

THE FERMLAB SUMMER PROGRAM FOR MINORITY STUDENTS

The Equal Employment Opportunities Staff
and
The Summer Program Committee

Introduction

For the past six years, Fermilab has carried out a summer program for minority students in science. The program has evolved considerably in this time and the purpose of this report is to tell the development of the program and to acquaint the reader with its successes and failures. The program is operated by the Fermilab EEO Office with a Summer Program Committee of technical staff members choosing students and work assignments, advising on the operation of the program, and acting as liaison to the rest of Fermilab.

The underrepresentation of minorities in science and engineering is well documented (for example, in Ref. 1). Although minority races are 17% of our population, they account for less than 2% of scientific and technical personnel. The primary objective of the Fermilab program is to stimulate minority students' interest in pursuing a career in science in order to attempt to reduce this great disparity in representation. We bring approximately twenty students to Fermilab for some ten or eleven weeks to bring them in contact with technical work and technical workers, so that they will learn for themselves the attractions of a scientific career.

Assignments

The key to our entire program is in the nature of the students' job assignments. When the program began, it was thought that students would

gain most by working as active technicians in a large group. For a student from a large university with its own research programs, assignment as a technician might be ideal, for it would complement his academic-year work and would teach him how to solder, drill, order from the stockroom, and all the many other things all of us do, but are never taught. But such a student from a large institution probably doesn't need the stimulation of our program at all.

On the other hand, there are many smaller minority institutions that do not have large research programs and cannot offer their students any contact with technical work outside their courses. It is these students we can help, by showing them that there are possibilities for interesting and rewarding careers in science. They need to have close contact with a technical adviser who can show them how the work they do on a project is related to the total purposes of the project and can serve as an example of how a scientist or engineer works at his profession.

Our feedback from students reinforces this lesson. At the end of every summer, we have solicited comments from the student participants concerning the program and their assignments. There has been an overwhelming consensus, and these comments have been instrumental in the evolution of the program away from "technician" assignments toward "student-participant" assignments.

To create these assignments, every winter the Summer Program Committee asks for proposals for assignments from Fermilab staff members. We ask the proposers to describe the work and any special qualifications

needed and to name a supervisor who will be available to the student for consultation and discussion. We receive more proposals than we have student places, so we attempt to choose those assignments that we judge will be of the largest educational benefit to the individual students. Good past experience with particular supervisors is a guide, but is not the whole story. There has always been room for new proposals. We will be happy to consider proposals from users for work here at Fermilab.

It may be noted that the nature of most assignments has changed. In earlier times, most students were involved in construction-related projects, whereas now most are involved in experiments or activities closely related to them. The number of assignments involving some computer work has also risen dramatically as more students are involved in experiments.

Recruiting of Students

We said above that students from large universities probably do not need our program. In addition, approximately three-fourths of the bachelor's degrees awarded to minority students in physics come from predominantly minority institutions. These institutions are therefore a good source of students for us. Over the years, we have established good relations with a number of these institutions, primarily in the South and Southwest. In the last year, we have also begun to take a few students from large institutions (URA universities). We believe that this mix of students will enhance their mutual educational opportunities. We are interested in receiving recommendations of worthwhile students from university faculty members.

Members of the EEO staff and the Summer Program Committee visit each campus and interview interested students. After consultation with faculty members, they choose two students from each institution to invite to our program. We have found the advice of faculty to be important, because they know their students' capabilities very well.

This technique of interviews at students' institutions may seem complicated and expensive, but we have found that it is all too possible without interviews to choose students who do not do well in our program. Our visits have the additional advantage that they open a window to a larger world even to those students who are not yet advanced enough to be chosen for our program.

The best time for a student to be in our program is between his junior and senior years. We take a few graduating seniors, but their career decisions have usually been made by graduation. It is more difficult to find good assignments for sophomores-juniors because they have not taken as many physics or mathematics courses. We take a few sophomore-juniors and work to find the right assignment.

This summer was a rarity in that we had no students returning for a second summer in the program. We have encouraged returning, but have found recently that the program's utility to a student decreases significantly after two years. We therefore discourage students from returning for a third year.

The pay we offer the students is adequate, but not sensational, because it is not our objective to provide them with a merely lucrative summer. We

also subsidize their housing and provide transportation. Almost all of our students depend to some extent on their summer earnings during the school year. But if a student's primary goal is to earn money, he will probably do better working and living at home. We hope that our students will be able to save some money, but will get even more in educational benefits of value in the longer range.

We are not the only summer program extant, and we find that there is some competition for the better students among the several programs. Our recruiting has been forced to move somewhat earlier in order to offer our program to the students as one of their possible alternatives. Recruiting is now usually finished by the end of January. When the students have been matched to assignments by the Committee, we inform each student of his prospective assignment and supervisor. The supervisor frequently also communicates directly with his student in the spring with information on how to prepare for the summer.

Summer Operation

We arrange for transportation of the students from their home to Fermilab, and return at the end of the program. We have housed them in dormitories at Aurora College, on the far west side of Aurora 15 miles from Fermilab. We would prefer to house the students at the Laboratory, but the shortage of on-site housing in the summer has made that impossible. The students need some way of getting from Aurora College to Fermilab and back. In past years we had bussed them, but this year we have been able to alleviate the difficulties of busing by providing several leased automobiles.

The students have worked out the sharing of these cars among them and have not abused the use of the cars.

When the students arrive, we orient them to the Laboratory and to Chicago (the largest city that many of them have ever seen), then take them to their supervisors. We continue to gather the students all together through the summer, first for a series of introductory talks by staff members on technical topics (electronics, high-energy physics, programming, statistics), then for reports by the students themselves on their works. These student reports have become an important part of the educational process, very much like an undergraduate seminar at a university. We also provide some electronic equipment for the students to experiment with.

Up to this point, this report may sound as if the summer program runs like a well-oiled machine. Any smoothness we now have has come after some years of trial and error. But even with our experience there are still problems that inevitably arise, of assignments that are wrong or misunderstood, of communications problems, and so on. The solution of these problems is usually worked out by the Program Coordinator. Professor James Davenport, Chairman of the Physics Department of Virginia State College has spent several summers at Fermilab in this capacity. Having someone available to handle these problems is important, because it means that they do not grow to the point where they ruin a students' entire summer.

Conclusion

Most of our recent students are still in school. Of the earlier summer-program participants (through 1974), a remarkable 40% are in graduate

school, and one fourth are still undergraduates. Another quarter have become scientists, engineers, or teachers. The Laboratory has hired three for its own staff. The remaining 10% have entered other careers. We consider this a good record of success in meeting our primary objective.

It is undoubtedly true that much more needs to be done in this field. But within the framework of Fermilab's commitment to physics, we have managed to help some minority students towards careers in science to alleviate the disparity in numbers cited in the introduction.

This report is a summary of the work of Kennard Williams, Joyce Downs, Robert Sykes, Warren Cannon, Roel Rodriguez, and Joyce Curry of the Fermilab EEO office, Richard Carrigan, Francis Cole, Eugene Fisk, E. L. Goldwasser, James Griffin, Fred Hornstra, Shirley Jackson, Cordon Kerns, Ernest Malamud, Frank Nezrick, Raymond Stefanski, Dennis Theriot, Timothy Toohig, and Herman White of the Summer Program Committee, and James Davenport of Virginia State College.

Reference

1. A. Wilburn, Science 184, 1148 (1974).
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