Capstone project aims to help solve global water shortage

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Ryan Wasserman, E'15, tests his group's solar desalination system on a particularly sunny day on campus. Credit: Matthew Modoono/Northeastern University.

Five Northeastern University student-researchers have worked to address

the worldwide water crisis, designing a solar-powered desalination system that produces potable ocean water.

They created the device for their senior capstone project, which was supervised by mechanical and industrial engineering professor Mohammad Taslim. Team members comprised Eric Anderson, Jon Moll, Dave Rapp, Murphy Rutledge, and Ryan Wasserman, all E'15.

In their project report, the students pointed to the urgent need to solve the global water shortage: Some 750 million people lack access to clean water, according to water.org, and approximately 840,000 people die each year from a water related disease. Indeed, the water crisis represents the greatest risk facing the world today.

"We wanted to work on this project precisely because of the world's water problem," said Wasserman, who recently graduated with his Bachelor of Science in Mechanical Engineering. "Developing nations like Haiti need a cost-effective method for obtaining usable water without power input."

The team's desalination system consists of a parabolic mirror, a copper heating pipe, and two tanks—a storage tank and a condenser tanked filled with cold water. Here's how it works: A user pours a small jug of salt water into the pipe. The mirror reflects sunlight onto the pipe, causing the water to evaporate. This process creates water vapor, which in turn flows through a condenser coil located inside the condenser tank. The resulting potable water drips from the bottom of the condenser tank into the storage tank, leaving the salt behind in the pipe.

In tests, the system produced one gallon of potable water per day. While comparable products on the market produce a fraction of this quantity, Wasserman plans to fine-tune the prototype before considering its marketability.

The prototype's design, he noted, was shaped by his co-op experience with Instron, the maker of materials-testing equipment, and QinetiQ North America, the defense technology company. "Both these co-op jobs were influential," Wasserman said, adding that he recently landed a full-time job with QinetiQ. "I took in a lot of general knowledge that I was able to apply to the assembly of the system."

Taslim underscored Wasserman's sentiments, saying that capstone represents the culmination of five years of hard work in class and on co-op. "During their senior year, students put all their engineering knowledge to work by going through the entire design process from A to Z to bring an idea to reality in a fairly short time," he said. "This is a real-life experience for them so they can join the engineering world prepared."

Provided by Northeastern University