

Addressing Future Engineering Educators Through ASEE

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ABSTRACT

ASEE promotes excellence in engineering teaching by targeting established professors for participation in teaching workshops, and by creating a forum for the exchange of ideas and successful classroom strategies. ASEE is widely recognized for its contributions in this area, and is a valuable resource. However, ASEE has largely overlooked a second population, which has great impact on the quality of engineering teaching: the future professors. To address this issue, several academic institutions have founded ASEE student chapters (1) with the goal of creating a forum for education issues among graduate students.

Here we will highlight the activities of the University of Texas at Austin ASEE Student Chapter (2) which build upon the national ASEE Mission (3, 4) to develop the nation's future engineering professors:

- (1) to inform undergraduate students about the options and potential benefits of attending graduate school;
- (2) to raise the quality of graduate student teaching;
- (3) to enhance the teaching and presentation skills of prospective educators;
- (4) to encourage graduate student communication between different engineering departments;
- (5) to assist graduate students with the academic hiring process; and
- (6) to develop the skills needed to establish and lead a research program.

INTRODUCTION

As the mean age of ASEE engineering professors is over 50 years, there is the potential for ASEE to fulfill several points of its mission statement, "to encourage youth to pursue studies and careers in engineering and engineering technology; and influence the recruitment and retention of young faculty and underrepresented groups." (3) by working with ASEE Student Chapters to prepare future faculty. ASEE can sponsor events for graduate students, facilitate contact between graduate students and professors, and take an active role in preparing teaching assistants.

To these ends, the University of Texas at Austin Student Chapter seeks to fulfill the goals of the ASEE National Chapter Mission Statement. We have done this on three levels:

- (1) educating engineering undergraduate students about continuing their studies on the graduate level;
- (2) to increase the interest of engineering graduate students in careers in engineering education by holding workshops and presentations addressing teaching and teaching techniques;
- (3) informing graduate students about the faculty recruitment process, and educating them about faculty life via experiences of local faculty.

ADDRESSING UNDERGRADUATES

Undergraduate students in engineering who enjoy and perform well in their studies face a difficult decision as graduation draws near: apply for jobs (often with dazzling salaries), or apply for graduate school (is this just four more years of undergraduate life?). How can students make informed decisions about which is best for them? Students may know a few graduate students through classes as teaching assistants, or by working as an undergraduate research assistant, but many may not know any graduate students well enough to ask about graduate life.

To give these students an opportunity to learn from an unbiased group of graduate students (pursuing masters and Ph.D. degrees in four different engineering fields) we have hosted an annual panel discussion, to provide undergraduates with candid answers to questions like: how many hours do you spend in lab each week? How do you choose an advising professor and what is your relationship like? What were your criteria in choosing a graduate program? This is a program unlike any other at UT, and fills an important role in preparing the next generation of graduate students and professors.

ADDRESSING TEACHING

Teaching excellence among graduate students is a common source of undergraduate complaint, and is a natural area for ASEE Chapters to address.

Bringing technology to the classroom Computers and the internet permit students to experience and visualize the physical phenomena they are learning about in ways impossible with paper texts. Dr. Philip Schmidt of Mechanical Engineering encourages such use, and has presented examples of interactive thermodynamics problems to the ASEE student group. Dr. Billy Koen of Mechanical Engineering has discussed how to treat each class period as if the students were design engineers.

Academy of Distinguished Teachers ASEE chapters can rely on resources at their home institution to encourage teaching assistants to excel in the classroom; one of which is professors who are members of the Academy of Distinguished Professors. The ASEE chapter at UT has invited Dr. Jim Stice of the Chemical Engineering Department to share his “10 Rules for Teaching,” and Dr. Wallace Fowler of the Aerospace Department to suggest ways to work with students to conquer difficult material.

ADDRESSING FUTURE PROFESSORS

Students interested in academic careers are often familiar with the route their own advisor has taken from graduate student to professor, and are likely unfamiliar with other options. These can include working in industry before returning to academia, or considering different types of institutions than the student has attended. Moreover, it can be difficult to learn about the faculty recruiting process, negotiating an offer, teaching the first course and establishing a research program while still a graduate student. Learning from the experience of those who have successfully navigated these stormy waters can save students time and anguish, and better prepare them for the challenges of a young professor. Thus, the ASEE Student Chapter invites new and established professors to discuss their experiences and offer advice to student members.

Go directly to academia or via industry? The decision to spend time in industry before returning to academia presents unique challenges, and these have been addressed by Dr. Jon Olson, a professor of Petroleum Engineering at UT, who spent five years in industry. During an intimate brown bag luncheon with 15 graduate students, he shared his experiences: the difficulties of keeping active research interests while in industry, and learning to be a “manager” upon return to the university.

Small teaching college or major research university? These are the two polar extremes of higher education in the United States, and are bridged by colleges which emphasize teaching and smaller research programs. Which type of school will be a good fit is a highly personal decision, and can best be made by learning from those with personal experience. To these ends, the UT ASEE Student Chapter has hosted a panel discussion with professors from local small colleges with engineering programs such as Trinity and Baylor Universities. Furthermore, Associate Dean of Graduate Studies Dean Cherwitz has addressed the group on his “Preparing Future Faculty” Program, which pairs graduate students with local faculty, and allows the student to shadow for a semester, taking part in all faculty duties from teaching to committee work.

The Application Process This is always a difficult period, but being informed about the process can ease tensions considerably. The UT ASEE Student Chapter hosts an annual Curriculum Vitae workshop, presented by faculty active in the UT recruitment process; and has hosted proposal writing workshops. The Chapter has also hosted practice interview seminars, in which the faculty candidate presents their seminar for constructive feedback from an audience of graduate students.

Challenges of a Young Professor These have been addressed by annual brown bag lunches for 15 graduate students with a UT professor within the first three years of his/her appointment. Advice here has focused on negotiating start-up packages, recruiting graduate students, the difficulties of writing a first grant, and the need to practice good time management.

Advice of an Established Professor Dr. Wallace Fowler (ASEE President-Elect) has addressed the group to share his perspective on academia and the role of future professors, particularly in eradicating technological illiteracy.

ABET 2000 It is necessary for new faculty to be prepared for all aspects of their new job, including the new ABET 2000 accreditation process. The UT Student Chapter is involved in developing performance evaluations to meet the new requirements.

EVALUATING PERFORMANCE

Evaluating our achievements is difficult, because success can present itself in several forms. Individual programs are successful for exposing undergraduate and graduate students to information which can be difficult to locate otherwise: how is graduate school different from undergraduate life? What to recruiting committees look for in a curriculum vitae? A concrete measure of our success is that after only three years on the University of Texas campus, our Honor Roll of ASEE alumni who have found academic placements has grown to seven. These placements have been at major research universities (including the University of California at Santa Barbara and Arizona State University), teaching colleges (West Point Academy), and institutions which combine emphases on teaching and research (California State University at Sacramento). However, if a student realizes that an academic career is *not* what they are looking for, saving themselves unhappiness searching for and obtaining an academic position, that is also a success.

For those interested in starting an ASEE Student Chapter at their institution, or to learn more about ASEE Student Chapters, please see references (5) and (1)

1. 1999. <http://www.asee.org/student/html/students.htm>
2. 1999. <http://uts.cc.utexas.edu/~asee.html>
3. 1999. <http://www.asee.org/welcome/html/mission.htm>
4. 1999. <http://www.asee.org/student/html/students.htm>
5. Matsumoto, E., Arthur, L., Tumer, I., Gray, J., Serpas, F., Vogler, T., Jaramillo, N., Barr, R. 1997. *Establishing an ASEE Student Chapter at The University of Texas at Austin*. Presented at the Proceedings of the 1997 ASEE Gulf-Southwest Section Annual Meeting. 1997

AUTHOR BIOGRAPHIES

Jennifer Maynard is a doctoral candidate in the department of Chemical Engineering at the University of Texas at Austin, and 1999-2000 President of the UT ASEE Student Chapter. **David Garza** is a doctoral candidate in Aerospace Engineering and Vice-President; **Cynthia Finley** is a doctoral candidate in Civil Engineering and Membership Officer; **Zeno Philip** doctoral candidate in Petroleum Engineering and Treasurer; **Michael Tsurikov** is a doctoral candidate in Aerospace Engineering and Information Resources Officer; **Fernando Ulloa** is a doctoral candidate in Civil Engineering and Secretary; **Dr. Ron Barr** is a Professor of Mechanical Engineering at UT who has received many awards for his involvement with ASEE, and is the faculty advisor for the UT ASEE Student Chapter.