News

NORTH CAROLINA AGRICULTURAL AND TECHNICAL STATE UNIVERSITY

Dr. Beni in Cooperation with the Geomatics Program Using Unmanned Autonomous Vehicles for Flood Mapping and Management

Greensboro, NC – October, 2018 – Dr. Leila Hashemi Beni, an assistant professor in the Geomatics Program in the Department of Built Environment in the College of Science and Technology, is using unmanned autonomous vehicles (UAVs) as remote sensing mechanisms to develop flood mapping in the state of North Carolina. Supported by a three-year, $300K grant through the National Science Foundation (NSF), Beni's project is designed to gain a fundamental understanding of UAV data processing and to develop a research program on remote sensing data processing for environmental management. The NSF grant provides programming support for research experiences impacting both high school and undergraduate students, whose research will be further integrated into new undergraduate and graduate curriculum at the university.

Data Collection with Team from North Carolina Geodetic Survey

Historically, scientists have used satellite-based techniques to develop flood mapping and modeling, however, cloud cover, satellite revisit time, viewing angle limitations and the complexity of urban landscapes have made this application somewhat unreliable. The recent development of UAVs has revolutionized data gathering and its use in geospatial research. Using UAVs to collect data with appropriate flight modes and optimized sensors allows researchers to overcome adverse issues associated with using satellite-based sensor data. Beni's project aims to investigate and evaluate the application of UAV data for flood mapping and management, improving simulation and modeling of 3-D dynamic phenomena such as floods, forest fires, and air pollution. The project will develop a novel method for 3-D water surface reconstruction and delineation of flood boundary and water level measurements. These measurements can then be integrated with existing flood models to identify areas vulnerable to future flooding.

North Carolina Applications

Beni's research is especially important and timely considering the challenges facing the state of North Carolina. Barely recovered from the devastation caused by Hurricane Matthew in 2016, the state is facing additional challenges from the recent flooding from Hurricane Florence. The North Carolina Emergency Management Agency is working with Geomatics program, taking steps to use UAVs to help them respond to and recover from disasters. An existing partnership between the North Carolina Geodetic Survey, North Carolina Emergency Management, and the Geomatics program is training more UAV pilots, visual observers, and collecting and processing aerial imagery of the state and supporting drone research.
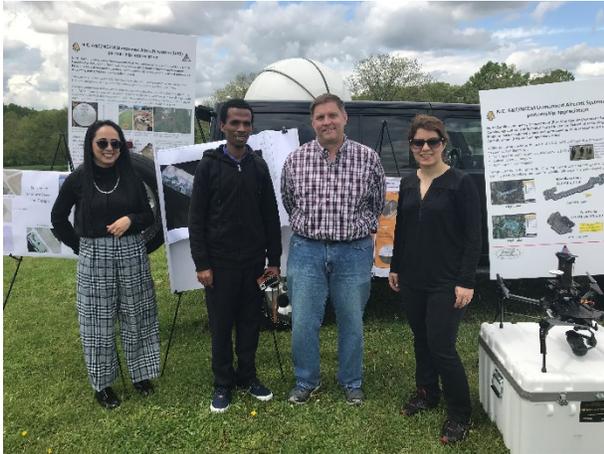
Research Assistants from the N.C. A&T Geomatics Program Doing a Demo

N.C. A&T's Geomatics program is housed in the College of Science and Technology, and is the only four-year program in Geomatics in the state of North Carolina. Geomatics focuses on the use of measurements to determine locations on the earth's surface and is part of the application of geographic information systems, which are essential to drone operation. N.C. A&T's Geomatics program is the only one in North Carolina that prepares students for professional licensure.

Summer Programming for Students

In addition to providing robust curriculum for undergraduate and graduate students at the university, Beni's NSF grant provides resources to educate area high school students through a week-long day camp during the summer of 2019. Eighteen high school students will receive instruction in the use of UAVs for geomatics applications along with more general data collection and processing exercises, culminating in a real-time project that demonstrates their knowledge and ability to acquire and use remotely-sensed data. The summer camp is designed to build student confidence in their scientific abilities, enhancing interest and performance in STEM coursework. Drs. Beni, Fersner and Nave will lead the camp experience, with assistance from undergraduate and graduate students in the Geomatics program. For more information about the summer camp, please contact Dr. Beni at lhashemibeni@ncat.edu or Professor Fersner at fersner@ncat.edu.