



## Chapter 8: Student Leadership Councils

### 8.1 Executive Summary

The Student Leadership Council (SLC) is a vital part of every NSF-funded Engineering Research Center (ERC). Required by NSF, it serves as a voice for the students and a vehicle for many of their activities in the center. The SLC chapter of the ERC Best Practices Manual is a guidebook for SLCs, both new and preexisting, that provides useful ideas and principles for starting and operating an SLC to obtain the highest possible benefit for the students and the center. This online edition of the SLC Best Practices chapter was first posted in October 2014 and is a thorough update of the original chapter. It is updateable online by SLC students on a continuing basis, ensuring that it will remain current.

This Executive Summary will briefly summarize the main points of the chapter, section by section. The authors encourage all SLC members to read the entire chapter, as it is a rich resource for detailed tips and suggestions that will make SLC membership and the ERC experience as a whole more beneficial and enjoyable.

#### SLC Formation and Purpose

The SLC consists of students, undergraduate as well as graduate, who have a leadership position as students in the ERC--including the leaders of the SLC itself and others with specific roles and responsibilities such as outreach, industry liaison, and communication. Its primary mission is to organize student activities. An SLC should establish its mission and organizational structure to best suit its particular ERC's research, the universities it represents, and the size and nature of its student body.

Main elements of the SLC's mission are:

- Representation of the students and communication with the students, center administration, and industrial partners
- Service to the ERC and students
- Broadening the overall experience of ERC students
- Organizing to represent students and carry out the SLC's activities
- Providing opportunities to develop leadership skills and experience.

#### Planning, Administration, and Development

One role of the SLC is to work closely with center administrators, and in particular, the education director(s) to plan and help organize center activities that involve the SLC and/or ERC students generally, such as workshops and seminars. Scheduling regular meetings of the SLC with center administrators is a good idea, as is attending some of each others' meetings as appropriate. The center director in particular should be kept informed regarding student activities and opinions, either through direct communication with the SLC or via reports from the education director(s).

The SLC can be an excellent medium for the "onboarding" of new students joining the ERC, especially given the multi-institutional nature of these centers. Orientations, a website, and lists of pertinent information such as industrial partners all help speed the integration of new students into the ERC.

#### Organizational Structure

The way an SLC is structured is key to how well it can meet its goals and carry out its mission. While a few SLCs are open to all ERC students as members, most comprise volunteers representing about 10% of the ERC student body, with members from each of the university partners. A strong effort is usually made to include undergraduate students in the SLC. In most cases, all members have titles and specific responsibilities such as outreach, social activities, communications, etc. Several ERCs have bylaws that govern their structure and operations. This is not



required, but in general, those SLCs that have bylaws tend to function especially well.

### Generating and Maintaining Interest

There are three guiding principles that allow an SLC to hold the interest of its members: value, respect, and ownership. The SLC must be seen as offering benefits for membership that allow it to be seen as a valuable association for a student to hold. Second, the SLC must respect its member students, and especially their time, in order to maintain their willing participation. If the first two principles are consistently observed, the students will begin to feel a sense of ownership of the SLC. If students think of the SLC as *their* own group instead of an external organization, as their way to interact with the center administration and the NSF, they will be interested in it and will participate actively.

### Communication

SLCs serve as a liaison between the student community and the center administration, and as a facilitator of communication between staff, students, the NSF, and industry partners on center research, organization, and function, as well as with students outside the center. Thus, effective communication is an essential requirement for a successful SLC.

Today there are many routes to communication through email, meetings, websites, social media, and traditional publications. Good communication involves a mixture of “mass” media and individual and in-person contacts. Some SLCs maintain intranets to provide communication of various kinds with a variety of internal audiences within the center. This can be particularly effective in maintaining good communication across various university partners in an ERC. SLCs also have a role in recruiting new students into the ERC.

### Outreach

Outreach—to undergraduates, precollege teachers and students, and the general public—is an integral part of the SLC mission. It is an ERC-wide activity in which the SLCs often have an active role in planning and implementation. Participating in these activities benefits the SLC members through building mentoring and leadership skills.

It is important to begin planning the center’s outreach activities at the beginning of the semester or academic year. Most SLCs have an outreach student coordinator or student committee as the focal point for these activities. In order to maintain the interest of student volunteers, it is important to add new activities on a regular basis and to recognize publicly the contributions of individual students. Also, keep the activities local to the center students. SLCs should facilitate the planning of outreach activities independently at each ERC partner institution.

### SWOT Survey and Analysis

Every SLC is required to conduct an annual Strengths-Weaknesses-Threats-Opportunities (SWOT) analysis involving a survey of all students in their ERC. This analysis benefits the SLCs and NSF alike by giving a clear picture of the condition of the ERC student body, including its demographics. Follow-up to address areas of concern identified in the SWOT is an important part of this process.

### Site Visits

A key role for SLCs is to represent the ERC student body to center administrators and guests. This is particularly important prior to and during site visits. In most centers, (SLCs) provide considerable assistance in the preparation and execution of the annual site-visit reviews of the ERC by NSF. The SLC role can include the preparation of posters, poster competitions, and other presentations, as well as the student SWOT.

The SLC often assists center administration in gaining the full participation of students during site visits. It is important to maintain good communication among students from all ERC partner institutions and to include viewpoints from all partners within the SWOT results. Finally, the SLC is the conduit for any student issues or concerns that might arise regarding the site visit (scheduling, agendas, etc.)

### Industry Meetings



In conjunction with the SLC's role of providing student perspectives and facilitating communication between students and other stakeholders in the center, student contributions and input regarding industry meetings are valuable to the center and to industry. The SLC can also plan events that give ERC students opportunities to network with industrial visitors to identify employment and internship opportunities. Some SLCs host industry seminars in which companies come and present on the company or on their industry. Another popular activity is workshops in which industry representatives teach useful skills to the students. Finally, compiling a student resume book can be an effective way to market students to industry.

To ensure effective communication with industry and “advertising” of industry-related programs, the SLC should dedicate a student or even a committee specifically tasked with maintaining student-industry relations.

### **Building a Student Community**

Social activities enhance student life, build community, and add to the center experience. Students at ERCs should benefit from a broader range of experiences than typical university research assistants, including multi-disciplinary interactions and opportunities to network with a wide variety of industry professionals. Social activities are generally planned by the SLC, but they are sometimes assisted by the Education Director or other center staff members.

It is important to involve the ERC's partner institutions in these activities, to the extent possible. An annual (or even more frequent) retreat is one traditional way to do this. Each partner institution's SLC rep(s) should be responsible for organizing social events on their campus as well.

One popular type of event is “Student Day,” a 2-3 day event held at each partner university in which students from all the ERC's participating institutions attend. The center-side “Perfect Pitch” competition is often held during this event. It is best to survey the ERC's students as to which types of activities they prefer, and to advertise the events thoroughly and persistently.

### **Facilities**

The SLC has a vested interest on the part of the ERC's students in the facilities in which and with which they will work. These include general facilities, computers and other technical equipment, and the student area. Ideally, a facilities management plan can be put into effect by a joint effort of students and center administration. The most important objective here is to ensure that the students have access to the technology they need to be productive. Generally, maintenance and services are left to the university staff.

## **8.2 Introduction and Overview**

### **8.2.1 Overview**

The Student Leadership Council (SLC) Chapter of the ERC Best Practices Manual contains best practices and recommendations that should be useful for all SLCs that operate in an Engineering Research Center. The original chapter was written in 2002 and was updated in 2014 to produce this edition. All sections were revised and in some cases rewritten. In certain sections, survey data incorporated in the original chapter was kept where appropriate and still applicable.

### **8.2.2 Methodology for Writing the Chapter**



### 8.2.2.1 Original 2002 Edition

The Student Leadership Council of the NSF Engineering Research Center for Reconfigurable Manufacturing Systems (ERC/RMS) at the University of Michigan volunteered to conduct a study of the role played by SLCs at various centers across the country with the goal of identifying "best practices." Toward this end, a comprehensive survey was sent to SLCs. The survey addressed issues in key areas generally relevant to all SLCs, such as organizational structure, communication with students, faculty, and industry, social and outreach activities, site visit preparations, and facilities management. Specific questions were also included to address the special features of ERCs that span multiple universities. The respondents were also given a chance to share their ideas on issues that were not addressed in the survey, and also given an opportunity to evaluate their performance in various areas

Responses to the survey were analyzed to produce a set of recommendations and best practices for SLCs. These were organized into the 2002 edition of the SLC Chapter of the Best Practices Manual.

### 8.2.2.2 Current 2014 Edition

The 2014 edition of the SLC Best Practices chapter started with a student retreat at the 2012 ERC Program's Annual Meeting, in which students from all 17 of the active ERCs at the time formed into teams to discuss best practices about a particular function of the SLC. These teams then generated a set of recommended best practices and designated writers to be responsible for chapter sections. Further work was delayed until 2014 due to web developer turnover, as the [erc-assoc.org](https://erc-assoc.org) website was undergoing a complete redesign at the time. Once a new plan for updating the chapter was devised, additional writers were selected from among active SLCs to augment the writing teams and they then built on the 2012 work to produce the new chapter.

## 8.2.3 Organization of Chapter

The chapter is organized as follows:

Sections 8.2 and 8.3 provide an introduction and overview, outline the objectives of the chapter, describe the 2002 survey methodology and the methodology of the 2014 update, and discuss the reasons for forming a Student Leadership Council.

Section 8.4 discusses SLC planning, administration, and development strategies, along with the onboarding of new students so that ERC information and related policies and procedures can be passed on to the next generation of students.

Sections 8.5 through 8.13 cover the various SLC functional areas addressed in the survey - namely, organizational structure, communication, outreach efforts, site visits, industry meetings, social activities, and facilities management. Each of these sections addresses the importance of the functional area, summarizes the survey findings, discusses any special aspects relevant to multi-university centers (which all current ERCs are), and identifies the best practices. In Section 8.14 we present conclusions and possible future directions.

## 8.2.4 Contributors

A list of contributors for this chapter from the 2014 update and after can be found at <http://erc-assoc.org/content/subsequent-contributors-new-chapters-and-updates>. The chapter is set up for easy updating online by authorized SLC members as circumstances and best practices for SLCs change over time. Contact the webmaster (see bottom of screen) to obtain authorization.

In addition, the authors of this study are grateful to Courtland Lewis, NSF consultant, for his encouragement and valuable advice regarding both the original and updated editions. We also acknowledge the work of Dr. Michael Nolan, graduate of Iowa State University and the CBiRC ERC and President of WebChemi LLC, for serving as coordinator of the update effort and for developing the online updating utility.

## 8.3 SLC Formation and Purpose



### 8.3.1 Forming the SLC

The formation of a Student Leadership Council is required by NSF's Cooperative Agreement with all ERCs. In most centers, this council must be comprised of representatives from both undergraduate and graduate programs. SLC members are thus a subset of the entire ERC student body, but one with an important role in the center. The SLC consists of students who have a leadership position as students in the ERC--including the leaders of the SLC itself and others with specific roles and responsibilities. A typical SLC consists of the following positions (although these vary): President, Vice President, Education & Outreach Coordinator, Industrial Liaison, and SLC rep (one for each partner institution who oversees activities at that university). Sometimes chair positions are created for major ongoing tasks to be handled by the ERC--for example, Web Chair or Seminar/Lectures Chair.

SLC members are usually students who volunteer for these positions. If no one volunteers for a role that is needed, then the ERC's Education and Outreach Director typically will reach out to students who are deemed to be a good fit. Usually these are students who are active in the center and have demonstrated a willingness to take on extracurricular activities in addition to research.

Contractually, the primary responsibility of an SLC is for the organization of student activities. Further, they are responsible for carrying out a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis and communicating the results to the center director and leadership team, and to the NSF site visit team. Communication of SWOT results to the NSF site visit team is conducted in a private session. However, most SLCs see their role as broader than what is contractually specified.

NSF does not specify guidelines for the organizational structure or required activities of an SLC, except for the SWOT analysis. Therefore, it is important that an SLC establish its mission and organizational structure to best suit the research being conducted by its center, the university or universities it represents, the size of its student body, and the age of its center. Further, the manner in which the center is organized may influence the organization of the SLC. Developing SLC bylaws or an organizational charter is an excellent mechanism for tailoring the SLC to meet the organizational needs of center students.

### 8.3.2 Mission

A previous survey of SLCs indicated that they see their primary mission as (in order of frequency):

- *Representation and Communication* - The SLC is seen as a liaison between the student community and the center administration, and should facilitate communication among staff, students, the NSF, faculty, and industry partners on center research, organization, and function. Further, the SLC is seen as a vehicle to promote communication outside the center and provide an entry point for students wishing to get involved in the center.
- *Service* - The SLC is seen as a formal mechanism for students to contribute to the center above and beyond their research, activities facilitating outreach activities with students outside the center, such as entertaining and educational projects to excite K-12 students in engineering, and undergraduate recruitment to graduate programs.
- *Broaden the Student Experience* - The SLC is seen as providing a well-rounded experience for students through seminars/workshops, outreach, and social functions. This includes facilitation of engineering education beyond traditional methods; providing a social setting (social club) in which students from different disciplines and backgrounds within the center can network, collaborate, and build friendships with people outside individual labs; and providing an opportunity for students to have presentations and papers reviewed by their peers.
- *Organization* - The SLC is seen as a governmental entity that facilitates the organization of students working within a center to plan, coordinate, and execute activities that reflect student interests. While noted specifically as a mission, this is a really a means for performing the other missions.
- *Leadership* - The SLC is seen as providing students with a unique opportunity to develop leadership and management skills that may not be part of their curriculum.

The survey indicated that SLCs see one or more of the following as what their main functions are or should be in fulfilling their primary mission.

*Representation and Communication* -



- Communication with the center administration concerning student needs and perspectives on the academic and work environment, research, curricula, and outreach development.
- Facilitate the interaction between faculty and student members of the center.
- Sponsor events such as meetings, seminars, and networking opportunities with industrial affiliates and center visitors.

### *Service -*

- Promote engineering education outreach through support of the center's education director or coordinator and participation in educational events to encourage an interest in science and technology.
- Serve as mentors for undergraduate students selected into the summer research programs through the center.
- Assist in student recruitment for the university, the center, and the SLC.
- Promote awareness of the center (what it is and how to get involved).

### *Broaden the Student Experience -*

- Encourage social interaction among center students through planned events. Usually, there is one "team-building" event planned for each major multi-institution meeting.
- Encourage students to initiate collaborations with students from other universities by providing travel grants.

### *Organization -*

- Aid in the development and administration of planned responsibilities of center students, including social and professional activities.

### *Leadership -*

- Provide a student government entity where leadership experience can be obtained.
- In many centers a student's tenure on the SLC is limited to a year to ensure that there is turnover and that the maximum number of students benefit from holding a leadership position.
- Act as an advisory council for input to major center and faculty decisions.

### **8.3.3 Bylaws**

SLC bylaws or an organizational charter can play a significant role in good SLC practice. While there seems to be a strong positive correlation between having bylaws and a good organizational structure, the lack of bylaws does not necessarily imply the absence of an efficient SLC organization.

Based on the survey, bylaws typically provide officers with guidelines on the mission of the SLC, roles and responsibilities of the officers, membership rules, voting rights and procedures, meetings, and amendments.

Examples of bylaws are provided in 8.15.1 Appendix A: Bylaws of Selected SLCs.

## **8.4 Planning, Administration, and Development**

### 8.4.1 Collaboration with Staff, Administration, and Faculty

The SLC should work closely with center administrators, and in particular, the education director(s) in planning, administration, and development of center activities that involve the SLC and/or ERC students generally. The administration will appreciate student leaders who are willing to help organize activities and make preparations for lab reviews, among other tasks. All the ERC students will benefit from the improved work environment and better



center policies that result when student perspectives are effectively communicated to the administration.

One successful method for good communication between the SLC and center administrators is to schedule regular meetings. For example, if the SLC meets once a week or once a month, the education director(s) could be invited to attend a portion of each meeting, or every other meeting. Alternatively, correspondents from the SLC (e.g. president and/or vice president) may wish to attend faculty meetings on a periodic basis to facilitate communication and report student issues as they arise. In keeping with this idea, members of the SLC may also wish to allocate part of their regular meeting time to hear from attending students wishing to voice questions and concerns. This will help to make SLC/faculty interactions as efficient as possible.

The center director should also be well-informed regarding student activities and opinions, either through direct communication with the SLC or via reports from the education director(s). Finally, establishing email distribution lists can greatly facilitate communication among SLC members and between SLC members and administrators. In this manner, when issues arise where administrators require student input, they do not need to wait until the next scheduled meeting. This is especially important when students do not work regular hours or are geographically distributed around the lead university campus and partner university campuses.

Research-related work such as presentations and demonstrations are generally coordinated by individual faculty members or research scientists, who direct the activities of their own graduate and undergraduate researchers. At times, however, faculty members may require assistance from the SLC in order to communicate expectations, requests, and deadlines to the general ERC student body.

### 8.4.2 Leadership and Professional Development

Being part of an NSF-sponsored research center should provide students with additional opportunities for leadership and development beyond their degree program requirements. The SLC can assist administrators in encouraging students to further develop their skills by helping to plan workshops or seminars and by recognizing students who have made specific achievements.

In 2002, the SLCs then in operation were surveyed as to whether they or their centers presented awards or recognition to graduates. While half of the SLCs reported they do nothing formal, the following recognitions were noted among those who did:

#### Awards

- Best Poster
- Best Presentation
- Best Undergraduate Research Paper
- Outstanding Students/Teams/ Leadership
- Certificate of Recognition for Service
- Certificate for Course Completion

#### Graduate Recognition

- Graduation Parties/Receptions
- Banquet
- Certification (associated with program)
- Guest speaker after graduation

A similar range of awards and recognitions are still employed today.

It is very important to publicly recognize students who assist with center-related work that is beyond the scope of their research – for example, those who volunteer to help with site visit preparations, plan social events, and help with outreach activities. Widely attended social events such as end-of-year banquets and receptions, or welcome picnics and orientations, provide good opportunities for such recognition. Another option would be to recognize such achievements in periodic student newsletters, which could be authored by the SLC with additional help from the center administrators and/or education director(s).

While most centers conduct workshops and seminars for the students, in most cases SLCs are not involved with their planning or execution. One exception is that some SLCs sponsor graduate student research seminars. While the great majority of the seminars are research oriented, other seminars/workshops hosted by centers include:

- Resume Writing
- Preparing a Curriculum Vitae
- Managing Thesis as Project
- Team Building
- Presentation and Communication Skills



- Assessment & Evaluation
- Mentoring
- Educational Techniques
- “What is [this center]?”
- MD Seminar (on reallife work experiences)
- LIFE Seminar (Learn about Industry From the Experts)
- Ethics
- Job Negotiation Strategies
- Career Preparation
  - Transitioning from Grad School to Industry: IAB-hosted Q&A forum
  - Mock/Practice Interview Sessions: Hosted by IAB members or faculty
- Patent Research/Writing and Intellectual Property
- Starting Your Own Business.

### 8.4.3 Onboarding of New Students

New graduate and undergraduate students join universities, and thus ERCs, each academic semester. It can prove challenging for a new student to receive all pertinent information regarding the ERC, which typically spans several institutions. The SLC can be an excellent medium for the onboarding of these new students. Onboarding refers to the mechanism or methods through which new ERC students and/or SLC members acquire the necessary knowledge, skills, and behaviors to become effective organizational members. Several strategies include:

- Beginning of the semester orientations -- Current SLC officers/members can host a meeting or series of meetings which provide a semester outline of the SLC’s functions, e.g., typical events hosted, upcoming goals of each SLC committee or officer, available involvement positions, etc.
- Website or documentation which provides:
  - An overview of the ERC’s main Thrusts and/or testbed projects
  - Video interviews or write-ups from the Thrust or Testbed leads (faculty) can be incorporated into these overviews (uploaded to Youtube if the ERC website is unavailable for this purpose)
  - A directory providing all faculty, staff, and student contact information
    - May also include a short bio of each person containing their ERC Thrust or Testbed project involvement and their institution affiliation
- A list of all industrial partners working with the ERC
  - Due to intellectual property rights or non-disclosure agreements, details of each company’s involvement in an ERC’s Thrust(s), Testbed(s), or projects may vary
- A comprehensive list of equipment available to the ERC researchers, including name and contact information of each tool or software program owner
  - Google Drive provides ease of accessibility and security (e.g., “Only those with link”) and allows multiple users to continuously update and edit this list
  - Troubleshooting advice, tips, or questions can be a subset of this list such that owners of the same or similar tools can readily discuss best practices in a documentable manner
- Formal/informal gatherings at conferences highly attended by large percentages of faculty, staff, students, and industry partners of the ERC
  - Schedules of talks, presentations, and poster sessions specifically of ERC members can be distributed to allow greater interaction and exposure for new students to projects spanning the ERC
  - ERC-sponsored luncheons at these conferences

**Note: If a website is utilized to provide the above information--especially bullets #3 and #4--it is highly recommended that a login process is required so that this information is not publicly available.**

## 8.5 Organizational Structure



### 8.5.1 Motivation

The organizational structure of an SLC is often an excellent pointer to its activities. The way an SLC is structured provides important information on how it is equipped to meet the mission and goals outlined in its charter, and whether it is able to meet those goals.

### 8.5.2 Different SLC Types

SLCs may be broadly classified into two categories. A few schools have open membership in the SLC for the entire ERC student body. Such membership may be either mandatory or voluntary. Subsequently, SLC leadership councils and committees may be formed to provide direction to the students, and to provide the impetus for various activities. The more traditional type of SLC is one in which a small percentage of ERC students are elected or volunteer to serve on a leadership council to represent the interests of the students.

### 8.5.3 More about SLCs

The size of SLCs varies greatly. In a couple of centers, the entire ERC student body is automatically part of the SLC, while in most centers, they are made up of about 5-10 members representing an overall ERC student body of 50-100. Since an ERC involves participation from different universities, the SLC should be formed such that there is a proportionate representation from different schools.

The motivation for SLC membership can be in the form of monetary incentive, in the form of an increase in salary to serve on the SLC, bookstore gift certificates, or even reimbursement for travel. In most cases, however, recognition and appreciation and greater involvement in the center are what motivates people to serve.

Most of the well-established centers are making special efforts to encourage undergraduate participation on the SLC. In some centers, it is a requirement of the administration or their bylaws that some undergraduates be members of the SLC. Some centers could be constrained by their relatively small student body, or even the fact that undergraduate students are present only during the summer, making them unavailable to serve in a leadership role. But most places seem to make a sincere effort to recruit undergraduates to the SLC.

Most of the SLCs hold elections for SLC officers. In smaller or newer centers with fewer overall students, members tend to be appointed or volunteered, while the more established centers with a sizeable study body hold elections. If elections are held, then this is done by email, voice vote, or secret ballot. Nomination periods range from 1 week to 1 day. In the case where elections are conducted, the nominees can be asked to share their details and their plan of action for the SLC in the year with the entire ERC student body. This approach can help the students choose their representatives.

Most SLCs have titles and specific responsibilities for their officers, but in some cases, officers simply get together on various projects on an as-needed basis. In some other cases, officers are elected for each research thrust area in addition to holding other positions such as social activities, outreach efforts, etc. Nearly all SLCs have a designated person or committee to focus on outreach efforts. There might be cases where responsibilities could also be shared if two people are assigned to each role/committee.

In centers where the entire student body constitutes the SLC, meetings are held only a few times a term, though the leadership meets more often. In other centers, the SLC meets weekly, every two weeks, or monthly. Since the SLC has members from different universities, the meetings could be conducted via Skype, telecon, Webex, etc. Most SLCs have a meeting at the start of the term, in which they decide what they need to accomplish that term. Most centers have someone from administration attending SLC meetings, by invitation.

Several SLCs have bylaws that govern their SLC's functioning. There seems to be no correlation between having bylaws and having a good organizational structure. But in general, those centers that do have bylaws tend to have a strong SLC organization. See Appendix A for sample SLC bylaws.

Communication between the SLC and the rest of the ERC student body could be via a variety of methods: email, questionnaires, mass meetings, newsletters, etc. Some SLCs also have their LinkedIn and Facebook pages to keep everyone informed about upcoming events, research and development activities, and upcoming seminars and conferences. At a few ERCs, the SLC also undertakes the task of updating the ERC website.

### 8.5.4 Best Practices and Conclusions



### *Create bylaws and follow them in both letter and spirit*

The absence of bylaws does not necessarily imply a weak organizational structure, but the converse is invariably true: Bylaws give structure to an organization's activities and lend weight and substance to its decision-making process. Bylaws may typically include (but are not limited to) information on officers' roles and responsibilities, membership rules, voting rights (if elections are held), amendments, and meetings.

### *Have an outreach coordinator*

Most ERCs have an outreach coordinator on their SLC. This appears to be a very desirable practice. Experience has shown that outreach efforts are usually very challenging in terms of time, logistics, and the effort involved in motivating students to participate. Given the importance of outreach activities to the center, it is an excellent idea to designate an SLC officer to handle all outreach activities and to liaise with the center leadership in all such efforts.

### *Invite center leadership to SLC meetings*

Inviting a representative from the center's administration, such as the education director, to SLC meetings is a desirable practice. The presence of such a person provides an opportunity for better communication between the students and the administration, avoids potential communication gaps, can provide information about money matters and budget allocation, and expedites decision-making.

### *Other suggestions*

Some SLCs reported that they do not assign roles for their officers, but rather allow them to work on projects they are interested in, as this motivates them to do a better job. While this practice may work in some cases, another idea may be to pair up officers in committees, so that they may motivate each other and share the responsibilities.

## 8.6 Generating and Maintaining Interest

The best methods for generating and maintaining interest in the Student Leadership Council are going to be different for each center. However, in all cases those methods should be guided by three intertwining principles: value, respect, and ownership.

- **Value**

For students to have interest in their SLC, they have to see the SLC as something that benefits them. The easiest way to provide value to students initially is of course by giving them free food, and an SLC event without free food is a poorly attended one. However, other methods are required for encouraging more than just attendance.

In general, greater participation deserves greater rewards. A student who has contributed time and effort to the SLC and is overall having a positive impact on the whole center should be given more rewards and opportunities than a student who shows up to an SLC event twice a year. These rewards can take any form that the SLC sees fit, from gift cards to travel awards to project funding. If students see that being on the leadership council is a lot of hard work with little appreciation, they will take their talents and energies elsewhere.

However, this philosophy does not mean ignoring uninvolved students. The SLC must also represent and advocate for all of the ERC's students. When any student has a complaint concerning the center, the SLC has an obligation to investigate and respond. A single voice is easily silenced, but the power of the SLC is the unity of its members. Therefore, an SLC that neglects its responsibilities is worthless to its members and to the other ERC students. This same principle holds on the positive side as well; the SLC can be instrumental in communicating positive features of the ERC to engineering students, including those



already involved in the ERC and those who are not.

- **Respect**

Students are people too; and of all organizations, the SLC is one that cannot afford to forget this. Students are the fundamental building blocks of each ERC, and disgruntled students weaken the whole center. The SLC must respect their member students, and especially their students' time. Graduate students are a busy lot, and if they perceive that the SLC is wasting their valuable time, they will disregard it as a trivial distraction at best, or a dreary requirement at worst.

Therefore, the SLC must take care of how it presents itself. Should an activity be mandatory, or should it be an optional opportunity for the member students? Students respond more favorably to events that are beneficial but optional than to mandatory events of dubious value, so the number of events that are absolutely required for each student should be minimized. If turnout remains low, the SLC should re-evaluate those events: Is this what the students want, and if not, what do they want??

- **Ownership**

The natural continuation of the previous two principles is that, if they are consistently observed, students will begin to feel a sense of ownership over the SLC. The SLC member students must feel that this organization is *their* SLC for it to flourish. If students think of the SLC as *their* own group instead of an external organization--as *their* interface with the center administration and the NSF, and as a reflection and representation of *themselves*, they will be interested in the SLC and will participate actively.

As such, each student must be free to voice their thoughts about the SLC. They should not find the SLC disorganized or chaotic; established bylaws should lend structure and purpose. The center administration should treat the SLC in a hands-off manner, but it is still up to the students to make the SLC theirs.

At this point, it must be stressed that these ideas are nothing if the average student never hears about them. Communication is essential, from the leadership council to the ERC students and vice versa. Center administration does not always communicate the center's goals and philosophies to the students. It is often up to the leadership council to give the center's students a sense of cohesion and direction. How this communication should be conducted can be coordinated with the center leadership to avoid mixed messages and redundant efforts. It is also a good opportunity for the SLC to recruit members of the council from among the ERC students.

Special care must be taken for centers that are spread out over multiple campuses. When a large number of students are at one campus, it becomes logistically simpler to tailor events to that main campus. However, this practice excludes students at the branch campuses. Each campus must have a campus representative who will organize local events at their respective campuses. These representatives will ensure that their local peers are receiving a fair share of the SLC's benefits, creating and sustaining a local ERC community, so that no student will feel that, "The SLC is just for those other students." (See the following section 8.7 for more discussion of this topic.) Ultimately, when the SLC is useful to all of its members and treats them with respect, the students will be interested and active in their organization.

## 8.7 Communication

### 8.7.1 Motivation

An important aspect of the SLC's role is that of a liaison between the student community and the center administration, and as a facilitator of communication between staff, students, the NSF, and industry partners on center research, organization, and function. Further, the SLC is seen as a vehicle to promote communication outside of the center and provides an entry point for students wishing to get involved in the center as well as a vehicle for reaching out to pre-college students to interest them in engineering. Thus, communication is a vital aspect of a successful SLC and is addressed in this section to identify best practices for this area.



### 8.7.2 Communication Best Practices

The center leadership can communicate with the students through email lists, meetings, flyers, websites, in-person communication, newsletters, and through the students' advisors. Communication from the SLC to the students (SLC members and others) can occur through email lists, texts and Twitter, meetings, websites, and in-person communication.

Given the inherent challenge of communicating within any large organization consisting of disparate locations and various disciplines, such as an ERC, such organizations often employ an internal-facing website (intranet) to help solve this challenge. The SLC can easily develop and host an intranet that contains information of common interest to all students (see example below). Such information may include: events calendar; time zones by location; key contact information for the SLC, ERC leadership, and liaisons by partner university; links to the ERC's online presence such as their homepage, LinkedIn page, Facebook page, etc.; links to various shared Google docs wherein a variety of information may be shared and updated; and links to the websites of and contact information for industry partners. The code for the intranet itself need not be complex in nature and could even be as simple as a single HTML file with information formatted in simple HTML tables and links to other websites and hosted images. A screenshot is given below as an example of such a website, including multiple tabs at the top which display examples of some of the content mentioned above.

If ERC students have any concerns they wish to relate to the center administrators or staff, they can raise them through personal communication or e-mail with the administrators or discuss them with the SLC, which acts as a liaison. Students can voice concerns to the SLC and other students through weekly/biweekly/monthly student meetings, the SWOT analysis, or social events. SLC meetings should be open to all center participants so that they can voice concerns there.

Students can learn about other research being conducted in the center through meetings. The best practice is a weekly SLC meeting where the students presenting their research are evaluated by the other students in order to improve their public speaking skills.

If students need to express confidential concerns such as conflicts with faculty or harassment while they are working at the center, they can report to the SLC, administrators, or the ERC's Education Director. If the student is leaving the center, these concerns could be expressed through an exit interview or questionnaire.

SLCs can communicate openings for new undergraduates with the ERC primarily through advertising and undergraduate programs. Advertising can take the form of email, flyers, ads at campus employment offices, and website postings.

Communication between the ERC students or the SLC and industry partners occurs mostly at meetings where industry partners visit, or through students' advisors. Students and industry partners can meet in the form of table discussion or working lunch without the presence of faculty. The best practice to promote communication between ERC students and the NSF is through the annual site visit and the SWOT. The Student Retreat at the ERC Program's Biennial Meeting can also be a good connection to the NSF.

The ERC Association website ([www.erc-assoc.org](http://www.erc-assoc.org)) is potentially a useful means of communication among SLCs and between SLCs and other groups such as industry partners and potential ERC or SLC student recruits. For example, the "Student Portal" area contains contact information as well as resources for use by all SLCs. The Portal main page also lists [all current SLCs](#) and the addresses to their web page.



Events | Contact Info | PVSC 2014 | Online Presence | Links | Industry Partners | Equipment | Key Conferences

### QESST Scholar Events (Arizona Time)

Today | Thursday, September 4 | Week | Month | Agenda

Showing events after 8/1. [Look for earlier events](#)

**Monday, August 25**  
11:00am All QESST Vidyo Conference

**Tuesday, August 26**  
12:00pm Solar Energy Research in Mexico: Examples from the Instituto de Energias Renovables

**Wednesday, August 27**  
12:00pm Engineering Research to Better Society: Examples from the Institute of Engineering--UNAM

**Friday, August 29**  
10:30am Electrical Research in a Developing Country: A Social Innovation?

Showing events until 11/15. [Look for more](#)

Events shown in time zone: Mountain Time - Arizona

PDT  
CalTech

AZT  
ASU  
U of A

MDT  
UNM

CDT  
U of Houston

EDT  
U Del  
GaTech  
MIT

Developed by Tim Reblitz of Tree Blitz Engineering | Best Viewed with Google Chrome

## 8.8 Outreach

### 8.8.1 Overview

Outreach is one of the important objectives of the ERCs, and is an integral part of the SLC mission. Active participation in outreach mutually benefits both the students who are volunteering and the community they are serving. This also enhances the leadership, communication, and networking skills of the students involved.

The planning for ERC outreach activities and the involvement of SLCs in those activities is generally overseen by the education director(s) of the ERC. Most SLCs also have an outreach student coordinator or a student committee who help and are involved in the planning and implementation of the activities. Outreach activities can be implemented that cater to students of different ages and specializations.

ERC outreach activities typically encompass some or all of the following:

- Summer internship for undergraduates – Research Experiences for Undergraduates (REU)
- Summer internship for high school teachers – Research Experiences for Teachers (RET)
- Summer internship for high school students – Young Scholars Program (YS)
- Science club and science fair activities for middle school/high school students
- Volunteering at on-campus "ERC open house" days
- Volunteering at science museums to explain science and technology projects
- Participating in university-wide outreach activities
- Designing activity kits and in-class demonstrations for middle school/high school students.



### 8.8.2 Outreach Activities Planning

Planning the center's outreach activities at the beginning of the semester/academic year is one of the crucial steps to ensure successful outreach participation of the center and the SLC. During the planning, it is important to take into account the diversity and the variety of activities being considered. For instance, a student might be interested in volunteering to teach science to middle school students and a different student might be interested in designing an activity kit for middle school students. Although the above two activities are targeted to reach the same community, they are quite different in implementation and both may need additional student volunteers to help the primary organizer. Considering the above factors when planning the activities increases the student participation.

### 8.8.3 Best Practices

It is important for the SLC to be actively involved in outreach, as the center's student body is critical in supporting those activities. The benefits of volunteering for these activities, to both the students and the center, should be discussed and emphasized with the students. Benefits like broadening mentorship and leadership skills and the importance of these skills in advancing their career should be discussed.

#### [Beware of lagging interest](#)

One of the biggest problems in implementing outreach activities is gaining and maintaining the interest of the volunteering student. Most students get busy with their academic/research activities and do not find time to be involved with outreach activities. Also, in older centers, students might have a "been there, done that" sentiment which discourages them from participating further. This problem can be avoided by keeping the activities diverse and ensuring that fresh activities are added regularly.

#### [SLC outreach coordinator or committee](#)

This feature provides a focal point for the SLC to organize outreach activities and support the ERC's education outreach director. The SLC outreach coordinator can also work closely with the ERC student body and know their personal opinion about the outreach activities. This viewpoint could serve as a feedback mechanism during the design of new activities.

#### [Recognize your participants](#)

Because SLCs rely heavily on volunteers for their outreach activities, it is critical to publicly recognize their involvement. Center wide email "thank-you's", certificates of recognition, or banquets are several suggestions. Incentives such as t-shirts, giveaway merchandise (like water bottles, etc), and free food may also be helpful.

#### [Keep activities in scope and distribute the leadership roles](#)

Many volunteer activities fail due to their sheer magnitude. Keep activities within a manageable size for the size of your student body. Distributing leadership roles for an outreach project beyond the SLC not only makes it more manageable, but also provides more opportunities to develop leadership skills while potentially helping with recruitment of more students into the SLC.

#### [Design a student expectation chart for the students of the center](#)

Designing a chart that lists the expectations of students working in a center will be helpful, to both the center and the students, in planning their activities ahead of time. This practice is not only limited to help with outreach involvement, but will also serve as a guide for the overall planning of the student. For example, the NASCENT ERC suggests that a student be involved for at least 6 hours of outreach per semester. Although this is still entirely voluntary, providing an expectation seems to increase the student involvement.

#### [Find effective communication channels](#)

Volunteers do not participate in outreach activities when they are not informed about an event in a timely fashion. Direct email, listservs, posting on an SLC Facebook page and/or an SLC page on the ERC's website are all communication mechanisms that can be used. Don't forget the effectiveness of one-on-one in-person communication.



### [Encourage local schoolteacher involvement](#)

Many outreach activities involve secondary and primary school children. The effectiveness of these programs is dependent on the support received from their schoolteachers. Encourage teachers to involve themselves in the development of these outreach activities.

### [Keep it local](#)

For maximum participation in an outreach activity, keep it local to the center students. SLCs in multi-university centers should facilitate the planning of outreach activities independently at each partner institution.

## 8.9 SWOT Survey and Analysis

SLCs are responsible for conducting an annual survey of all students within their ERC regarding center Strengths, Weaknesses, Opportunities, and Threats. The information gathered in this SWOT analysis is intended to help SLCs identify center strengths to be capitalized upon, identify needed areas of improvement, and plan for future opportunities and threats. The SWOT analysis also aids the NSF in assessing student life and the students' views regarding the center.

The SWOT analysis is carried out once per year, and the results and planned follow-up are discussed with the NSF in a closed meeting between the NSF, SLC and, in some centers, the entire ERC student body.

### 8.9.1 Generating Questions

Most SLCs generate questions and issues to include on the SWOT survey through brainstorming sessions and discussions. This can be achieved at meetings of either the SLC leadership or the general student body, over email, or through social media and online forums such as reddit. Some centers review the results from the previous year, or even simply revise the old survey, but this might not effectively address all new issues affecting students in the center. The recommended best practice is to gather student input ahead of the SWOT survey in order to get recommendations for new questions or issues that arise. To aid in maximum survey participation and completion, survey questions should not be too numerous. Depending on the section, a maximum of 15-20 questions is appropriate, and similar questions should be merged.

Since the goal for the SWOT survey is to get a clear picture of the condition of the student body, questions on student demographics should be gathered. Demographics include information such as a student's university, core or associated status, thrust/section/testbed affiliation (the term varies by ERC), and years in their graduate/undergraduate career. This information is necessary for analysis of the results, which will be discussed in Section 8.9.3 below.

Regarding the questions, responses should follow a Likert Scale (1 to 5, with 1 being strong disagreement and 5 being strong agreement), and may also include a response about the student's awareness of an issue (such as "not aware"). Questions should be phrased so that the meaning of agreement or disagreement is very clear, and it is best if one or two members of the SLC who had a lesser role in developing the survey complete the survey first to get an impression of how the questions will be interpreted. Short answer responses may also be gathered, and if so, comments should be solicited at the end of each of the four sections of the SWOT survey so that a student does not forget his or her comment(s) about that section.

### 8.9.2 Conducting the Survey

Different centers conduct the SWOT survey through a wide variety of methods: SurveyMonkey, paper-and-pencil, email, and verbal responses have all been used. Some centers have an initial discussion and then use follow-up emails or surveys to generate responses from a greater percentage of the ERC student body. Response rates vary



from 20% to almost 100%. There is little correlation between the response rate and the center's size, age, or strength. In fact, some of the largest centers are able to achieve the highest participation rates. Centers with a large number of partner institutions, however, seem to have lower response rates for SWOT surveys.

Successful methods for gaining a high response rate have included incentives (such as a drawing for prizes), timing the survey with a student event that has large student participation, or creating a paper-and-pencil survey that is physically given to all students. With all current ERCs consisting of two or more partner institutions, web-based surveys typically have very low student participation unless the SLC assigns a champion for each university, who contacts other ERC students on their campus.

### 8.9.3 Analyzing Results

Proper analysis of the SWOT survey results can be a powerful tool for getting a snapshot of the condition of students across an ERC. At least a week should be set aside for analysis of results, as responses should be measured not only in aggregate, but also by demographics. For example, a weakness with a 60% agreement rate may be composed of 50% from one demographic and 10% from another, pointing to issues such as a lack of engagement for new students or for students at a particular university. Since drilling down on questions can be time consuming, priority should be given to survey responses that merit action items.

SLCs from mature centers may come across repeating problems, which have not been resolved despite numerous efforts by the SLC. In these cases, studying the demographics of the response can often point to the source of the issue (such as new students being unaware of resources) but after this, it may also be helpful to append additional questions to the survey or gather more detailed student feedback. One center was able to identify, for example, that its inability to resolve a complaint about internships came mainly from newer students being unaware that the center provided internships.

Proper analysis of the SWOT survey can also help generate better questions in future years.

### 8.9.4 Forming an Action Plan

Surveying students for the sake of presenting results to administrators or NSF evaluators is not enough. The SLC should be responsible for following-up on the results of the SWOT analysis. Some SLCs assign specific individuals to areas of concern. Others make recommendations to center administrators regarding how problems might be resolved or student life improved. For instance, when computers, notebooks, and tablets were found to be inefficiently distributed at one center, action was taken in the subsequent year to allocate resources appropriately. In another case, when the judging procedure for site visit poster contests was not working well, it was later revised. The Site Visit Team looks not only for action plans for the current SWOT survey, but also for success with action plans for previous surveys.

## 8.10 Site Visits

### 8.10.1 Motivation

Site visits are, of course, a necessary component of all NSF-sponsored centers. In most centers, Student Leadership Councils (SLCs) significantly assist in the preparation and execution of these reviews. Site visits provide students with opportunities to showcase their research efforts and achievements, as well as network with visiting scholars. Providing the student perspective is critical at these reviews, and the SLC should facilitate this



process and help organize the student body of the center.

### 8.10.2 Summary

Almost all centers have poster exhibitions or competitions and other presentations and demonstrations in conjunction with the site visit. In most cases, the SLC plays some role in the preparation of these presentations. Examples of assistance include providing poster guidelines, templates, materials, and printing facilities. They also play a major role in organizing the poster session and competition, when applicable. Preparations begin anywhere from a few weeks to a few months in advance. Students may only be required to attend a small portion of the site visit, but are strongly encouraged to attend as much as possible in most centers, particularly technical sessions and those which are most closely related to their research. During the site visit at some centers, students also help with other volunteer or assigned jobs such as poster session set-up, transportation, and lab tours.

The other key component of the site visit, from an SLC perspective, is the presentation of SWOT survey results to the NSF and the written SWOT report, which was discussed in [Section 8.9](#).

### 8.10.3 Multi-University Centers

With regard to site visits, the most significant difference for centers that span several universities is that there seems to be lower participation from partner institutions. Holding events and retreats that bring together students from all institutions garners camaraderie and increased cross-institutional collaborations. It is important to maintain good communication among students from all partners in multi-university centers and be sure to include viewpoints from all institutions within the SWOT document/presentation.

### 8.10.4 Best Practices and Conclusions

One role of all SLCs is to represent the student body to center administrators and guests. This is particularly important prior to and during site visits. In addition, the SLC needs to assist the entire student body as they prepare for and carry out their duties during the visit.

#### *Preparation*

The SLC should work with the administration to determine what is needed and expected from students well in advance of the site visit. Then, the SLC must communicate these expectations to the students and assist them however necessary. Work related to the site visit itself can take a significant amount of time for students and they must account for this in their schedule. The SLC can help by distributing the work as evenly as possible and minimizing the time required to prepare. The SLC should organize the poster session, which is an important opportunity for students to directly present themselves and their work to NSF visitors. Students should be provided with specific instructions on how posters should be designed, what electronic templates or samples are available, and how posters should be printed and mounted. The timeline for reviews and submission deadlines of posters, presentations, and demonstrations should be communicated to the entire student body. SLC leaders should generate and conduct the SWOT survey more than one month in advance of the site visit, so that there is sufficient time to develop a presentation that fully represents the student perspective for the closed-door session with the NSF during the site visit.

#### *Student Participation*

Encouraging full participation of students during site visit events can be challenging in many centers and the SLC often assists the administration in this regard. Where students must help with specific tasks and jobs, many centers first ask for volunteers. If volunteer positions are not filled, the SLC can help in assigning remaining jobs. Incentives such as food are often used to encourage participation. In addition, some centers mandate participation as a condition of funding, to varying levels of success. Advisors and administrators encourage participation with repeated reminders and sometimes by verifying attendance. One more positive method that has been used to increase student participation is to organize the poster session and/or meals with visitors in a manner that is conducive to networking.

#### *Student Input*

Another best practice is for the SLC members and other students to be advocates for student concerns during site visits. For instance, student input regarding scheduling, agendas, session locations, and other issues is important. Advance notification of visitor names, research interests, and affiliations can help students be better prepared for questions they may encounter. It is important for students to be well informed about results from previous site visit reports as well as overall objectives and research thrusts of the center. Having effective communication channels



throughout the year is the best way to prepare for site visit reviews. Many centers accomplish this through seminars and lunches that expose students to research areas beyond

## 8.11 Industry Meetings

### 8.11.1 Motivation

One of an SLC's primary missions is to provide student perspectives and to facilitate communication between students, center staff, industry partners, and the NSF. Student contributions and input regarding industry meetings are valuable to the center and to industry. Another function of the SLC is to plan social and professional events that provide students with opportunities to network with center alumni and visitors from industry and academia. Meetings with industrial partners are an ideal opportunity to fulfill these objectives. Students can find potential future employers and also broaden their educational experience through practical applications of their research via internships and other collaborations with industrial partners.

### 8.11.2 Current Practices Within Active ERCs

#### *Industry/Working Meetings*

Center-wide industry meetings are typically held between one and four times per year. Other industry meetings at a project level can occur much more frequently at some centers. As with site visits, students are generally expected to participate in a poster session and other presentations and demonstrations during industry meetings. However, most of the preparation work is conducted through center administrators and faculty advisors on a more individual basis. Industry meetings seem to be an area where SLC and center students are less involved or less successful in their involvement, despite the fact that student involvement with industry relates directly to several of the stated SLC missions and functions as well as to those of the ERC. This is an area where students, working with faculty and center administration, could begin to have greater input over time.

#### *Industry Committee*

One center's SLC has an Industry Committee that focuses on activities and events related to industry. For instance, they organize seminars where industry members teach current industry practice to the students on a regular basis and compile lists of current journal publications from the center to distribute to industry.

#### *Industry Seminars*

Some SLCs host student-oriented industry seminars, in which companies come and present on the company itself or on their industry in general. Another popular activity is to host workshops in which industry or ERC representatives teach a useful skill to the students. The primary challenge identified with industry seminars is maintaining sufficient student attendance to keep the interest of industry speakers; this is a responsibility of the SLC's leaders. Other possibilities for student-led industry interactions include:

1. Informal Luncheons at conferences attended by students of the ERC and industry members partnered with the ERC Industry
2. Career Panels, where a panel of 3 or more industry members answer questions from students in the ERC relating to internships, future career paths, and general advice for transitioning from a graduate school environment to industry.
3. Mock Interview Sessions where industry representatives and/or faculty hold in-person or via video (Skype, Gchat, Vidyo, etc.) interviews for a fabricated job position with students. These can be one-on-one or multiple-on-one (multiple interviewer-to- one interviewee) interview sessions

#### *Foundry Programs*

Entrepreneurial students at some ERCs are taking part in ERC Foundry-type programs, which give such students



training and support at the earliest stages of company formation. Examples of Foundries can be found here:

<http://erc-assoc.org/achievements/qolt-booth-hit-consumer-electronics-show>

<http://erc-assoc.org/achievements/erc%E2%80%99s-world-innovation-and-technology-led-entrepreneurship-continues-evolve>

Typically, an SLC's role is to maintain contact with an ERC's foundry program and to promote opportunities to students.

### *Resume book*

Finally, some ERCs currently collect resumes of students seeking jobs and internships and compile them into a physical and digital book for distribution to IAB members.

### **8.11.3 Best Practices and Conclusions**

Again, one main function of an SLC is to represent the student body to center administrators and guests--especially industry sponsors. Industry meetings provide an excellent opportunity for students to network and socialize with industry executives. The SLC can facilitate this process by:

- Maintaining a dedicated SLC position to oversee relationships with the ERC's Industrial Advisory Board (IAB), Foundry program (if available), and students; this position may be called the IAB Chair or SLC/Industry Coordinator
- Helping to organize events such as luncheons or private sessions with industry
- Contributing to resume books and student/company matching programs for internships and full-time positions after graduation.

*Conclusion:* In order to ensure effective communication with industry and timely promotion of programs, the SLC should dedicate a student specifically to maintaining student-industry relations. It may be necessary to create a committee of students. For these students, primary tasks include gathering student requests for industry interaction and professional development, planning industry seminars, and creating the student resume book. An additional task may be to maintain industry contacts in order to disseminate job and internship information.

## **8.12 Building a Student Community**

### **8.12.1 Motivation**

Social activities relate to several motivations and goals of SLCs. One of the main missions of SLCs is to represent the student body. In order to do this effectively, the SLC must frequently interact with members of the student body in social settings. In addition, the SLC should facilitate communication between students, faculty, staff, NSF reviewers, and industry partners of the center. Social activities also enhance student life, build community, and add to the center experience. Students at NSF-sponsored centers should benefit from a broader range of experiences than typical university research assistants, including multi-disciplinary interactions and opportunities to network with a wide variety of science and engineering professionals. Finally, NSF-sponsored centers have service obligations to educate the public and the next generation of engineers with regard to the research they conduct. This service function can be fulfilled through outreach activities that are also enjoyable for center students who participate.

### **8.12.2 Overview of Social Activities**

In addition to helping to fulfill some of the main mission elements of SLCs, social activities provide a wide variety of benefits for students, including:



- Provide a forum for multi-disciplinary interaction
- Encourage informal interaction between individuals in different center roles (undergraduates, graduate students, faculty, staff, etc.)
- Enhance research relationships
- Build community and a sense of belonging
- Reward students and staff
- Provide a fun break from work.

The type and frequency of social events at different centers varies widely. Based on results of a survey of SLCs taken in 2002, most centers have between four and six events per year. Activities include:

Activity Type	# of Centers Approx	# of Participants
Barbeques and picnics	5	45
Banquets	2	93
Meals with visitors	2	8
Food-based socials (holiday parties, ice cream socials)	4	45
Activity-based socials (bowling, trivia/games, Halloween)	4	45
Sports outings or intramural teams (does not count large #s of non-center students)	4	20
Research or outreach-based field trips	2	12
Seminars	4	35

Some centers use weekly or bi-weekly social meetings and lunches to share specific areas of research with students and staff from throughout the center. This helps everyone to be more informed about everything that is going on at the center, but falls more into the realm of communication than purely social activities.

Other idea for events and activities include:

- Going out to lunch
- Holiday themed parties
- Seminars followed by potlucks
- University partner-specific events vs whole-center events

Social activities are generally planned by the SLC, but they are sometimes assisted by the Education Director or other staff members. There are also opportunities to partner with other research groups or professional organizations at the university. Almost all centers fund their social activities through the SLC or Education budgets. Another possible funding source is through the university. One center chartered itself as a university organization in order to qualify for reimbursement through departments or groups such as student government. This typically involves paperwork and annual renewal forms, but often these groups have more money to distribute than what is requested by student organizations. Restrictions may exist on the type of activities that can be funded in this way (such as not paying for food or events where alcohol is served, etc.). Students can be asked to pay all or a portion of the costs for certain types of events, particularly tickets to sports events or events where non-center students are also invited to participate. This may discourage some students from attending.

### 8.12.3 Involving Partner Institutions of Multi-University Centers

All ERCs encompass one or more core partner institutions in addition to the lead institution. Social activities are especially important for bringing together students, faculty, and staff from multi-university centers whose



participating institutions are located in different geographic regions. Depending on the proximity of the participating institutions, these centers might have relatively few cross-center events during the year. It is customary that centers without major geographical restrictions schedule at least one annual retreat, during which high attendance rates are expected. However, centers in which the participating institutions are located in widely dispersed geographic regions should plan quarterly or bi-annual events to foster enhanced communication among researchers within the center. The responsibility of hosting these events should also be alternated among the participating institutions. An additional cost of social events at multi-university centers is travel, which must be budgeted for and funded.

Suggestions on how to more effectively organize events are:

- Keep location in mind
  - Certain locations can be more appealing to students
  - Alternate locations for different events
  - Pick an activity that is relevant to the location
- Have each school's SLC reps organize local events
- Plan whole center events around the center's annual meeting
  - Team building events: scavenger hunt, outdoor education (zip-lining, rock-climbing)
  - Interactive seminar or training sessions (public speaking, diversity); "alternative teaching"

"Student Day" -- The Student Day retreat, a 2-3 day event held annually or bi-annually at each major ERC partner university, can provide ERC students with opportunities to:

- Visit labs at other ERC campuses
- Get up to speed on projects outside of their major research focus
- Network with other ERC students and faculty
- Instill a sense of pride in being an ERC student
- Participate in and lead professional development efforts
- Conduct the "Perfect Pitch" Contest to select a center-wide winner to represent the center at the ERC Program's biennial meeting
- Exercise skills in leadership by defining and organizing the event activities
- Perform the center SWOT analysis

The Student Day can be further used to conduct a poster session (where every student presents their research in the form of a poster) as well as to provide time for different SLC leadership teams to work on other ERC initiatives e.g. ERC Newsletter, outreach strategies, the SLC's website, and professional development opportunities.

At the end of every Student Day, SLC leadership surveys the participants to make sure that each Student Day is better than the last. The biggest impact of these events comes from the friendships and professional relationships that are forged among the students; Partnerships emerge across universities at the student level, students become aware of the big picture, and they feel accountable for the success of the center.

### 8.12.4 Best Practices and Conclusions

Personal interaction and interpersonal communication is one of the best ways to understand student concerns, perspectives, and desires. When the SLC plans social events, several best practices will help to ensure success:

- Survey students for ideas on the types of activities they prefer and which previous activities they enjoyed most.
- Advertise well in advance of the event, through a variety of methods (email, text and Twitter; flyers in the workspace, particularly near doors and elevators; the SLC website).
- Personally invite students, faculty, and staff through word-of-mouth, including announcements at meetings.
- Send multiple reminders as the date of the event approaches.
- Require or recommend an RSVP, particularly when resources such as expensive meals or advance-sale tickets are required.
- Provide incentives to increase participation, such as food, prizes, entertaining activities, or the price of



admission to special events.

- Even when RSVPs are used, expect more participants than just those who respond, including last-minute requests to attend.
- Enlist the help of staff members or administrators such as the Education Director, when needed.
- Always thank everyone who participates and publicly recognize volunteers who help to plan social events or other center activities.
- Help organize transportation such as car-pooling (use dropbox or google docs to facilitate), provide public transportation, or allocate additional travel expense.

## 8.13 Facilities

### 8.13.1 Motivation

Facilities management encompasses a broad spectrum of areas that are rooted in the needs and wants of the student body. Since any SLC is formed with the intention of representing the students, it is natural that the SLC should be concerned with the facilities and environment where the students work. Knowing that not all student requests and inputs will be included in a final decision should not take away from the fact that a facilities management plan put into effect by a joint effort of students and administration could benefit both sides of the table. The administration and faculty will receive organized feedback, and the students will be able to express concerns in a fashion that increases the effectiveness of the response.

### 8.13.2 Facilities Issues

Issues regarding facilities can be divided into three main categories: general facilities; computers and other available technology; and the student area. A student area is simply where each respective lab or center has assigned student desks and/or workstations.

#### 8.13.2.1 General Facilities

Many of the centers allow students similar full-access privileges to the "core facility," a library, and perhaps a separate computer lab, with no restriction of scheduled hours. While student groups are generally not charged with maintenance of the areas they are permitted access to, it is reasonable to expect that students will "leave it as you found it." The same holds true for a snack area for students, if there is one.

Recycling is also a task that most centers leave to the university, except for one. In this instance, the SLC designates one person to handle recycling and puts the money earned from bottles and cans back into a student-run store.

#### 8.13.2.2 Computers and Technology

Computers and technology are perhaps the most important area in facilities management, since they are the focal point of much of the work that gets done in any research center. Quite commonly, a center will have a given number of computers allotted for individual assignment as well as a set designated for general usage. Usually, the SLC has little or no input into the computer assignment process; it is done by the center administration. Seniority and degree pursued are typically used as a criterion for computer assignment, which commonly leaves the undergraduate students sharing computers. Some centers do not assign undergraduates to a computer at all. Perhaps it is surprising, then, that SLCs generally report that their computer resources are sufficient. Part of the



reason undoubtedly is that every student has their own laptop, notebook, or tablet for autonomous computing and later connection to the network.

When it comes to computer updates and maintenance, the SLC is only marginally involved in the upgrading of their individual center-owned computers, while network and university computers are left to the administration. To ensure that student computing needs are accommodated, the SLC should offer to provide input to the center administration on an "as needed" basis and make the student body aware that the SLC can communicate needs to the ERC's leadership team.

Available peripheral devices and technology typically consist of printers, scanners/copiers/faxes, digital cameras and videocameras, LCD projectors, and video editing equipment. The selection of peripheral devices for student use is in the hands of the administration, although SLC input is sometimes requested by the administration. Some centers have a Facilities Director/Network Support Specialist who is in charge of such decisions and will sometimes ask for the input of the SLC.

### *8.13.2.3 Information Exchange*

Also included under facilities is the issue of information exchange among the center students, faculty, administration, and industry partners. Email (including listservs such as Google Groups) and a website are the most common means. Most SLCs maintain their own web page within the ERC's main website. Some have a dedicated Facebook page for news and networking.

### *8.13.2.4 Student Area Environment*

The final major facilities issue concerns the areas where students typically spend a majority of their time in the ERC. This itself varies greatly across the centers. Some schools have one general area where students have their desks and computers; but others have several such areas, and on separate campuses. That being said, this discussion will apply to each individual area or lab, rather than to the center as a whole.

Most centers put the students' office space together, or in close proximity to each other. The responsibility for desk space and arrangement of lab area workspace varies across the centers. In some ERCs this varies according to department; some centers allow the students to decide, or at least solicit SLC input; in others this varies per faculty member and in others the students have no involvement.

Some ERCs have student offices spread out through their respective departments but designate a large space for collaboration with labs, lounge areas, and conference/meeting rooms with multimedia display options such as desktop sharing to enable communication across campuses or other locations. SLC/Student input should be heavily considered in the design and furnishing of this space since it is primarily for the students. Recreation and lounge areas are important for community building within the center.

Many centers have a phone system that assigns anywhere from 2 to 10 people per phone in a student area. This type of system requires a method for making sure that people get their messages when they are not personally able to answer the phone. Some centers have given each phone a voice mailbox for taking messages, thus eliminating the responsibility and culpability for message delivery, or lack thereof. Perhaps the more common approach relies on a note or email to the person for whom the phone call was intended. Most centers reported that their methods worked satisfactorily. Obviously in the era of ubiquitous cell-phones, the center phone system is less important than it was in the past, although there is still a role for the traditional wired phone system.

Aside from email, one of the most common document exchange methods is online, via Dropbox or Google Docs or other file-sharing system. This can be accommodated at the SLC level or the ERC level. Ftp is rarely used nowadays, as are faxes.

Meetings and presentations are quite commonplace in almost any center; therefore, reserving conference rooms is an important task. Most schools centers rely on a web-based sign-up scheduler such as Outlook or contact a center administrative staff member, who will note the reservation and set the room and audio-visual equipment as resources for the meeting. Connectivity options for meetings spanning several campuses or other locations including webcams and some desktop sharing software such as WebEx can also be very useful.



### 8.13.3 Best Practices and Conclusions

#### *General Facilities*

There does not appear to be a best practice here, unless it is the common practice of leaving maintenance and services in the hands of the university.

#### *Computers and Technology*

It is universally true that obtaining the best results from one's hard work and effort requires that one use the right tools for the job. It is a given in any center that access to adequate technology is necessary for students to be productive in the lab. Any SLC and any administration will concede this point willingly; the problem arises with the definition of "adequate." Few people will know what the students need better than the students, but among those few would perhaps be the select group of administrators and faculty members involved in the center. It is a good idea for these two groups to discuss together what is needed to maintain or improve the work coming out of their center, rather than having one group dictate these decisions.

#### *Information Exchange*

It seems that, especially with all ERCs being multi-university centers, a website or file server, or in some cases a dedicated SLC Facebook page, might be the simplest form of mass information exchange. Using a file server or website eliminates the delay associated with waiting for someone to check their email, and creates an easily accessible and convenient method of information storage-if properly indexed, of course. In conjunction with Smartphones, Facebook posts can be useful; and for brief messages, Twitter can be employed.

#### *Student Area Environment*

Students must be able to achieve a reasonable comfort level within the center if they are to be expected to work and be productive there. Students who don't find this "comfort zone" may become disconnected from the center, which then creates other problems. The student area environment, then, must be conducive to getting work done and must be somewhat malleable to meet the needs of the students. This may be primarily a function of student seating arrangements, which appears to be quite similar from center to center. Locating people according to project or department seems to be working very well for each center, except in cases where the center is widely dispersed across campus.

Mediating issues that arise between students may be something in which SLCs should not get involved. Instances where judgment and decision may leave some or all of the parties involved feeling slighted or resentful is not something that any center wants or needs for its students. The administration is the most impartial and probably the best source for resolution of conflicts that arise between students. However, there may be a role for the SLC here, which could be determined by each SLC as they see fit. This is a matter of quality of student life within the center, and as such the SLC should have some - even if limited - involvement and attention.

While there is no best ratio of telephones to students, the size of the student body within the center and character of the center should be a consideration when setting up the message system. If center students make and receive important phone calls, voicemail may be the best way to relieve people of the pressure of delivering someone's "very important and urgent message" and then making sure someone gets that message. With regard to the use of cell-phones in labs and classrooms, standard phone etiquette prevails and should be adhered to and made clear to individuals who tend to violate these standards.

Conference rooms are always in demand, and it may be the case that they are quickly booked when found to be available. Even if this is not the case, making a conference room's schedule of events easily accessible, either by website or Microsoft Outlook online scheduler, makes planning and coordinating meetings, conferences, and presentations much easier.

#### *Overall Facilities Conclusion*

One of the primary responsibilities of each SLC, as noted in Section 8.3.1, is to represent the student body to the administration, and in doing so to communicate the needs and concerns of the students. Allowing the SLC to have some voice in facilities management ensures that they carry out another facet of this responsibility. The most important objective is to ensure that the students at least have access to the necessary technology to be productive. However, one should not discount the other issues raised here, as all hold relevance to student life in their respective center.



## 8.14 Conclusions

The Student Leadership Council, as an entity, generally becomes more active over the life of its center and plays an increasingly important role in representing students and solving their problems. Its focus on establishing itself as a student representative body evolves over time to operate more effectively and to live up to students' expectations. The number of students in a center can substantially increase over the years, usually from a handful at inception to over 100 at maturity; therefore, the importance of the SLC grows accordingly. In many cases, the SLC meetings that were once a month later become a weekly event. In the process, the SLC emerges as more dynamic and more actively involved in the student body.

Although the primary responsibility of an SLC is to attend to the basic needs of the students, a successful SLC does not restrict itself just to this. An active SLC coordinates a variety of activities, including outreach and social events. These activities not only entertain the ERC's students, but also improve student cohesion while generating interest and involvement in the SLC, the ERC, and engineering in general on the part of students at the partner institutions and elsewhere, including pre-college students. Social activities such as Students' Day, barbeques, potlucks, etc., along with outreach activities such as peer review, mentoring Research Experiences for Undergraduates students, organizing middle-school LEGO competitions, etc., have become part of the tradition of many SLCs. Various committees are established periodically by or within the SLC to address specific interests. For example, the industry committee at one center organizes LIFE (Learn Industry From the Experts) courses for students and has individual student liaisons assigned to each industry partner. Similarly, the poster committees at many centers assist students in displaying their accomplishments in poster format, while public relations or social committees are responsible for planning social events and maintaining external communications.

SLCs have been generally successful in fulfilling their responsibilities, although along the way some initiatives are not as successful as hoped. However, following best practices such as holding an annual SWOT survey, having student representation from all partner universities, and developing clear role and responsibility assignments aids SLCs in identifying and resolving issues quickly. Further, these and other best practices make it easier to develop and evaluate successful SLC programs.

Throughout this chapter-updating project, we have attempted to ascertain the "best practices" of SLCs from as many centers as possible. Overall, nine SLCs from a diverse set of centers (in terms of ERC age and subject matter) came together for this project, leading to a truly collaborative effort. We believe we have put together a comprehensive document that summarizes the important activities of SLCs and identifies best practices in several key areas.

We hope that this chapter will benefit not only new centers, as a kind of "how-to" guide for nascent SLCs and an orientation guide for new members of all SLCs, but also will give mature SLCs an opportunity to borrow ideas that have been tried and successfully tested elsewhere. We hope that this will be an ongoing process, with new findings being periodically added to update what will be a living document.

### 8.15.1 Appendix A: Example SLC Bylaws

Jump to section:

[8.13.2.1 Bylaws of the Pacific Earthquake Student Association](#)

[8.13.2.2 ERC-RMS Student Leadership Council Bylaws](#)

[8.13.2.3 WIMS Student Association Bylaws](#)

[8.13.2.4 Charter of the Biotechnology and Bioengineering Student Council](#)



[Next - Top](#)

### 8.13.2.1

#### **Bylaws of the Pacific Earthquake Engineering Research Center Students Association**

As amended through October 14, 1999

##### **Article I. Identity**

This organization shall be known as the Pacific Earthquake Engineering Research Center Students Association, PEER Students Association, or PSA.

##### **Article II. Purpose**

The purpose of this organization is to provide a forum for collaboration of students engaged in study and/or research in fields related to earthquake activity. These areas include, but are not limited to, Engineering, Seismology, Geology, Public policy, Technology impact, Urban planning, and Disaster risk analysis and hazard mitigation.

##### **Article III. Membership**

1. **Active membership.** An active member shall be a student at a recognized postsecondary educational institution studying or performing research in an earthquake-related field. Active members shall be able to vote, but only students at a core PEER institution may hold senior offices on the Student Leadership Council (q.v.). It shall be the obligation of each active member to inform the Secretary of his current mailing address.
2. **Advisory membership.** An advisory member shall be an advisor as defined in Article IV. Advisory members shall have all rights and privileges of active membership except those of voting or holding office in the Association, other than the Chairman of the Advisory Committee. It shall be the obligation of each advisory member to inform the Secretary of his current mailing address.
3. **Alumni membership.** An alumni member shall be anyone who has left the Association, having been at one time a member.
4. **Suspension.** A member shall be liable for suspension upon the written petition of a majority of the active members. The Secretary shall notify the member in question of the charges against him at least thirty days prior to the suspension proceeding. All of the active and advisory members shall be notified of the proceedings at least thirty (30) days prior to the proceedings. These proceedings shall be at a regularly scheduled Association meeting at which a majority of the active members are present at the time of the proceedings. For due cause and after just deliberation, a member may be suspended from the Association by an affirmative vote of two-thirds of the active members present at the proceedings. The Chairman of the Advisory Committee shall preside over the suspension proceedings.
5. **Honorary Association membership.** Honorary Association membership may be conferred at a regularly scheduled Association meeting upon those persons who have contributed significantly to the ideals and purposes of the PEER Students Association by a three-quarters vote of the entire active membership. Honorary Association membership may not be conferred upon members who are still eligible for active membership in the association.
6. **Association life membership.** Association life membership may be conferred upon any member by a unanimous vote of the active members present at a regularly scheduled Association meeting. An Association life member shall be entitled to all the rights and privileges of active membership. He shall not count towards a quorum, or hold an office other than Chairman of the Advisory Committee, unless he is granted these rights under another classification of membership.

##### **Article IV. Officers**



1. **Officers.** The officers of this Chapter shall be the President, Secretary, Mentoring Coordinator, Outreach Coordinator, and Newsletter Editor. All offices shall be held by active members who are students at a core PEER institution.
2. **Appointed Officers.** The President shall appoint the following positions by the end of the second week of his term: Sergeant at Arms/Parliamentarian and Alumni Liason.
3. **Junior Officers.** The junior officers of this Association shall be the Internet Coordinator and Historian. All junior offices shall be held by active members.
4. **Student Leadership Council Representatives.** One Student Leadership Council Representative shall be appointed by each core PEER university. This person may also serve as an office or the Association. In no case, however, may any member have more than one vote on an individual motion, regardless of the number of positions he holds on the Student Leadership Council.
5. **Term of office.** Each officer shall serve from the time of his installation until the installation of his successor. An elected officer may succeed himself only once.
6. **Vacancies.** If a vacancy occurs among the officers or junior officers of the Chapter, the President shall appoint an active member to temporarily fill the vacancy, except the case of a vacancy in the office of President, the Mentoring Coordinator shall assume his duties until the election of a successor. The Secretary shall immediately notify all active and associate members that a vacancy has occurred. At the first regularly scheduled Association meeting occurring after this notification, nomination shall be made and elections held to fill the vacant office and any offices vacated as a result thereof.
7. **Removal from office.** An officer shall be liable for removal from office upon written petition of a majority of the active members of the Association. Written charges must be sent to the officer under consideration at least thirty days prior to the removal proceedings, and the officer shall at that time be suspended from performing further duties of the office. The Student Leadership Council shall appoint an active member to fill the office for the duration of the proceedings and shall submit a written report to the Association before a vote is taken. The removal proceedings shall be held at a regularly scheduled Association meeting at which a majority of the active members are present at the time of the proceedings. All of the active and associate members shall be notified of the proceedings, at least seven days prior to the proceedings. For due cause and after just deliberation, an officer may be removed by an affirmative vote of two-thirds of the active members present at the proceedings. The Chairman of the Advisory Committee shall preside over the proceedings.

### Article V. Duties of Officers

1. **President.** The President shall plan the agenda and preside at all meetings of the Association and the Student Leadership Council, and shall be an ex-officio member of all committees. He shall coordinate the functions of all Association officers and committees. He shall appoint any committees necessary for expediency in carrying out the Association program. He shall serve as a member of the Advisory Committee, and arrange for the participation of Advisors at Association activities. He shall be responsible for the external relations of the Association except as otherwise provided by the Association or these bylaws. He shall give supervision to the Association and its officers, and shall see that its constitutional duties, both local and national, are fulfilled.
2. **Mentoring Coordinator.** The Mentoring Coordinator shall perform all functions of the President in the absence of the President. He shall be responsible for the operation and coordination of all Association mentoring programs and shall chair the Mentoring committee.
3. **Outreach Coordinator.** The Outreach Coordinator shall be responsible for activities relating to membership enlargement and retention. He shall serve as chairman of the Membership Committee. He shall be responsible for maintaining the permanent membership records of the Association and for seeing that all related responsibilities are fulfilled. At the beginning of each Pacific Earthquake Engineering Research Center funding period, he shall be responsible for contacting the central office and obtaining a list of the current.
4. **Secretary.** The Secretary shall coordinate the internal affairs of the Association. He shall be responsible for keeping the active and advisory members informed of all matters pertaining to the Association, and for overseeing the administrative details of the Association. He shall assure that the attendance and minutes of each Association and Student Leadership Council meeting are recorded, and see that these minutes are placed in the Association archives and made available for the members' inspection. He shall keep up-to-date the copy of these bylaws on file with the Pacific Earthquake Engineering Research Center, and shall submit to them the names of all members elected to any office in the Association immediately upon their assuming office.
5. **Newsletter Editor.** The Newsletter Editor shall be responsible for the regular publication and distribution of



the Association newsletter.

6. **Internet Coordinator.** The Internet Coordinator shall maintain the electronic mailing lists, homepage, and other Internet-related resources of the Association.
7. **Historian.** The Historian shall keep historical records by archiving photographs, keeping scrapbooks, and archiving the Association newsletter. He shall serve as chairman of the Archives Committee.
8. **Student Leadership Council Representatives.** Student Leadership Council Representatives shall be responsible for attending all Student Leadership Council meetings. In addition, he shall serve as the first point of contact for students at his university regarding activities of the PEER Students Association. He shall also perform active promotion of the PEER Students Association as appropriate at his university, and represent the PEER students Association and Student Leadership Council to the public whenever necessary or appropriate.
9. **Duties of all Officers.** Each officer shall, at the end of his term of office, instruct his successor in the duties of his office and shall see that all files and records of his office are placed in the Association archives. He shall perform any other duties the Association may direct.

### Article VI. Advisors and Advisory Duties

1. **Advisory Committee.** There shall be three or more Faculty Advisors, and as many Service and Industry Advisors as the Association deems necessary. They, with the Association President and the past Presidents of the Association shall constitute the Advisory Committee of the Association.
2. **Faculty Advisors.** The Faculty Advisors shall encourage the development of high fraternal and scholastic standards. They shall assist the Association in planning and executing campus projects. They shall attend association meetings as regularly as possible, and shall serve as personal advisors and counselors on Association matters at all times.
3. **Service Advisors.** The Service Advisors shall give counsel and advice to the Association when they deem appropriate. They shall encourage a high standard of excellence in the Association and its service program. They shall attend Association meetings as regularly as possible.
4. **Industry Advisors.** The Industry Advisors shall assist and advise the Association in matters related to interaction with the professional industry. Industry advisors from all areas of earthquake-related practice are strongly encouraged, including both private and public agencies.
5. **Chairman of the Advisory Committee.** The Chairman of the Advisory Committee shall call and preside over all meetings of the Advisory Committee. He shall attend Association meetings regularly and shall serve as advisor and counselor at all times to the Association, its members, and its officers. He shall serve as presiding officer at any suspension or removal proceedings of the Association.
6. **Duties of the Advisory Committee.** The Advisory Committee shall, if necessary, give leadership in starting the Association's program at the beginning of the academic year. They shall meet, when necessary, for the purpose of advising the Association on its program and administration.

### Article VII. Student Leadership Council

1. **Membership.** The Student Leadership Council of the Association shall consist of the officers of the Association, the Chairman of the Advisory Committee, and the Junior Officers. The President shall serve as chairman. At least one representative from each core university shall be a member of the Student Leadership Council, with full voting rights. The other Association members and advisors may attend the meetings of the Student Leadership Council and have floor privileges, but shall not have voting rights. No member of the Student Leadership Council shall have more than one vote.
2. **Meetings.** The Student Leadership Council shall meet at least quarterly. Special meetings of the Student Leadership Council may be held upon the call of the President, or upon written request of one-third of the members of the Student Leadership Council.
3. **Duties of the Student Leadership Council.** The duties of the Student Leadership Council shall be:
  1. To exercise, when necessary, all the powers of the Association during the interval between Association meetings.
  2. To be responsible for carrying out the resolutions, policies, and activities of the Association.
  3. To refer to the Association such legislation as it may desire.
  4. To advise the President in the coordination of all Association affairs.
  5. To analyze the past projects of the Association, weigh their value, and determine the advisability of their continuance.
  6. To analyze any particular problems of the Association pertaining to its program or administration, and plan



for their solution.

7. To perform all other duties as directed by the Articles of Association, these bylaws, or the Association.

4. **Quorum.** A Quorum of the Student Leadership Council shall be a majority of the voting members of the Student Leadership Council.

## **Article VIII. Committees**

1. **Standing Committees.** The standing committees of this Association shall be the Mentoring Committee, the Membership Committee, and the Archives Committee. The chairman of each committee shall be responsible for seeing that its duties are fulfilled.
2. **Mentoring Committee.** The Mentoring Coordinator shall serve as chairman of the Mentoring Committee. The duties of this committee shall be:
  1. To make plans for carrying out the traditional Association mentoring programs.
  2. To work with the Faculty and Industry Advisors to determine the need for additional educational programs of various types.
  3. To work in cooperation with the local community leaders, the Service Advisors, Faculty Advisors, and Industry Advisors to determine the need for additional projects of a community nature.
  4. To present definite plans for each service project to a meeting of the Student Leadership Council for its approval, well in advance of the time the project is to take place, and to secure the cooperation of the entire membership in making each project a success.
  5. To assist in the formation and continuance of other service organizations.
  6. To submit to the Pacific Earthquake Engineering Research Center at the end of each term, a complete report on the mentoring program of the Association for that term.
  7. To make a full report to the succeeding committee which shall include both reports on the individual mentoring projects and an evaluation of the entire term's mentoring program.
3. **Membership Committee.** The Outreach Coordinator shall serve as chairman of the Membership Committee. The duties of this committee shall be:
  1. To inform students who are eligible for membership in the Association of the activities of the Association and their opportunity to join.
  2. To hold open meetings of the Association at frequent intervals to which prospective members will be invited.
  3. To check the qualifications and eligibility of prospective members and to recommend them for membership.
  4. To plan and carry out membership campaigns and work toward definite membership goals.
  5. To make a full report to the succeeding committee which shall include an evaluation of the entire outreach program.
4. **Archive Committee.** The Historian shall serve as chairman of the Archives Committee. The duties of this committee shall be:
  1. To establish standards for the archiving of historical materials.
  2. To maintain archives of minutes, newsletters, event reports, photographs, and other historical materials.
  3. To maintain the scrapbooks and the picture board.
  4. To ensure that adequate supplies of film and other archival materials are maintained in the Historian's supplies.
  5. To make a full report to the succeeding committee which shall include both reports on the individual policies and procedures and an evaluation of the entire term's accomplishments.

## **Article IX. Meetings**

1. **Regularly scheduled Association meetings.** The Association shall meet at least annually at the Pacific Earthquake Engineering Research Center Annual Meeting. Additional meetings may be scheduled upon a majority vote of the active members of the Association.
2. **Place and Time.** There shall be at least one regularly scheduled Association meeting during each year. These meetings shall be held in such places as the Student Leadership Council shall direct.
3. **Special Association Meetings.** Special Association meetings may be called by the President or the Student Leadership Council on their own initiative, or upon the written request of one-fourth of the active members of the Association. The President shall call a special Association meeting to be held within three weeks after the presentation of such a request; if the President does not comply with the request within the required time, a



request in writing of one third of the active members may be presented to the Chairman of the Advisory Committee, who shall immediately call and preside over a special Association meeting. All active and advisory members shall be notified in advance of each special Association meeting. This notification shall include either a statement of the purpose of the special Association meeting or of the special business to be transacted.

4. **Quorum.** A quorum at all regularly scheduled and special Association meetings shall be one-third of the active members, unless otherwise provided in these bylaws.
5. **Written Motions.** All main motions, resolutions, and amendments of greater than ten words length shall be submitted to the chair in writing before discussion is in order on the proposal.
6. **Closed Meetings.** A meeting may be closed either to include only active members or to include only active and advisory members by a majority vote of the active members present.
7. **Voting.** Only active members shall be able to vote. Voting by proxy shall not be allowed on any Association business or during any Association elections.
8. **Parliamentary Authority.** For all questions of parliamentary procedure not covered by the Articles of Association or these bylaws, the current edition of Robert's Rules of Order shall be considered authoritative.
9. **Floor Privileges.** All persons present at a meeting shall have the right to speak. Only active members shall have the right to introduce or second a motion or resolution.

### Article X. Elections

1. **Advisors.** At the second regularly scheduled Association meeting of the academic year, the Student Leadership Council shall submit a list of advisors to the Association for its approval. At this meeting the Association shall elect the Chairman of the Advisory Committee by plurality vote. Advisors may be added to this list at any regularly scheduled Association meeting.
2. **Officers.** The Association shall conduct an election of officers at the Pacific Earthquake Engineering Research Center Annual Meeting. Only active members shall be eligible to hold office. At least twenty-eight days prior to this meeting, the President shall appoint a nominating committee, which shall present its report at the Association meeting prior to commencing the election. Nominations from the floor may be made at the meeting prior to the beginning of the vote for the office in question, or any time between Annual meetings upon notification of the President. Election shall be by a preferential balloting procedure, and each office shall be voted on separately, from the highest to the lowest as listed in Article II, sections 1 and 3 of these bylaws.
3. **Election Procedures.** All elections shall be by secret ballot. Only those candidates who have accepted nomination can be candidates in a Association election.
4. **Holding Offices.** Each Officer or Junior Officer Position may be held by only one person at a time.
5. **Assessments.** An assessment may be levied on all active members upon the affirmative vote of three-fourths of the active members present at a regularly scheduled Association meeting at which a quorum prevails, provided that:
  1. At least fourteen days prior to the voting the proposed assessment shall be read, entered upon the minutes, and discussion opportunity provided via an approved medium.
  2. All active and advisory members shall be notified, at least seven days prior to the voting, of the proposed assessment.

### Article XI. Amendments and Bylaws Interpretation

1. **Amendment Procedure.** The bylaws may be amended upon the affirmative vote of two-thirds of the active members present at a regularly scheduled Association meeting at which a special quorum of one-half the active members prevails, provided that:
  1. The proposed amendment has had the consideration of the Student Leadership Council at least twenty days prior to the voting.
  2. Each proposed amendment has been submitted to the Student Leadership Council in the form of a petition signed by one-fourth of the active members.
  3. At least fourteen days prior to the voting, the proposed amendment has been read, entered upon the minutes, and discussed in an approved forum.
  4. All active and advisory members have been notified, at least seven days prior to the voting, of the contents



- of the proposed amendment.
5. Before the vote is taken, a copy of the proposed amendment and the recommendations of the Student Leadership Council has been distributed to all present.
  2. **Approval.** Each amendment shall be submitted to the Pacific Earthquake Engineering Research Center when it becomes effective.
  3. **Bylaws Interpretation.** Questions involving the interpretation of these bylaws shall be decided by the President. The President's decision may be changed by a two-thirds majority vote of the active members present at any regularly scheduled Association meeting.
  4. **Discussion Requirement.** All changes to the Bylaws, Standing Policies, or other governing documents or procedures of the Association must be discussed at a meeting of the Student Leadership Council before being in order for discussion at a meeting of the Association.

[Prev](#) - [Next](#) - [Top](#)

### 8.13.2.2

#### STUDENT LEADERSHIP COUNCIL

##### Engineering Research Center for Reconfigurable Machining Systems The University of Michigan

#### BYLAWS

##### Article I: Aims

The Student Leadership Council (henceforth referred to as "SLC") aims to:

1. Provide leadership for the undergraduate and graduate students (henceforth referred to as "students") of the Engineering Research Center for Reconfigurable Machining Systems (henceforth referred to as "ERC").
2. Act as representatives of the students in all discussions with the ERC administration concerning their general well being.
3. Actively encourage and promote cooperation and camaraderie among the students.

##### Article II: Officers of the SLC

Officers shall consist of a President, a Social Activities Coordinator, a TAC Meeting/Site Visit Coordinator, a Facilities Coordinator, a Communications Coordinator, and an undergraduate member, all holding office for a term of one (1) year. At least one of the officers shall be an undergraduate student.

###### A. The President shall:

1. Convene and preside at SLC meetings.
2. Represent the SLC and the students in all discussions with members of the ERC administration.
3. Maintain and manage the SLC budget.

###### B. The Social Activities Coordinator shall:

1. Organize social activities such as picnics, parties, and sporting events to enhance interaction among the students, and report expenses arising from such activities to the President.
2. Preside over the bi-weekly student meetings.
3. Assist the President in organizing the annual ERC banquet.
4. Maintain and update a list of significant dates (such as birthdays, weddings, and bereavements) and make arrangements to suitably mark such occasions.



C. The TAC Meeting/Site Visit Coordinator shall:

1. Assist the ERC administration in organizing the TAC meetings and site visits.
2. Work with the administration to assign duties to students during these events.
3. Initiate and conduct the annual SWOT analysis.

D. The Facilities Coordinator shall:

1. Ensure that ERC facilities are generally clean and well maintained, and that all computer equipment is in working condition.
2. Coordinate the distribution and return of ERC-owned student laptops with the administration.
3. Assist in the administration of the ERC store, including coordinating its recycling efforts and report accounts to the President.

E. The Communications Coordinator shall:

1. Convene and decide the agenda for bi-weekly student meetings, including student presentations and announcements.
2. Maintain attendance records at bi-weekly student meetings.
3. Keep minutes of all SLC and bi-weekly student meetings and disseminate them to the appropriate audience.
4. Arrange food for bi-weekly student meetings.

F. The Undergraduate Member shall:

1. Represent the students at the annual ERC conference in Washington, D.C.
2. Attend all SLC meetings on a regular basis.
3. Assist other SLC members in the discharge of their responsibilities.

### **Article III: Voting Rights and Elections**

1. All students who are currently on the payroll of the ERC shall have the right to vote in the election of SLC officers.
2. Elections shall normally be held annually in April during the last bi-weekly student meeting of the academic year.
3. Any student of the ERC who will continue on the payroll of the ERC for at least one term during the forthcoming academic year shall be eligible to be a candidate for a position on the SLC.
4. The outgoing SLC shall appoint a responsible person to serve as Election Officer.
5. Students interested in being candidates should file their nominations with the Election Officer at least one week prior to the date of the election. No write-in candidates shall be allowed.
6. Following the deadline for filing nominations, the Election Officer shall create a ballot in sufficient quantities for use in the election.
7. Each student who has the right to vote shall be eligible to cast one vote each for six (6) candidates (for 6 positions on the SLC).
8. Elections shall be conducted by secret ballot.
9. Ballots with more votes than the number of available positions on the SLC shall be deemed invalid.
10. The six candidates with the highest number of valid votes (including at least one undergraduate) shall be deemed elected as members of the SLC by the Election Officer.
11. In the absence of any undergraduate on the ballot, only five (5) members shall be elected. The vacant position shall be filled by a suitable undergraduate student as soon as possible, either by appointment or by invitation.
12. Following the election, the newly elected members of the SLC shall elect a new President. This shall be done by consensus, or by simple majority of the entire SLC.
13. Other roles and responsibilities on the SLC shall also be assigned after the election.
14. The term of the SLC shall be one (1) year.
15. Midterm vacancies on the SLC, if any, shall be filled by nomination or by invitation.



## Article IV: Meetings

1. Student meetings shall be held on a bi-weekly basis during the academic year at a time convenient to the majority of the students. Food and drink shall be provided. The purpose of such meetings shall be to foster a spirit of interaction among the students by holding student research presentations, making key announcements, and generally providing an atmosphere that stimulates discussion. Students shall make every effort to attend these meetings.
2. The SLC shall normally meet on a weekly basis during the academic year, at a time convenient to all SLC members. The purpose of such meetings shall be to discuss student concerns and make decisions in the interests of the students, and to propose and discuss new ideas for the betterment of the students. Members shall also use this opportunity to update each other on their respective activities.

## Article V: Amendments and Ratification

1. Any amendments to this document shall be ratified by the students before taking effect. Information regarding proposed amendments shall be posted at least one week in advance of the bi-weekly student meeting.
2. Any amendment shall require a quorum of 25 students before being proposed for ratification.
3. Ratification of each proposed amendment shall require a simple majority of the quorum.

[Prev](#) - [Next](#) - [Top](#)

### 8.13.2.3

#### **WIMS Students Association**

[Bylaws of the Center for Wireless Integrated MicroSystems,  
University of Michigan]

1. The WIMS Student Association (WIMS-SA) is formed to discuss activities and ideas relating to the WIMS ERC and its students.
2. The WIMS Student Association exists to advance the development and interest in Wireless Integrated MicroSystems among the students of the WIMS ERC.
3. **WIMS-SA Structure** - The WIMS Student Association has a president, a vice-president, and a University of Michigan Engineering Council representative. There are also 3 subcommittees, each having one chair.

#### **3.1. Committees and Leadership Responsibilities:**

**3.1.1. Student Leadership Council (SLC):** This is comprised of the president, vice-president, UMEC representative, and the three committee chairs. This council serves as the steering committee for WIMS-SA.

3.1.1.1. *President* is responsible for: (1) planning SLC and Student Association meetings, (2) facilitating the activities of the committees, (3) providing interaction with the WIMS ERC director, (4) providing direct feedback to the NSF, and (5) updating the database of WIMS-SA students.

3.1.1.2. *Vice President* is responsible for (1) the yearly budget planning, (2) planning the SLC and Student Association meetings.

3.1.1.3. *UMEC Representative* provides interaction the University of Michigan Engineering Council.

3.1.1.4. *Committee chair* responsibilities are listed below.

**3.1.2. Education Committee:** Primarily responsible for organizing activities that encourage those outside of the WIMS ERC, especially pre-college and undergraduate students, to learn more about Wireless Integrated MicroSystems as well as the mathematics, science, and technology in general.



3.1.2.1. *Education Committee Chair*: Responsible for organizing and overseeing Education committee meetings, encouraging student participation in Education activities, and coordinating interaction with the ERC Educational Outreach Liaison.

**3.1.3. Social committee**: Primarily responsible for fostering interaction amongst all members of the WIMS ERC, thus facilitating an more personal level between all that are involved in the ERC

3.1.3.1. *Social Committee Chair*: Responsible for planning social activities for the WIMS Student Association

**3.1.4. Industrial committee**: Primarily responsible for organizing activities related to interacting with industrial members in the field of MEMS, especially those connected directly to the WIMS ERC. Responsible for developing ways to better share information between industrial members of the ERC and its students.

3.1.4.1. *Industrial Committee Chair*: Responsible for (1) interaction between the student association Industrial Advisory Board members as well as planning and communication with the Industrial Outreach Liaison, (2) planning Industrial Committee meetings, and (3) exploring possible student internship opportunities

## 4. WIMS-SA By-Laws

**4.1. Membership**: WIMS-SA is open to all interested students at the institutions participating in the WIMS ERC. This can include non-ERC Students<sup>1</sup>. A student becomes a member by contacting the President directly or through another SLC member.

**4.2. Participation in Events**: Most WIMS-SA events are open to the following: WIMS-SA members, faculty and staff of the WIMS ERC, industrial members of the WIMS ERC, and personal friends and family thereof. Exceptions:

4.2.1. For WIMS-SA student mass meetings, only WIMS-SA members and invited speakers shall attend.

4.2.2. For SLC planning meetings, only the SLC members will attend.

**4.3. Funding of Events**: Decisions regarding the funding of activities and events will be made by the SLC, with the option of final approval being reserved by the WIMS ERC Director.

4.3.1. Generally, WIMS-SA may pay funds for activities toward ERC students<sup>1</sup> only. Unless otherwise specified, funding will be provided given that (1) the activity has participating ERC Students<sup>1</sup>, and (2) the activity was formed as part of WIMS-SA.

4.3.2. Funding may be decided in 2 ways:

4.3.2.1. The amount of money contributed toward these activities will reflect the percentage of ERC students participating. Examples include (but are not limited to): site visits to companies, conferences, and IM sports.

4.3.2.2. As part of its outreach to the public, WIMS-SA may schedule activities (e.g.



barbeques) where non-ERC students<sup>1</sup>, and non-WIMS-SA members can attend. WIMS-SA may pay for any portion of the expenses of these gatherings. This portion will be decided upon by the Student Leadership Council and must be within reason.

**4.4. Elections** will be held once a year, at the first WIMS-SA mass meeting held each January.

4.4.1. Only ERC students<sup>1</sup> may run for an office.

4.4.2. The committee chairs, UMEC representative, and the vice-president are elected by a simple majority vote from all present WIMS-SA members.

4.4.3. The vice-president automatically becomes the president for the following year.

4.4.4. Only one office may be held by a member at any given time.

4.4.5. If any elected officer becomes unable to fulfill his/her duties during their term, an interim officer will be appointed by the SLC by a simple majority vote from the remaining members. This officer will serve out the remainder of the term until new elections are held.

**4.5. Amendments** to the WIMS-SA bylaws may be suggested by any WIMS-SA member, and will be enacted by a unanimous vote of the SLC members.

4.5.1 Appendix

[1] The term "ERC Students" refers to: directly funded students, partially funded students, and students on associated contracts only. This is not to be confused with WIMS-SA members, who may be any student regardless of funding.

[Prev](#) - [Top](#)

8.13.2.4

### Charter of the Biotechnology and Bioengineering Student Council [MIT]

#### Mission

The Biotechnology Process Engineering Center (BPEC) and Biotechnology Training Program (BTP) Student Council has a general mission of promoting interdisciplinary interactions among trainees supported by the NSF-funded BPEC and the NIH-funded Biotechnology Training Program, and participating in outreach to the larger community, including MIT, other academic institutions, government and industry.

#### Background and Context

BPEC and BTP both support interdisciplinary training with an emphasis on the interfaces between engineering, biology, and chemistry. Among academic institutions, MIT plays a unique role in promoting the interface between biology and engineering, setting the pace for an emerging new discipline. "Bioengineering" as it is evolving at MIT is rooted in the now-established molecular science of biology and thus has become a new fundamental discipline in engineering, with a wide spectrum of applications, including medicine among others, in a manner analogous to the emergence of chemical engineering from the molecular science of chemistry early in the 20th century. The department-level academic structure, the Biological Engineering Division (BE) is charged with creating educational curricula in bioengineering, as well as environmental health, so it joined the departments of Biology, Chemistry, and Chemical Engineering as a major partner in the BPEC and BTP programs and serve as the academic home for bioengineering degree programs. Since many of the issues in the areas we have traditionally viewed as "bioprocess engineering" and "biomedical engineering" at MIT have merged, it makes great sense to take advantage of the



synergy offered by joining many activities supported by BPEC and the BTP. Coordination is facilitated by Douglas A. Lauffenburger's positions as Co-Director of BE, Executive Director of BPEC, and BTP Steering Committee Member. Linda G. Griffith, in her capacity as BPEC's Executive Director of Education and BTP Steering Committee Member, coordinates the activities of the BPEC/BTP Student Council on a day-to-day basis.

### Composition of the Student Council

The Student Council comprises trainees drawn from the participating Departments of Biology, Chemistry, Chemical Engineering and the Division of Bioengineering and Environmental Health. The Graduate and Postgraduate Student Council has at least 6 member, 2 from each department. The Undergraduate Student Council has at least 6 members, one from each department.

### Responsibilities of the Student Council

1. Meet monthly with Professor Griffith to discuss current issues, provide suggestions about improvements in training or operations, and update any changes in the responsibility list.
2. Organize a seminar series which meets on a weekly basis in which trainees present current work. Each trainee should present at least 4 times per year. Students will decide the format of the seminar series and organize a list of speakers, with assistance from Professor Griffith. BPEC administrative staff will ensure the series is advertised. Professor Griffith will be responsible for encouraging faculty attendance.
3. Provide input to the content of the BPEC and BE Websites. A formal representative from the Council will be listed with the BPEC administration as the contact person for student input.
4. Provide lab tours for visitors from other academic institutions (including middle and high school teachers and students), government, and industry. Lab tours are arranged on an ad-hoc basis, initiated by calls from the outside to BPEC, and thus rotating assignment of trainees who would be available each month as suggested. The Student Council will be responsible for providing the BPEC administration with a pair of trainees capable of giving tours each month.
5. Representatives of the Student Council will participate in site visits by NSF and NIH. While most such meetings are held at MIT, some travel to NSF may be required.

The Student Council will perform a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis of BPEC and prepare a report for the NSF. BPEC staff will assist in organizing and running this analysis and preparing the report, while students will provide the intellectual input.

## 8.15.2 Appendix B: Contact Information

For more information on the contents of this document, please contact:

Courtland Lewis

SciTech Communications

[clewis@associates.nsf.gov](mailto:clewis@associates.nsf.gov)

For help with updating and other procedural matters, contact

Michael Nolan

WebChemi

[mike@WebChemi.com](mailto:mike@WebChemi.com)



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