

G. E. FOUNDATION FACULTY FOR THE FUTURE PROGRAM AT TEXAS A&M UNIVERSITY

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INTRODUCTION

The GE Faculty of the Future program in the College of Engineering at Texas A&M University is focused on encouraging, supporting and increasing the participation of high achieving women and minorities who are typically under represented in engineering to earn the doctorate and enter faculty careers. This paper will describe the three components of the program which include; undergraduate student research with faculty members; graduate student fellowships; and junior faculty coupons. We will begin by stating the problem and giving some background information on our university, the College of Engineering and the GE Faculty for the Future Program.

THE PROBLEM

The United States of America is respected around the world for its graduate programs. The graduate experience in the U.S. is rated the best of any country, and this is particularly true in engineering and science. The enrollment of U.S. citizens in graduate engineering and science programs has continually declined over the last decade, and is especially obvious at the doctoral level. In addition, the enrollment of women and minorities in engineering and physical science still reflects very poor representation levels with respect to our increasingly diverse population. Ultimately, these trends are reflected in a concern over who will be doing the research in the U.S. and who will be the faculty at our universities.

Texas is in the front nationally of demographic changes that will dramatically affect the character of our public schools, universities, and work force. Today, Texas African American and Hispanic children represent the numerical majority of the fourth grade population. How we respond to these changes in Texas will profoundly affect the character of our society in the coming years. When African Americans and Hispanics in Texas come to represent the numerical majority of our population in the very near future,

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there must be in place the cultural expectation and realization that their full participation in engineering and science provides one essential foundation of our public, private and social institutions, particularly our major research universities and industry-based research and development centers.

The problem we are attempting to address with this program is that with a more and more diverse population filling up our classrooms, we have the need for a more diverse faculty. A more diverse faculty will help create better engineers and scientists for our society.

UNIVERSITY ENVIRONMENT

Of 41,461 students enrolled at Texas A&M, the College of Engineering represents 22% of the enrollment with 9,138 students. The student body of the university is now 44% female and 13% minority. Within the college which includes computer science and engineering technology as well as 10 engineering departments, women represent 1,460 of the undergraduate, 184 of the master level and 93 of the doctoral level enrollments. Minorities makeup 1,069 of the undergraduate, 58 of the master level and 39 of the doctoral level enrollment. In 1996, engineering and computer science awarded 1,118 bachelor degrees of which 234 were women, 118 were minorities; 363 master degrees of which 78 were women, 18 were minorities; and 143 doctoral degrees of which 10 were women, and 6 were minorities. The College of Engineering has 34 women and minority tenure or tenure track faculty out of the 367 such faculty. Of these 3 are African American, 14 are Hispanic, 3 are Native American, and 18 are female.

Texas A&M University is ranked 2nd in the U.S. in enrollment for B.S. degrees in engineering, 4th in Hispanics, 2nd in women. We are also ranked top 5 in the U.S. in graduation of B.S. degrees in engineering, top 5 in Hispanic and top 4 in women. Texas A&M ranks 6th in the U.S. in graduate engineering degrees granted to Hispanics, African Americans, and women.

THE PROGRAM

This program began in the Fall of 1991 and was made possible through the generous funding provided by the G. E. Foundation. The G. E. Faculty for the Future program includes three components: undergraduate student research, graduate student fellowships and junior faculty coupons.

Undergraduate Research Component:

The ability to fund undergraduates in research programs is the single most important factor in defining the character and representation of women and minorities on this nations' engineering and science faculty. The undergraduate research component of the

G.E. Faculty for the Future program provides an opportunity for participation by undergraduate students as a funded member of a faculty research team with the faculty member serving as the mentor on a major research project. The students serve not as lab assistants, but as an integral part of the research team. These experiences also give the students an opportunity to relate the knowledge they have gained in the classroom to actual research problems. It provides them an academic experience that incubates their interest and allows them to make an informed decision on their future. Participants are identified and selected from students at the sophomore, junior and senior levels within all engineering disciplines. Students with a 3.5 GPA and an interest in academia are targeted. After selections have been made, each participant is teamed with a faculty research mentor on a major research project. The students are allowed and encouraged to select their own research mentors for this program. By linking these students with a faculty research mentor the students gain a better understanding of what a research mentor is, how research is done, as well as gaining hands on experience. Students receive a stipend of up to \$4,000 for the summer. Participants are required to enroll in a 485 Problems course for which they receive three semester credit hours. Students are also encouraged to participate in the course entitled "A Seminar in University Research and Teaching (ASURT)." This graduate level course gives them awareness of what it is like to be a faculty member; what it takes to do research; as well as reinforces the decision by women and minorities to earn a Ph.D. and enter careers as university faculty or faculty research equivalents in industry. In addition, the students are encouraged to attend workshops with emphasis on multimedia presentations, taking the GRE, and ethics training. As part of the program, the students also attend three luncheon meetings with their faculty mentors where discussion of their abstract and research findings are shared with others in the program. The students present their research at a conference in conjunction with other colleges to deans, faculty, administrative staff and other students. These presentations incorporate oral and multi-media technology skills participants have acquired through workshops. At Texas A&M University the mentored research experience has proven to be a particularly effective mechanism for the recruitment and retention of women and minorities to graduate programs and faculty paths.

Graduate Student Fellowships:

The second component of our program is the Graduate Fellowship Program. These fellowships are provided as a need-based mechanism to offer support; ensure their continued participation in and progress towards a Ph.D. degree; and enhance development of future faculty. Fellowship recipients are awarded \$15,000 stipends per year and are also encouraged to participate in the ASURT Seminar mentioned in the undergraduate component above. We consider the graduate fellowships to be another tool to encourage our undergraduate research participants to continue on to graduate school.

Junior Faculty Coupons:

The third component of our program is the Junior Faculty Coupon component. An award of \$15,000 per year is awarded to new, untenured, tenure track faculty members in an effort to help initiate research needed to achieve tenure. These funds can be used for equipment purchases, hiring graduate assistants, attending seminars or other research related expenses.

SUMMARY OF THE PROGRAM

To date, 83 students have participated in the undergraduate research program. The program breakdown by ethnicity and gender are as follows: 20 Hispanic males, 8 African American males, 1 Native American male, 17 Hispanic females, 8 African American females, 1 Asian female and 28 White females. Females represented 60% of the participants in the program. We are extremely strong in retention to the bachelors' degree and very successful in student continuation to the technical graduate studies. Of the 83 undergraduate participants, 51 have graduated with a bachelor's degree, 24 are pursuing advanced degrees, 26 are in industry, 1 is attending a Naval School and 32 are still enrolled in the College of Engineering. This success rate is more impressive than expected, as the private sector vigorously recruits under represented minority and women graduates of this caliber on our campus.

We have had 19 graduate fellowship recipients. Eight have graduated with Ph.D.'s. Five have entered faculty positions around the nation: Lesia Crumpton, at Mississippi State University; Carmine Plott, at Duke University; Jaime Garcia-Ramirez, at University of Puerto Rico; William Hernandez, at University of Puerto Rico and Ruth Seidel, at Blinn Junior College. Gale Holmes and Heather Cornea accepted positions in industry. Kelly Andrews accepted a post doc position and eleven are currently enrolled. Of those still enrolled two are teaching in assistant lecturer positions.

Three faculty members have received faculty coupons. Two are now tenured and one is currently in a tenure track position.

CONCLUSION

This program cannot do all that is needed at Texas A&M or in the nation, however it is a very proactive start in the right direction. In addition, the climate and culture developed for graduate students in these programs should be expanded upon and provided for all graduate students.