

Villanova Engineering PhD candidate Andrew Golato was initially drawn to service work when his co-worker Tim Masterson told him about the James A. Masterson Foundation, which he had established to honor his late brother Jim, a Villanova alumnus. The organization's mission is to "help people in crisis" and at the time was raising money to buy water filters for families and communities in developing countries. When asked if he wanted to get involved, Golato welcomed the opportunity and was brought onto the foundation's advisory board. Shortly thereafter, he embarked on his first service trip to Colombia where he and Tim traveled to remote locations and distributed 150 filters, which provided more than 10,000 people with clean drinking water.

This life-changing experience made a strong impression on Golato, leading him to initiate a meeting with the College's Director of Villanova Engineering Service Learning Jordan Ermilio, who recruits student volunteers to travel and support the initiatives of Villanova's service partners around the globe.

As a result of their meeting, Golato was appointed a leader for the College's 2016 fall break trip to Nicaragua. The goal of this trip was to support a

long-term community initiative to provide greater access to clean water. Golato, Ermilio and seven students traveled to Waslala, where they worked with community members to help survey and test the water. Upon arrival, they were greeted by a familiar face,



Doctoral candidate Andrew Golato in Nicaragua with Heryel Erwin Jr., godson of Iain Hunt, the College's international development initiative manager.

Adam Butler '15 ME who has been living in Nicaragua, fully immersed in the project since fall 2015.

Golato recalls, "The community welcomed us into their homes, cooked meals for us and treated us as family; there was instant absorption into the culture and community when we arrived." Reflecting on the work, he says, "This project opened the eyes

On the last day of the trip, the Villanova team joined together with the community for a big dinner with dancing. While the community was grateful for the work the students had done, Golato insists, "The students are the real beneficiaries of this work. Not to downplay our role, but we have the chance to discover a new culture, apply our engineering skills and help the community execute this project; it's a humbling experience."

Back on campus, Golato and his teammates are busy wrapping up the final deliverables, which include a recommendation for a computer model of a water-distribution system, a cost-benefit analysis, two site maps and a how-to guide. A follow-up trip is scheduled for spring 2017.

Golato appreciates the opportunity he says he only could have found at Villanova. He knows it will be an advantage as he applies for teaching positions at area universities after earning his doctorate this May. He notes, "VESL gave me a greater perspective on what I thought was a narrow career path. Being a professor can be about more than teaching and research; you can have truly global impact." ■

of many students on the trip. Some were, for the first time, applying the engineering concepts they learned in class to real-world issues."

## ... TO STRUCTURAL HEALTH MONITORING AT VILLANOVA

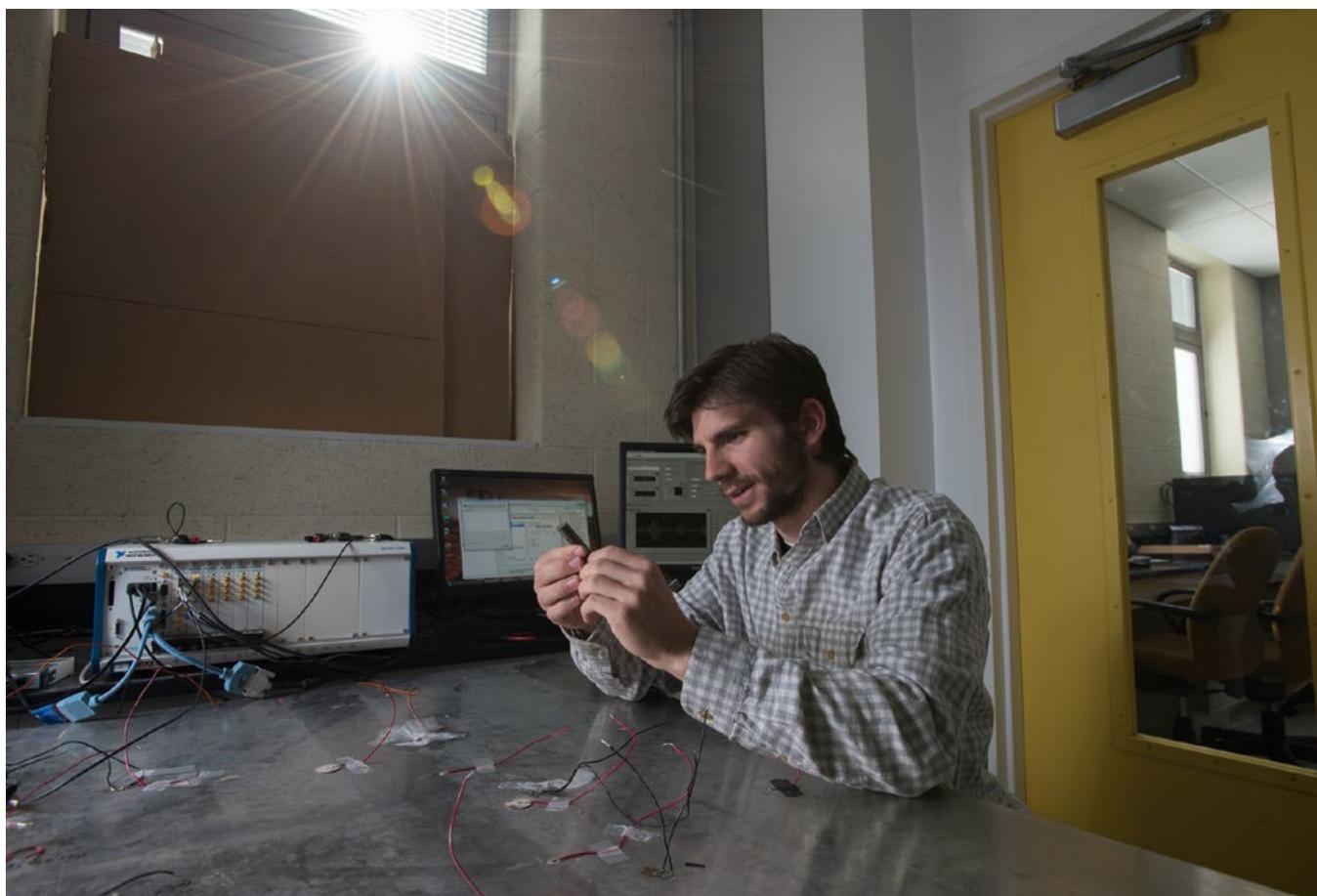
Given the service projects he's worked on, one might assume that PhD candidate Andrew Golato is a civil or environmental engineer pursuing his doctorate in the area of water resources. In fact, Golato's service experiences are unrelated to his academic pursuits, which lie in the area of structural health monitoring, a subfield of non-destructive testing that allows for real-time, in situ monitoring.

For those unfamiliar with the field, Golato offers an analogy, "Your car has a check-engine light, which monitors your engine to ensure all components function

properly. When one is failing, the light turns on, and a mechanic connects a computer to the car, and the computer identifies the faulty component."

In Golato's work there is a system of piezoelectric sensors, which constantly transmits a prescribed ultrasonic wave into the pipe or plate being inspected. If a flaw (crack, hole, corrosion, sediment build up, delamination) is detected, the propagating acoustic wave will be scattered by that flaw. A series of piezoelectric sensors functioning as "receivers" obtain that scattering and record it. The recorded scattered wave is then applied to a computer algorithm that Golato wrote, which uses prior knowledge of model-based scattering physics and wave propagation to provide the coordinates of the damage. The output is an image of the inspected plate or pipe on a computer screen with any and all damage properly located to within 10 mm.

Golato is advised by Villanova University Mechanical Engineering Professor Sridhar Santhanam, PhD, and Temple University's Fauzia Ahmad, PhD, an associate professor of Electrical and Computer Engineering. He also works with Center for Advanced Communications Director Moeness Amin, PhD. ■



Andrew Golato inspects a steel rod used in an ultrasound-based defect localization scheme for thin plates.