

NO CHILD LEFT BEHIND GRANT ABSTRACTS 2013-2014

Following is a list of sub-grants funded by the Arkansas Department of Higher Education through the federally funded No Child Left Behind grant program. The purpose of the grant funds is to improve the quality of teaching in Arkansas. The grant notifications were distributed in March 2014. For more information and to receive a registration form, contact the project director of the funded project using the email provided below.

ARKANSAS STATE UNIVERSITY

\$69,459

Craighead County

Project Title: Accentuating the “E” in STEM Education in NE Arkansas

Contact Information: Dr. Julie Grady – jgrady@astate.edu

The goals are to improve grades 3-5 science teaching and increase student science achievement. Objectives include (a) a statistically significant increase in teachers’ knowledge of physical science, earth/space science, and engineering design and practices; (b) an increase in teachers’ classroom use of engineering design and practices; (c) an increase in teachers’ integration of mathematics and literacy with engineering lessons, and (d) a statistically significant increase in students’ knowledge of physical science or earth/space science, and engineering design and practices. Arkansas State University (ASU) partners include the Education Renewal Zone and Colleges of Sciences and Mathematics, Engineering, and Education and Behavioral Science (CEBS). High-needs LEAs Blytheville, Osceola, and Nettleton, are the school district partners. Instructional staff from ASU includes Dr. Ashraf Elsayed (Engineering), Dr. Julie R. Grady (CEBS), Dr. Amanda Lambertus (Mathematics and Statistics), and Ms. JaneMarie Dewailly (CEBS). In addition, an engineer from Nucor-Yamato Steel Corp will discuss engineers’ work with the industry. During the eight day summer and two fall face-to-face sessions, participants will engage in *Engineering is Elementary* units developed by the Museum of Science, Boston. Several sessions will be scheduled for school-based mentoring of teacher teams. ASU will provide meeting space for the institute.

ARKANSAS TECH UNIVERSITY

\$153,778

Pope County

Project Title: Improving Teacher Quality through Vertically Integrated Project-Based Learning

Contact Information: Bruce Lazarus - hlazarus@atu.edu

The goal of this project is to create an innovative pilot project constructing a strong, seamless process leveraging Common Core State Standards (CCSS), Next Generation Science Standards and state science frameworks into a K-16 vertical progression. The project builds connections and collaboration between elementary and secondary teachers and post-secondary faculties so that students achieve success across STEM subjects from kindergarten all the way through college. The key is building a collaborative pathway linking teachers at all levels to a strong core of aligned standards, teaching practices and learning outcomes. This grant will fund a pilot project that is the first of its kind. The project intensifies vertical collaboration between grade levels within K-12 and between secondary and post-secondary educators. It prepares elementary teachers to initiate an emphasis on STEM instruction through professional

development for Project Lead the Way's (PLTW) elementary curriculum, which leads to STEM instruction in place in middle and high schools using PLTW curricula. The project utilizes sustained, high-quality professional development and collaborative learning that results in a transformation in teaching practice in elementary, secondary and post-secondary classrooms. The change is designed to increase student performance in the science and engineering content areas from kindergarten through college/university graduation.

HARDING UNIVERSITY

\$52,525

White County

Project Title: Accentuating the “E” in STEM Education in NE Arkansas

Contact Information: Dr. Allen Henderson – ahenderson@harding.edu

We propose a summer project at Harding University that will expose math and science teachers to the engineering design process. The project will be offered to a maximum of 20 science/math teachers. Participants can receive three semester hours of graduate credit with no cost to the participant or grant, a \$1500 stipend, and \$300 of materials and books at the conclusion of the project. The objective is to increase teachers' knowledge of engineering; to orient teachers to the Engineering is Elementary (EIE) curriculum and demonstrate the pedagogical approach used therein aligned to NGSS standards; to increase teachers' confidence to implement open-ended engineering design challenges with their students; and to expose teachers to an actual engineering design project that accomplishes a useful task using the Lego Mindstorms robotics system. Our methods include hands-on active learning that will establish foundational knowledge. The lecture portion will model effective pedagogical strategies relevant to the EIE curriculum that will enable the teacher to incorporate engineering design into their curriculum. Cooperative learning and discussion will also be emphasized and assessment will occur in all phases of the project. Follow-up evaluation and coaching will be extensive throughout the school year.

HENDERSON STATE UNIVERSITY

\$60,843

Clark County

Project Title: Geometry Transformed

Contact Information: Ms. Betty Ramsey – ramseyb@hsu.edu

The summer institute, Engineering for the Next Generation: Engineering, Inquiry, and More will enable participants to become fluent in the connections between the Disciplinary Core Ideas, the Science and Engineering Practices, and the Cross-cutting Concepts which make up the Framework for K-12 Science Education published by the National Research Council in 2012. Teaching science using these three components of the framework will require teachers to think more deeply about their instructional purpose and ultimate goals for their students. The inclusion of the engineering practices provides an opportunity for students to apply their scientific knowledge and use of the practices to design practical, real-world solutions to problems either posed by the teacher or by the students. The summer institute will provide teachers experience in studying the properties of air, the processes of flight, and participate in the design of hot-air balloons, airplanes, helicopters, and rockets. Each teacher will be trained in the use of the Delta Science Module, **Flight and Rocketry**. The kit can be used across multiple grade levels. Teachers will also receive instruction in using the Common Core Reading and Writing Standards expectations in science lessons, argumentation in science, and teaching students how to use evidence to justify claims.

SOUTHERN ARKANSAS UNIVERSITY**\$68,045****Columbia County****Project Title: Technology Bootcamp: Engineering and Robotics for Science Teachers
Grades 3-5****Contact Information: Dr. Roger Guevara – rcguevara@saumag.edu**

A key tenet of the Common Core State Standards (CCSS) and the Next Generation Science Standards (NGSS) is that disciplines must be integrated and applied to real world practical situations to better address student learning. Employing an overarching theme, this research project focuses on embedding technology in the conceptualization, design, and evaluation of robotics engineering as a blended approach to integrate 2 core science ideas associated with engineering as delineated in the Next Generation of Science Standards: PS2-Motion and Stability: Forces, and Interactions; and PS3-Energy. Furthermore, 3 of 6 crosscutting concepts will be used to link the different domains of engineering, science, and technology, with a special focus on math: 1) Patterns; 2) Cause and Effect; and 3) Scales, Proportion, and Quantity in order to help make student learning explicit by using hands on methodologies and embedding technology. The content, grade level, pedagogical approach, learning experiences, and follow up activities have been exceptionally vetted to maximize enhanced teaching and learning for all science teacher participants providing instruction in grade levels 3-5, with an emphasis on the assessment of a blended science and math content knowledge.

UNIVERSITY OF ARKANSAS, FAYETTEVILLE**\$54,427****Washington County****Project Title: Science and Engineering in the Elementary Classroom****Contact Information: Ms. Lynne Hehr – lhehr@uark.edu**

The focus of the *Science and Engineering in the Elementary Classroom* (SEEC) will be to engage teachers in the Engineering Design Process, the NGSS Science and Engineering Practices and the K-12 Framework for Science Education. Tying grade level appropriate science content with engineering practices, the curriculum resources and materials used during the institute will be centered on but not limited to NASA and PBS Design Challenges and *Engineering is Elementary* (EiE). The EiE program, researched and developed by the Boston Museum of Science, uses problem-based scenarios to engage students in hands-on science and develop critical thinking and collaboration skills. Content knowledge related to the EiE units will be supported by CMASE and UA faculty, while engineering careers will be highlighted through a tour of the UA College of Engineering and discussions with engineers from Aspire Solutions and other engineering firms in the Northwest Arkansas region. The eight (6 hours/day) day summer institute will be followed by two six-hour fall workshops. Participants will select topics for follow-up workshops based on needs including engineering design challenges and technology such as probe-ware, LEGO WeDo, Pico Crickets, Mind-Storms, iPad/computer games, and simulations to enhance problem solving skills.

UNIVERSITY OF ARKANSAS, FAYETTEVILLE**\$65,193****Washington County****Project Title: Project SOAR: Science Curriculum that Soars to New Heights Through STEM****Contact Information: Dr. Cathy Wissehr – cwissehr@uark.edu**

This project is designed to improve teacher quality and student achievement in science and engineering design. The project involves two integral methods of support: (a) a summer workshop (45 hours), and (b) classroom follow up (15 hours). Through the summer workshop, university faculty and community partners will team with grades 3-5 elementary teachers to design integrated STEM units focused on aviation to be taught in the fall. Utilizing a neighboring airport and a private engineering business, teachers will access materials and resources to enhance their unit to provide real world learning experiences that highlight Next Generation Science Standards (NGSS), Arkansas Science Frameworks, STEM principles, and Common Core State Standards. In addition to content, teachers will receive training in the curriculum model *Understanding by Design*.

In the fall, university and community partners will follow up with classroom teachers as they teach their units. Reflection on STEM principles and NGSS will continue to encourage high quality lessons that engage and challenge students. Through the partnership with faculty from Civil Engineering, Arts and Sciences, ROTC, Education and the community airport, this project aspires to help teachers access rich resources in their community and soar to new heights through STEM.

UNIVERSITY OF ARKANSAS AT LITTLE ROCK **\$56,223**

Pulaski County

Project Title: Science Education through Engineering Design (SEED)

Contact Information: Mr. Keith Harris – krharris@ualr.edu

The goals of Science Education through Engineering Design are to increase 4th to 8th grade teachers': (1) science content knowledge; (2) knowledge of the engineering design process; (3) planned use of relevant science inquiry and engineering design in their classrooms; and (4) confidence delivering science content through engineering practice.

The content emphasizes physical science. University partners include UALR's Arkansas Partnership for STEM Education, UALR Teach, and the Jodie Mahony Center in the College of Education, the College of Science, and the Donaghey College of Engineering and Information Technology (EIT). Little Rock and North Little Rock School Districts are high-need local education agencies and public school project partners. Instructors and instructional support staff from each university partner will provide experiences that focus on the science and engineering practices set forth in the Next Generation Science Standards (NGSS) implementing research-based curriculum. Industry partners will provide opportunity to observe the engineering process in action at their facilities. Teachers will practice their learning with students participating in UALR's Summer Laureate program. The institute will be held for eight days during summer 2014, with a minimum of two follow-up face-to-face sessions during the Fall 2014. Instructors will schedule several sessions for school-based mentoring of science teacher teams.

UNIVERSITY OF ARKANSAS AT MONTICELLO **\$57,756**

Drew County

Project Title: The UAM Summer Institute for Geometry —Teaching with the New Common Core State Standards

Contact Information: Ms. Pam Beard – beard@uam.edu

The UAM Summer Institute for Geometry —Teaching with the New Common Core State Standards will be held July 8-11 and July 15-18, 2013 at University of Arkansas at Monticello,

School of Education. Participating teachers will attend the sessions from 8:30 to 3:30 each day. One follow-up day will be held during the fall, 2014. Teachers may take the course for professional development hours only. Membership in the project will be open to 20, 5-8th grade teachers.

Participants in The UAM *Geometry* Institute will become familiar with the new standards through working on standards-based problems in the sessions. Each day of the summer institute will be centered on a cluster of standards and participating teachers will be required to consult the standards to discover how the problems and the standards are correlated. Mr. Lowell Lynne and Mrs. Linda Chapman from the UAM School of Math and Science will be the instructors for the summer institute.

UNIVERSITY OF ARKANSAS AT PINE BLUFF

\$61,812

Jefferson County

Project Title: Robotics Training for 6th-8th Grade Math and Science

Contact Information: Dr. Shelton Fitzpatrick – fitzpatrick@uapb.edu

This project will facilitate activities which are aligned with Arkansas Curriculum Frameworks and state science standards. The project will have a summer component, whereby teacher participants are trained to infuse robotics education into their science curriculum. Robots will be built and programmed by the teachers individually and as a group project to demonstrate fundamental concepts about physical science, mathematics, computer science and engineering. The intent of the project is to train teachers in the use of new materials to build an interest in science and engineering (STEM) in children of all ages. It is a hands-on program designed to capture students' inherent curiosity and direct it toward discovering the possibilities of improving the world around them. The project features real world challenges for teachers and their students to be solved by research, critical thinking and imagination.

UNIVERSITY OF CENTRAL ARKANSAS

\$68,772

Faulkner County

Project Title: Beginner Robotics for STEM Teaching: Grades 6-8

Contact Information: Dr. Uma Garimella – ugarimel@uca.edu

UCA STEM Institute will offer a "Beginner Robotics for STEM Teaching: Grade 6-8" professional development program for 20 math and science teachers. The program will provide long-term, sustained high quality learning opportunities to Arkansas teachers; especially those in high need LEAs. It is a program designed to prepare teachers to capture students' inherent inquisitiveness, to cultivate an interest in science and engineering, and direct it toward discovering the possibilities of STEM-related careers. Participants will be trained to integrate robotics into STEM-related curriculum that aligns with Arkansas and the National Research Council's Science Standards. Participants will go through a 60 hour professional development training during which they will build and program robots through a collaborative and experiential learning program integrating concepts from various disciplines such as biology, physical science, mathematics, computer science and engineering. The program features real-world challenges for participants and their students to solve through conducting research, utilizing critical thinking and imagination. Design elements will include the incorporation of multiple learning styles (auditory, visual, and kinesthetic components) and the use of a 5E lesson format.