Abstract of the **UK AMSTEMM** NSF proposal (2004):

**Recruiting, Retaining, and Graduating**

*University of Kentucky Appalachian and Minority Science, Technology, Engineering, and Mathematics Majors (UK AMSTEMM)*

The primary objective of this proposal is to increase the number of science, technology, engineering, and mathematics (STEM) majors enrolled at the University of Kentucky (UK) who are minorities or from Appalachian counties by at least 240 over the five year grant period, from the current level of 703 to almost 950, a 34% increase. Furthermore, the number of these students graduating with STEM majors will be increased by a total of at least 35 in the fifth year of the project. A program entitled University of Kentucky Appalachian and minority STEM Majors (**UK AMSTEMM**) will be created that will recruit, retain, and graduate STEM majors from Appalachia and minority populations by means of a number of related activities. The recruitment phase of the **UK AMSTEMM** program will include providing and coordinating such programs as high school mathematics support, summer science camps on-campus, visits to schools, teacher support, programs for parents, and Saturday events, such as career advising. Furthermore, **UK AMSTEMM** will provide a number of students with the financial assistance (in the form of fellowships for participating in mentored research experiences and serving as peer mentors) that will allow for them to realistically afford to attend UK. In addition, there will be a concerted effort to persuade first-year students, especially women, enrolled in special sections of pre-calculus courses to redirect their choices of majors to STEM disciplines. The retention phase will include dedicated professional advising, faculty mentoring, intensive summer mathematics courses for students who are not totally prepared for calculus, increased support for the Math Excel program for pre-calculus students, a special first year, place-based, Discovery Seminar program, mentored research experiences for first- and second-year students, a peer mentoring program, and bi-weekly research colloquia. The graduation phase, intended to ensure that majors make regular progress toward their degrees and graduate "on time," will include continued participation in the biweekly research colloquia; continued professional advising; additional peer mentoring; increased mentored research experiences; and place-based courses in the various STEM disciplines -- courses that are interesting, challenging, and relevant to the students' lives and home communities.

**UK AMSTEMM** has an exceptionally strong project team with experts in Appalachian studies, minority affairs, Mathematics education, and undergraduate education. The program will be monitored and assessed by two experienced project evaluators. The products and deliverables of the program, including course syllabi, workshop outlines, peer mentoring guidelines and training materials, and articles by students and faculty, will be available on the project Web site, the project newsletter, and in various professional publications and presentations.

In addition to the immediate influence of **UK AMSTEMM** on the number of STEM majors and graduates at UK, the project will add significantly to the knowledge-base of how to recruit, retain, and graduate minority and rural students and how to serve their unique needs. The success of such innovative techniques as involving parents extensively in pre-college recruiting and orientation; offering intensive pre-college mathematics testing, counseling, and courses; and providing place-based Discovery Seminars, enrichment seminars, and STEM courses will...
provide a model for other efforts to increase STEM enrollments. Beyond the intellectual impact of UK AMSTEMM, the program will reach many students who may not elect to attend UK, as well as their parents, teachers, and communities. These people will be exposed to the STEM disciplines and the college experience in positive ways that they might not otherwise encounter. They will, in turn, be enabled to spread these positive images of STEM disciplines, educations, and careers, and the potentially important impact on their communities. Although there are some unique aspects to Appalachian and minority populations in Kentucky, the lessons and components of UK AMSTEMM can serve as a model for and be generalized to analogous programs for other rural and minority populations in other areas of the country.