. Michelle Duong, food science and technology: “Franken-phage to Save the Day.”

>>Duong: Every year, one in 10 people around the world gets sick from just eating and drinking. One big reason is contaminated water. 25 percent of the world's population does not have access to clean drinking water. To address this issue, my dissertation focuses on developing a bio technology that allows end-users to verify whether their water is contaminated with pathogenic bacteria. I aim to develop an inexpensive, qualitative, and rapidly acting diagnostic tool for detecting bacteria and low resource settings. For example, if you are traveling abroad and there's no water, what do you do? Or if you are serving in the military working in a remote area or even back in the United States if you work for food production plants, there is no rapid way of detecting and painting bacterial contamination. The current gold standard method for detecting bacteria takes three days, requires clean samples, complex instruments, and trained personnel. My approach uses phages, short for bacteriophages for detecting bacteria. Phages are a type of beneficial virus that only infect bacteria and are harmless to humans. Phages are also inexpensive and easy to produce and, most importantly, only infect live and active bacteria. In addition, phages, one, infect a bacteria with his, with his tail fibers. What I did was I assembled a library of effective tail fibers to engineer my new phage called the Franken-phage. The Franken-phage has mixed tail fibers so that one Franken-phage can infect many species of bacteria and not just one. In addition, upon detecting harmful bacteria, my Franken-phage causes a change in color, thus alerting the end users of the presence of harmful bacteria in their water. So imagine if I have a cocktail of these Franken-phages tailored to detect different bacteria, the possibilities are endless. My next step is to take this proof of concept and commercialize it. Next month, we will be conducting our first field test in Kenya in fulfillment of UNICEF Water Safety's goal. So when you're traveling abroad two years from now or serving in the military, you rely on this technology to keep you safe under just a few minutes. Remember, this is where you first heard about Franken-phage. Thank you.

[Applause]