NEWS

Water research project helping rural community

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In the eight years Tania Datta has been at Tennessee Tech, she has worked on several water-related projects. An associate professor in civil and environmental engineering, Datta's research usually focuses on water resources as well as water quality and waste-water treatment.

"We have done a lot of state-funded projects as well as national and international projects," said Datta. "All of them have to do with the protection of communities from any kind of water disasters such as floods or storm water issues or anything that has to do with the treatment of water or protecting our water quality."

Datta's current research project focuses on some of the water issues happening in nearby Gainesboro, a small town in Jackson County. The area suffered severe flooding in June 2018 and February 2019 with water invading the emergency management systems building and the city library.

"Because they do not have a lot of resources, we got the opportunity to collaborate and partner with them to address some of these issues," said Datta. "It is a true university-community partnership which is mediated by the Tennessee Department of Environment

SECTION NAV

and Conservation."

One of the main goals of the project is to have Tennessee Tech students work on these issues while getting hands-on experience so they can understand what communities go through and develop a skill set to solve these problems.

"I participated in a summer research grant funded by the university and was fortunate enough to be able to really start collecting data for this project under the advisement of both Dr. Tania Datta and Dr. Alfred Kalyanapu," said Maci Arms, a senior majoring in civil engineering and foreign languages. "This project really appealed to me because I've wanted to use engineering to help people. I think that's exactly what this project does using engineering to empower a local rural community."

Thomas Harris, a senior civil engineering major, is another student working on the project with Arms. Both students assist in monitoring sensors that have been installed at various places throughout the county which monitor water levels and the weather and provide data.

"We started identifying the storm water systems within Gainesboro and identifying how that can be a possible reason as to why flooding happens here," said Harris. "As an engineer, I think it is important to help underprivileged communities by using our knowledge. I think that is one of the main reasons why people get into engineering, and that's one of the reasons why I did. This is a project that encompasses all of that which is really, really awesome."

Using the data that is collected, Arms and Harris are helping Datta and Kalyanapu, an associate professor in civil and environmental engineering, develop models in order to predict how these floods happen and to propose mitigation measures for floods.

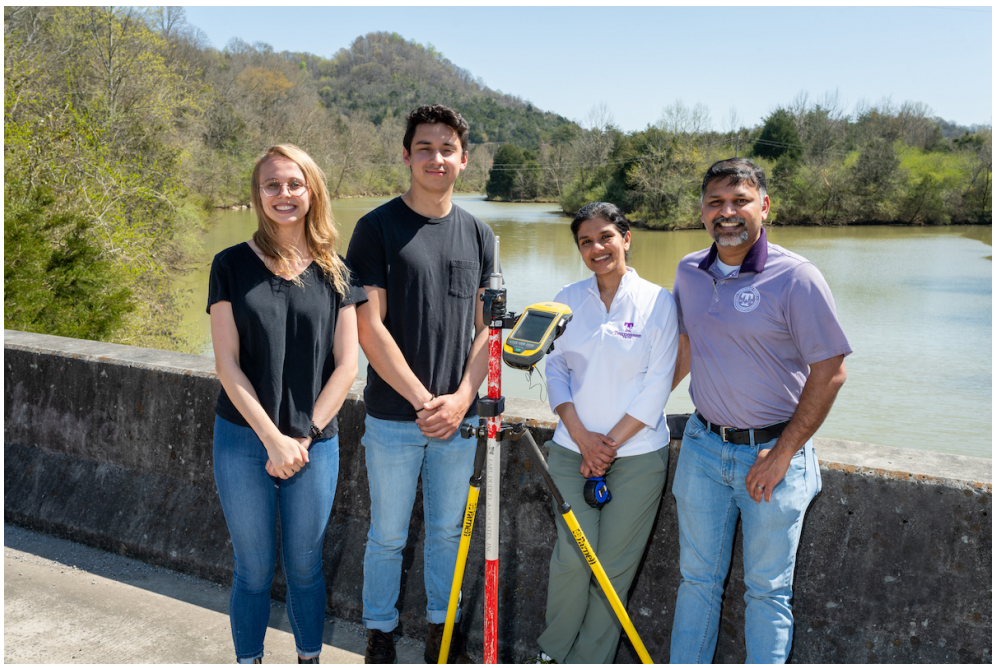
"The goal here is to bring all of this data together and build computer models that can simulate, given a particular amount of rain, where all of the water would go and how will that water go," said Kalyanapu. "If it goes fast and deep, we are talking about floods. We try to look at the hydrology of water in this water shed."

Kalyanapu also said that the way the model can be applied is that it can simulate what has happened in the past, but can also help with future predictions. For instance, if the national weather service says that seven inches of rain are expected over a period of 24 hours, one can hypothetically run these models and figure out all the hotspots where they might have high flood levels and the emergency management personnel can go in there and clear the areas.

"It's operation as well as general maintenance. It is a partnership program," Kalyanapu explained. "We, as a university, are providing service and not just education to our students. We are serving as partners in our local communities that, hopefully in the long run, also serves as a great example of others to follow."

Datta says that when there is a natural disaster or an environmental issue, most of the focus always goes to the urban areas. She says very few people are focusing on the underserved communities or rural communities. That is one of the reasons why she really enjoys working with students on this project.

(2) "What we are going to find is that at the end of the day we are going to help the community understand what was causing the issue and hopefully guide them to a certain solution they can address to solve the issue."



SECTION NAV

(/)

RETURN TO NEWS ROOM (/NEWS/INDEX.PHP)

Tags: 2021 (?tag=2021) Featured (?tag=Featured)

civil and environmental engineering (?tag=civil and environmental engineering)

college of engineering (?tag=college of engineering)

ADMISSIONS (/ADMISSIONS/INDEX.PHP)

ABOUT TECH (/ABOUT/INDEX.PHP)

NEWS (/NEWS/INDEX.PHP)

CALENDAR (/CALENDAR)

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EVENT MANAGEMENT SYSTEM (HTTPS://EMSWEB.TNTECH.EDU/VIRTUALEMS/)

CONSUMER INFO (/CONSUMER-INFO/INDEX.PHP)

Express Resources

TECH EXPRESS (HTTPS://EXPRESS.TNTECH.EDU)

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FACULTY & STAFF (/FACSTAFF/INDEX.PHP)

ALUMNI (/UNIVADV/CAC/INDEX.PHP)

PARENTS & FAMILY (/PARENTS/INDEX.PHP)

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SECTION NAV