Math, science get $2.2 million NSF grant

A thorough and innovative plan to strengthen science, technology, engineering and mathematics (STEM) education at Alabama A&M University has been given a financial nod of approval by the National Science Foundation. The Department of Physics has been awarded nearly $2.2 million grant to implement the STEM Education and Research Program at AAMU. Guided by Dr. Mostafa Dokhanian, professor of physics, the research project is a unique, comprehensive, and focused approach to strengthening STEM education at the historically black university.

“I am excited about this project and award,” commented project director Dokhanian. He said the scope of the research project encompasses all of AAMU’s STEM areas. “We plan to meet these improvements to STEM education by enhancing undergraduate research, improving pedagogy, developing new curricula, and providing extra student academic support.”

More specifically, AAMU investigators will work toward enhancing the quality of education, mentoring students to improve the graduation rates of STEM undergraduates, and improving the Fundamentals of Engineering (FE) examination passing rates for engineering graduates. The project will also entail efforts to increase the recruitment and retention of STEM students; expand research opportunities and existing STEM curricula; and providing extra student academic support.”

With funding from the Nuclear Regulatory Commission (NRC), Alabama A&M University will “launch a presence” in nuclear science and engineering this fall, according to Dr. Matthew Edwards, dean of the School of Arts and Sciences.

“The expectation is to have the curriculums and course contents with student and faculty research in place within three years,” he said.

To begin the program, the University will launch one concentration in nuclear physics under the auspices of the School of Arts and Sciences, and another in nuclear engineering to be offered by the School of Engineering and Technology.

The new degree concentrations could greatly impact the workforce in the Tennessee Valley and beyond, as well as assist the nation’s growth toward a “more green” society, according to Dr. Edwards.
Researchers discuss efforts to boost Black Belt region

Four AAMU researchers were among 50 others from 30 institutions, organizations and federal and state agencies across the country who participated in a meeting in Atlanta recently to discuss the benefits of landowner management. The two-day session, facilitated by the Selma, Ala.-based Black Belt Community Foundation, was a follow-up to 16 training workshops held in six southern states over the last five years.

Drs. Rory Fraser, Colmore Christian, Buddhi Gyawali and Rao Mentreddy, all of the School of Agricultural and Environmental Sciences, participated in the review process that assessed their role, subsequent efforts and current activities since participating in one or more of the 16 landowner training workshops.

According to Dr. Fraser, presentations were made by 15 landowners and nine agency representatives, including four AAMU forestry alumni, on new innovations, and the coordinated participation of state, federal, university, extension, and non-profit organizations. Participants also talked about management practices on peer landowner properties, and collaboration among landowners across the Black Belt region.

Significant outcomes of the proceedings, according to Fraser, were the submission of a white paper for the USDA Forest Service on the importance of continuing landowner training programs; grant proposals to the USDA and Ford Foundation for funds to help landowners implement some of the sustainable land management practices; and the organization of a regional limited resource minority landowner group.

Since the event, Frasers says, an Alabama group, the Limited Resources Landowner Education and Assistance Network, has partnered with the Natural Resources Conservation Service on the importance of landowners as participants in the USDA Forest Service landowner management pilot initiative, which may influence how all other southern states implement their CCPIs,” Fraser said. Similar initiatives are being pursued with respect to the cap and trade in carbon credits, conservation easements, hunting leases, etc., to help limited resource landowners reverse the trends in land loss, especially among traditionally underserved minorities.

The project, led by Dr. Fraser, is funded by the USDA Forest Service. It will be continued through research and outreach efforts initiated by Dr. Christian, on female landowners; Dr. Gyawali, landowner education; and Dr. Mentreddy, who will handle issues dealing with medicinal plants.
AAMU gets $1 million for advanced materials, nanophotonics research

With already existing strong emphases in optics and materials science, AAMU’s doctoral program in physics has got another shot in the arm with the infusion of new funding from the National Science Foundation (NSF) to add new research components to the discipline.

Under its HBCU Research Infrastructure for Science and Engineering (HBCU-RISE) program, the NSF has awarded the University $999,999 to develop research infrastructure in the areas of advanced materials and nanophotonics. A previous HBCU-RISE grant, which supported research in advanced sensors, ended in July.

Just as the previous grant, this new endeavor, the result of collaboration between AAMU and several institutions and individuals, is under the leadership of Dr. Anup Sharma, professor of physics, as principal investigator. Drs. Mohan Aggarwal, Matthew Edwards, Rami Bommareddy, Vernessa Edwards and Ashok Batra, all from the Department of Physics, are co-investigators on this project.

The new program, designed to build upon existing strengths in the physics program, will support such research projects as nanostructured binary materials and their application to chemical sensing, growth of novel triboluminescent crystals and their application to structural glasses, and the development of high-yield organic solar cells sensitized with metal nanoparticles, among others.

A major component of the new project is the creation of programs such as workshops and short courses in advanced materials and nanophotonics, to help motivate students, particularly underrepresented minorities, as well as create a pipeline for recruiting future physics graduates at AAMU.

With the increasing demand for clean energy, nuclear technology is reassuming a new level of importance.

Dr. Matthew Edwards

Dr. Trent Montgomery

Dr. Claudia Muntele

In nearly 20 years no new nuclear plants have been constructed in the United States. With the increasing demand for clean energy, nuclear technology is reassuming a new level of importance, the deans said.

“As new nuclear plants come online,” explains Edwards, “new scientists, engineers and technicians will be needed to fill the void.”

As the two degree concentrations mature, additional components will be developed for the inclusion of middle and high school teachers during summer sessions, along with a research component that will delve into the “weak force”—one of the four fundamental forces of nature (i.e., gravitation, electromagnetism and strong force).

The NRC is providing a one-year, $100,000 funding for the programs.
The AAMU Department of Natural Resources and Environmental Sciences and Auburn University’s Organic Vegetable Production Research Program recently co-hosted a successful field day at the Winfred Thomas Agricultural Research Station in Hazel Green, Ala.

During the August 5 event, about 200 people listened to George M. Paris, director of the Agriculture Promotion Section of the Alabama Department of Agriculture and Industry, discuss funding opportunities for organic certification. Those gathered were later divided into groups to visit organic tomato, pepper and other production research plots. AAMU’s Dr. Cathy Sabota, professor of horticulture and Extension specialist, also took groups on a tour of the shiitake mushroom production and research operations at the farm.

Additionally, Dr. Rao Mentreddy, professor, Department of Natural Resources and Environmental Sciences, explained to field day participants the benefits and opportunities in the production of medicinal plants, exotic Indian vegetables and tropical legume pigeon pea.

Agricultural Experiment Station researchers from AAMU and Auburn are teaming to identify practices that could help farmers who grow crops organically overcome certain mid-summer production problems.
Academy accreditation gives environmental health program major boost

With the endorsement of a major accrediting body, the new undergraduate degree concentration in environmental health science at Alabama A&M University, launched just last spring with 5-7 students, is expected to attract significantly greater numbers this fall. The program, the only one offered in the state of Alabama, has received the coveted accreditation by the Association for Environmental Health Academic Programs (AEHAP). AAMU is now one of only 10 such minority-serving programs in the United States.

“I’m very excited about this program,” says Dr. Teferi Tsegaye, chair of the Department of Natural Resources and Environmental Sciences. “It’s a breakthrough that will make AAMU more visible in the environmental health science-related fields. Students will also be better equipped for medical degrees.”

Tsegaye says plans are already in the works to introduce a degree program in environmental health science at the master’s and doctoral levels. Coordinated by Dr. Elicia Moss, the program will lead its future graduates toward career paths that include food and hospital inspection, industrial safety investigation, and numerous opportunities with the armed forces, the Centers for Disease Control, and the U.S. Public Health Service, among others, Tsegaye says. He thanked the U.S. Environmental Protection Agency and colleagues for their part in helping to bring the program to fruition.

The program brings together the mainstay fields of animal science, biology, chemistry, food science, and urban planning.
AAMU graduate students in food science won awards recently for their scientific paper presentations at the annual meeting and food expo of the Institute of Food Technologists (IFT) in Anaheim, Calif.

"It is indeed another feather in our cap," said Dr. Martha Verghese, AAMU food scientist and advisor of the three awardees, "as there is always very stiff competition with the major players in the field."

Doctoral student Vishnupriya Gourineni earned a first place honor, while master’s students Cheryl Rock and Dattatreya Gajula won 2nd and 4th places, respectively.

The graduate student researchers in AAMU’s Nutritional Biochemistry Laboratory conduct colon cancer research under Verghese’s advisement and have since 2002 been competing and winning against major IFT players such as Cornell University, Purdue University, Rutgers, North Carolina State Ohio State University, University of Georgia, among others.

Last year, AAMU students secured two of the three top awards (2nd and 3rd) presented, said Verghese, while in 2007, AAMU food science students nabbed three of the four awards presented, capturing 1st, 3rd and 4th places. That winning streak extends even further in time. For instance, in 2006, students from “The Hill” won four of the five awards (1st, 3rd, 4th and 5th places) and, in 2005, won the 1st and 3rd places (two of the three awards) in the same competition. Dr. Verghese also received the Outstanding Section Volunteer Award and her name was displayed on the “IFT Wall of Fame” during the meeting.

Founded in 1939, the IFT is a nonprofit scientific society with 22,000 members working in food science, food technology, and related professions in industry, academia, and government. The 2009 meeting lured more than 14,500 food professionals to California to learn the latest food science and technology developments, along with products and trends, as well as to build stronger professional relationships.
Video teamwork to attract interest in nanoscience

By Jerome Saintjones

It takes a village to ... make a film. To create awareness and interest in nanoscience among the area’s middle school students, Alabama A&M University is teaming with several campus and community partners to complete a 15-minute adventure video.

Set aboard a space shuttle, the characters in the video learn about nanoscience as they seek answers to the problems they encounter while in space. The production is funded by a seed grant from Tuskegee University, one of 10 awarded throughout the state to help form a comprehensive plan aimed at ultimately producing more scientists and engineers, particularly among minority populations. That plan will form the nucleus of future funding efforts spearheaded by Tuskegee next year, as well as AAMU’s Office of Institutional Research, Planning and Sponsored Programs’ funding activities for the same period. The completed film production will be disseminated to the state’s middle school science teachers, along with a teacher’s guide.

The short film has called for the expertise and support of numerous academicians, technicians and other professionals. For instance, Gay Broad of the Renaissance Theatre in Huntsville has been a resource in costume conceptualization for “NanoBot,” a key character in the film’s storyline.

The collaboration also brings together AAMU’s Telecommunications Center, AAMU’s Center for Irradiation of Materials, biotechnologist Florence Okafor, SciQuest, Renaissance Theatre, Huntsville Arts Council, local teachers and administrative staff from the School of Arts and Sciences, to name a few.

Tuskegee University’s research vice president Shaik Jeelani and research/grants specialist Tanjula L. Farlough were expected to secure updates from representatives from AAMU and other funded sites prior to their scheduled presentations in Tuskegee on August 25. Dr. Matthew Edwards, dean of the School of Arts and Sciences, is the principal investigator for the minigrant awarded to AAMU.

Area senior citizens get food preservation tips

Alabama A&M University food scientists, in conjunction with staff, seniors and volunteers from the office of Madison County Commissioner Bob Harrison, are using state-of-the-art laboratory equipment to help senior citizens preserve nutritious food.

As part of a Food Engineering pilot plan coordinated by Dr. Martha Verghese, professor and interim chair of the Department of Food and Animal Sciences, senior citizens are bringing green beans and other healthy vegetables to AAMU for blanching and canning, a process known by food scientists as “retorting.” The vegetables can then be stored for later use.

AAMU’s massive food laboratories are providing those in their golden years with every tool needed to secure a nutritious diet well into the future. The facilities allow for every food process from canning to the making of common breakfast cereals through a process known as extrusion, says Dr. Verghese.

On hand to assist the senior citizens and District Six staffers in the community outreach project are three research associates—Peter Wambura, Louis Shackleford and Rhona Miller Cebert.
$600,000 NSF grant to benefit STEM students

Dr. Jeannette Jones, professor of biology and principal investigator of the grant project, this will be accomplished by putting emphases on student support services such as supplemental instruction, summer bridge programs, career counseling, and internship opportunities to enhance entrance into the STEM graduate and professional workforce.

“The scholarships to freshmen, supplemental instruction, career counseling and development will provide the stimulus to attract and retain students in STEM,” she said.

Scholarship recipients – 15 biology and 10 chemistry majors – must be full-time students, with GPA of 3.0 or higher, and must demonstrate financial need. Along with Dr. Jones, the grant, made possible through a competitive proposal to the NSF, is also under the direction of Dr. Florence Okafor, associate professor of biology; Dr. Malinda Gilmore, assistant professor of chemistry; and Dr. Mostafa Dokhanian, assistant professor of physics. The title of the proposal was “Biology/Chemistry Scholarship Program.”

The broader impact of the project, according to the four researchers, is the creation of a pipeline for recruitment of talented financially disadvantaged students, as well as providing further “testing of our collaborative student support model” for success. “This will further alleviate the problem of minority and women’s under-representation in the nation’s scientific workforce,” they said.

AAMU brings best in nanoscale science to teachers

Teachers from as far away as Chicago and South Carolina were among 17 middle and high school teachers who attended a recent summer in-service training program on nanoscale technology at AAMU, the nation’s largest producer of African American physics doctorate recipients.

Funded by the National Science Foundation’s National Center for Learning and Teaching (NCLT) in Nanoscale Science and Engineering, the AAMU program has served some 80 teachers over the last three years, says Dr. Matthew Edwards, dean of the School of Arts and Sciences.

The just-ended, eight-day summer NCLT program featured three nanoscale science experts who, Edwards said, brought “extreme enthusiasm” and made the program “the best” session thus far. The presenters included Dr. William Seidler, a nuclear materials specialist from Boeing; Dr. Jennifer Weil, director of education for the Nanobiotechnology Center at Cornell University; and Richard Kirk, a retired scientist from Dow Chemical Company, who is president/owner of the Claro Chemical Corporation in Atlanta.

AAMU’s NCLT program is part of a 13-university consortium administered by Northwestern University, with other major universities including Purdue, Michigan State University, and the University of Illinois at Chicago. Other historically black universities participating in the project are Fisk University in Nashville, Tenn.; Hampton University (Va.); and Morehouse College in Atlanta. The University of Texas-El Paso, and the University of Puerto Rico, Mayaguez, two Hispanic-serving institutions of higher learning, are also part of the consortium.

An additional and ongoing component of the NCLT program at AAMU is the sustained introduction of nanoscale technology into the science curriculum of schools within the vicinity, Edwards said.

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