

Enhancing Geoscience Education at Historically Black Colleges and Universities: Mapping Opportunities and Developing Capacity-Building Resources

Reginald S. Archer ^{a,*}, Naomi von Bose ^a, Sue C. Ebanks ^b, Edith G. Davis ^c

^a Tennessee State University – rarcher@tnstate.edu, nvonbose@Tnstate.edu

^b Savannah State University - ebankss@savannahstate.edu

^c Florida Agricultural & Mechanical University - edith.davis@famu.edu

* Corresponding author

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Abstract:

The underrepresentation of African Americans in the geosciences is a significant issue in the field, with less than 1% of undergraduate geoscience degrees being conferred to African Americans nationwide. Historically Black Colleges and Universities (HBCUs) are well-positioned to address this issue by introducing geosciences to students from underrepresented and underserved communities through their teacher education programs.

This project, supported by National Science Foundation (NSF) Award #1802124 'GP-IMPACT: Expanding HBCU Pathways for Geoscience Education,' aims to map geoscience offerings and teacher education offerings at HBCUs, identify gaps and opportunities, and develop data layers that depict the intersections between pre-service teachers and earth sciences, indicating the offerings at each institution. The pairing of education and geoscience programs will enhance experiential, place-based opportunities across various disciplines, such as pedagogy, geography, weather, climate, food science, marine science, Earth, and space science, as well as emerging technologies.

The broader project's purpose is to develop and deploy a scalable tool, known as the 'Deep Dive,' for a comprehensive assessment of geoscience content and overall support for underrepresented minorities (URMs), particularly African Americans, in teacher education programs. Additionally, it aims to develop an accompanying enhancement component to the Deep Dive that compiles, maps, and delivers specific capacity-building recommendations tailored to each institution. Specifically, the project aims to:

- 1) identify and map STEM offerings, related to Geosciences, at every HBCU, and
- 2) indicate the educational offerings at HBCUs where geoscience is also offered.

The intersection of these layers serves as the basis for opportunities to assess institutional offerings and their ability to combine content, pedagogy, experiential and place-based learning for pre-service and in-service teachers.

While the comprehensive assessment tool was deployed at six institutions and provides detailed observations about their geoscience capacities, the accompanying GIS component will help to identify institution specific pathways for enhancing capacity for geoscience education across the HBCU landscape. HBCUs already demonstrate success in geosciences and education among African American populations, with over 75% of HBCUs offering a program or concentration in education and 45% offering earth science-related programs. By identifying opportunities for connections between programs, this project aims to strengthen HBCUs' capacity to provide and support geoscience education. Mapping institutions and their proximity to potential sites for experiential field learning aims to strengthen HBCUs' capacity to provide and support geoscience education, highlighting the potential of HBCUs as communities of practice for innovation in pedagogy for both teacher education and K-12 teaching within African American communities.

We utilize geographic analysis to identify opportunities and potential sites for experiential field learning near HBCUs. Mapping HBCUs and their proximity to potential field learning sites will aid in recommending necessary resources to support key elements of geoscience teacher education. In support of the broader project, an accessible, web-enabled dashboard will be developed to provide geographically specific, culturally relevant geoscience connections for teacher education and pre-service and in-service teachers over the long term. This will help to strengthen HBCUs' capacity to provide and support geoscience education and highlight their potential as communities of practice for innovation in pedagogy.