Colorado LSAMP Lessons Learned, Issues and Best Practices Summary

(1996 – 2006)

The process of increasing underrepresented minority participation in the Science, Technology, Engineering and Mathematics (STEM) disciplines is a time-consuming and challenging process. It requires a change in academic culture of the institutions of higher education involved, as well as of the communities being served. This process must include higher-level administrative personnel, faculty, staff, family, community members, and of course students. In the state of Colorado, the underrepresented communities are mainly Hispanic, Native American, and a small African American population. In Colorado, the CO AMP project is completing the 10th year of operation. During this time, we have learned a great deal about what types of activities and support make a difference in encouraging underrepresented students to pursue and obtain STEM degrees.

- **Broaden Participation:** CO AMP provides the opportunity to faculty, administrative personnel, staff, and community members to work together towards the goal of recruiting underrepresented minority students to pursue college education in STEM disciplines, as indicated:
    - An increasing number (59 STEM faculty members at CSU, alone) of committed faculty members devote their time and energy to travel to national conferences to recruit more minority students to Colorado and hire them in their laboratories.
    - Faculty members interact with the CO AMP director, coordinator, and staff to work on grant proposals that will enhance diversity in their respective departments and bring more minority students to their research laboratories.
    - Continuing the development of a CO AMP Steering Committee at each partner institution to disseminate CO AMP goals and objectives in the STEM departments. The Steering Committee increases the pool of faculty and department heads that are actively engaged with the recruitment and retention activities to enhance diversity in their departments.

- **K-12 Outreach Activities:** CO AMP provides the opportunity to the 14 institutions and the 4 Native American tribes involved in the alliance to reach out to younger students and introduce hands-on math and science activities, as well as exposing them to the engineering concepts.
    - Summer outreach programs at most of the CO AMP partner institutions have brought underrepresented young students from elementary, middle and high school to the college environment. Summer camp programs were conducted at Fort Lewis College, Metropolitan State College, Colorado State University, Colorado School of Mines, Colorado State University – Pueblo, University of Colorado – Boulder, and the University of Colorado – Denver. Each camp consisted of 30-50 students from areas surrounding the campus. These programs invited parents, teachers, counselors, and community members to be part of the students' support system by attending workshops and a concluding symposium to

celebrate the students' success. This broad support is essential to effect the long-term cultural and academic change.

- **Research Experience for Undergraduates:** CO AMP provides opportunities for research experience for undergraduates at most of the partner institutions, including community colleges. In addition, other retention programs such as mentoring, advising, and social interaction during recognition dinners, strengthen the relationship between students and faculty and strengthen retention.

- **Placement in Graduate School:** CO AMP student's academic progress and their undergraduate experience with research encourage them to pursue graduate studies in STEM disciplines.

- **Cultural Awareness:** The nature of the science and engineering curriculum in the United States is frequently not compatible with the culture of our minority students and the way they have been raised. CO AMP provides opportunities to discuss cultural issues, helping the students recognize and manage the differences between their culture and STEM education. Students learn that it is possible to comfortably maintain and promote their culture and traditions, while pursuing their STEM education.

- **General Awareness:** CO AMP recognizes the needs of minority students, and provides academic, financial, cultural and logistical support to help underrepresented students achieve their STEM degree. In addition, CO AMP assists faculty and staff to recognize the untapped potential of underrepresented students in STEM disciplines.

- **The Bridge to the Doctorate** (BD) program's primary goal is to build well-qualified, highly-competitive STEM education and research scholars to enter the professoriate and become role models for other diverse students. CO AMP started Cohort I of the BD program this fall of 2006.

- **Centralization of Diversity Initiatives:** Colorado State University has created a new administrative infrastructure that has brought significant change to the way the university recruits, retains, and graduates underrepresented doctoral students in Colorado. At CSU, the CO AMP offices have been linked to the AGEP activities and other federally funded initiatives, and are centralized and implemented through the office of the Vice Provost of Graduate Studies. Centralizing all the diversity initiatives at the university level will expand the structure of the implementation of these initiatives to support the CSU strategic plan of enhancing diversity. Also, centralization will assist CSU administrators and deans to institutionalize many of CO AMP activities to insure continued support of underrepresented students after NSF funds expire.

- **Engineering Research Centers at CSU:** Colorado Alliance for Minority Participation activities and momentum has been the catalyst to bring more funding. Examples include the Alliance for Graduate Education and the Professoriate, CSEMS, IGERT, Engineering Research Center for Collaborative Adaptive Sensing of the Atmosphere (CASA), Engineering Research Center for Extreme Ultraviolet Science and Technology Laser and the

Center for Multi-scale Modeling of Atmospheric Processes (CMMAP) and other research opportunities across the 14 partner institutions.

- **Curriculum Development** and academic excellence workshops have been developed to provide extended calculus, physics, and chemistry workshops to enhance students' academic performance in these disciplines. In addition, weekly self-management and leadership classes have been designed to develop students' leadership qualities and communication skills. Professional development workshops have been provided to encourage the students to pursue graduate studies. In addition, several travel opportunities for students and faculty have been provided to attend regional and national conferences to present their research findings.

- The **Community Colleges** introduced research opportunities for undergraduates at the freshmen and sophomore levels. At Trinidad State Junior College the CO AMP biology internship program has been very successful since its start in 2001. Students from Trinidad Community College were recognized for their excellence in Biological Research at the TriBeta National Biennial Biology Conference, held summer 2006 in Melbourne, Florida. Several other students have been selected to participate in the Bridges to Biomedical program at CSU –Pueblo. The CO AMP research program at the junior and community colleges help to give minority students the background and incentive to apply to research institutions to complete their bachelor degree and to pursue graduate study in STEM disciplines.

- **International Initiative:** In the summer of 2006, the CO AMP program at CU in Colorado Springs (UCCS) hosted a group of 16 exchange students from Taiwan. UCCS CO AMP is in the process of developing a transfer program for CO AMP students to go to Ching Yung University in Taipai. The international partnership program with Cing Yun University, supported by the UCCS College of Engineering, is a wonderful opportunity for our minority students to study abroad. Room and board will be provided by Ching Yun University. Students will have the opportunity to tutor English and have an international internship.

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