

NSF-ERC Annual Meeting

Summary from Student Symposium

Saturday November 6, 1999
Mayflower Hotel, Washington D.C.

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As part of the NSF Engineering Research Center annual meeting, a student retreat day was organized. The following is a summary of what was discussed at the meeting, which consisted of both graduate and undergraduate representatives from each ERC.

Agenda:

- 9:00 Introduction of participants
- 9:30 *Four Years: Why More?* Panel discussion of the pros and cons of graduate school.
- 10:15 Break
- 10:30 *Mentoring: A Mutually Beneficial Alliance.* Panel discussion of how to make the most of a mentoring relationship.
- 11:15 *SLC/Student Involvement.* Open discussion of ways to foster student participation.
- 12:00 Lunch: Guest Speaker: Dr. Jim Fitz-Gerald, 1998 UF ERC alumni
- 1:30 *SWOT: Friend or Foe.* A how-to look at different ways to conduct a student SWOT analysis.
- 2:15 Poster Session
- 3:00 www.erc-assoc.org. An update and discussion of the ERC web page.
- 3:30 *The Role of Students in ERCs.* Open discussion of the role of students in the ERCs decision making processes.

Four Years: Why More?:

I was asked to be on this panel to offer advice and answer questions regarding the decision to go to graduate school. Issues whether a Masters or Ph.D. degree is recommended for students hoping to pursue an industry job or an academic position were discussed. Our expectations of graduate school and whether they were fulfilled were presented and advice was given about relationships between advisors and what you can expect from them. The consensus was that graduate school differs from a bachelor degree because motivation must now come from within, but graduate school was recommended by all as the way to go nowadays.

Mentoring: A Mutually Beneficial Alliance:

The focus of this session was the mentoring relationship between undergraduates and graduate students. The students were divided and asked to brainstorm about what each group expects for a successful mentoring relationship. Essentially, both groups thought that both parties should set goals at the beginning of the mentoring relationship. Undergraduate students found the experiences to be more worthwhile when they felt like they were active contributors to the project. They expected feedback and direction and guidance from their mentors. The graduates looked for students who took initiative, were independent, and were willing to give input, but who were also willing to ask questions when they did not know something and were enthusiastic to learn. It was advised to mentors to recognize that different personality types exist and so different methods of reaching the mentee are necessary. Also it is important to progressively let

go of your tight reign on the undergraduate student. In other words, the mentor should gradually give the undergraduate student more freedom, as they become knowledgeable about the work. Challenging but realistic work and responsibility should be provided.

SLC/Student Involvement:

This session focused on issues that many SLC s are tackling. The most critical problem of all SLC s was how to foster student participation. Recommendations from established SLC s included organizing social activities such as bowling, tubing, paintball, industry tour outings or informal get togethers with food. Free food, of course, was a big motivator to get students involved. Other ways to get students involved is providing research opportunities in the form of scholarships for undergraduates, and education programs such as seminars, mentors, and fun classes.

Since in a multi-institution research center we are dealing with problems like geographic issues, I asked for advice from other SLC s about how to get students involved. Video conferencing and email were recommended as ways to communicate between students. Also, student only days that incorporated some social/fun activity like hikes, going to the beach, etc. were suggested. Furthermore, it was recommended that we should try to join in the leadership of organizations that are already established at our universities to help facilitate getting the word out about our research center. It was emphasized that the director of the research center should budge money for student involvement.

The University of Florida s ERC set up a Graduate Research Forum . This orientation session invited undergraduates interested in research to hear about the types of projects that are available to them. This enabled the SLC to inform the students about the ERC, and teach the basic knowledge like computer/lab skills that are necessary to get the students started on research.

Lynn Preston, NSF coordinator of the ERC program, indicated that the role of the SLC is to foster communication with the center. Students involved in center research learn technical, management, and mentoring skills, which are important tools for a successful future in any discipline. Furthermore, student involvement with ERC s promotes industry contact. Although a student involved in ERC research is often faced with additional work, more travel, seminars, presentations and papers, the advantages are endless. As the luncheon speaker noted, You get out what you put into the ERC .

An issue that arose is whether the administration of the individual ERC s is interested in the role of the students. Do the directors come to student meetings? Are they open and willing to implement ideas? Is faculty contribution important in the SLC?

Some other ideas that SLC s implemented were educational classes aimed at industry members who could use some extra knowledge on a specific topic, workshops on presentation skills, outreach collaboration with other universities, summer short courses for students, and pre-college programs to encourage interest in the field. Johns Hopkins established a weekend competition for high school students. They brought in students for the weekend to introduce and excite them about engineering in the form of a hands-on technical competition.

SWOT: Friend or Foe:

I thought this session was very interesting because we have yet to perform a student SWOT analysis at PEER. I was not even aware of what SWOT actually was (Strengths, Weaknesses,

Opportunities, and Threats). Two institutions presented their SWOT analyses and some preliminary results. The objective being analytical input from students about the ERC.

Several general issues were recognized. First of all, it is necessary that the SWOT analysis is objective, and focuses on core concepts. The positives and negatives of the ERC should be honestly obtained. Also, the SWOT analysis should attempt to leave personal vendettas out of the results. Opportunities represent new ideas or directions that emerge from the ERC, while threats are show Stoppers like lack of funding, poor leadership by the director, or cancellation of the project.

The University of Michigan performed a computerized survey that was made available over the Internet. Using Microsoft Access as the database software, the survey was easy to modify and implement and supported multiple question types and automatic entry of data. However it was time consuming to set up because significant computer experience was required. It was also very easy to make the survey too long, and it was somewhat impersonal. Although the survey was anonymous, they kept track of the students who did not participate. General questions consisted of whether the student was pleased with their advisor and the funding from the center. Specific questions addressed potential problems. Free response questions were provided so that new ideas from the students could be obtained. Charts and trends were created for data analysis with the most critical results stemming from the unusual distributions of data. Results were shared with students, administration and the ERC site visit team.

Lessons that Michigan learned from their SWOT analysis was that the survey should not ask too many questions, and should avoid the neutral response because most engineers are conservative and usually answer neutrally. Avoid confusing questions such as double negatives and ask why whenever possible. Specifically they found that students thought the research seminars were useful. Problems that students addressed were that computers require significant maintenance and software and they needed help with this in the form of a system manager.

The University of Florida performed a less numerical SWOT analysis. They started with a brainstorming session to decide the format of their SWOT analysis, which ended up being a mass email to collect information from the students, and then a follow up meeting. Faculty and administration were banned from the meeting. Answers from original questions in the email were addressed first, which fostered further discussion. The meeting resulted in 5 or 6 comments for each SWOT category. They compiled and wrote a report and presented the data to NSF.

Essentially it was concluded that if you spend a little time planning the SWOT analysis in the beginning, the results would fall into your lap. In terms of getting the center administration to actively fix the weaknesses that arise from a SWOT analysis and to promote opportunities, it was suggested that the SLC give the administration a deadline to achieve the goals. Also, concrete recommendations or solutions for how they could achieve the goals should be provided.

ERC Web Page:

This session presented the student page of the ERC web page, which is the largest page available on the site. The web page essentially disseminates information about the ERC with the focus of recruiting students and facilitates communication across ERC s between students and staff. All major national societies have a link to this site and various education program links and email contacts are provided. There is a search engine for the site and a username/password registration format. Forums are set up explicitly for the ERC s and a key feature is a job link.

Basically it is a resume posting site that all ERC industry contacts will have access to. Furthermore, student news on recent happenings, awards, achievements, and upcoming events can be posted. In the future, contact lists will be provided.

The student web page has not been used as much as the organization would like. It is up to the SLC and ERC to ensure the NSF web site is updated and utilized. The SLC must spread word about the web site to its students, and must either select a student or someone within the research center to provide the NSF web master with relevant information. The web master is interested in getting feedback from the students regarding what they believe is still needed on the web site.

The Role of Students in ERC s:

This session emphasized that productivity is enhanced when communication between management levels occurs. Furthermore the student perspective is valuable and students are mature enough to handle decisions relating to the center mission. The student body currently interacts with professors and center management by inviting directors to SLC meetings, as well as inviting center administrators to give seminars to the students about the history, focus, and research activities of the center. Individual thrust area meetings also provide ways for students to give input.

The students feel that interaction with the center administration could be enhanced if the students are informed about the results from the administration SWOT analysis so we are aware of what the center believes its strengths and weaknesses are. Perhaps students could be involved in the Technical Executive Committee, Science Advisory Board, or Industry Board meetings. Students want more interaction with industry partners and more involvement in the annual site visit. Another suggestion included having center administrators include the SLC in the emails sent out for anything related to the students.

It was recommended that perhaps a national ERC student association should be developed to foster communication between ERC s, provide newsletters and articles about ERC research, etc However, this idea was shot down because most students did not feel another organization was necessary, especially since it is difficult enough getting students actively involved at the individual research centers. The students decided that having the NSF web page as a method to promote communication is good enough as long as the web site is utilized.

Summary:

Overall the student day was very informative, especially for young SLC s like us at PEER. However, I found that the issues we are dealing with for student involvement were very different than the other ERC s because our center consists of many institutions scattered around the entire West Coast. Everyone agreed that our issues were challenging, but nobody had any suggestions on how to approach them.

Lynn Preston mentioned she would be willing to send the SLC s a list of what the NSF review board is looking at during the site visits. This way we can know ahead of time what we will be evaluated on. I think we should actively take her up on this offer because it will help us focus our goals.