

OKLAHOMA LOUIS STOKES AMP

Oklahoma Louis Stokes Alliance for Minority Participation in
Science ↔ Technology ↔ Engineering ↔ Mathematics



**2003 Report for
Performance Effectiveness Review**

**To
Division of Education and Human Resource Development
Alliances for Minority Participation**

**at
NATIONAL SCIENCE FOUNDATION
ARLINGTON, VIRGINIA**

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**Oklahoma Alliance for Minority Participation
"PERFORMANCE EFFECTIVENESS" REVIEW (P.E.R.)**

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The National Science Foundation

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Arlington, VA 22230

2003

PERFORMANCE EFFECTIVENESS REVIEW

**Oklahoma Louis Stokes Alliance for Minority Participation in
Science, Technology, Engineering, and Mathematics
(OK-LSAMP STEM)**

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INTRODUCTION

The Oklahoma Louis Stokes Alliance for Minority Participation was formed in 1994 under the leadership of Oklahoma State University and the Oklahoma State Regents for Higher Education. The administrative staff consists of the Program Director, Program Manager, Data Manager, Evaluator, and Secretary. Each Partner Institution has a Campus Coordinator and, in some instances, an Assistant Coordinator or a Graduate Liaison. Only the Lead Institution has a full time Campus Coordinator. Staff turnover is low which is good for the program, with changes over the past three years due mainly to retirement and relocation.

The unified focus of the Alliance is to implement initiatives aimed at increasing the number of students from underrepresented populations (Native American, African American, Hispanic, and Pacific Islander) who receive baccalaureate degrees in Science, Technology, Engineering, and Mathematics (STEM). Specifically, the program aims to maintain a minimum 15% increase annually in the number of under-represented minorities enrolled and graduating in STEM disciplines, expand research opportunities, and expand the graduate preparation program. A highly skilled scientific workforce is vital for this country to remain the leader in advancements that impact virtually every facet of human existence. It is projected that needs in science and engineering will increase by 44% or by 1.36 million jobs in the 1996-2006 decade. In lieu of changing demographics, efforts to increase minority participation in STEM disciplines cannot be overemphasized.

Success of the Oklahoma AMP is measured ultimately by the graduation rate and by the number of students enrolling in STEM graduate programs in preparation for faculty and research positions. Program evaluation shows that the Partner Institutions are making good progress in graduating underrepresented STEM majors within five (5) and six (6) years. By utilizing a variety of methods to track graduates, more than forty (40) former scholars are known to be enrolled in graduate programs. One (1) Ph.D. was awarded in 2002-2003, making a total of three (3) Ph.D's during this 2nd phase of the program. At least three (3) former scholars are known to be nearing completion of the doctoral degree.

The current OK-LSAMP partnership includes ten (10) institutions. Among these are three (3) research universities - *Oklahoma State University* (Lead Institution), *University of Oklahoma*, and *University of Tulsa* (a private institution); the state's only historically African American university - *Langston University*; one metropolitan and urban university - *University of Central Oklahoma*; and five (5) regional universities of the state system: *Cameron University*, *East Central University*, *Northwestern Oklahoma State University*, *Southeastern Oklahoma State University*, and *Southwestern Oklahoma State University*.

While the majority of participants matriculate at Partner Institutions, they may be enrolled at any of the state's 27 colleges and universities. Thus far in Phase II (1999-2004), participating Affiliate Scholars have matriculated at six (6) non-partner institutions. These are St. Gregory's College, Northeastern University, Oklahoma City

University, Oklahoma Christian University, University of Science and Arts of Oklahoma, and Tulsa Community College. *In 2002-2003, Alliance institutions enrolled more than 4000 students from underrepresented populations pursuing STEM majors (See Table1 below). At the program’s inception, this number was less than 2000.*

Class	<u>African American</u>	<u>Hispanic</u>	<u>Native American¹</u>	<u>Pacific Islander</u>	<u>Minority²</u>	Total
<u>Community College</u>	0	0	0	0	0	0
<u>Freshmen</u>	392	170	466	6	1	1,035
<u>Sophomore</u>	309	120	416	12	0	857
<u>Junior</u>	269	110	409	17	1	806
<u>Senior</u>	439	224	621	31	1	1,316
<u>Unknown</u>	0	0	0	0	0	0
<u>Total</u>	1,409	624	1,912	66	3	4,014

At the inception of OKAMP in 1994, the number of students from under-represented populations in STEM majors was less than 2000.

PROGRAM PERFORMANCE

Toward realization of program goals, varied Alliance activities that lend to a supportive and instructional environment are in constant motion. These activities include 1) intense efforts to recruit students who are qualified as well as qualifiable 2) development and revitalization of academic and social/emotional support mentoring programs 3) expanded research opportunities through summer internships and academic year programs 4) increased interactions with STEM faculty, graduate students, and professionals associated with various research facilities and agencies 5) increased memberships in professional societies and participation in local, regional, and national meetings, and 6) strengthening relationships with ethnic minority communities and tribal entities, thus impacting favorably on future program recruitment and retention. Freshman and sophomore students are generally required to participate in weekly small group sessions called *cadre* meetings.

OK-LSAMP research opportunities are greatly expanded in Phase II. Students are expected to participate in a designated Mentoring Component that requires:

- Current enrollment as a continuing undergraduate student in an eligible STEM discipline
- At least one semester’s participation in a designated group (*cadre*, etc.)
- Maintenance of the minimum GPA for OKAMP participation
- An established working relationship with a mentor

Students are expected to identify with a mentor, who is sometimes the Campus Coordinator (since most of the coordinators are tenured or tenure-track faculty). An outline of research activities must be prepared under the direction of the mentor and submitted to the campus coordinator or his/her designee. The outline includes a description of the research and other scholarly work in which the student will be involved, along with the specific number of hours per week. Weekly activities typically include informal meetings with the mentor, training in basic laboratory skills as well as specific techniques pertinent to the particular research, literature reviews, and attendance at departmental seminars and colloquia. At the end of the semester, the scholar is required to submit a summary or progress report to the Campus Coordinator. Faculty mentors are asked to complete a brief evaluation form near the end of the semester. For the most part, evaluations are very good.

At the inception of Phase I of the Oklahoma AMP program in 1994, the baseline number of STEM graduates from under-represented populations in the state was 214. In 1999, Phase II began with a baseline that had increased more than 100% to 438. Each succeeding year of Phase II has Throughout Phase II, the number of underrepresented STEM graduates has consistently increased to *510 in 1999-2000; 571 in 2000-2001; and 587 in 2001-2002. In the 2002-2003 academic year, the number was 593 (See Figure 1 below).*

**Oklahoma Alliance Underrepresented Minorities STEM Bachelor's Degrees Report
Race/Ethnicity by Academic Year**

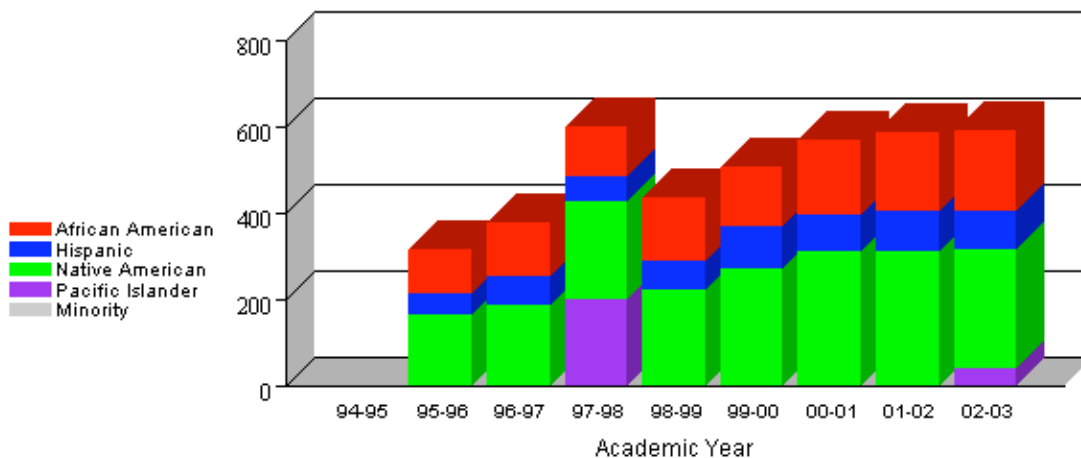


Figure 1: Baccalaureate degrees in STEM fields from the 1994 baseline of 214. This includes all Partner and Affiliate Institutions in the Oklahoma AMP program.

Figure 2 below shows that the top majors among the 593 graduates of 2002-2003 were: Engineering, 232 (39.1%); Life Sciences, 117(19.7%); Computer Science, 116(19.6%); Mathematics, 52(8.8%); and Agricultural Sciences, 30 (5.5%). Most of the degrees were awarded to Native Americans (46.9%); 31.7% to African Americans; 14.5% to Hispanics; and 6.9% to Pacific Islanders.

**Oklahoma Alliance Underrepresented Minorities STEM Bachelor's Degrees
Academic Year 2002-2003/Reporting Year 2003
Discipline by Race/Ethnicity**

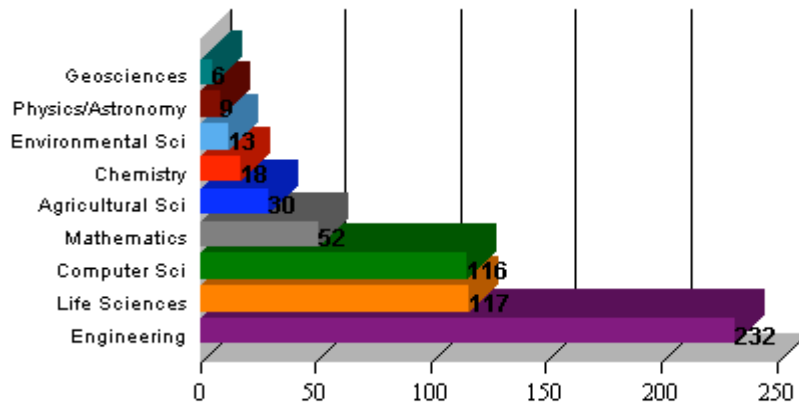


Figure 2.

In terms of gender, as shown in Figure 3 below, 366 or 61.7% of the 593 baccalaureate degrees were awarded to males and 227 or 38.3% to females.

**Oklahoma Alliance Underrepresented Minorities STEM Bachelor's Degrees
Academic Year 2002-2003/Reporting Year 2003
Gender by Race/Ethnicity**

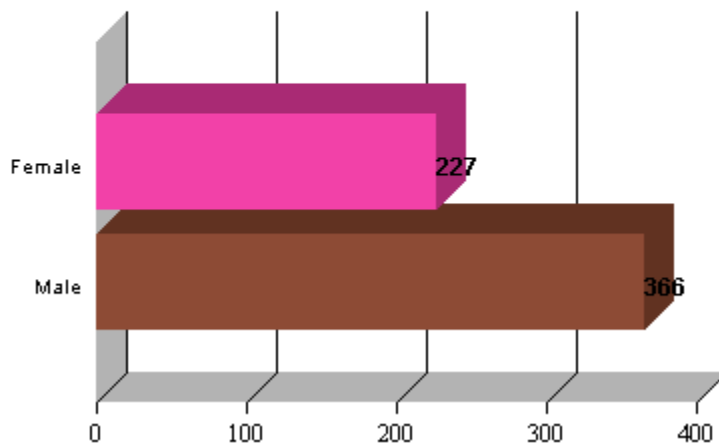


Figure 3.

VALUE ADDED FOR INTER AND INTRA-INSTITUTIONAL PROGRAMMING AND COHERENCE

Intra-Institutional Value Added

Through Alliance collaboration, Partners have continually improved and expanded program resources and initiatives at their respective campuses. Many resources are available among faculty, staff, undergraduate and graduate students, and community leaders. On orientating new students to college/campus life, issues and concerns are addressed in the form of workshops, panels, group discussions, or talks. Some of the areas that are consistently addressed are study, listening, and note-taking skills; time management; campus/community involvement; selecting a major; safety; managing finances; etiquette and social skills; graduate school preparation, and mentoring (peer-mentoring, faculty and staff).

Ways are constantly sought to align OK-LSAMP activities with other campus programs and events. For example, scholars frequently serve as tutors and lab assistants in various STEM departments during regular semesters and for special summer programs; assist in planning annual programs for groups such AISES and for designated events scheduled by Native American, African American, and Hispanic student groups. Other programs and funded projects in STEM departments seek out OKAMP scholars for special summer opportunities.

Interdepartmental collaboration is strongly emphasized. Student research projects might involve up to three departments, such as mathematics, biology, and agriculture; or computer science, chemistry, and meteorology. Collaborative research enhances the ability to think critically, impacts on quantitative skills, and broadens laboratory skills.

In an effort to increase student participation in professional meetings, more of the partner institutions are hosting their own research symposia. This helps in developing presentation skills, overcoming stage fright, and answering questions.

Inter-institutional activities across the Alliance included:

The cultural impact of having underrepresented minority students involved in research and presenting papers is a major component of the value added. During the past year, scholars made an impressive number of presentations at a variety of meetings (See page 13).

Communication among the entire OKAMP is practically a daily occurrence. In addition, four (4) roundtable meetings are scheduled during the academic year and held at a central location which is the Oklahoma Regents for Higher Education Building in Oklahoma City, OK. At each meeting, problems and concerns are addressed; innovations discussed; and updates provided from each program sector. Frequent collaboration has resulted in more effective and productive ways to continuously improve all aspects of the program.

Partner institutions continue to implement the three essential programs (Summer Bridge, Scholars Program, and Summer Research Internship) with similarities and differences appropriate to each campus. During summer '03, bridge programs, in most cases, were modified to one- or two-day workshops due to lack of additional funding.

Inter-institutional value is also added through:

- Centralized data collection and management
- Centralized program management
- Student participation in professional meetings held at Alliance Institutions
- Tracking OK-LSAMP graduates
- Use of graduate school preparation modules
- Assistance in submission of competitive applications for summer internships

Regarding graduate school preparation, modules have been developed that are utilized across the Alliance. These modules incorporate graduation preparation from the freshman year through completion of the baccalaureate degree. Through on-line courses, students have opportunities to collaborate with peers and mentors. Upon reaching the junior and senior years, students began to focus on required graduate entrance exams and the total application process. Detailed information provided on entrance exams covers the *what* and *why* of the exam; cost; format; skills covered; scoring; how to prepare for the exam and practice resources.

STUDENT ACHIEVEMENTS AND COMMENTS

Ph.D. Recipient

Edward Daniel earned the doctorate degree in Electrical Engineering at Oklahoma State University in July 2003. He came to Oklahoma to become an electronics technician. During his time at OSU from undergraduate through graduate school, Ed received more than 30 scholarships, fellowships, awards, and recognitions.

“OKAMP provided financial assistance that enabled me to complete my undergraduate degree and provided opportunities to engage in summer research. Through the research experience, I was paired up with a mentor who became my Ph.D. Advisor.”

*Edward Daniel, Ph.D., July 2003
Electrical Engineering, OSU*

Tribal Councilwoman

Cara Cowan (BS, Mechanical Engineering, OSU; MS, Telecommunications Management, OSU), former OKAMP scholar, was recently elected to represent the Cherokee Nation's 7th District. Cara was a founding member of the OK Professional Chapter of AISES (American Indian Science & Engineering Society), Co-founder of the Tulsa-Northeastern Chapter of the Society of Women Engineers, and a member of the Native American Chamber of Commerce of OK. She has been employed as a Telecommunications Engineer at Witel Communications since 1999.

Comments from Congressman Brad Carson (Excerpts from letter to Cara Cowan, Cherokee Tribal Councilwoman)

“Thank you for...requesting my support for programs that support minority students, such as the Louis Stokes Alliance for Minority Participation. I am certainly aware of the good work AMP has done in supporting deserving young students...earn their undergraduate degrees in science, technology, engineering, and mathematics...As Congress considers programs designed to support minority students, you can count on my continued support for these programs.”

(Congressman Carson - United States Representative - 2nd Congressional District of Oklahoma).

COLLABORATIVE AGENCIES

Collaboration with various agencies and individuals is frequent and benefits the program in many ways. Persons from different academic departments and other programs participate via presentations throughout the academic year as well as during the summer at OKAMP activities such as the Annual Research Symposium, scholars meetings, cadre meetings, and Bridge Programs. As a result of program publicity and the academic achievements of participating scholars, research faculty and local research agencies notify the program about opportunities available to deserving students. During the summer, such opportunities were afforded by Oklahoma EPSCoR, Department of Plant and Soil Science at Oklahoma State University, various STEM departments at the University of Tulsa, and the Robert S. Kerr Environmental Research Laboratory other Faculty and other mentors generally welcome the opportunity to participate in the academic preparation of OKAMP students.

Oklahoma EPSCoR (Experimental Program to Stimulate Competitive Research) funded two (2) paid internships at \$5,000 each for Alliance students under the mentorship of Functional Genomics Scientists in summer '03. In Spring '03, EPSCoR provided 100% funding for ten (10) OKAMP scholars and two (2) faculty mentors to attend the *National Conference for Undergraduate Research (NCUR)* in Salt Lake City.

The Alliance maintains a close working relationship with faculty at Seminole Junior College, Oklahoma City Community College, Redlands Community College, and select high schools. Some promising students have been recruited from these institutions.

Oklahoma State University Campus Coordinator and Bill Gates Scholarship recipient, Valerie Shangreaux, is involved with dissemination of Bill Gates Scholarship information. This involvement enables the Alliance to play a key role in providing high school students, parents, and school officials with accurate and updated information relative to the application process.

The Alliance maintains a strong collaboration with the Multicultural Engineering Programs (MEP). In spring 2003, OKAMP students and staff participated in all aspects of the program that was planned and implemented for Native American Students

weekend. MEP provides continuous assistance in the dissemination of program information.

AMP-SUPPORTED STUDENT ACTIVITIES

Scholars Program participants received regular semester stipends ranging from \$500 to \$1500 (some students were beneficiaries of special awards for outstanding scholastic achievement as well as a *Senior Incentive Award* of an additional \$500 for seniors if accepted into graduate school during the senior year); Summer Research Interns received stipends between \$2500 and \$3000 for 8 weeks; Bridge Program college preparation workshops (Survival Skills) provided \$200 stipends each to a total of 19 participants, and tutors were provided as needed at \$15 an hour. Additionally, students received financial support to attend more than 15 professional meetings.

At one Partner Institution during the past summer, five (5) Alliance scholars were awarded paid internships by EPSCoR, Howard Hughes program, and the Oklahoma State University Department of Plant and Soil Science. When opportunities arise, they are communicated to alliance staff and students.

AMP-SUPPORTED FACULTY DEVELOPMENT ACTIVITIES

By mentoring undergraduate research students from under-represented populations, faculty were provided increased opportunities to enhance teaching/mentoring expertise; expand research projects by having additional trainees (OKAMP Scholars) in their laboratories; and to dispel misconceptions and raise the level of awareness relative to the abundance of untapped talent among the rapidly increasing minority population.

AMP-SUPPORTED CURRICULUM DEVELOPMENT AND RELATED ACTIVITIES

The program heightens awareness of the minority presence along with the need to strengthen and implement programs and services that more effectively address cultural diversity. The program has developed a GRE preparation module and a presentation entitled 'Decision to go to graduate school' that has benefited various academic areas. Also, various survival skills workshops (pertinent to money management, business and professional etiquette, learning how to learn) serve as prototypes or enhancements for some institutional programs. The impact of the Annual OKAMP Research Symposium has motivated some partner institutions to implement a similar activity on their campuses, thus impacting favorably on the interest level in the STEM disciplines.

SUMMER BRIDGE AND RELATED OUTREACH

With financial support from the Oklahoma State Regents for Higher Education, this current phase of the program has particularly addressed the critical *bridge* from high school to college. The program has also emphasized transitioning from 2-year to 4-year college, and from 4-year college to graduate school and advanced study in STEM fields.

One Residential Summer Bridge Program, funded by the Oklahoma Regents, was hosted by Langston University. These were actually carry-over funds from summer '02 due to illness of the campus coordinator.

Recruitment efforts for the Summer Bridge were coordinated with those of the Langston University Recruitment Office. The twelve (12) students identified through this office had previously expressed interest in STEM-related career fields and met the academic requirements specified by the Program. Eight (8) other potential participants were recommended by Langston University faculty and staff as well as by science teachers at Millwood High School and Northeast Academy for Math and Science – both high schools located in Oklahoma City.

Of the twenty (20) application packets mailed, eleven (11) students responded – seven (7) African American females and 4 African American males. Two (2) males withdrew their applications before the screening of applicants began. Of those remaining, seven (7) females and two (2) males were accepted. One (1) male and two (2) females declined our invitation because of summer jobs and one (1) male elected to participate in another Langston University summer program.

The following five (5) students were admitted to the university and to the Program.

Breckenridge, Melanie C., Hennessey High School, Hennessey, Oklahoma; interest in Biology

Buxton, Latasha S., Booker T. Washington High School, Tulsa, Oklahoma; Biology interest

Jackson, Chasity J., Lawton High School, Lawton, Oklahoma; Biology interest;

Franklin, Raniesha C., Northeast Academy of Math and Science, Oklahoma City, Oklahoma
Field of Interest, Management Information Systems

Majors, Contessa S., Lawton High School, Lawton, Oklahoma; Biology interest

Program Activities and Outcomes

The students were enrolled in College Algebra and English Composition I and successfully completed the courses. All five of these students are continuing their freshmen studies at Langston University.

Program Recommendations

A petition will be submitted to the Dean of the College of Arts and Sciences, asking his consideration of a request that Bridge students be allowed to enroll in general education Honors classes. Should the Bridge students' performance in their summer courses justify such placement, we feel this would be a value-added program component as well as an opportunity for the students to experience higher level academic challenges in the early phases of their college work.

Other Bridge Activities

Other bridge programs were Survival Skills Workshops that provided stipends of \$200 each to 19 participants who had been accepted at an Oklahoma higher education institution.

OTHER AMP-SUPPORTED ACTIVITIES

Toward increasing program awareness and expanding recruitment efforts, the program encourages volunteerism within as well as external to the campus community. Some Scholars tutor high school students, serve as guides for prospective students and parents on campus visitations, assist with charity and other fundraising campaigns, and participate in tribal and other activities. These involvements afford excellent opportunities for one-on-one networking.

ALLIANCE HIGHLIGHTS

Research Experiences:

Scholars participated in summer research programs and internships at *Oklahoma's research and regional universities; Inroads, Mercy Health Center (Oklahoma City); Advanced Systems Technology; Dynamic Research Corporation; Fort Sill Oklahoma's Natural Resources and Environmental Division; Robert S. Kerr Environmental Research Laboratory; University of Michigan (Ann Arbor); General Motors; Mercury MerCruiser; Exxon Mobile Drilling; Haliburton; US Army Corp of Engineers; Choctaw Nation; U.S. Fish and Wildlife Service; Weyerhaeuser, Inc.; U.S. Department of Agriculture; 3M; Ford Motor Company; Department of Transportation; Boeing; UPS; Praxair, and the Biomedical Research Infrastructure Network.*

Three (3) of OKAMP Scholars completed summer internships at the following National Laboratories: *Stanford Linear Accelerator Center (SLAC), Sandia National Laboratory, and NASA's Glenn Research Center.*

Presentations:

Oklahoma AMP students made presentations at the following Oklahoma conferences: Oklahoma LSAMP Annual Research Symposium; Research Day for Regional Universities; Oklahoma Academy of Science; National AISES Conference; Oklahoma Chapter, American Fisheries Society; Oklahoma Clean Lakes Association; Oklahoma Academy of Science Field Meeting; Southwestern Oklahoma State University Research Fair; Langston University School of Arts and Sciences Annual Research Symposium.

Presentations were made at the following *out-of-state* meetings: National Association of Mathematicians Undergraduate MATHfest; National Conference for Undergraduate Research (NCUR); American Biomedical Research Conference; American Chemical Society; Annual Joint Meeting of Beta Kappa Chi Scientific Honor Society, National Institute of Science and the Brookhaven Semester Program; Las Cruces, NM AMP meeting; and the national SACNAS meeting.

Former OKAMP Scholar Funds OSU Scholarship

Former Scholar, Mita Young, (2001 Management & Informations Systems graduate) has funded a scholarship at Oklahoma State University called the Mita Young Endowed

Scholarship Fund. Young, who is giving \$2,500, is employed by ExxonMobil who will match the scholarship 3:1.

ALLIANCE ACCOMPLISHMENTS:

- Two hundred twenty-six (226) students were supported during academic year 2002-2003
- Sixty-six (66) scholars participated in summer research programs and internships
- 593 baccalaureate degrees were earned, with the highest numbers in the fields of engineering, life science, computer science, mathematics, and agricultural sciences
- One (1) Ph.D. was earned in July, 2003 (Edward Daniel, Electrical Engineering, Oklahoma State University).
- Scholars attended and made presentations at 16 local, regional and national conferences
- A total of 24 students participated in residential and non-residential bridge programs

ALLIANCE OBSTACLES:

Although the Oklahoma Regents provided funds that sustained Residential Summer Bridge programs through summer '02, the acquisition of additional non-federal funds by the Alliance was inadequate to support these programs as in past years. The Oklahoma State Regents for Higher Education had to cut higher education budgets by 11%; thus, matching funds committed were eliminated. While the funding shortfall did not eliminate bridge programs altogether, programs were modified to several one-day college preparatory workshops.

Change of major to a non-STEM discipline is not uncommon. Among the reasons are inability to cope with the rigorous demands of STEM fields and job market opportunities afforded by other disciplines.

Attractive starting salaries lead a significant number of students, particularly engineering majors, to enter the workforce rather than graduate school. On the other hand, a significant number of those who enter graduate school tend to pursue the MBA in anticipation of managerial positions.

Program Evaluation

