



**North Carolina Agricultural And Technical State University**  
 The Division of Research and Economic Development  
 1601 East Market St.  
 Greensboro, NC 27411



2018

# Annual Report

The Division of Research  
 and Economic Development

North Carolina Agricultural and Technical State University

## Research at a Glance

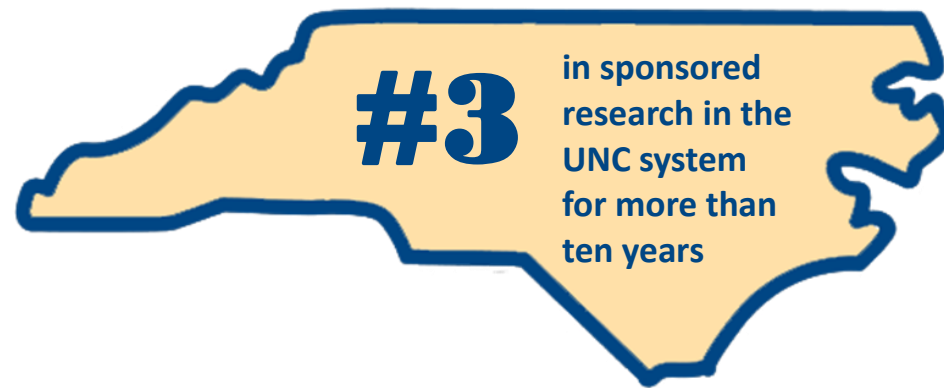
**\$62.5 Million in Total Awards**

From July 1, 2016 through June 30, 2017, N.C. A&T received \$62.5M in direct and indirect federal funding, which represents 94% of the total sponsored projects awards.

**R2**

**Classification**

Doctoral University -  
 Higher Research Activity



## Research Areas

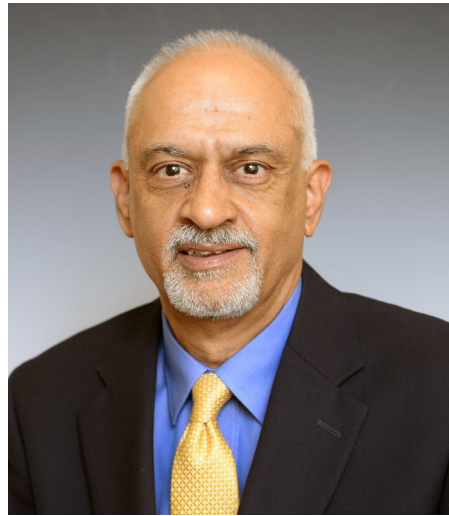
Aerospace and Transportation Systems  
 Biomedical Research  
 Biotechnology and Biosciences  
 Computer and Computational Science  
 Defense and National Security  
 Energy and the Environment

Food Science, Human Wealth, Nutrition and Wellness  
 Leadership and Community Development  
 Nanotechnology and Multi-Scale Materials  
 Social and Behavioral Sciences  
 Transportation and Logistics

We celebrate another stellar year of excellence at North Carolina Agricultural and Technical State University!

As we recognize and reward excellence in research we know the impact of our service across this campus and within the community continues to contribute to N.C. A&T's status as one of the nation's most highly-respected land-grant, doctoral higher research activity universities.

Through exemplary instruction, interdisciplinary research, and creative scholarship, our efforts engage and inspire students to solve complex global challenges while enhancing the quality of life for the communities in which they live, work, and serve.



**Dr. Sanjiv Sarin**  
Interim Vice Chancellor  
for Research and  
Economic Development

As a land-grant university, N.C. A&T has a distinguished 126-year history of solving research challenges. Addressing today's great issues requires research in emerging and converging disciplines such as biotechnology, nanotechnology, energy and the environment, cybersecurity and big data. Accordingly, research at N.C. A&T extends beyond the traditional and land-grant fields of engineering and agriculture, into biomedical research, leadership development and the social and behavioral sciences as well.

Faculty and students engage in transformative interdisciplinary research and scholarship through collaborative partnerships among academic units, with other universities, and with corporate and government researchers. Through competitive research and innovation, Aggie researchers are creating new knowledge, spurring economic activity and improving quality of life for our community and the world.

## Sang Brings Novel Aspirin Derivatives to Marketplace

Patients who require the benefits of aspirin without the accompanying stomach irritation are a step closer to comfort and cures with the signing of an exclusive licensing agreement. Dr. Shengmin Sang, a food scientist with N.C. A&T, licensed his patent for a family of novel aspirin-derived compounds to SARISA Therapeutics, an Invenshure Company out of Minneapolis, MN. Sang's patented compounds may be useful in treating or preventing colon cancer, heart disease and other disorders.

Through this commercialization effort, more patients may be able to receive the benefits of aspirin without incurring adverse side effects.



## A&T Secures \$5.3 Million Defense Contract

DORED secured a federal contract through the Test Resource Management Center within the U.S. Department of Defense. The four-year contract, with a value of \$5.3 million, commenced in January 2017. The goal is to create a data-driven intelligent prediction tool for the testing and evaluation (T&E) of unmanned autonomous systems (UAS), such as drones, rovers or other air and ground vehicles. The contract will be completed in three phases; the development of T&E algorithms, simulation and soft-testing, and finally the implementation of the algorithms on actual Department of Defense platforms. For phases one and two, the Georgia Tech Research Institute will provide a team of unmanned vehicles for the project, with the ability to collaboratively search for ground targets using onboard vision processing.

## N.C. A&T Studies Food Aid Using Big Data Analytics

Principal Investigator Dr. Lauren Davis and her cross-disciplinary team have secured a five-year, \$3 million grant through the National Science Foundation's Research Traineeship (NRT) Program. The NRT grant will support food insecurity research in a project called Improving Strategies for Hunger Relief and Food Security Using Computational Data Science. In addition to Dr. Davis, the research grant involves four additional Co-Principal Investigators, Dr. Seong-Tae Kim, Dr. Kenrett Jefferson-Moore, Dr. Steven Jiang and Dr. Albert Esterline. The team represents talent and expertise across three N.C. A&T Colleges: the College of Engineering, the College of Science and Technology, and the College of Agriculture and Environmental Sciences.



## UNC ROI Grant Aims to Convert Bio-Waste to Gasoline

N.C. A&T's Dr. Debasish Kuila has secured a \$2 million UNC ROI Grant to convert bio-waste to gasoline. The primary goal of Kuila's and his interdisciplinary team members' three-year research project is to convert animal and food wastes to gasoline, lowering the environmental footprint and costs of the agricultural enterprise, while simultaneously generating a fuel of immediate value to the farmer. The project will demonstrate proof-of-concept for a highly efficient, modular gas-to-liquids (M-GTL) technology that uses solar energy to convert biogas obtained from animal and food-wastes into carbon-neutral gasoline. The resulting M-GTL prototype will be used to attract robust private and public funding for scale-up and commercialization.

## Faculty Research Awards

Eight N.C.A&T faculty members received the university's five research awards at the 2017. The winner of the Senior Researcher Award is Dr. Solomon Billigin, Professor of Physics in the College of Science and Technology. The recipient of the Outstanding Young Investigator Award is Dr. Mahour Mellat-Parast, Assistant Professor of Applied Engineering Technology in the College of Science and Technology. The winner of the



Rookie of the Year Award is Dr. Andrea Ofori-Boadu, Assistant Professor of Built Environment in the College of Science and Technology. The recipient of the Intellectual Property Award is Dr. Shengmin Sang, Associate Professor in the Center for Excellence in Post-Harvest Technologies in the College of Agriculture and Environmental Sciences. The Interdisciplinary Team Award went to Dr. Ram Mohan, Professor of Nanoengineering in the Joint School of Nanoscience and Nanoengineering; Dr. Sameer Hamoush, Professor of Civil, Architectural and Environmental Engineering in the College of Engineering; Dr. Ajit Kelkar, Professor of Nanoengineering in the Joint School of Nanoscience and Nanoengineering; and Dr. Miguel Picornell-Darder, Professor of Civil, Architectural and Environmental Engineering in the College of Engineering.