



UNIVERSITY  
of ARKANSAS  
AT PINE BLUFF  
1873

School of Agriculture, Fisheries and Human Sciences

# *Strengthening Lives and Communities in Arkansas and Beyond*

**SAFHS 2018-2019 Annual Report**

# SAFHS Interim Dean/Director's Message

The University of Arkansas at Pine Bluff's School of Agriculture, Fisheries and Human Sciences (SAFHS) is excited about upcoming opportunities in 2019! We are in the process of hiring new faculty to replace several who have retired. SAFHS researchers have attracted new grant funds and launched new projects that will positively impact lives in the Arkansas Delta and beyond. Here at SAFHS, we take seriously our responsibility as an 1890 land grant institution to improve the quality of life for people in Arkansas, the nation and the world through education, research, Extension and public service with an emphasis on rural development.

The Department of Human Sciences is working to address the obesity epidemic and reduce the prevalence of "lifestyle" diseases like type II diabetes, high blood pressure and more. The Aquaculture and Fisheries Department is working closely with the Arkansas Game and Fish Commission to identify and slow the spread of invasive fish species in Arkansas' natural waters. The Department of Agriculture continues its efforts to reduce the impact of disease on important Arkansas crops like rice and sweet potatoes through research and its Sweetpotato Foundation Seed Program. Students in our 4-H, summer high school AgDiscovery and study abroad programs participate in experiential learning activities that enrich their understanding of the impact of agriculture on their lives. Outreach activities like the Annual Rural Life Conference and Ag Field Day impact all residents of the Delta by providing up-to-date information to help them improve their lives.

At SAFHS, excellence is the expectation. Through emphasis on rural development, SAFHS continues to help improve the quality of life for people in Arkansas, the nation and the world. We wish you a happy, healthy and prosperous 2019!



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*Muthusamy Manoharan, Ph.D.*

## **New MOU for Poultry Sciences Program Broadens Career Opportunities for Graduates**

The demand for skilled graduates in the poultry industry is at an all-time high in Arkansas and across the nation. More jobs are available in the industry than can be filled by graduates of all the university poultry science departments across the country. There is a need for Arkansas students to gain training and experience in the field.

UAPB recently signed a revised Memorandum of Understanding (MOU) for the joint 3 + 1 Program in Poultry Science. Established in 2013 between the UAPB School of Agriculture, Fisheries and Human Sciences and the University of Arkansas at Fayetteville (UAF), the program allowed senior UAPB agriculture majors with a poultry science option to take poultry sciences courses at UAF and earn a Certificate of Excellence. The new MOU enables students to earn a bachelor's degree in agriculture-poultry science from UAPB and a concurrent bachelor's degree in agricultural, food and life sciences-poultry science from UAF.

The changes to the 3 + 1 Program will boost enrollment at the two universities and give students more flexibility as they start their careers. Students will be able to more easily complete their studies in a timely manner and graduate with the knowledge and skills necessary to find well-paying jobs in the poultry industry. The program continues to be an efficient recruitment and retention magnet that enhances the visibility of the animal science programs at UAPB and UAF.



## Students Network to Find Job Opportunities at Production and Processing Expo

Agriculture majors at UAPB benefit from internships in the production and processing industry during their studies. Recent graduates with industry experience are more likely to be hired for professional positions and receive higher starting salaries. Seniors in the Department of Agriculture should consider applying for industry jobs during their studies to jump-start their career immediately after graduation.

In 2018, 12 students received scholarships for travel and accommodation through the UAPB College Student Career Program to attend the Annual International Production and Processing Expo in Atlanta, Georgia, to search for jobs and network with professionals in the poultry and egg, meat and feed industries. Students were advised to submit their resumes several months before the expo to set up interviews for jobs and internships during the event.

Of the 12 students, one senior received two job offers, and three students received offers for internships. Industry professionals provided helpful information for participating students to plan for their professional careers. The UAPB Department of Agriculture plans to coordinate visits to the expo in subsequent years to give more students the opportunity to find internship and job opportunities.



## Sustainable Solution Protects Beehives from Invasive Pest

The fruit and vegetable industry is valued at more than \$50 billion every year, and honey bees are critical to pollination and ensuring successful fruit set. The small hive beetle (SHB) is an invasive pest species that infests honey bee hives. After adult SHB lay eggs in a beehive, their larvae feed on honey, pollen and honey bee larvae, severely affecting the health of the hive. If the infestation is severe enough, bees will abandon the hive. In 2013, of the 11,474 honey bee colonies surveyed by Arkansas apiary inspectors, 1,237 colonies were infested with SHB.

SHB larvae have to migrate from the beehive to nearby soil where they pupate. They later emerge from the soil as adult beetles that are able to lay more eggs in the hive. Although an approved chemical control can be used to interrupt SHB pupation in the soil, most Arkansas beekeepers do not want to use it because of its toxicity to honey bees. UAPB researchers have sought sustainable ways to interrupt the SHB lifecycle to reduce beekeepers' losses. They tested the effectiveness of iodized salt in treating soil infested with SHB.

Researchers found that mixing as little as 3 to 5 grams of iodized salt to every 100 grams of soil in which SHB larvae pupate may reduce SHB larvae survival by 80 to 97 percent. This non-chemical control method will help disrupt the pest's lifecycle in the soil and ensure conditions in which honey bees can thrive.



## UAPB International Students Gain Employment and Job Experience at Internships

Each semester, around 50 students from other countries study at UAPB. Because the majority of international students are not eligible for Federal Financial Aid, those interested in studying at UAPB typically focus on mobilizing financial resources through scholarships, fellowships, graduate assistantships and personal or family savings to meet the initial costs of enrollment. In the past, after enrolling at UAPB, international students had limited opportunities to learn about employment opportunities they could legally pursue once in the U.S.

The UAPB Office of International Programs and Studies partnered with the UAPB Office of Career Services to help ensure international students studying at UAPB are able to earn money and gain practical work experience. The ongoing collaboration aims to help international students find meaningful paid internships to both offset the costs of tuition and to allow the students gain work experience related to their field of study.

In the past year, 11 international students at UAPB have interviewed for and gained internships at private companies and educational institutions across the U.S. in fields including medicine, informational technology and computer science. Employers have included the State University of New York Upstate Medical University, International Business Machines Corporation and the University of Arkansas for Medical Sciences. While the financial benefits of summer internships are a big incentive for UAPB's international students, these experiences also help them to learn more about U.S. society in general, sharpen their short-term and long-term career goals and build confidence in their ability to exercise leadership and demonstrate effective teamwork in professional settings.

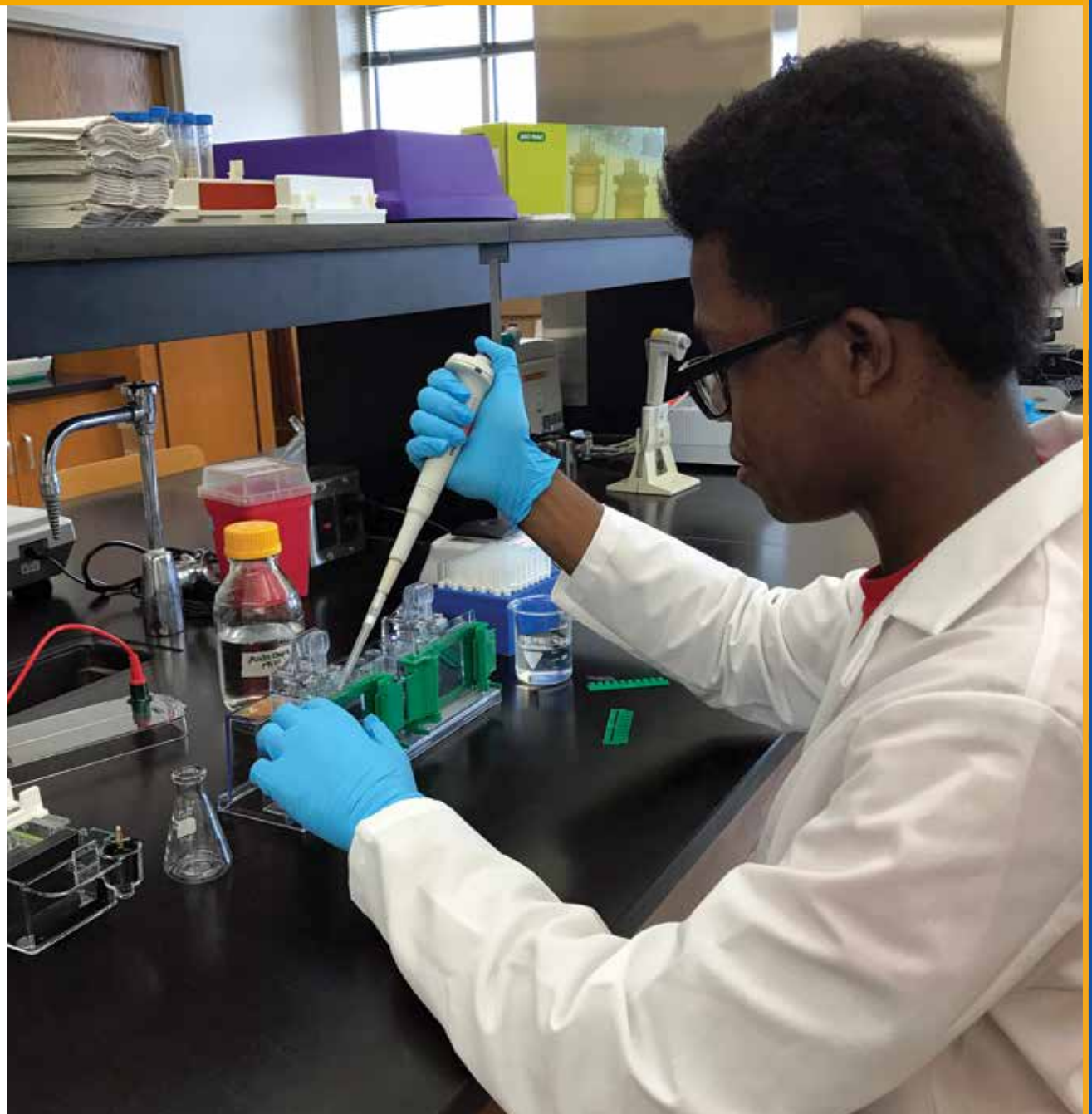


## Potential Alternatives to Chemotherapy: Plant Extracts to Treat Fish Disease

Fish farmers must raise fish in high densities to meet growing industry demands. Bacterial diseases such as columnaris and motile aeromonas septicemia often occur in overcrowded fish populations. These diseases cause sudden mass mortalities in a wide variety of fish species grown in aquaculture ponds and result in huge economic losses for farmers. Although vaccines and antibiotics are available to help control bacterial diseases, they are not always efficient and there are strict regulations governing the use of antibiotics in aquaculture. There is an urgent need to identify alternative, cost-effective solutions to prevent and treat fish diseases.

UAPB researchers evaluated the antimicrobial properties of methanolic extracts from 11 herbs and spices for use against *Flavobacterium columnare* and *Aeromonas hydrophila* bacteria. They gauged the sensitivity of bacteria to the 11 extracts and compared their antibacterial properties to that of the commercially-available antibiotic oxytetracycline (Terramycin® 200).

All extracts (tested in quantities of 30mg/ml) demonstrated bactericidal effects against *Flavobacterium columnare*. Extracts of clove and cinnamon showed the highest antimicrobial activity against the bacterium at a rate comparable to that of oxytetracycline. When tested against the *Aeromonas hydrophila* bacterium, the extracts were more effective than oxytetracycline. Additionally, clove extract cured the ovary cells of channel catfish infected with *Flavobacterium columnare*. When tested for cytotoxic, genotoxic or growth effects, the ovary cells did not show significant side effects. The research shows the potential of affordable extracts in the prevention and treatment of common fish diseases.



## Goat Farmers in Nepal Enhance Operations After Consultation with UAPB Livestock Specialist

Goat farming is an important source of income in many communities in the Surkhet District of southwest Nepal. The popularity of the business has led small goat farmers to produce more goats. Increases in production have not always correlated to increases in income, however, as many producers did not know how to breed goats appropriately for hardiness (health). Random breeding in the goat herd meant that many goats that went to market were of inferior quality. Additionally, the farmers lacked an efficient parasite management plan to further ensure the overall health of the herd.

In the spring of 2018, the UAPB Extension livestock specialist traveled to Nepal to help the farmers optimize their production practices as a volunteer for the U.S. Agency for International Development Farmer-to-Farmer program. Improvements he recommended included developing a good record-keeping system and implementing a rotational breeding system that will reduce inbreeding and ensure larger, healthier offspring for sale. The farmers were encouraged to pool their funds to purchase superior breeding bucks that will help guarantee more valuable kids. The livestock specialist also taught the farmers how to accurately identify and treat goats infected by parasites.

The new production practices will help the farmers produce more pounds of goat for market more efficiently and protect the herd against disease and parasitism. Household incomes should increase by \$5 U.S. per goat, which is a significant gain in the community. Survival of individual goats in the herd is estimated to increase by 5 to 10 percent over the next few years. Each additional goat that survives will amount to an additional \$50 for a family.





## Researchers Determine Treatment for Cyanobacterial Blooms

Cyanobacterial blooms are increasingly becoming a major water quality challenge in ponds, lakes, rivers and aquaculture systems across the world. These blooms can negatively affect the overall productivity of aquaculture ponds and natural water bodies by releasing toxins and limiting the light availability for photosynthetic phytoplankton. Intense cyanobacterial growth may also hinder the growth of other aquatic plants that serve as habitats for fish and invertebrates. Fish raised in a pond with a cyanobacterial bloom are often characterized by a distorted flavor and odor.

UAPB researchers examined the effectiveness of a granular hydrogen peroxide-based compound, sodium carbonate peroxyhydrate (SCP, trade name Pak 27®), to suppress noxious cyanobacteria in aquaculture ponds. They sought to determine the appropriate dose of SCP that could be used in full-scale aquaculture ponds to diminish cyanobacterial blooms and their toxins without harming biota such as green algae and zooplankton. A mesocosm experiment was conducted in which cyanobacterial blooms were grown in a series of circular enclosures installed in experimental ponds. The cyanobacteria-containing enclosures were treated with nine varying concentrations of SCP (from 0 to 8.0 mg/L H<sub>2</sub>O<sub>2</sub>) and were monitored daily for 10 days.

Following pond treatments, cyanobacterial populations declined by 80 percent in three to five days. Results suggest that SCP at a concentration of 2.5 mg/L H<sub>2</sub>O<sub>2</sub> can selectively mitigate harmful cyanobacterial blooms without leaving lasting traces of hydrogen peroxide in the water that could harm green algae and zooplankton.



## Local Children Learn to Cook at UAPB Summer Camp

Arkansas has the ninth highest obesity rate in the nation for youth ages 10 to 17. To combat the high childhood obesity rate, it is important for children to eat healthy and incorporate physical activity into their daily routines.

UAPB's Cooperative Extension Program hosted a youth enrichment summer camp to encourage local children, ages 6 to 11, to eat healthier meals and snacks through hands-on cooking experiences. The camp focused on basic cooking skills, good nutrition, food safety and fun ways to be physically active.

Twenty-five children participants learned about topics including kitchen safety, basic cooking measurements and the nutritional content of different foods and beverages. They prepared foods such as pizza, chicken quesadillas, tacos, pudding, shakes and breakfast treats. During a class on vegetable production, they planted their own tomato plants. Physical activities included dancing and 4-H yoga. Upon the camp's completion, all participants said they enjoyed the camp and would be interested in participating in subsequent camps.



## Apprenticeships Train a New Generation for Work in Food and Agriculture

Between 2015 and 2020, it is expected that there will be an average of 57,900 annual job openings in the food and agricultural sciences industries. However, only 35,400 students with agriculture-related degrees are expected to graduate annually, leaving a 39 percent gap of jobs unfilled. The lack of a trained workforce in food, agriculture, renewable natural resources and the environment will greatly limit the industry's ability to feed 9.8 billion people by 2050.

The UAPB Agricultural Research Apprenticeship Program seeks to address critical workforce needs by expanding opportunities to university students across multiple academic disciplines for career development in the food and agriculture industries. During summer internships, students work closely with a faculty mentor from the SAFHS and contribute to a U.S. Department of Agriculture (USDA) research project. The program provides a chance for students to learn about careers in agriculture, aquaculture, natural fisheries, family and consumer sciences and community and youth development while gaining hands-on job experience.

In the summer of 2018, 29 students participated in the apprenticeship program. They developed research skills and interests that will lead to further undergraduate research in agricultural sciences. Upon graduation, apprentices are expected to have the preparation and knowledge to pursue advanced degrees or fill needed research roles at the USDA National Institute of Food and Agriculture (NIFA) and in the agricultural industry. Engaging students in NIFA knowledge-based research will ultimately result in the development of a new generation of human capital for the food and agriculture industries.



## Small Producers Optimize Farm Operations Through EQIP Assistance

Small and socially-disadvantaged producers (SSDPs) in Arkansas often lack the financial resources to install conservation practices vital to the preservation and maintenance of their land. Important land management practices that would improve irrigation efficiency, promote soil health or restore pastureland are often financially infeasible. SSDPs also lack knowledge about conservation programs that provide financial incentives to help install these management practices to improve their land.

The Small Farm Program at UAPB helps SSDPs in Arkansas receive cost-share assistance funded through the Environmental Quality Incentives Program (EQIP). Administered by the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS), EQIP enables producers to implement structural, vegetative or management practices that improve natural resources at the farm level. EQIP often shares up to 90 percent of project costs for conservation practices implemented by socially-disadvantaged, limited-resource, beginning and veteran farmers and ranchers. Small Farm Program associates work with producers to understand their operations and goals for improving their land. They then connect the farmers with local NRCS personnel who can assist in applying for EQIP funds.

The Small Farm Program has been instrumental in increasing the participation rate of SSDPs in NRCS conservation programs by almost 70 percent in the last five years. During this time, the program has helped these producers obtain over \$6 million in funding to enhance their farm operations. EQIP-funded improvements have included the addition of wells for irrigation and watering livestock, the installation of underground pipelines or cross fencing and implementation of organic pest and weed management practices. Producers have said the funding allowed them to take on new projects and increase their profitability, and in some cases, was instrumental in keeping the family farm in business.

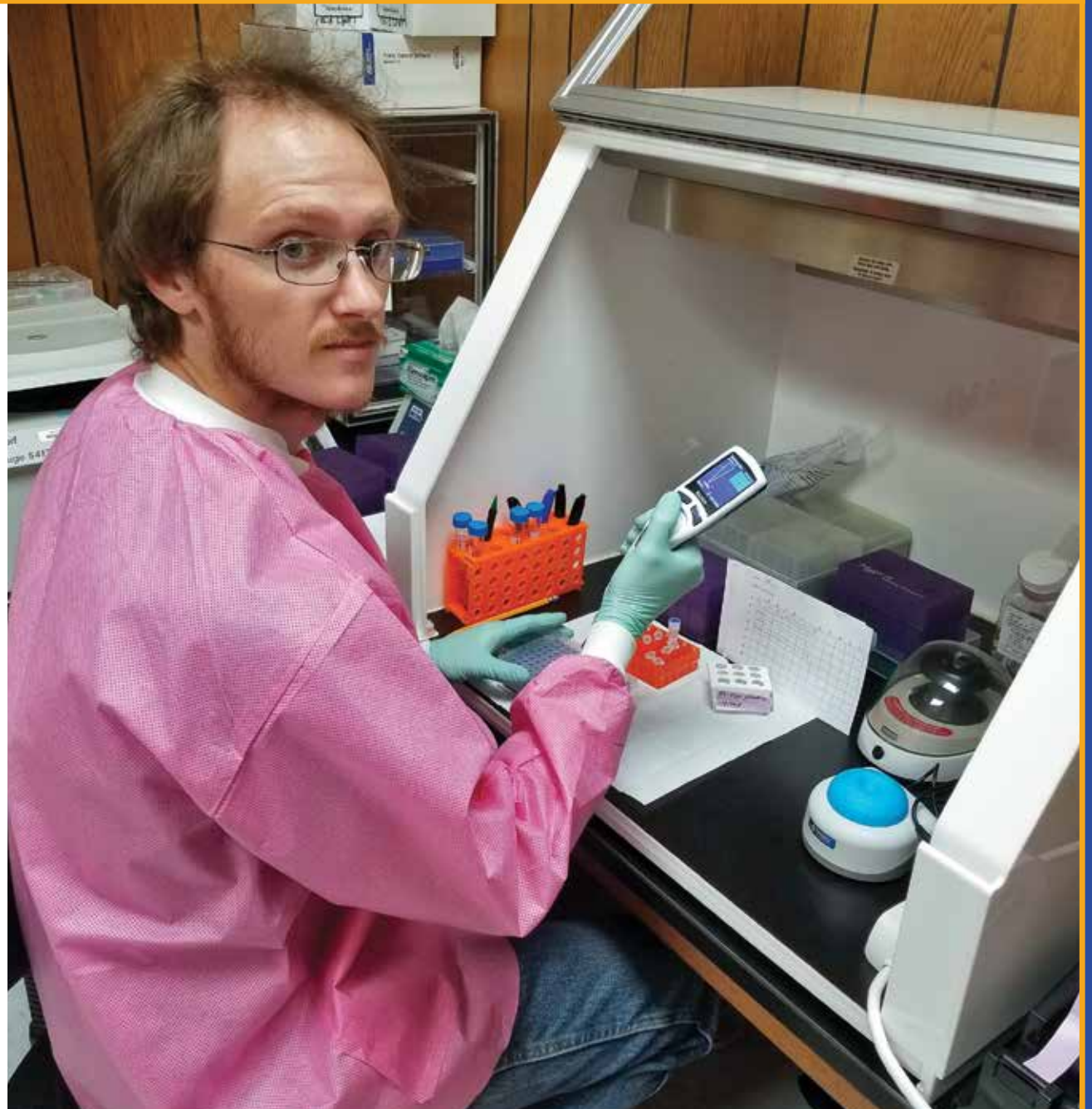


## Research Helps Producers Know When to Treat Largemouth Bass for Ammonia

“High environmental ammonia” designates ammonia concentrations that threaten the survival of fish. This type of ammonia is a common problem for all fish producers as they raise fish in increasing densities. Fertilization, agricultural runoff and metabolic activities of the fish can contribute to this problem. Not all fish species are equally susceptible to toxic ammonia, however. Therefore, it is vital for farmers to know the resilience of their fish towards ammonia to make sure they are well-kept and healthy until harvest.

Because no relevant information exists on the physiological response of largemouth bass to ammonia, UAPB research focused on how this species alters its physiology in response to elevated ambient ammonia. Researchers determined the lethal dose values of ammonia for largemouth bass, as well as the physiological effects of chronic sublethal exposure to ammonia.

The trial showed that while short term exposure to ammonia can be harmful to largemouth bass, they become more capable of dealing with this stress to some degree over time. However, chronic exposure to ammonia reduced the fish’s ability to obtain oxygen, which may exacerbate high ammonia problems when dissolved oxygen in the water is low. Results suggest that water quality monitoring and treatment options are most effective within the first seven days of an ammonia spike. With this timeframe in mind, Arkansas producers raising largemouth bass will be better prepared to treat their fish for high environmental ammonia at the right time.



## Outreach Efforts Help Youth Consider Future in Textile Sciences

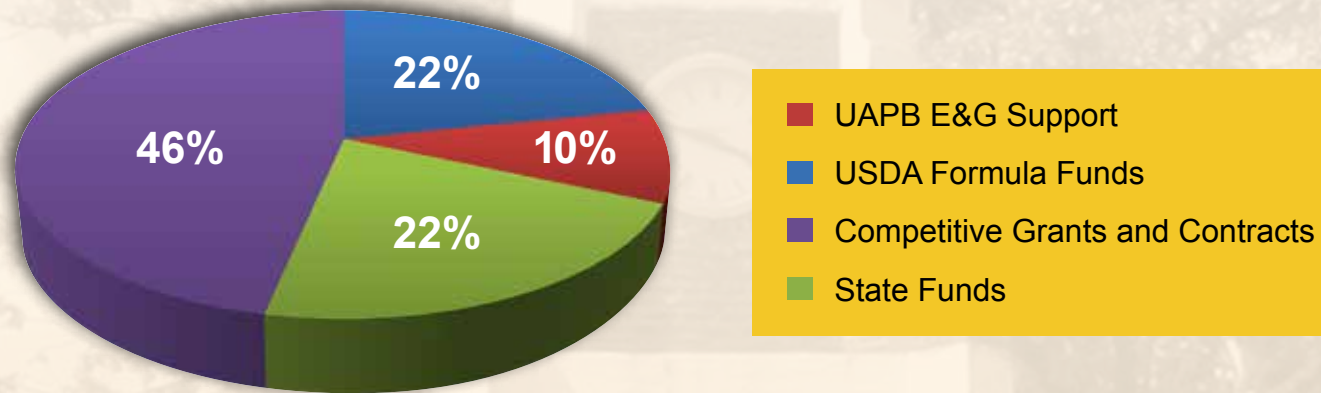
Textiles are the backbone of the global clothing industry and are also vital to the development of construction, transportation and medical applications. As the field of textile sciences continues to expand with innovations in product design and development, career opportunities in the industry are opening up. Despite new opportunities, many universities no longer offer programs in textile sciences, and students are not aware of educational or career opportunities in the field.

In an effort to boost local interest and participation in the industry, faculty members of the UAPB Merchandising, Textiles and Design (MTD) program are extending the basic concepts of textile sciences and apparel design to youth in southeast Arkansas. They have conducted presentations at several community events on topics including fiber carding, wool spinning, garment draping, pattern making and fiber identification using a microscope. Additional outreach efforts by the MTD program have included assisting with costume design in local theatrical productions and participation at Little Rock Fashion Week.

Participation in events hosted by the MTD program has grown in recent years. At the events, young participants have expressed interest in learning more about fabrics, textiles and fashion design. The program's outreach efforts help ensure that recent high school graduates and undecided college majors can consider attending a university that either specializes in textiles or offers a merchandising and design program and then pursue a career in the textile or fashion industry.



## SAFHS Annual Report 2018



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**University of Arkansas at Pine Bluff  
School of Agriculture, Fisheries and Human Sciences  
1200 N. University Drive, Mail Slot 4990, Pine Bluff, AR 71601**