

## THE SOCIETY OF WOMEN ENGINEERS PRE-COLLEGE OUT REACH PROGRAMS AT TEXAS A&M UNIVERSITY

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A strong and active student chapter of the Society of Women Engineers (SWE), is an extremely valuable component to an effective Women in Engineering Program. Such a chapter can be the catalyst for starting a new program, or the amplifier for existing programs. At Texas A&M University the SWE chapter has been the only activity focused on women in engineering until 1992. Now the two entities function in a very interlaced and effective manner. In the discussion here we will strive to illuminate the programs which SWE supports and the tremendous value added by their participation. First, we will give some background information on our University and the College of Engineering.

### University Environment:

Texas A&M University is the land grant institution of Texas. It was founded in 1876, and functioned for most of its first 100 years as an all male military institution. In the mid 1960's students were no longer required to be members of the Corps of Cadets, and shortly after that, women began to be admitted to the institution. While the Corps of Cadets is still an essential and highly visible institution for the University's traditions, it now has a membership of only approximately 2000 out of the 41,000 students enrolled at the Texas A&M University, College Station campus. The student body of the University is now 43% female. The College of Engineering represents about one quarter of this enrollment with 10,282 students. Within the college, which includes computer science and engineering technology as well as ten engineering departments, women comprise 18.5% of the undergraduate, 15.2% of the master level, and 9.7% of the doctoral level enrollments. In 1992, engineering and computer science awarded 1046 Bachelor degrees of which 19.1% were women, 386 Master degrees of which 11.7% were women, and 111 Ph.D. degrees of which 6.3% were women. The College of Engineering has 9 women tenure or tenure track faculty out of the 330 such faculty.

The student chapter of the SWE appears to have formed in the early 1970's at Texas A&M University. In 1975, the organization began coordinating a conference in the early part of the Spring semester to introduce engineering to high school students. In 1990, the chapter began a summer camp for junior high girls. The chapter has been continually involved with local girl scouts, girls clubs and public schools in promoting engineering to young people. Currently the chapter has

approximately 150 active members. The ethnic diversity of the active members of SWE is slightly better than the College's (the College enrollment of African Americans is approximately 3%, of Hispanics it is 9%, of Native Americans it is 5%). We will briefly discuss the support the chapter provides for undergraduates and then we will describe the High School Conference and the Junior High Camp in more detail.

#### SWE Peer Activities:

The SWE chapter has a number of activities every year which promote a supportive and professional network for women. Some of the major annual activities are:

- bi-weekly meetings, often with professionals from industry and academia as speakers
- activities with the dorm clusters (within the women's dorms at the University, engineering students can request to be clustered on certain floors into neighboring rooms)
- big sis/li'l sis couplings of upper class and graduate women engineering students with freshmen and sophomores
- forums focused on women's issues where administrators are addressed
- pre-college and community college outreach efforts
- coordination with the College career fair

The dorm clusters mentioned above are part of SWE's Residence Hall Clustering Program which began in 1992. Incoming freshmen female engineering students are notified before the school year begins about the clustering program. They are informed that a special housing request can be made. They can request to be placed in three particular dorms on campus so that they will be clustered with other women engineering students in groups of nearby rooms. This allows for easy access to study groups. The women engineers are able to be more supportive of each other under these conditions and helps to do away with the feelings of being isolated. The Women in Engineering Program provides a female graduate student to mentor and coordinate activities with the dorm clusters. This program was initiated by SWE and has been supported by the Campus Housing Office.

The members of SWE are regularly contacted as the source of input to the College and University concerning the status of women in the programs. Particularly at the undergraduate level, many of the women enrolled in the College have not encountered, or more often, are not aware that difficulties they encounter may have a gender discrimination component. In the SWE membership, awareness of gender harassment issues are somewhat higher than the College as a whole, however, they primarily serve as a professional exposure network and a social exchange student organization. Intramural teams and social parties are important components of the chapter activities.

#### High School Conference:

The SWE organization hosts an annual High School Conference which is designed to offer students who are interested in math and science a first hand look at the opportunities available to them in the field of engineering. This conference also gives counselors, teachers, and parents incite of the engineering disciplines and what courses should be taken in order to help better prepare the students to be able to enter an engineering program. All public high schools throughout the State of Texas receive invitations for the conference. All schools with Junior Engineering and Technology Society (JETS) chapters receive invitations as well. The SWE chapter organizes this mailing effort in the Fall semester every year.

The conference is usually held in February on a Friday and Saturday on the Texas A&M University campus. A fee of \$24.00 for both days or \$18.00 for one day is requested. Texas A&M sponsors some school districts which have large enrollments of economically disadvantaged students. Additional funding for the conference is provided by the Texas Education Agency and corporate donations which have been solicited by SWE members.

The SWE members work very hard at planning the conferences. They schedule tours, reserve rooms, organize speakers and help with all logistics in preparation for the conference attendees. Recently conference attendance is typically in excess of 400 participants. This year approximately 60 parents, teachers, and counselors, and 380 students attended. Of the attendees, 60% were women, 25.5% were Hispanic, and 7% were African American.

Some of the activities and events of the conference include: the option of attending one or two classes; tours of engineering research facilities and local industry; participation in a design competition; panel discussion of students consisting of males, females, athletes, etc.; panel discussions consisting of working engineers; a panel discussions of undergraduate advisors and faculty members; a parent, teacher, counselor seminar, an awards banquet; and an overview presentation of all of the engineering programs available.

Four \$250.00 scholarships are awarded at the conference. In order to receive the scholarship the students must register at Texas A&M University in the College of Engineering when they reach the University level.

The SWE chapter organizes and raises funds for this entire conference. They solicit funds for and select recipients for scholarships. The Women in Engineering Program serves as a facilitator for this program only in the sense that some facilities and buses are more easily arranged by a University department instead of a student organization.

#### Junior High School Summer Camp:

The Society of Women Engineers' student chapter at Texas A&M University

hosts an annual summer camp in an effort to address the problems many young girls have in choosing electives and curricula paths in high school. Sometimes the choices they make may leave them unprepared or insecure about choosing engineering as a career. Often these girls are simply not informed about engineering and the courses necessary to effectively enter a program, and sometimes they are misinformed about the potential for women in the engineering field.

The camp is held in the summer and invites rising seventh and eighth grade girls for a one-week residential engineering enrichment program that exposes them to activities and laboratories in engineering, and gives the campers an idea of what campus life is like. Notification of the camp is mailed to junior high schools in the surrounding areas of Texas A&M.

Camp is partially funded with funds from the Texas Education Agency. Additional funding comes from corporate donations acquired by SWE members who make visits to companies in their home town areas while on Christmas break. A \$50.00 camp fee is requested but can be waived for special circumstances.

Selection of campers is based on teacher recommendation, an essay on the goals of the individual and expectations for the camp written by the student, and the likelihood of the student having access to information on engineering from other sources.

This particular out-reach program involves lots of fun and exciting activities, including tours of campus facilities such as the Wind Tunnel, Wave Tank, and Nuclear Reactor on campus. Tours of laboratories are also given by faculty members who describe research opportunities available in the engineering profession as well as give the girls an opportunity to gain hands on experiences in the labs, and get a feel for what engineering is really all about. Last Summer, the campers took a field trip to Astroworld, a large amusement and theme park located in Houston. This was another fun filled learning experience. Not only did the campers get to ride the rides, but were also taken behind the scenes to get a look at the engineering aspect of the rides and they conducted physics experiments on the rides. Guest speakers from industry are invited to speak during the week and always manage to give the girls their exciting views on engineering.

During the week, the girls are involved in a design contest which emphasizes team work and creativity. An example of last year's design is building a boat out of a milk carton, straws, and aluminum foil. The boats were judged on speed, distance, and buoyancy. This particular contest was held at the swimming pool on campus. After the boats were judged and winners announced, the swimming party began. T-shirts are also designed and campers are encouraged to include logos of corporations who have helped in the funding of the camp.

The week is filled with many different activities and concludes with a banquet

for the campers, their parents, and brothers and sisters. Industry representatives are also in attendance and ready to re-emphasize the importance of the information gained during the week long camp. At the closing of the camp, it is clear that each camper has a clearer picture of what engineering involves and steps they should take to be included in the engineering programs.

The SWE chapter coordinates all of the camp planning and organizations through the Women in Engineering Program. Every year the College administration or Women in Engineering Program has funded almost half of the camp. The rest of the money for the camp is raised by SWE members. The counselors for the camp are all SWE member volunteers, some of whom receive a week off of their summer interns to return to the camp. All of the counselors agree to work regardless of pay, however, every year there has been funds left to pay the counselors a small amount for their time.

### Conclusions:

The Society of Women Engineers' student chapter is very important to the Women in Engineering Program at Texas A&M University. Many of the outreach programs for pre-college female students were initiated by SWE before there was an official Women's Program in the College of Engineering. The extent of the programs undertaken by this organization could not easily be supported by industry engineers in our environment, due to the small town location with relatively few industries employing engineers in the immediate vicinity. In addition, funding for staff to handle the logistics and planning carried out by SWE would be prohibitively expensive without so many volunteers.

The participation in running the pre-college outreach programs is an important mechanism for retaining women in the engineering program. By taking part in the outreach activities the women students learn more about the professional options in engineering as well as the status of women in the fields. These students get involved in "selling" engineering to young prospects, and therefore usually "sell" it to themselves. The women participate in important activities which help them establish a supportive network with other women in the College. Finally, because SWE is responsible for so many aspects of these programs, the SWE members develop valuable organizational and leadership skills.

Currently, the two advisors for SWE, the authors, work in the College Dean's Office, and are also very involved in the Women in Engineering Program. The current statistics for graduation of women in the College of Engineering is higher than the national average at the undergraduate level. Cooperation between SWE and the Women in Engineering Program will continue to benefit the College in terms of women enrollment and retention. SWE provides the input to the administration of the College which will facilitate changes which will make Engineering even more inviting and encouraging for women in the future.

