Georgia State University 2011 STEM II Initiative: Enhancing STEM Education through Field-Based Problem Solving and Real-World Applications of Geographic Information Systems

Course: GEOG 4532/6532: Geographic Information Systems  
Traditional Enrollment: 44 students (both undergraduate and graduate)

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**Executive Summary:** In many STEM courses, including Geosciences courses in Geographic Information Systems (GIS), students are encouraged to learn new technologies that will allow them to engage in applied, scientific problem solving for use in their own research interests. GIS, a scientific technology taught at GSU, can help students visualize, analyze, manipulate and capture data about real-world scientific phenomena. Often, GIS courses over-utilize in-class labs with specific step-by-step instructions for students to learn the technology. In these assignments, memorization and button-clicking become the keys to success; whereas, critical thinking and application to real-world scientific problem solving are lacking. Portions of our courses remove the step-by-step instructional labs and focus on field-based projects where students engage in applied scientific problem solving. Through this grant, we plan to measure how and in what ways student learning is enhanced through field-based STEM projects. Our analytical framework will include quantitative assessment (multiple choice questions, demographic data, and pre and post surveys) and qualitative assessment (open-ended questions, short interviews with randomly selected students). We will disseminate results in at least one peer-reviewed pedagogical publication (*Journal of Geography in Higher Education*), a presentation at the Association of American Geographers meeting, a GSU Geosciences brown bag, and university seminars.