



**NORTH CAROLINA AGRICULTURAL
AND TECHNICAL STATE UNIVERSITY**

COLLEGE OF AGRICULTURE AND ENVIRONMENTAL SCIENCES (CAES)

The “A” in N.C. A&T – Research Highlights

Dr. Valerie L. Giddings

August 6, 2017

*AGGIES***DO**



CAES Research Priorities

Research Strategic Direction

- Contemporary issues pertaining to food distribution systems;
- Sustainable agricultural production;
- Improving the quality of life for individuals, families and communities with a focus on nutrition, health and overall well-being;
- Enhancing the productivity of small and limited resource farms;
- Adopting safe and effective agricultural biotechnology techniques to improve food products.

Funding Sources

CAES generates over \$21 million in external funding

- National Institute of Food and Agriculture (NIFA)- USDA
- Department of Energy
- Environmental Protection Agency
- National Science Foundation
- Sustainable Agriculture Research and Education (SARE)
- US Agency for International Development (USAID)



Research Facilities

Facilities for Ongoing Research

- Analytical Services Lab (Carver Hall)
- University Farm – 492 Acres
- Center for Excellence in Post-Harvest Technologies (CEPHT), Kannapolis, NC
- The Center for Environmental Farming Systems (CEFS) in Goldsboro, NC
- L.C. Cooper International Trade Center
- Reid Greenhouse



Laboratories in Animal Sciences

- Bioinformatics Learning Facility
- Laboratory for Studies in Genomic Diversity
- Poultry Research Laboratory
- Veterinary Microbiology Research Laboratory in Animal Sciences

Laboratories in Family and Consumer Sciences

- Child Development Laboratory
- Apparel Design Laboratory
- Food Preparation Laboratory
- Food Chemistry/Biochemistry and Product Development Laboratory
- Food Microbiology and Toxicology Laboratory
- Food Sensory Laboratory
- Food Safety Microbiology Research Laboratory
- Textiles Laboratory

Natural Resources and Environmental Design Laboratories

- Bioprocessing and Fermentation Laboratory
- Bioremediation and Nitrogen Transformation Laboratory
- Mushroom Biotechnology Laboratory
- Plant Biotechnology Teaching and Research Laboratory
- Plant Tissue Culture Biotechnology Laboratory
- Soil Physical Properties Laboratory
- Soil Chemistry and Fertility Laboratories



Research Impacts

Human and Community Development

Research focuses on socioeconomic, infrastructure, and public policy analyses for optimizing human capital and strengthening communities.

- Dr. Terrence Thomas is working with communities in Greensboro to address the impact of food deserts.
- He has engaged residents of 12 minority communities of District 2 in north east Greensboro in an action based research project to modify the food desert environment to produce desirable health outcomes for residents.



Human and Community Development

- Market Potential for Local and Organic Products in North Carolina
- Investigating the Role of Community-Based Organizations in Promoting Development of Local Alternative Food Systems
- Small Farm Agri-tourism as a Tool for Community Development in North Carolina



Food Security and Hunger: Plant

- Dr. Guochen Yang received a patent for the *Micropropagation of Alexander Laurel*
- Developed a gel media containing a pH balanced recipe of plant hormones and nutrients to regenerate a tiny sample of plant tissue
- Medicinal plants are popular as alternate cash crops; therefore Yang hopes to give farmers a reliable supply of plants for cultivation using his technology

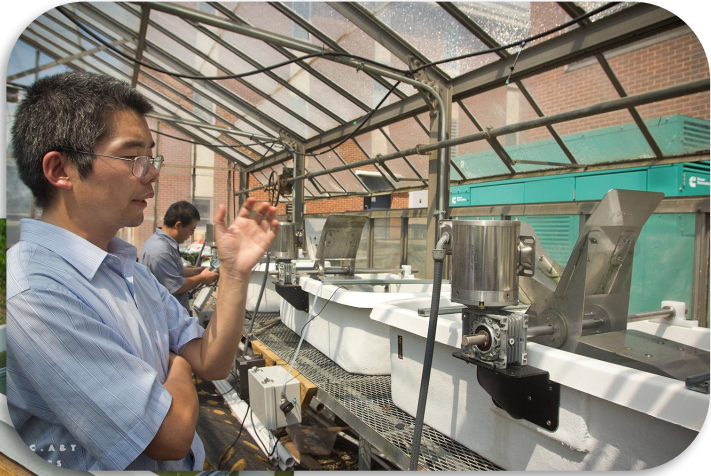


Food Security and Hunger: Animal Health

- Maintaining healthy hogs and increasing production is important to the pork industry, consumers, and the economy.
- Dr. Radiah Minor is investigating ways to promote the health of weaned pigs and protect against post weaning diarrhea (PWD), colonizing the gut with positive bacteria (segmented filamentous bacteria) so that strong intestinal/mucosal immunity develops.



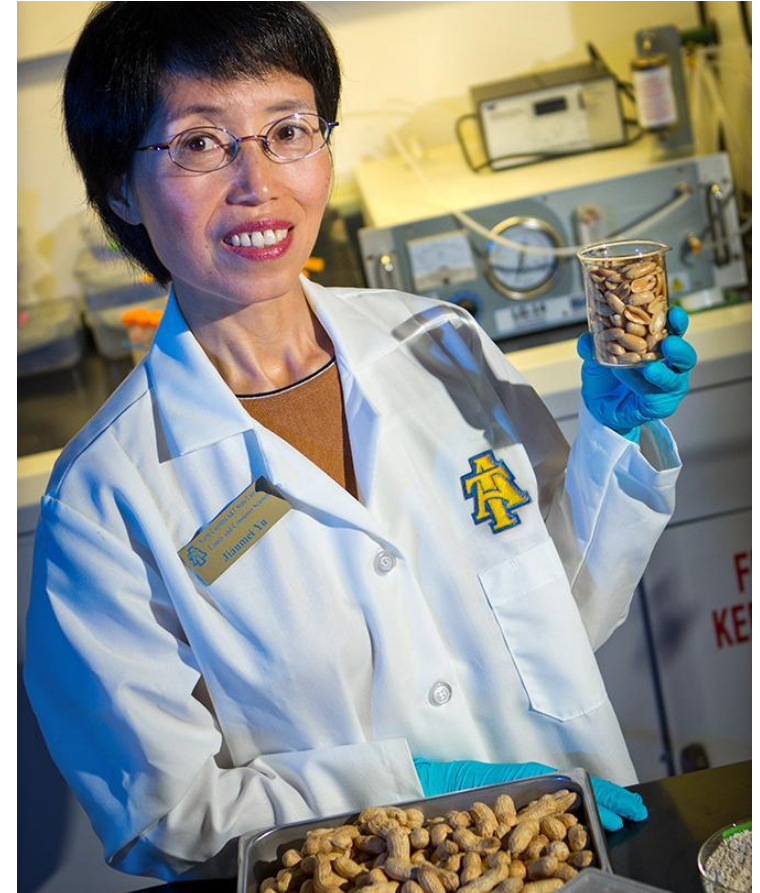
Sustainable Energy



- The supply of energy, fertilizers and water for agricultural production is becoming a constraint to food security and environmental sustainability.
- Drs. Abolghasem Shahbazi and Lijun Wang are investigating an advanced biological system to efficiently and economically treat agricultural and industrial wastes, and recover materials and energy from those wastes as a potential source of fuel.
- They have developed a novel cultivation process to enhance the growth of algae on swine wastes; they tested green biorefinery wastes and biochar from biomass gasification.

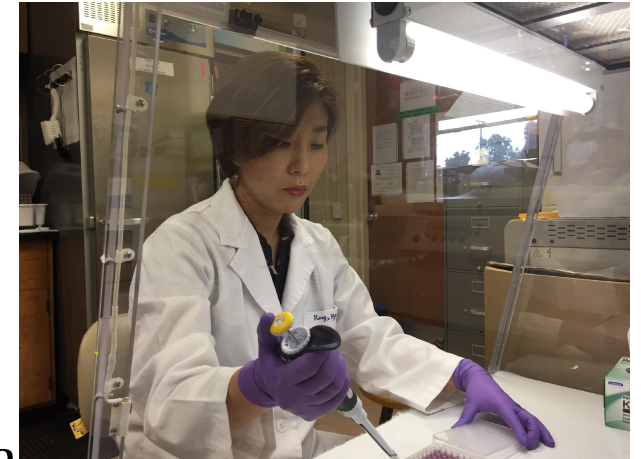
Food Safety

- Peanut allergies are prevalent in the U.S. affecting close to four million people.
- Dr. Yu developed a method to reduce the allergens in peanuts for the relief of millions of Americans and others worldwide who suffer from peanut allergies
- She has developed a patented, safe process for deactivating the allergenic proteins in whole roasted peanuts.
- Work is ongoing to create peanut products that are allergen free.



Obesity

- Childhood obesity has been identified as the number one nutrition-related problem in the United States.
- Dr. Hye Won Kang, using mice studies, is examining the relationship between brown fat and obesity and identifying edible plants that have the ability to activate brown fat, reduce white fat and eventually reduce obesity.
- Findings from this research will contribute to the knowledge base concerning foods that can reduce accumulations of white fat, which causes obesity, and reduce body weight by increasing energy expenditures through the activation of brown fat.



Human Health, Nutrition and Well-Being



- Dr. Shengmin Sang was recently awarded a patent for the new family of novel aspirin and ginger derived compounds that could be useful in treating or preventing colon cancer, heart disease and other disorders.
- Sang isolated and synthesized specific compounds within the ginger rhizome that are most effective against disease.
- Tests on colon-cancer cell lines showed that the novel aspirin and ginger compounds were more effective at inducing cancer-cell death than any of the individual components administered alone or physically mixed in a non-compounded form.



CAES Research Goals

Research Goals

- Encourage and support efforts to expand our external funding sources
- Continue to emphasize collaborations and partnerships
- Continuously improve and modernize laboratory facilities and upgrade equipment
- Continue to address strategic and relevant issues that impact families and communities
- Translate research into viable technologies and practices that promote the success of small and limited resource farmers

