Abstract - Enrollment and retention of undergraduate and graduate women students in Computer Science, Engineering, and Technology (CSET) remains a challenging issue despite recent efforts from many national engineering societies, industries and universities. Over the past decade, a number of successful mentoring programs have been developed, but most of these mentoring programs are college- or university-wide programs. One of the areas in which mentoring can be significantly improved is department-specific mentoring. A mentoring program was launched in fall 2004, in the Agricultural and Biological Engineering (ABE) Department at the University of Florida. Monthly meetings during the fall included women speakers with ABE expertise at different stages of their careers. During the spring semester, the meetings focused on undergraduate research opportunities in ABE and related fields. Feedback forms were obtained at each meeting. We discuss the outcomes from these meetings and the feedback forms, including initial accomplishments and challenges of the mentoring program.

Index Terms – Women in engineering, Mentoring of undergraduate and graduate women students; Department-specific mentoring program

INTRODUCTION

Enrollment and retention of undergraduate and graduate women students in Computer Science, Engineering, and Technology (CSET) remains a challenging issue despite recent efforts from many national engineering societies, industries and universities. Studies show that women students switch out of science and engineering programs primarily due to a loss of academic self-confidence [1-2]. Women faculty can play a crucial role in recruitment and retention of women students [3]. As role models, women faculty can mentor women students and improve retention, encouraging them to pursue further studies in graduate school and improve retention. Women represent only 22% of workforce in science, mathematics, engineering, and technology fields [4]. Women students represent only 19.7% of the total number of engineering undergraduate students [4] and their retention rate is about 42%.

Over the past decade, a number of successful mentoring programs have been developed (for example, [5]), but most of these mentoring programs are college- or university-wide programs. One of the areas in which mentoring can be significantly improved is department-specific mentoring. Every department has its unique issues, problems, and political atmosphere. An effective department-specific mentoring program for both undergraduate and graduate women students is needed where there is a strong faculty involvement, primarily from women faculty. In the fall semester in 2004, we launched such a mentoring program for undergraduate and graduate women students in the Agricultural and Biological Engineering (ABE) Department at the University of Florida. The specific objectives of this program are (1) to present the women faculty in our department as role models and possible mentors to the women students in our department; (2) to provide a setting where the older students in the department can interact with and mentor the younger students; (3) to understand specific issues that the women students face in our department and areas where the mentoring program can contribute; and (4) to ensure that the mentoring program is self-propelling in the long-term.

MENTORING PROGRAM

To accomplish the above objectives, we held monthly meetings during the fall semester. Our first general meeting introduced the program and the objectives to the participants and held an open forum for the students to ask questions and suggest focus topics for our future meetings. We met two more times and women speakers from academe (Dr. Jasmeet Judge, ABE) and from industry (Dr. Benita Whalen, South Florida Water Management District). The three speakers discussed various challenges they faced during their career and mentors that helped them along the way. Feedback forms were obtained from each student attending these meetings.

As per the suggestions obtained from the students, the meetings during the spring semester (2005) focused on undergraduate research opportunities in ABE and related fields. Five speakers presented a brief seminar on their research program and what activities will the undergraduate researcher perform in their group. Table 1 gives the speakers and the titles of their presentations. As during the fall semester, feedback forms were obtained from each student attending these meetings.
During the three fall semester meetings, we had 12, 7 and 20 attendees, respectively. Most of the attendees were undergraduate students with 1-3 graduate students in each meeting. From the feedback forms, the junior and senior students were primarily dealing with issues of summer internships, preparation for GRE, graduate school applications, and jobs after graduation for those not going to graduate school. The freshman and the sophomore students were primarily concerned with not knowing many people in the department and what classes they should take. Most of them were unsure about whether they want to go to graduate school or work in the industry after graduation. In response to the expected help from this mentoring program, all the students mentioned that they hoped to meet with other women students and faculty through this program. Some students were interested in the research opportunities offered in the department, while others wanted advice on graduate school selection and help in the application process.

During the spring meetings, the attendance was less than expected, ranging from 2-20 students. The attendees were very interested in the presentations and asked questions about the exact nature of the research tasks they will be involved in if chosen. To our surprise, nine male attended the seminar in cellular mechanics and biorheology by Dr. Roger Tran-Son-Tay. They filled out the feedback forms and were genuinely interested in undergraduate research opportunities.

Over the past year of this mentorship program, we faced two major challenges: increasing participation and attendance; and keeping the mentorship program exclusive for women students. The low attendance could be partially explained by schedule conflicts. But, both these challenges are primarily because our ABE department is unique in having a significant women student and faculty population. We have 16% tenured and tenure-track women faculty compared to the average of national average of in average of 10.4% in 2004. During the academic year 2004-05, women represented about 16% tenured and tenure-track women faculty compared to the significant women student and faculty population. We have primarily because our ABE department is unique in having a significant women student and faculty population. The low attendance could be partially explained by schedule conflicts. But, both these challenges are primarily because our ABE department is unique in having a significant women student and faculty population.

This is double the College of Engineering and the national average. Both men and women students experience similar support and mentoring in the department. This similarity resulted in the women attendees welcoming their male colleagues to join them in our meetings. These challenges confirm the need for a department-specific mentoring program compared to a mentoring program based upon the national or college statistics. We realized that the ABE Department does not need a mentoring program that is exclusively for women students only. It needs a mentoring program designed both for males and females to discuss the issues of job search, internships, graduate school, and research opportunities. Involvement and mentorship from both men and women faculty is imperative for such a program to be successful.

### RESULTS AND DISCUSSION

During the three fall semester meetings, we had 12, 7 and 20 attendees, respectively. Most of the attendees were undergraduate students with 1-3 graduate students in each meeting. From the feedback forms, the junior and senior students were primarily dealing with issues of summer internships, preparation for GRE, graduate school applications, and jobs after graduation for those not going to graduate school. The freshman and the sophomore students were primarily concerned with not knowing many people in the department and what classes they should take. Most of them were unsure about whether they want to go to graduate school or work in the industry after graduation. In response to the expected help from this mentoring program, all the students mentioned that they hoped to meet with other women students and faculty through this program. Some students were interested in the research opportunities offered in the department, while others wanted advice on graduate school selection and help in the application process.

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### CONCLUSIONS

Over the past decade, a number of successful mentoring programs to increase enrollment and retention of women students in Science and Engineering have been established. Most of the efforts have been made at college, or university-wide programs. However, department-specific mentoring is tailored to students of each discipline. In our mentoring program, we found that the ABE Department has unusually high number of women students and faculty compared to the national averages. Based upon the feedback forms, there is a strong need for a mentoring program that involves students and faculty from both genders.

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### REFERENCES


