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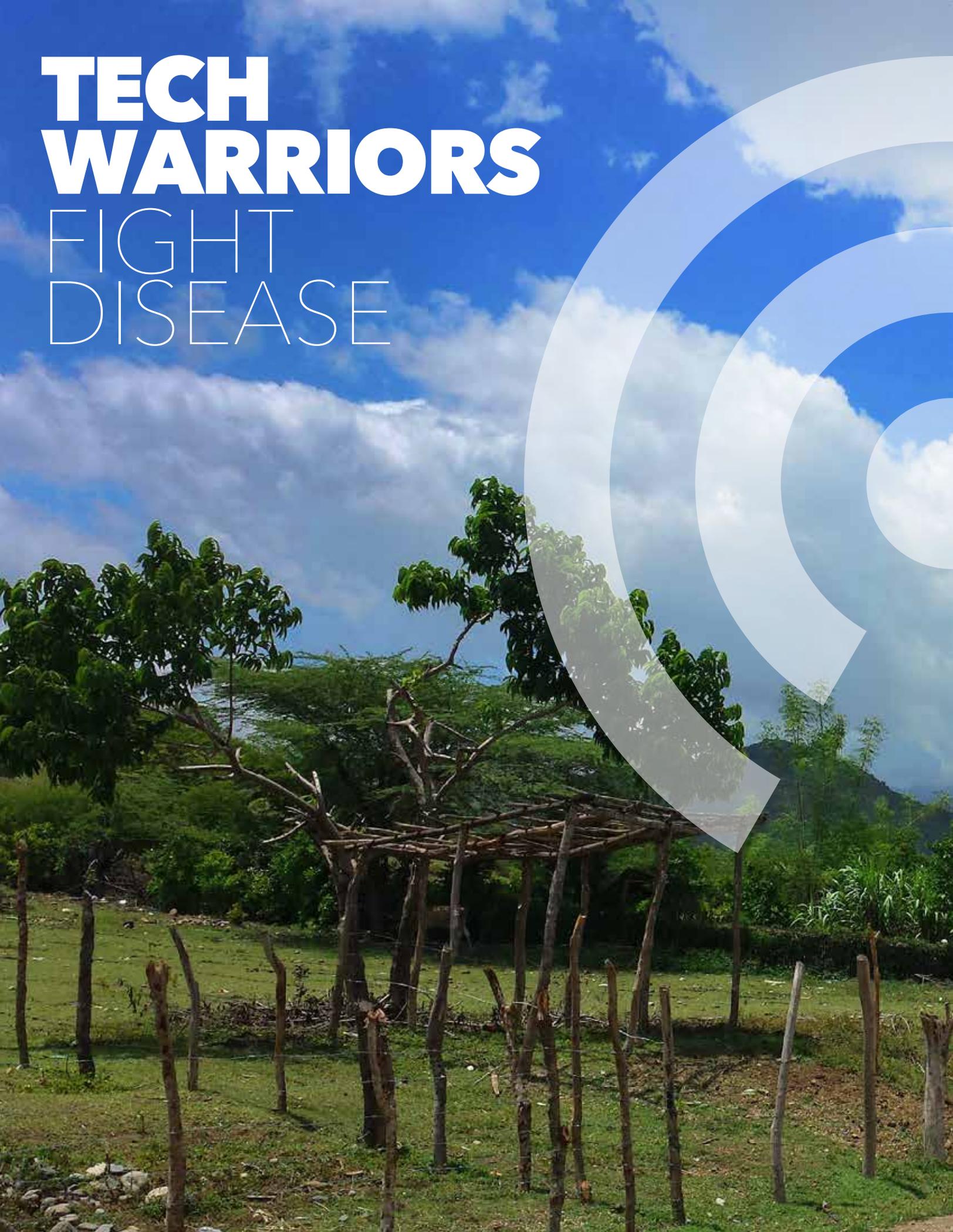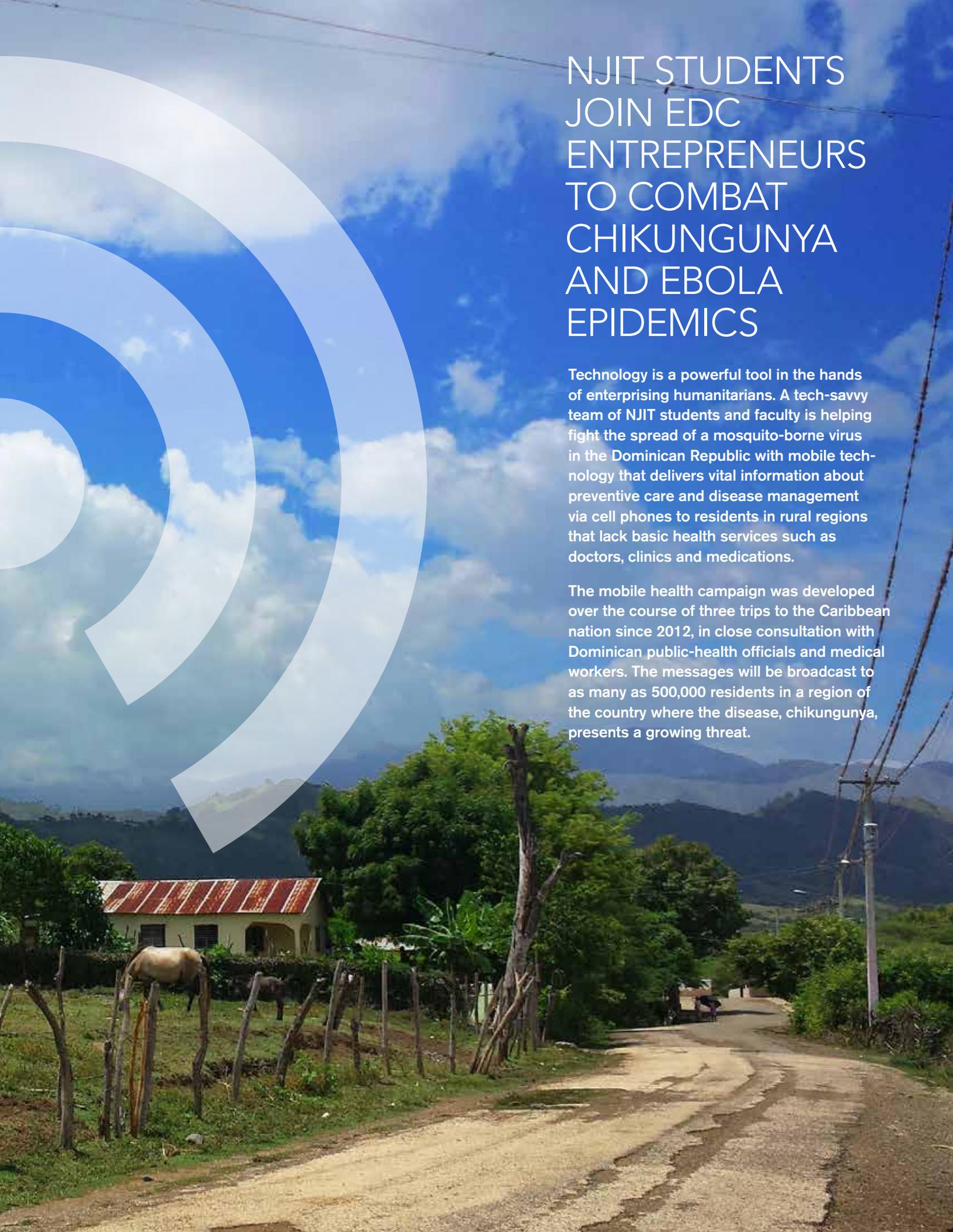
NJIT STUDENTS JOIN EDC ENTREPRENEURS TO COMBAT CHIKUNGUNYA AND EBOLA EPIDEMICS

Technology is a powerful tool in the hands of enterprising humanitarians. A tech-savvy team of NJIT students and faculty is helping fight the spread of a mosquito-borne virus in the Dominican Republic with mobile technology that delivers vital information about preventive care and disease management via cell phones to residents in rural regions that lack basic health services such as doctors, clinics and medications.

The mobile health campaign was developed over the course of three trips to the Caribbean nation since 2012, in close consultation with Dominican public-health officials and medical workers. The messages will be broadcast to as many as 500,000 residents in a region of the country where the disease, chikungunya, presents a growing threat.

Anna Jezewska '16, a math major from Wallington, returned in the fall from the city of San Juan where she and two other NJIT students worked with Dominican collaborators on videos instructing villagers how to avoid contracting the viral disease by drinking clean water and eliminating mosquito breeding conditions, among other tactics. Chikungunya infections cause fever and severe joint pain that can be long-lasting, and are potentially fatal.

LEARNING LOCAL EXPRESSIONS AND UNIVERSAL PRINCIPLES

"I'm not a biology major and so the opportunity to make an impact on public health was extremely unique and appealing to me, something I knew I could not pass up," says Jezewska, an Albert Dorman Honors College student who added that the experience also taught her important lessons about project management – "Try to lay out your work plan pretty perfectly!" – and, surprisingly, risk taking. "It's important to connect with the right people, but it's not always clear who they are, and so you have to reach out and start talking to people. You never know who is going to help."

She also learned a fundamental principle that informs strategy across the business spectrum, from start-ups, to large public companies, to non-profits: know your audience.

"We discovered that the Spanish we hear in the U.S. is different from what's spoken colloquially in the Dominican Republic," she recounts. "Working with native speakers, we were able to tailor the messages for local audiences."

The project is a partnership between Albert Dorman Honors College, the School of Management, and Cell Podium, an e-learning start-up housed at NJIT's Enterprise Development Center that has devised methods for relaying healthcare and training multimedia through mobile technology. Paul Dine, then assistant dean for student programs at the Honors College, identified the need for public health services on a 2012 humanitarian-service trip to the country with several of his students and contacted Cesar Bandera, an assistant professor of entrepreneurship in the School of Management and one of Cell Podium's founders, when he returned.

HIGH-TECH SOLUTIONS IN LOW-TECH LOCALES

"We noticed on that first trip that in the rural areas there were no doctors or clinics – no medical care at all. I knew about Cell Podium's m-Health work and wondered if that were a

Kevin Chen '16 (left), Pitambar Dayal '16, and Nikhil Kaushal '16 visited rural health clinics in the Dominican Republic as part of the mobile communications health project.

service we could offer," Dine recounted, calling the Dominican project "an opportunity for students to learn transcultural skills hands on."

The company's technology is a broadcasting system that delivers multimedia information and training to cell phones via multimedia messaging (MMS) regardless of the carrier or model of the phone, and without requiring access to the Internet or apps. The deployment of this system will enable video intercommunication between patients and healthcare workers.

"The technology is pretty unique. Our web application communicates through the Internet, bypassing the need for interoperability between telephone carriers," says Matthew Cooper, a computer science graduate student at NJIT from Mountain Lakes who has worked at Cell Podium for the past two years. He traveled to the country in August with Dine, Jezewska and Marvin Castellon '14, a biomedical engineering major from Union City and graduate of the Honors College.

"My role was to aid in the technical aspects of creating cell-phone ready video and to perform a demonstration of Cell Podium's

technology while we were there. We succeeded, sending one of the videos we developed to 25 local recipients," Cooper notes.

In 2013, Dine and Bandera received a $10,000 grant from the International Foundation, a global development organization, to travel to the Dominican Republic to conduct a small pilot project involving a few dozen participants and a small clinic. The project has grown considerably since then. In July, Bandera and three Honors College students – Nikhil Kaushal '16, a biology major from Montgomery Township, Kevin Chen '16, a biology major from Wayne, and Pitambar Dayal '16, a biomedical engineering major from Allentown, Pa. – met with their Dominican clinical and public health partners, including Hector Guerrero, M.D., director of the Ministry of Public Health for the region of the country hardest hit by the chikungunya epidemic.

"At that dinner, the pilot evolved into a nation-wide project that may involve as many as 500,000 Dominicans," Bandera says, noting that the health ministry will make the patients' health records available so the team can assess the effectiveness of the communications technology by tracking clinic visits and patient records. Upgrades to the MMS technology to cover the larger audience are supported by a $1 million grant Bandera and Cell Podium received from the Centers for Disease Control and Prevention (CDC).

Bandera and NJIT students are working on proposals for additional funding from the CDC as well as from the National Institutes

of Health. They are also planning a return trip to the Dominican Republic to set up a system with real-time capability for evaluating the effect that the mobile video broadcasts actually have on public health and health practices, based on the patient data to which they've been given access.

TAKING THE FIGHT TO AFRICA

Going forward, the team plans to expand their effort to countries that include Senegal and Sierra Leone, where officials learned about the Dominican Republic project on a trip to the U.S. Khadija Sesay, director of the Sierra Leone Open Government Initiative, a communications agency reporting directly to President Ernest Bai Koroma, visited NJIT in September to discuss the deployment of MMS in her country to help stop the spread of the Ebola virus and to clear up misinformation

People in the Dominican Republic and other countries can be connected to vital health information through the innovative communications technology developed at NJIT.

about the epidemic that has led to ethnic violence in other nations.

At the request of Senegalese Minister of Health Madame Dr. Awa Marie Coll Seck, Bandera and his team have designed a mobile health system for her country. Although Senegal has been cleared with respect to the Ebola epidemic, their health ministry wants to use cell phones as an early warning system that the public can use to report suspected cases.

Bandera notes of these developments, "By collaborating with agencies in different countries, students learn to work in diverse political and social environments." ∎

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