

Biological and Environmental Science (BES) Scholars @ AAMU: Pathway for Demonstrating Excellence and Strengthening Training in the Environmental Sciences at Alabama A&M University

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Environmental issues have created a critical global need for highly educated scientists, professionals, and government officials to develop and implement procedures, policies and regulations. Unfortunately, under-represented minorities, especially African-Americans and Hispanics, lag behind in employment within the bio-environmental sciences. In 2012, of the 105,000 people employed as environmental scientists, only 7% were African-Americans (Bureau of Labor Statistics, 2012). Forecasted demographics suggest that the U.S. needs to increase racial and ethnical diversity in scientific professions in the next 50 to 100 years because its economic viability depends on a diversified work force. If African-Americans, women, Hispanics and other minority races are to account for a significant number of new entrants into the labor force, those groups have to be adequately trained to fill this gap. Although minorities are seriously underrepresented in science, technology, engineering, and mathematics (STEM), Alabama A&M University (AAMU), a historically black college and university (HBCU) has been at the forefront of efforts to train minority students to assume leadership roles in the environmental, biological and natural resource disciplines. This is evident by the undergraduate composition of the College of Agricultural, Life, and Natural Sciences (CALNS) with 91% African-Americans and 1.5% Hispanics. These demographics provided the solid foundation for the newly initiated BES Scholars program @AAMU, which **aims** to:

- 1. Strengthen the capacity and quality of programs in the Department of Biological and Environmental Sciences (BES) through intensive recruitment and retention efforts and effective academic advising and assessment.*

Underrepresented minorities are recruited from Huntsville City Schools in Madison County, AL (northern section of state) and underrepresented minorities from the impoverished Black Belt area of Alabama, which includes Sumter, Greene, Choctaw, Marengo Counties, and others (central section of state) as well as other high schools and community colleges throughout the state and country. The BES Scholars application has the following requirements: target students with high scholastic aspirations who have a **GPA of 3.0 or better; ACT score; academic transcript; a 250-word essay** describing their interest in biological and environmental and geosciences and subsequent career goals; **two letters of recommendations**; and be willing to participate in various mentoring and support activities offered by the program. Ten (10) incoming freshmen are selected as BES@AAMU scholarship recipients. Each scholar receives \$2,500 each semester of their first two years here at AAMU (\$10,000 total) and works with assigned mentors to find additional supplemental funding for the remaining two years. This will make long-range progress in biological and environmental education at AAMU and enhance institutional capability to increase the flow of under-represented ethnic minorities in these STEM careers. It will also enhance the partnership between AAMU and the various high schools and community colleges involved.

2. Cultivate academic competitiveness by engaging in rigorous curricula and extracurricular activities in the Department Biological and Environmental Sciences (BES).

Departmental faculty have identified rigorous, yet diverse current course clusters that will be included for interactive environmental enhancements through the purchase of software, such as Environmental Science Interactive with RAMAS eLab (web-based); Electronic Texts with RAMAS EcoLab; EcoSim, An Ecological Simulation Program¹²⁵; Environmental Health and Safety Freeware; and arcGIS, and used in smart classrooms with current online resources, which help in managing interactive student learning through:

- 1) Environmental science and environmental health
- 2) Soil and plant sciences/soil microbiology
- 3) Hazardous waste management and environmental toxicology
- 4) Soil and water pollution, soil chemistry and fertility, hydrology and watershed management and soil/water conservation
- 5) Remote Sensing of the Environment/Introduction to Geographic Information Systems (GIS); GIS Spatial Analysis and Modeling
- 6) Applications of Geostatistics
- 7) Climate and Global Change
- 8) Aerial PhotoInterpretation

Students enrolled in the course clusters will also take study tours to enrich their course and laboratory learning. Some of the locations will include: Oakridge National Laboratory, Chemical Waste Management Lab, Tennessee Valley Authority (TVA)-Air Quality Monitoring Facilities, Centers for Disease Control (CDC), EPA Region 4 office and the Bankhead National Forest.

3. Provide experiential learning opportunities for BES Scholars through training to utilize advanced and emerging instruments and techniques performed in biological, environmental and geosciences, which will inevitably enhance workforce diversity

BES Scholars are given the opportunity to train and learn all aspects of emerging technology and instrumentation, including novel imaging techniques, genomics, proteomics, nanotechnology, and rapid DNA sequencing through bi-weekly/work-study appointments in various labs throughout the Department. BES Scholars, with the aid of mentors, seek domestic and international experiential learning opportunities sponsored through AAMU (the National Science Foundation sponsored Research Experiences for Undergraduates (REU) and Undergraduate Research and Mentoring (URM) programs, REU-China, and Experiential learning opportunities in Ghana and Brazil), as well as various other internships at universities and agencies to gain practical skills.

The successful execution of this program will expand the educational value beyond the confines of AAMU and train African-Americans and other minorities for employment in a discipline in which they are grossly under-represented.

U.S. Bureau of Labor Statistics. *Employed persons by detailed occupation, sex, race, and Hispanic or Latino ethnicity*. Washington, DC. 2012