

**Final Report ASTC Program
DE-FG03-92ER75768**

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MASTER

The specific goals of the ASTC program were:

- to pilot and administer a year round program to engage and support ethnic minority and women students to enter the pre-college teaching profession.
- to develop the ASTC program across California on all twenty CSU campuses.

The initial goal of piloting a year round program to engage and support ethnic or underrepresented science students to enter the teaching profession was put in place at CSUS in the Fall of 1993, with the recruitment of students to enter the program in the Spring of 1993. Three students were selected to enter the program, one male Latino, one female Latina and one Caucasian female. The areas of study of these students was respectively biology, physics and geology. All of the students were within two years or less of completing their degree requirements.

During the first semester of the program we worked on the portion of the model dealing with student participation in the schools with a mentor teacher. The idea being the students would spend a minimum of six hours a week in the classroom of the mentor teacher working with them and their students. In addition the students were assigned to a faculty mentor within their discipline, a person whom they could go to for help and support in their academic efforts.

In the first semester we learned that the model we were proposing for the students participation in the classroom of the mentor was not going to work. It would not work because we had a requirement of participation in the program that the students would carry a full academic load. With all of them enrolled in laboratory based courses this made it very difficult for them to schedule or devote the time to the public school assignment, although they tried it was not turning out to be the kind of experience we wanted them to have. This part of the program was modified in ensuing semesters so the ASTC students spent the entire month of January all day in the classroom of their mentor working with them and with the mentors students. This worked very well and gave them an excellent perspective of what teaching was about and what they would be confronted with. The mentor teachers felt that this was a much better model both from what they were able to do with the students and for the quality of the experience for the ASTC students. We used this model during the remainder of the program with the students in the classroom during January of 1994 and at least one of them during January of 1995, after the grant had ended.

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In lieu of the students working in the mentor classrooms during the university semester we asked them to spend time in the tutoring centers on campus in their discipline areas. This

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provided them some contact with students, albeit university students, and opportunity to hone their own understanding of their own discipline.

During the Summer all three of the ASTC students worked at Lawrence Livermore National Laboratory (LLNL) in physics, biology or geology related projects. They also took part in the labs educational program for student interns which included attending weekly seminars and participation in short courses on technical writing and research methods.

In the Fall of 1994, the Latina physics student transferred to the University of California, Berkeley. However we had recruited three additional students, a female, African American chemistry major, a Caucasian chemistry major, and a Caucasian geology major to joint the program.

During the Fall of 1994 application was made for another year of funding which was granted and we were moving toward the implementation of the grants goal of adding additional students to the program each year.

During January all of the students except for one of the female geology majors worked in the classrooms of their mentor teachers for the entire month. The one student who did not continue with the program was hired by LLNL to work full time at the lab. This was a problem we had foreseen as a possibility and we had to accept that not all of the students who entered the program would necessarily opt for a career in education. The one good thing about it is there is one more female working in science that might not have been there if it were not for her experiences in the program.

During this second year of the program we encouraged the students to attend professional meetings and conferences in their discipline areas and to attend professional education conferences in the area such as the NSTA conference held in the Spring of 1994 in Anaheim, California. We also encouraged their university faculty mentors to involve them in any similar activities they were participating in.

In the Fall of 1994 we were advised that it was not likely that DOE would be able to continue to fund our project or others of its nature because of funding cuts in Washington. Based upon this we decided to not recruit additional students into the program for the Spring 1995 semester and attempt to make the funding we had go as far as possible toward getting the students through their degree programs. The only exception to this was a male Hmong chemistry major who was almost ready to enter the credential program. He was brought on board and started immediately in the credential program.

At the end of the Spring semester we had a total of five students in the program and a commitment from both LLNL and Lawrence Berkeley Laboratory to provide summer employment for four of the students. Three went to LLNL and one to LBL. Our Hmong student was able to find summer employment in a local hospital as he was not able to leave his family.

At the end of the summer all of the students returned to school and working under a no cost extension of the grant we were able to fund them through the Fall 1995 semester. During January of this year one of the students was able to work in the classroom of his mentor teacher even though the grant had ended.

In summary, a total of seven ethnic minority or female students in science were enrolled in this program from January of 1994, to December of 1995. Two of the students left the program at some point after having started, one transferred to another university and the second to take a job at LLNL. The biology major will graduate in June 1995, as will the Caucasian chemistry major and Caucasian geology major. The African-American chemistry major will not graduate until Spring of 1996. The Hmong student will receive his teaching credential in May of this year. The graduating geology major is planning to attend San Jose State University to obtain a teaching credential and a masters degree under the tutelage of her mentor at LLNL. The biology major and graduating chemistry majors are planning on entering the credential program at CSUS in the Fall of 1995.

A review of the specific objectives we set out to achieve :

- recruit high ability ethnic minority and women students to the program,
- provide emotional, financial, academic and professional support for the students.
- assign each student to a faculty mentor at the university and a mentor teacher in a local school where the ASTC student will work six hours a week tutoring students and assisting in the classroom
- provide each student a 10 week summer experience working at one of the National Labs.

shows they were met although, because of the elimination of funding to DOE, we were not able to fully implement the program. However, the lessons learned will provide the ground work for future efforts in obtaining funding from either granting agencies, school districts or industry to continue this effort to bring qualified minorities and women into science education.

Another key goal of the project, in cooperation with the other three CSU's who had obtained similar funding, was to try and establish a similar program on the 20 California State University campuses. However this goal has not been obtained as we were unable to clearly establish the program in the system with the abbreviated time to develop the model and implement it. The good thing is that we have a very clear idea of what works and how it should be implemented based upon this grant.

ABSTRACT

SCATS

Schools and Colleges for Advancing the Teaching of Science
California State University, Sacramento

"Access to Science Teaching Careers"

California schools have changed: the majority of students in public schools are of ethnic background that we still referred to as minority. It is estimated that over half of this new majority now entering junior high school will not graduate from high school. It is clear these students are at risk in our schools. In particular their participation and achievement in science and math are still on the decline in spite of considerable effort by both State and Federal agencies. The concern in California with bringing minorities into the mainstream of science education is no longer an equity issue, but as stated by the Federal Task Force on Women, Minorities and the Handicapped in Science and Technology (September 1988) "It is the key to future national strength in science and technology." Universities in general are not enrolling and graduating enough students in science and engineering. With our pool of students coming out of high school increasingly made up of ethnic minority youth we must rely on them to be our future scientist and engineers. However, college attendance in science and engineering by African American, Hispanic and American Indian youth has slowed in recent years. In addition women are still significantly under represented in university science and engineering programs. It is clear in California that we must turn this around and engage minority youth and women in the study of science.

Significant to the problem is that minority students and women are not currently pursuing programs which will lead to a career in middle or high school science teaching. Yet the need for Hispanic, African-American, American Indian and women science teachers in California schools is critical. If we are to impact more minority and women students to pursue careers in science and engineering our Universities must provide more minority and women teachers to show the way and inspire these students to succeed. California State University, Sacramento, (CSUS) working through the SCATS Center in collaboration with Lawrence Livermore Labs, Sacramento City and San Juan Unified School Districts are running a pilot program to address this issue. The program actively recruits minority and women science students to become secondary or middle school teachers. The program is currently providing support to two males, one Hispanic (biology) and the other Hmong (chemistry), and three women students, an African-American (chemistry), and two Caucasians (Chemistry and Geology) who have decided to become high school science teachers. The program includes an assured level of financial support, special mentoring at the university level in science content and other areas, an enriching experience at Lawrence Livermore or Berkeley Labs working on a research project in their area of interest and an in-depth opportunity to work with students in the classroom of a middle or high school mentor teacher. This pilot program is providing us with a better understanding of how CSUS and the CSU system can better address this critical problem for California education. It will also provide the foundation for developing long term financial support from the U. S. Department of Education, the State of California, local industry and school districts to carry out the program here and at other CSU campuses.