

U.S. DEPARTMENT OF EDUCATION

FY 2009 Project Abstracts

Minority Science and Engineering Improvement Program

TEXAS

The University of Texas at San Antonio – P120A090003
One UTSA Circle
San Antonio, Texas 78249

Four-Year Public

Project Director: Mehdi Shadaram

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Award Amount: \$556,433

Activity Description:

This proposed effort constitutes a fusion of strategies which has as its core long-term objective the minimization of factors that adversely affect academic performance of entering freshmen. These strategies are intended to minimize the impact of deviations that, if too great and side effects too many, then the probability of the desired outcome (choosing an engineering major, retention in engineering, and graduating as an engineer, and as importantly to the State of Texas, graduating in six years or less) becomes far removed and its predictability entirely uncertain, particularly for students from low socioeconomic groups and historically underrepresented minorities (our primary focus is on minority females from this population in engineering). Thus the purpose of this proposed effort at the University of Texas at San Antonio (UTSA) is to increase postsecondary enrollments, retention, and the number of engineering graduates (focused principally on minority females), and in this regard to increase collaboration between UTSA's engineering departments and the private technology companies in Texas that employ engineers.

We therefore propose a comprehensive best practices-based strategy that involves structured recruiting based on our successful 2005 MSEIP Department of Education (ED) grant (#P120A050003) where we have established a process that involves high school counselors as well as high school math and science teachers to recruit high school students into our summer programs. Minority female cohorts ages 17-19, through a competitive selection process, will be paid a stipend to attend a summer immersion camp. This proposed program is anchored by an engineering survival skills workshop. The participants will also receive a stipend during their freshman year to work in a research laboratory that focuses on their desired major, minimizing the student's need to work outside the university, as well as a new math preparation program for engineers based on the Wright State Model (which is funded through a Texas Higher Education Coordinating Board course redesign grant). Student researchers working in these labs will be paid a stipend to be formal mentors to these entering freshmen cohorts after undertaking mentoring training developed through the aforementioned 2005 ED MSEIP grant. Upon successful completion of the freshman year, summer internships will become available to our targeted cohorts by establishing collaborative articulation agreements between our engineering departments and the private companies that hire our engineering students. While many industrial partners provide summer internships to upper-division engineering students, few have offered this important retention vehicle to students having successfully finished their freshman year.

Three-Year Total Requested Funds: \$556,433

WASHINGTON

Northwest Indian College – P120A090033
2522 Kwina Road
Bellingham, Washington 98226

Four-Year Public

Project Director: Dan Burns

(360) 392-4309

E-mail: dburns@nwic.edu

Award Amount: \$468,423

Activity Description:

Project Title: Support Native American Women in Earning Baccalaureate Degrees in a STEM Field by Refining and Expanding the Northwest Indian College (NWIC) Native Environmental Science Interdisciplinary Concentration Option.

Goals: (1) Make science more relevant to Native American women; (2) Demonstrate to freshmen and sophomores that there is a positive future for those who continue their education and earn a baccalaureate degree in Native Environmental Science (NES) from NWIC.

Expected Outcomes: (1) Increase the number of students (especially women) who enroll in and graduate from NWIC with a bachelors degree in Native Environmental Science; (2) Expand the reach of the NES program by making it available to students at our Swinomish extended campus; (3) Improve the NES program by refining and expanding an Interdisciplinary Concentration option; (4) Increase the learning opportunities for students by developing new courses and reaching formal agreements with other universities, allowing NWIC students to attend their courses; (5) Enhance learning opportunities for Native Americans (especially women) by developing the NES program in ways that provide students with more culturally relevant, hands-on, place-based, and collaborative learning opportunities.

Population to be served: We will serve Pacific Northwest Native Americans, with an emphasis on those who take courses at the NWIC campuses at the Lummi and Swinomish reservations.

Contributions to Practice: We will implement pedagogies that are, for Native Americans, natural and traditional. The Interdisciplinary Concentration option within the Native Environmental Science program is especially relevant to both Native Americans and women. The model we are creating will be replicable at minority-serving institutions nationally.

Three-Year Total Requested Funds: \$468,423

MONTANA

Stone Child College – P120A090035
Academics STEM Department
RR 1, Box 1082
Box Elder, Montana 59521

Two-Year Public

Project Director: Cory L. Sangrey
(406) 395-4875

E-mail: clsangrey@yahoo.com

Award Amount: \$295,021

Activity Description:

Objective #1: During the project period of October 1, 2009 to September 30, 2012, Stone Child College will implement a comprehensive *STEM Transition Project* to provide a bridge program to improve student learning, promote student success, and increase access to postsecondary education for a minimum of 20 junior- and senior-level high school students per year through provision of counseling, tutoring, mentoring, and other services during the school year and a Summer Bridge Program where students can earn six college credits and conduct a practical community-based research project, as measured by student enrollment records, pre- and post-placement exams, career interest inventory assessments, college transcripts, course records, research project report and internal and external evaluation results.

Objective #2: During the same project period, Stone Child College will recruit and select at least two undergraduate students per year to serve as tutors, mentors, and research assistants to secondary students and at least four professional community members to serve as mentors to undergraduate students, as measured by project records, enrollment and retention records, mentoring and tutoring records, and internal and external evaluation results.

Three-Year Total Requested Funds: \$295,021

PUERTO RICO

Inter American University of Puerto Rico – Bayamón Campus – P120A090053
P.O. Box 363255
San Juan, Puerto Rico 00936-3255

Four-Year Public

Project Director: Alberto L. Vivoni
(787) 279-1912

E-mail: avivoni@bc.inter.edu

Award Amount: \$466,623

Activity Description:

The goal of this project is to improve the critical and analytical skills of science and engineering students at the Bayamón Campus of the Inter American University of Puerto Rico. The project objectives are: (a) train faculty in active learning methodologies using the latest computational technologies; (b) instruct biotechnology students in the use of bioinformatics tools; (c) improve student's performance in chemistry bottleneck courses; and (d) offer engineering students experience at building a Linux cluster. In order to achieve these objectives, a Computational Center will be set up for students to carry out computational chemistry and biology projects, give training and support to faculty in the computational techniques, and offer tutoring to help students carry out their projects-based activities. Students in the Parallel Computing course in the Computer Engineering program will build the Linux cluster for the use of faculty and students in science. The computing facility will also include ten workstations as well as bioinformatics and molecular modeling software. The project will impact the advanced courses in biotechnology, the first two years of chemistry (including chemistry for engineering) and the parallel computing course in Computer Engineering. The project is expected to improve the student's critical and analytical skills, enhance the student's preparation for the job market, engage more faculty members in the use of active learning techniques in their courses, expand the number and focus of the current research projects in campus and motivate students to pursue graduate studies and careers in science. The project will effect a long-range improvement in the science and engineering programs at the Bayamon Campus. One hundred percent of the students at the Bayamon Campus are Hispanics, 44.5 percent of which are female. The project will therefore improve the science and engineering education of minority students and minority women.

Three-Year Total Requested Funds: \$466,623

MONTANA

Fort Belknap College – P120A090058
1 Blackfeet Street
P.O. Box 159
Harlem, Montana 59526

Two-Year Public

Project Director: Deborah His Horse is Thunder
(406) 353-2607

E-mail: dhhit@mail.fbcc.edu

Award Amount: \$407,094

Activity Description:

This institutional project proposal is submitted by Fort Belknap College (FBC), a tribally controlled community college located on the Fort Belknap Indian Reservation in rural, north central Montana. The Fort Belknap Reservation is the home of the Aaniinen (White Clay People or Gros Ventre) and Nakoda (Assiniboine) Tribes. During the 2007-2008 academic year, Fort Belknap College had an enrollment of 300 degree-seeking students, 90 percent of whom are American Indians and 67 percent of whom are female. Through formally established partnership agreements, students earning associate of science degrees at FBC are able to pursue baccalaureate degrees in STEM disciplines at Montana State University-Northern (Havre, Montana).

The goal of this project is to promote student success in mathematics and science through a comprehensive restructuring of FBC's existing mathematics program. Project objectives include: (1) deconstructing the existing mathematics program to identify core topics and skills; (2) restructuring the college's mathematics program using culturally and geographically relevant applications and topic-based diagnostic tools; and (3) delivering restructured mathematics courses that will result in documented increases in student participation and success in STEM courses and degree programs. By accomplishing this goal and its associated objectives, the project will achieve a series of measurable performance outcomes related to increased enrollment, persistence, and graduation among American Indian students. Dr. Deborah His Horse is Thunder, Dean of Academic Affairs, will serve as project director. Other project participants include the project coordinator, mathematics tutor, and STEM faculty serving on the project's curriculum team. Dr. Carol Reifschneider, Chair of MSUN's College of Education, Arts & Sciences, and Nursing, will serve as her institution's point of contact.

Three-Year Total Requested Funds: \$407,094

PUERTO RICO

**Sistema Universitario Ana G. Méndez, Inc. (doing business as) Universidad del Turabo –
P120A090062
School of Science & Technology
State Road #189, Km. 3.3
P.O. Box 30303
Turabo, Puerto Rico 00778-3030**

Four-Year Public

Project Director: Jose E. Sanchez

(787) 743-7979

E-mail: jsanchez@suagm.edu

Award Amount: \$574,096

Activity Description:

The Universidad del Turabo (UT) School of Science and Technology (SST) proposes a three-year institutional project in the amount of \$574,096 to increase the pool of highly competitive Hispanic pre-college high school students in Puerto Rico prepared to successfully initiate and complete university studies in STEM fields; and to increase STEM undergraduate student retention by five percent over a three-year period through the enhancement of a STEM Student Support Center (SSC). Proposed activities include faculty development, and the development and implementation of new and revised materials, instructional procedures and methodologies in remedial and basic math and sciences courses. Puerto Rico has a large number of students that have significant deficiencies in their academic backgrounds. Many of them have not completed a chemistry or physics course, and a significant number of them come to the university with a score of 490 in mathematics achievement of the College Entrance Exam, which is too low to be enrolled in a first-year core course in science or engineering. Placement records in mathematics reflect that approximately only 15 percent of the students are able to be placed in a course with content over the level of elementary algebra. The majority of students have to take remedial courses in order to attend deficiencies before enrolling in a regular science course. In addition, the average Puerto Rican student faces poverty and many of them take part-time jobs resulting in graduation periods longer than expected. The proposed MSEIP project at UT will satisfy the urgent need to strengthen pre-college student math and science skills to achieve greater competitiveness, promote faculty development while improving and adapting new educational materials and technology in the learning process, and the provision of tutoring and mentoring for STEM undergraduates in basic math, general chemistry and general biology courses. The MSEIP project will benefit over 1,200 undergraduate Hispanic science and engineering students; and from 20 to 60 Hispanic pre-college students through research experiences in a three-year period.

Three-Year Total Requested Funds: \$574,096

CALIFORNIA

Charles Drew University of Medicine and Science – P120A090069
College of Science and Health
1731 East 120th Street
Los Angeles, California 90059-3051

Four-Year Private

Project Director: Gail Orum-Alexander
(323) 563-5851

E-mail: gailorum@cdrew.edu

Award Amount: \$556,540

Activity Description:

CDU College Bound Prep Plus: Pre-College Enrichment Program

Introduction/Background: Charles Drew University (CDU) College Bound Prep Plus, a 15 week pre-college enrichment program at Charles Drew University (located in a community that is 62 percent Latino and 33 percent African American), is designed to increase the number of underrepresented minorities pursuing careers in science and engineering. Building upon current pipeline projects which prepare about 20-30 students annually, this program was developed to better prepare more (up to 100 per year) minority 11th and 12th grade students from the Los Angeles metropolitan area to pursue science and engineering fields in college.

Objectives: The objectives of the program are: (1) to develop and evaluate a pre-college enrichment program for minority students emphasizing math and science; (2) to identify and recruit minority students who will participate in the program; and (3) to prepare identified students for admission into science and engineering college programs.

Methods: Students from surrounding high schools will be recruited to participate in a 15 week program (two sessions will be held in each academic year) with the following activities: (1) review of fundamental science, math, and college learning skills; (2) service learning; (3) faculty and student mentoring; and (4) group science projects. Pre- and post-surveys will be used to assess students' knowledge of science education opportunities. Students will be tracked for five years following program completion for college enrollment, major selection, and graduation.

Expected Outcomes: The program will provide students with: (1) knowledge of science and engineering careers; (2) preparation for college in math, science and learning skills; and (3) increase enrollment in college in math and science majors.

Three-Year Total Requested Funds: \$556,540

TEXAS

Laredo Community College – P120A090084
Science Department
West End Washington Street
Laredo, Texas 78040

Two-Year Public

Project Director: Marisela Rodriguez
(956) 721-5892

E-mail: mrodriguez@laredo.edu

Award Amount: \$600,000

Activity Description:

Increasing Access and Success in Science, Technology, Engineering, and Mathematics: Bridging the Educational Gap for Hispanics is the proposed institutional project by Laredo Community College, a two-year public, community college with an enrollment of 11,785 from Summer Session II 2007 through Summer Session II 2008, (11,170) which were 94.78 percent Hispanic. It has never received a MSEIP grant. A three-year institutional project is proposed to improve science education for students and teachers and to increase the number of Hispanic students, particularly women, in the STEM fields.

Summary of Requested Support:

- Activity 1 - Summer Success Program in STEM. Increase the number of students to gain access to STEM degrees four-week intensive summer program for sophomores and juniors - 32 slots. Top 10 students selected for mentorship upon entering the college. Sample key measures: number of students, especially women, to enter STEM as a declared major will increase by 20 percent over the three-year period; increased retention and success rates for majors.
- Activity 2 - STEM Summer Success Program. Increase skills of high school teachers in STEM. 80 STEM teachers from high schools will participate in one-week workshops to increase their skills as teachers and promote retention -- (20 biology, 20 chemistry, 20 physics, and 20 math teachers each summer). Sample key measures: retention of teachers; increased pass rates for students on TAKS. Project Management and Evaluation: External evaluator to monitor progress insuring that data are gathered, analyzed, and used to improve the program.

Three-Year Total Requested Funds: \$600,000

SOUTH CAROLINA

Allen University – P120A090088
1530 Harden Street
Columbia, South Carolina 29204

Four-Year Private

Project Director: Patrick T. Inyangetor

(803) 376-5931

E-mail: pinyangetor@allenuniversity.edu

Award Amount: \$578,411

Title: Science and Mathematics Curriculum Enhancement Project

Activity Description:

Allen University, Columbia, South Carolina, after extensive research decided to adopt and implement one of the most effective and well-known instructional delivery systems for mathematics, chemistry, and biology. Implementation of this system requires establishment of a computer laboratory with fast internet access, upgrading the existing science laboratories, modifying the curriculum delivery mechanism, and implementing a very powerful assessment system. Support is requested for equipment, supplies, software, and partial staff support. Allen University has committed significant resources, if the project provides requested support.

The primary objectives of the project include: (1) upgrading the existing science laboratories to enhance the quality of science courses by offering more hands on experiences and through Virtual Labs; (2) equipping classrooms with projection systems and internet access for enhancing the quality of teaching using electronic presentations for the content; (3) establishing an effective assessment system with built-in accountability and electronic reporting; (4) modify our existing course offerings to incorporate the above features in teaching and learning processes; and (5) train our faculty to use and implement all the above mentioned initiatives.

We have assured support of experienced faculty from other colleges and universities who have succeeded in successful implementation of similar approaches in their institutions. We expect to increase our retention rates in lower level math and science courses that will help us to have more and better quality science graduates from Allen University.

Three-Year Total Requested Funds: \$578,411

FLORIDA

Miami Dade College – North Campus – P120A090044
11380 NW 27 Avenue
Miami, Florida 33167-3418

Four -Year Public

Project Director: Heather Belmont

(305) 237-1757

E-mail: hbelmont@mdc.edu

Award Amount: \$857,909

Activity Description:

Miami Dade College - North Campus requests \$869,029 in funding from the U.S. Department of Education, Office of Postsecondary Education, under the Minority Science and Engineering Improvement Program, for *STEM Connections*, Cooperative Project, a three-year initiative between Miami Dade College - North Campus, St. Thomas University, and the supporting participation of Miami-Dade County Public Schools. The purpose of *STEM Connections* is threefold: (1) to increase the transition of high school minority students, particularly women, into college level STEM majors; (2) to increase enrollment and retention of declared STEM majors; and (3) to develop mentoring networks to assist and support both STEM students and faculty from these institutions.

STEM Connections will target two at-risk populations within STEM educational fields: minorities and women. Project objectives include: the development of an aligned mathematics and science program connecting high school minority students with postsecondary STEM career-related disciplines; the implementation of a tutoring and mentoring network assisting students at the college level successfully transfer to a four-year institution; and the implementation of a Summer Mentoring Research Program for undergraduate STEM students.

Funding requested from the Department of Education will be used towards project staff salaries, faculty, mentors, and student stipends, peer-to-peer mentoring equipment, educational materials, and travel. Both Miami Dade College - North Campus and St. Thomas University will provide institutional support to the project in the form of staff salaries, facilities, and administrative resources.

Three -Year Total Requested Funds: \$857,909

NORTH CAROLINA

Winston – Salem State University – P120A090124
601 Martin Luther King Jr. Drive
146 Carolina Hall
Winston Salem, North Carolina 27110

Four -Year Public

Project Director: John O. Adeyeye

(336) 750-2897

E-mail: adeyeyej@wssu.edu

Award Amount: \$89,910

The mathematics sequence referenced as foundational mathematics courses include college algebra, pre-calculus I, and pre-calculus II. Each year, these courses serve more than 1500 students, many of them potential majors in the STEM (Science, Technology Engineering and Mathematics) fields of Mathematics, Computer Science, Life Sciences and Chemistry each academic year. Our records show that the pass rates and proficiency level in these courses need to be substantially improved with appropriate strategies.

This project aims to increase the retention and academic pass rates in the specified sequence of three foundational mathematics courses.

We plan to achieve these improvements by training the faculty in the use of new technological tools for teaching, delivering homework, and collaborate with science faculty in producing problems that reinforce theory and application in the sciences. The initiatives we plan to implement include the design and use of: Integrated Instructional Delivery System (IIDS) in college algebra, pre-calculus I and II, collaborative supplementary problems developed by STEM faculty, peer tutoring using advanced STEM majors.

With these interventions, attrition rate will reduce significantly, and we will have more and better prepared students taking calculus level courses and succeeding in STEM disciplines. Overall, this project addresses MSEIP Performance Indicators 1. More minority students will enroll in higher level mathematics courses and as a consequence enrolment in majors in STEM disciplines will increase.

Three-Year Total Requested Funds: \$89,910

FLORIDA

Florida A&M University – P120A090122
P.O. Box 164, Technical Building A
Tallahassee, Florida 32307-5100

Four -Year Public

Project Director: Hongmei Chi

(850) 599-3050

E-mail: hchi@cis.famu.edu

Award Amount: \$592,070

Computation is playing an ever-increasing role in the conduct of modern scientific inquiry and experimentation. The goal of this project is to increase the number of STEM students who graduate with discipline-specific computational skills. This institute project will strengthen existing STEM programs through course enhancement and faculty development, and will lay a solid foundation for cross-disciplinary education and research among STEM disciplines. This project has the potential to effect long-term improvement in science and engineering education at Florida A&M University through increased use of computation in the teaching of STEM disciplines. The project will also promote the use of computation in the teaching of science at the high school level through the involvement of high school teachers and students in year-long activities with project personnel. The project will improve the computing infrastructure to ensure access to computational resources for STEM students. STEM faculty will be trained in the use of computational tools to stimulate increased integration of computation into STEM courses. Regular presentations and demonstrations of scientific computation will be given for faculty and students to increase exposures to state-of-the-art tools for modern science. Activities to attract high school students into computation-based science will include year-long projects involving high school teachers and students.

The expected outcomes over the three-year project include the following: (1) increased number of students with experience using computation in science; (2) increased number of faculty who incorporate computation into STEM courses; (3) increased undergraduate and graduate research involving computation in science; (4) increased computing capacity to support computation in STEM courses; (5) increased number of STEM graduates admitted to graduate programs with a focus on computational methods; and (6) increased awareness of computation in the teaching of science in area high schools. Project activities include the following: (1) identify requisite computing competencies for STEM graduates pursuing advanced study; (2) develop computation-in-science demonstrations for university and high school STEM courses; (3) develop instructional modules and course assignments requiring the use of computation in STEM courses; (4) enhance and develop foundational computing courses for STEM majors; (5) train faculty in use of computation in instruction; (6) sponsor annual computation-in-science showcase with leading scientists as guest speaker; (7) develop discipline-specific computational modules or courses; and (8) explore opportunities for cross-disciplinary computation-based courses and curricula.

Three-Year Total Requested Funds: \$592,070

ILLINOIS

East-West University – P120A090013
816 S. Michigan Avenue
Chicago, Illinois 60605

Four-Year Public

Project Director: Lawrence Gorman

(312) 939-0111

E-mail: larry@eastwest.edu

Award Amount: \$598,563

East-West University is applying to the Department of Education for an institutional grant to support Project EDGE: Advancing Minority Students at East-West University in Science and Electronics Engineering Technology. Our project targets three main objectives. First, we will initiate a bridge program for first-time freshmen students interested in math and science majors to prepare them for success in college-level courses in those fields. Second, we will broaden students' career horizons with a lecture series in science, engineering and related fields such as medicine and computer science. We will seek out successful minority professionals, especially women, as lecturers for the annual series. Mentoring and job-shadowing will be encouraged in the second and third years of the grant funding. As a majority minority school, a high number of minority graduates return for advanced courses and comprise a pool of prospective mentors for engineering students. We will also encourage students to engage in science and engineering internships. Third, we will strengthen our science and engineering courses as we move ahead with the university's comprehensive science improvement plan by designing and piloting courses in three areas: biological science, physical science, and electronics engineering technology. We plan to prepare syllabi for four courses and four laboratories in physics and two courses in electronics engineering as well as to pilot new courses. We will update biology labs and install equipment necessary to keep our neurotechnology program current. We are confident that the successful outcomes supported by the Minority Science and Engineering Improvement Program will improve the success rate of minority students at East-West University and increase the university's capacity to provide essential higher education in science and engineering.

Three -Year Total Requested Funds: \$598,563

NORTH CAROLINA

North Carolina Agricultural and Technical State University – P120A090049
1601 East Market Street
Greensboro, North Carolina 27411

Four-Year Public

Project Director: Xiaohong Yuan
(336) 334-7245

E-mail: xhyuan@ncat.edu

Award Amount: \$582,738

Security vulnerabilities caused by software defects are costing businesses millions of dollars each year and threaten the security of individuals and the nation. To improve the current situation in industry and government, there is the pressing demand for well-trained, diverse software professionals who can develop quality and secure software.

In response to the high demand for a well-trained workforce in the field of information security, particularly the demand for well-trained secure software professionals, we propose to improve the computer science (CS) curriculum at North Carolina Agricultural and Technical State University (NC A&T SU) through developing new course modules on software security, integrating these modules into existing undergraduate courses, developing two new graduate courses on secure software engineering, and creating a graduate level secure software engineering concentration program. To effect long-range improvement in computer science and information assurance education, we also propose to organize summer faculty workshops to disseminate our curriculum development results, and train other computer science or information technology faculty members to integrate secure software engineering concepts into their curricula. Faculty members from NC A&T SU, other colleges and universities, particularly minority institutions, as well as high school advanced placement class teachers from North Carolina and the nation will be recruited to attend the workshops.

To increase the number of high quality computer science graduates to meet today's workforce demand for secure software professionals, we propose to implement three student support programs to improve student retention. These programs are: (1) providing training to undergraduate teaching assistants and supplementary instructors; (2) conducting intensive supplemental instruction summer workshops to sharpen students' programming and problem solving skills for students who have completed their first year programming courses but did not do well; and (3) implementing a mentoring program specially for high-risk students.

The expected outcomes of this project include: (1) Seven course modules on software security will be developed and integrated into existing undergraduate courses; (2) Two new graduate courses on secure software engineering will be developed and taught; (3) A new graduate Secure Software Engineering Track will be created in the Department of Computer Science; (4) The enrollment, retention rate and graduation rate in the CS undergraduate program will be increased; (5) The number of CS graduates pursuing advanced degrees will be increased; (6) The enrollment and number of graduates in the CS graduate program will be increased; (7) The new course modules and graduate secure software engineering courses will be adopted by colleges and universities in North Carolina and nationwide; and

(8) The three student support programs can be adopted by other institutions to improve student retention.

The proposed project will improve computer science education by exploring a new paradigm of teaching software engineering. It will provide improved education opportunities for African American students, particularly female students. It will promote academic success of African American students, and increase the number of well-trained African American graduates entering the workforce in the field of information assurance, or pursuing advanced degrees.

Three-Year Total Requested Funds: \$582,738

MISSISSIPPI

Jackson State University – P120A090108
1400 J. R. Lynch Street
P.O. Box 17660
Jackson, Mississippi 39217

Four-Year Public

Project Director: Ezat Heydari

(601) 979-4230

E-mail: ezat.heydari@jsums.edu

Award Amount: \$557,001

Activity Description:

By the year 2050, ethnic minorities will make up more than 50 percent of the United States population. Yet, the record of attracting and retaining minorities into STEM fields in general and geosciences in particular has been very discouraging so far. To improve the situation in the geosciences, Jackson State University (JSU) has established the first Earth System Science degree program among HBCUs. The program has five major functions: (1) to educate and graduate minorities in the much needed geosciences discipline; (2) to enhance earth science knowledge of the general student population through its introductory courses; (3) to improve earth science education in the State of Mississippi by providing short courses to in-service K-12 teachers; (4) to produce K-12 teachers specialized in earth science education; and (5) to pave the way for continuous inflow of students into earth science through its activities for K-12 students.

To deliver the highest quality of education, the earth system science degree program needs quality instrumentation and supplies. The goal of the proposed project, ESSENCE: Earth System Science Education, a Necessity for College Experience, is to improve this situation. The proposal intends to achieve the following: (1) establish a Microanalysis lab and laboratories for four of its key courses; (2) upgrade the Metrology lab and the Earth Environment lab; (3) improve electronic delivery of course content; (4) initiate summer courses for K-12 students. The project will improve student learning, facilitate undergraduate research, attract new talent to the fields, and assist graduate student research from other disciplines within the university. Energy, climate change, clean water, and environmental detonation are main challenges of the future. Earth system science education is more relevant now than it has ever been.

Three-Year Total Requested Funds: \$557,001

TEXAS

Prairie View A&M University – P120A090123
Office of Sponsored Programs
P.O. Box 667
Prairie View, Texas 77446

Four-Year Public

Project Director: Jianren Zhou

(936) 261-9960

E-mail: jizhou@pvamu.edu

Award Amount: \$456,298

Activity Description:

The goal of this project is to integrate nanotechnology into undergraduate engineering and science curricula through a sequential preparation approach from freshman to senior level, aided by innovative computer simulations and state-of-the-art nanomaterials laboratory experiments. The project also has the objective to increase the number of minority undergraduate students at Prairie View A&M University (PVAMU) in fields of science, technology, engineering and mathematics (STEM) disciplines with specific training in nanotechnology through course lectures, laboratory experiments, and student participation in nanotechnology research. The intellectual merit of the proposed activities will be the assimilation and transformation of fundamental concepts and laboratory discoveries of nanotechnology into classroom teaching with specific unique features: (a) Sequential preparation - seven courses are selected for sequential and systematic learning of nanotechnology; (b) Modern tools assisted - computer simulations and software modeling; (c) Reinforced by lab experience - lab experiments will be developed to provide students hands-on experiences; and (d) Team diversity and multidisciplinary knowledge - this team is composed of faculty members of junior, senior, women and with disabilities, from various engineering and science disciplines with expertise in quality teaching and over 40 research projects.

This project has strong commitment and support from university and college administrators. The systematic integration of nanotechnology into undergraduate engineering curricula will enable PVAMU to stay in front of the national trend of engineering education in emerging technologies. All engineering students will gain fundamental nanotechnology knowledge through sequential courses. The approaches and education modules will be adopted or followed by other engineering and sciences courses to initiate the institutionalization process.

Three-Year Total Requested Funds: \$456,298

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