

**CHAPTER 8**

**STUDENT LEADERSHIP COUNCILS**

**Report of the  
Committee on SLC Best Practices**

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## 8.1 EXECUTIVE SUMMARY

The Student Leadership Council (SLC) of the NSF Engineering Research Center for Reconfigurable Manufacturing Systems (ERC/RMS) volunteered to conduct a study of the “best practices” of SLCs at various centers around the country. Eleven SLCs responded to a detailed survey with questions on key areas including organizational structure, communication, social and outreach activities, industry/site visit preparation, and facilities management. Questions were also aimed at gathering information on multi-university centers.

Based on the findings from the survey, several “best practices” were identified in each area. The most important “best practices” are summarized below.

### Organizational Structure

1. Create bylaws.
2. Have an outreach coordinator on the SLC.
3. Invite administration to participate in SLC meetings.

### Communication

1. Route students’ concerns through the SLC.
2. Hold regular and frequent students-only meetings to voice concerns.
3. Create forums for students to present research and interact with industry members.
4. Encourage students to register with the national ERC website.

### Activities (outreach, social, site visits, and industry visits)

1. Older centers need to beware of complacency and maintain student interest in outreach efforts by developing exciting new activities.
2. Publicly recognize and reward student participation in volunteer efforts.
3. Keep outreach activities local, and within a manageable magnitude and scope.
4. Encourage student involvement in poster design, scheduling of presentations, and creating agendas for site/industry visits.
5. Involve SLC in recruiting students to assist in site/industry visits.
6. Survey students and organize social activities according to their preferences.
7. Advertise social events by e-mail, flyers, word-of-mouth, and send out multiple reminders.

### Facilities Management

1. Allow SLC to have input in decisions such as maintaining/upgrading computers, student area layout, phone system/message boards, and student mailboxes.
2. Encourage students to participate in the upkeep of the student area/computer labs.
3. Encourage recycling efforts. Money earned from recycled bottles and cans may be put back into a student-run store for snacks and drinks, or used for social activities.

### **8.1.1 Organization of Report**

The chapter on SLC best practices is organized as follows: Sections 8.2 and 8.3 provide an introduction and overview, outline the goals of the project, describe the survey methodology, and discuss the reasons for forming a Student Leadership Council. Section 8.4 discusses SLC planning, administration, and development strategies, including the Strengths, Weaknesses, Opportunities, Threats (SWOT) analysis, collaboration with administration, faculty, and staff and leadership and development efforts. Sections 8.5 through 8.11 cover the various 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, and identifies the best practices. In Section 8.12 we present conclusions and possible future directions.

## 8.2 INTRODUCTION AND OVERVIEW

The Student Leadership Council (SLC) 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.

### 8.2.1 Study Methodology

The survey was drafted based on the experience of the SLC at the University of Michigan ERC/RMS. This survey was sent to all 19 SLCs listed on the ERC Association's national website, as well as to some recently graduated ERCs. Ten of the SLCs at current centers and one from a graduated center responded.

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 on a scale of 1-10, with 10 being the best. A copy of the survey is provided in section 8.13.1, Appendix A: Survey Questionnaire.

The responses from the survey were compiled and analyzed by a special committee set up by the SLC at ERC/RMS for this purpose. The Committee on SLC Best Practices consisted of the following members:

1. Siddharth Chandramouli (Chair)
2. Theodor Freiheit
3. Qiang Huang
4. Tahla Kidwai
5. Valerie Maier-Speredelozzi
6. Steve Swisher
7. Felipe Torres

The team members jointly compiled data from the survey, summarized findings, and drew insights on “SLC best practices” by correlating a center’s activities to its stated mission and goals and how well its activities helped in achieving those goals. The entire effort spanned nearly five months. This report is a comprehensive document that summarizes the data, the findings, and our conclusions.

### 8.2.2 Acknowledgments

The Student Leadership Councils of the following ERCs participated in developing these best practice guidelines by responding to the survey. Their cooperation is gratefully acknowledged. (In the case of multi-institution centers, denoted by \*, the lead university is noted.)

**Engineering Research Center for Particle Science and Technology**

University of Florida

**\*Georgia Tech/Emory Center for Engineering of Living Tissues**

Georgia Institute of Technology

**\*ERC for Computer-Integrated Surgical Systems and Technologies**

Johns Hopkins University

**ERC for Computational Field Simulation**

(The Center graduated from the ERC Program in 2001, and is now known as the Mississippi State University Engineering Research Center)

Mississippi State University

**\*VaNTH ERC for Bioengineering Educational Technologies**

Massachusetts Institute of Technology

**Biotechnology Process Engineering Center (BPEC)**

Massachusetts Institute of Technology

**\*Center for Wireless Integrated MicroSystems (WIMS)**

University of Michigan

**Center for Reconfigurable Manufacturing Systems (RMS)**

University of Michigan

**Center for Neuromorphic Systems Engineering (CNSE)**

California Institute of Technology

**\*Pacific Earthquake Engineering Research Center (PEER)**

California Institute of Technology

**Packaging Research Center**

Georgia Institute of Technology

In addition, the authors of this study are grateful to Courtland Lewis, NSF consultant, for his constant encouragement and valuable advice. The authors would also like to thank Tracey Patterson, ERC/RMS Education Coordinator, for her unflinching support during this entire effort.

## 8.3 SLC FORMATION AND PURPOSE

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. 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, SLCs see their role as broader than what is contractually specified, as was indicated in a survey question about their mission. 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.

### 8.3.1 Mission

A 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.
- 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.

*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.
- Act as an advisory council for input to major center and faculty decisions.

### **8.3.2 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 7.13.2 Appendix B: Bylaws of Selected SLCs.

## 8.4 PLANNING, ADMINISTRATION, AND DEVELOPMENT

### 8.4.1 SWOT Survey and Analysis

SLCs are typically responsible for conducting a survey of all students regarding center Strengths, Weaknesses, Opportunities, and Threats. The results of these surveys must be analyzed, statistics calculated, and summary presentations developed. The SLC leaders are expected to participate in a closed-door session with NSF evaluators. The NSF is generally interested in assessing student life and student perspectives of the center during this session, without the influence of center administrators. The meeting often starts with the SWOT survey results as a basis for discussion. SLC members and other center students who participate in this session are representing the entire student body, thus fulfilling one of the primary missions of an SLC, representation.

#### *Generating Questions*

Most SLCs generate questions and issues to include on the SWOT survey through brainstorming sessions and discussions. This can be achieved over e-mail or at meetings of either the SLC leadership or the general student body. 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.

- SWOT survey development should begin at least one to two months prior to the site visit.
- Current student complaints and new issues must be incorporated. The SLC should provide avenues for anonymous complaints and survey input.
- Weaknesses and threats from previous surveys should be reassessed to see if improvements have occurred.

#### *Conducting Survey*

Different centers conduct the SWOT survey through a wide variety of methods: paper & pen, website, e-mail, and verbal responses are collected. Some centers have an initial discussion and then use follow-up e-mails 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. Multi-university centers, however, seem to have lower response rates for SWOT surveys. In general:

- Student responses to the SWOT survey should be collected at least one month prior to the site visit.
- Paper & pen surveys or those conducted on the spot during a meeting have better response rates than other methods. One center conducts the survey verbally during a retreat that nearly all students attend.
- Providing an incentive to students who complete the survey increases the response rates.
- Assign a champion to administer the SWOT survey at each university in a multi-university center, and have the champions work together to compile both local and cumulative results.

### *Analyzing Results*

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 and phones were found to be insufficient 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.

- Presentations for the NSF based on SWOT survey results must be compiled prior to the site visit, and possibly must meet center deadlines for rehearsals, annual reports, and handout generation.
- The SLC needs to assign responsibility for follow-up on problems and concerns identified through the SWOT analysis.
- SWOT survey results can be used as the basis for strategic planning by the SLC in subsequent years. In addition, center administrators can take advantage of this summary of student perspectives to define their own future directions.

#### **8.4.2 Collaboration with Staff, Administration, and Faculty**

The SLC should work closely with center administrators, and in particular, the education director or coordinator. The administration will appreciate student leaders who are willing to help organize activities and preparations for lab reviews, among other tasks. The student body will benefit from the improved work environment and 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 or coordinator could be invited to attend a portion of each meeting, or every other meeting. The center director should also be well-informed regarding student activities and opinions, either through direct communication with the SLC or reports from the education director. Finally, establishing e-mail 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 campus or in multi-university centers.

Research-related work such as presentations and demonstrations is 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 student body.

#### **8.4.3 Leadership and 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.

The SLCs were surveyed for 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:

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

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.

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

- Resume Writing
- Managing Thesis as Project
- Team Building
- Presentation and Communication Skills
- Assessment & Evaluation
- Mentoring
- Educational Techniques
- “What is [this center]?”
- MD Seminar (on real life work experiences)
- LIFE Seminar (Learn about Industry From the Experts)
- Ethics
- Job Negotiation Strategies.

Other possible seminar topics relate to preparation for careers in either industry or academia.

## **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**

Based on the responses from the survey, SLCs may be broadly classified into two categories. A few schools have open membership in the SLC for the entire student body. Such membership may be either mandatory or voluntary. Subsequently, 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 students is elected or volunteer to serve on a leadership council to represent the interests of the students. Of the 11 SLCs that responded to our survey, 8 were structured in the more traditional fashion.

### **8.5.3 Summary of Survey Results**

The size of SLCs varies greatly. In a couple of centers, the entire student body is automatically part of the SLC, while in most centers, they are made up of about 5-10 members representing an overall student body of 50-100.

Only one of the respondents indicated that they offer a monetary incentive, in the form of an increase in salary, to serve on the SLC. One center offers bookstore gift certificates, and another reimbursement for travel. In most cases, recognition and appreciation 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 serve on their SLC. One center is constrained by its relatively small student body, while in another center 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.

Of the 11 respondents, 6 reported that they hold elections for SLC officers, suggesting that the practice of holding elections is evenly divided. In the smaller, less established 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 e-mail, voice vote, or secret ballot. Nomination periods range from 1 week to 1 day.

Most SLCs have titles for their officers, but in one, officers simply get together on various projects on an as-needed basis. In another center, officers are elected for each research thrust area in addition to holding other positions such as social activities, outreach efforts, etc. Except for one, all the other SLCs have a designated person or committee to focus on outreach efforts. A feature of one center is that two people are assigned to each role/committee, in order to share responsibilities.

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. 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. In one center, the external person actually makes the final decisions at most SLC meetings.

Only 4 out of 11 respondents have bylaws that govern their SLC's functioning. However, 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.

Almost all the respondents reported that they communicate with the student body using a variety of methods: e-mail, questionnaires, and mass meetings.

#### **8.5.4 Best Practices and Conclusions**

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

While the findings from the survey indicate that the absence of bylaws does not necessarily imply a weak organizational structure, 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 of the schools surveyed indicated the presence of an outreach coordinator on their SLC. This appears to be a very desirable practice. From the experience of the RMS center, and those of the others surveyed, 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 or coordinator, 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, 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 COMMUNICATION**

### **8.6.1 Motivation**

According to the responses from the survey, the SLC's role is primarily defined as 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. Thus, communication is a vital aspect of a successful SLC and is studied in this section to determine best practices for this area.

### **8.6.2 Summary of Survey Results**

The centers communicate with the students through e-mail lists, meetings, flyers, websites, personal communication, and through the students' advisors. A few centers use newsletters or written memos but none use voice-mail. Communication from the SLC to the students occurs through e-mail lists, meetings, and personal communication. Some SLCs use websites and other forms of communication (newsletters, written memos, advisors, voice-mail, etc.).

If students have any concerns they wish to relate to the center administrators or staff, they raise them through personal communication or e-mail with the administrators or discuss them with the SLC, which acts as a liaison. For the most part, the administrators all responded appropriately and promptly. Students voice concerns to the SLC and other students through weekly/biweekly/monthly student meetings, the SWOT analysis, or social events. Some SLC meetings are open to all center members so that they can voice concerns there. One center has no formal method for students to voice their concerns in this way.

Most students learn about other research being conducted in the center through meetings. The frequency and purpose of these meetings varies from center to center. One center has a weekly meeting where the students presenting their research are evaluated by the other students in order to improve their public speaking skills. Another center has poster sessions where students are encouraged to talk and read about each other's research. An ineffective method that was identified was relying only on hanging posters in a hallway and personal communication.

Students meet together in various formats. Some centers have less-formal weekly student meetings and others have SLC meetings with keynote speakers. One center only has an annual meeting for the students. In most cases, fewer faculty and staff attend these meetings and in other cases fewer undergraduates.

If students need to express confidential concerns such as conflicts with faculty or harassment while they are working for the center, some centers said this could be done through the SLC. One center said their administrators are open and available to talk about issues such as these. Another center said the education coordinator could handle this. Still another center said the student's specific department would deal with this. If the student is leaving the center, a few centers stated that these concerns could be expressed through an exit interview or questionnaire. A significant number of centers, however, said there were no formal methods of handling this type of situation.

SLCs communicate openings for new undergraduates to non-center students primarily through advertising and undergraduate programs. Advertising can take the form of e-mail, flyers, ads at employment offices, and website postings. One SLC states that they do not communicate openings to new undergrads.

SLCs generally do not seem to focus on communicating openings for new graduate positions to non-center students. A few centers stated that they also used e-mail and flyers or the SLC recruitment committee handles this. All of the other centers claim that the SLC is not responsible for or does not do much for this area of communication.

Most communication between the ERC students or the SLC and industry partners occurs at meetings where industry partners visit or through students' advisors. One center has a lunch where only the students and industry partners meet, and the faculty are not present. Another center identified their method of communicating through posters as ineffective. Almost every center communicates job interests and resumes to industry partners.

All SLCs communicate with NSF during the annual site visit. Many of them found that the SWOT analysis provides for good communication with NSF. One center mentioned the Student Retreat at the ERC Program Annual Meeting as a good connection to NSF. Another center publishes details of their outreach program on the NSF-sponsored ERC Association website.

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 "Joblink" page posts student resumes in a form that is searchable by industry partner companies from all the ERCs. Many centers do not have any students or SLC members registered on the site. A majority of centers had a very small percentage of students registered, and did not know whether any SLC members were registered. Only two centers had all of their SLC members registered.

### **8.6.3 Multi-University Centers**

In multi-university centers, communication among students from the different universities varies greatly. In some centers, students only meet at large events such as the NSF site visit or TAC meetings. Other multi-university centers, however, have students meeting together on a daily basis.

### **8.6.4 Best Practices and Conclusions**

From the questions answered in the communication section of the survey and the responses regarding the centers' SLC goals, several best practices can be derived. The center should communicate to students through e-mail, websites, meetings, personal communication, advisors, and flyers. The SLC should be in communication with center students through e-mail, websites, meetings, personal communication, and flyers.

As mentioned in the motivation section, the SLC should act as a liaison between the administration and the students. Student concerns should go through the SLC, not directly to the administration. The SLC can discuss issues brought up and deliver them to the administration in a more focused, organized manner, allowing for a timelier response. Student meetings should be held regularly and allow student concerns to be raised. These meetings should also be a time for students to learn about other students' research. The

SLC should make it clear to students that confidential concerns, such as harassment, can be brought to the SLC and handled in an appropriate manner. Additionally, the SLC or the education director should provide an exit interview or questionnaire for students leaving the center to reveal unvoiced concerns students may have had during their time in the center. This, however, would not provide for resolution of problems that could improve the environment while a student is still working at the center.

Another key communication issue is student recruiting. Undergraduates outside the center should be informed of available positions through e-mail, flyers, and websites. Graduates outside the center should be informed similarly, but recruitment in this case should also include center tours.

The survey also revealed best practices in communication with industry partners and the NSF. The SLC should be in direct contact with industry partners and should organize a forum where students can talk and network with them or learn from them. Resumes and job interests should always be communicated to industry partners by the SLC. With NSF, the SLC should be a part of the SWOT analysis at the annual center site visit.

Finally, an important area of communication that many centers did not take advantage of is the national ERC Association website. Its purpose is to allow center students to communicate with each other, make connections with students from other centers and learn about their activities, and connect with industrial partners of all the centers for employment opportunities. All SLC students and students in centers should register and utilize this great communication tool.

## **8.7 OUTREACH**

### **8.7.1 Motivation**

Outreach is an important concern for the administrators of ERCs, and was indicated by most SLCs as integral to their mission. However, active participation in outreach also fulfills other important SLC missions such as broadening the student experience, facilitating recruitment, and providing leadership opportunities.

### **8.7.2 Summary of Survey Results**

The SLCs reported involvement in many outreach activities. The responsibility for planning these activities generally falls to the center administration in the person of the education director or coordinator. However, some SLCs have outreach committees or student coordinators. Participation by students in outreach activities includes consulting on planning, preparation, and manpower. Some SLCs sponsor a specific outreach activity, such as a LEGO robot competition for high school students. Generally, no extraordinary encouragement is required to get center student involvement, although one school provides T-shirts and another provides free food.

Outreach activities are varied, mostly related to recruitment:

- Tours and lab visits
- Primary and secondary school visits
- Tech Day/Engineering Fair & on campus recruitment

Other activities include:

- Primary School Science Clubs
- Judging Local Science Fairs
- Museum Projects
- “Science is Fun” on-site classes to primary/secondary school students
- LEGO robot competition.

### **8.7.3 Multi-University Centers**

It was noted that some schools have problems coordinating outreach activities across the center when more than one university is involved.

### **8.7.4 Best Practices and Conclusions**

Despite the responsibility for outreach activities falling primarily with the center administration, it is important that the SLC take an active role in outreach, as the center’s student body is critical in supporting those activities. Outreach activities can be sold to the center’s student body as both broadening their educational experience and as a social activity. However, students’ first priority is their studies and, therefore, outreach activities must be well managed to prevent excessive demands on their time.

### *Beware of lagging interest*

The survey indicated that the SLCs that were least effective in outreach activities were those at the oldest centers. Those that indicated they were very effective in outreach activities were the youngest centers. While these differences may be due to differing expectations, it is also possible that student bodies at older centers experience a “been there, done that” sentiment. Avoid losing interest of the students by keeping outreach activities fresh.

### *Have an SLC outreach coordinator or committee*

This provides a focal point for the SLC to organize outreach activities and supports the education director.

### *Recognize your participants*

Because SLCs rely heavily on volunteerism to staff their outreach activities, it is critical to publicly recognize their involvement. Center wide e-mail “thank-you’s”, certificates of recognition, or banquets are several suggestions. Incentives such as t-shirts 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.

### *Find effective communication channels*

Volunteers do not participate in outreach activities when they are not informed about an event in a timely fashion.

### *Sponsor independent SLC events*

One SLC sponsored its own high school outreach event independently of the center administration. This event was very popular with center students.

### *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 institution.

### *Counterpoint – Find a central champion*

Multi-university outreach activities can be successful if there is a central champion who has the time and motivation to take on the administrative complexities of organizing a multi-university event.

*Collaborate with other funding sources*

Some outreach activities can be expensive to initiate. Solicit seed funding from your industry partners or other sources. For example, an industry partner donated several robot LEGO kits to a “Science/Engineering Is Fun” -type outreach project. Some SLCs have solicited recognition of their organization from their university or student governments, making them eligible for student fee funding.

## **8.8 SITE VISITS**

### **8.8.1 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 annual 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.

### **8.8.2 Summary of Survey Results**

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 preparations 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, which was discussed in Section 8.4.1.

### **8.8.3 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 response rates for SWOT surveys. Although it may seem that multi-university centers would need to begin preparing further in advance and require greater organization, a wide range of preparation times was also reported within this subset of respondents.

### **8.8.4 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 are important. Advance notification of visitor names, research interests, and affiliation 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 their own particular project.

## **8.9 INDUSTRY MEETINGS**

### **8.9.1 Motivation**

As a primary mission, the SLC should provide the student perspective and facilitate communication between staff, students, industry partners, and the NSF. Thus, student contributions and input regarding industry meetings is needed. 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 while simultaneously benefiting the student body. Students can find potential future employers and also broaden their educational experience with practical applications of their research.

### **8.9.2 Summary of Survey Results**

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, more 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 and/or less successful, despite the fact that they relate directly to several of the stated SLC missions and functions.

One center 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.

### **8.9.3 Multi-University Centers**

SLCs that report better performance with regard to industry meetings for multi-university centers are those where the SLC takes a more active role in helping students to prepare. This is also generally the case for single-location centers.

### **8.9.4 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:

- Helping to organize events such as luncheons or private sessions with industry
- Having student or staff liaisons for each partner company
- Contributing to resume books and student/company matching programs for internships and full-time positions after graduation.

In general, the SLC can act as a liaison to center administrators when students desire more interaction with industry or a change in format and procedures for industry meetings. For example, a proper balance of project-based meetings and center-wide meetings should be attained, which will most likely vary over time as the center grows and matures.

Preparations for industry meetings are somewhat similar to those for site visits and SLCs assist in a comparable manner: communicating expectations, organizing poster sessions, and encouraging participation. In some centers, however, industry meeting preparations are handled more by center staff, administrators, and faculty.

## 8.10 SOCIAL ACTIVITIES

### 8.10.1 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 effectively do this, 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 scientists with regard to the research they conduct. This function can be fulfilled through outreach activities that are also enjoyable for center students who participate.

### 8.10.2 Summary of Survey Results

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. 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	4	20 (does not count large # of non-center students)
Scientific 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.

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 recently 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.

### 8.10.3 Multi-University Centers

Social activities are especially important when students, faculty, and staff from multi-university centers meet. Depending on the proximity of the participants, these centers can have significantly fewer events during the year. One center has only a single annual retreat, but with high attendance rates. Other multi-university centers plan quarterly or bi-monthly events. An additional source of funding for social events at multi-university centers is travel budgets.

### 8.10.4 Best Practices and Conclusions

Personal interaction and 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 (e-mail, flyers in the workspace particularly near doors and elevators, 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, rides, prizes, or the price of admission or activities.
- 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.

## **8.11 FACILITIES**

### **8.11.1 Motivation**

Facilities management is something that encompasses a rather broad spectrum of areas that is rooted in the needs and wants of the student body. As 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.

### **8.11.2 Summary of Survey Results**

The survey questions 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.

#### *8.11.2.1 General Facilities*

Many of the centers allow students similar full-access privileges to the “core facility,” a library, and perhaps a separate computer lab; no one reported a restriction of scheduled hours. While no student group is charged with the maintenance of the areas they are permitted access to, one school specifically said that they are charged with a “leave it as you found it” rule. No other school reported that they have any such responsibility. This separation of responsibility is also seen on the question of a snack area for students – only one school has a student-run snack area operating in a co-op fashion. Similarly, only three others have externally (not affiliated with the center) operated vending machines, where one of the centers also has a café open during normal business hours. The remaining seven centers have no such feature.

Recycling is also a task that most schools 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 the student-run store.

#### *8.11.2.2 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. Where schools have set aside computers for individual use, only one school indicated that computer assignments are a joint effort of the SLC and administration. One SLC noted it had little input in the assignment process, while three others said they had no input in the process whatsoever. Irrespective of SLC input, seniority and degree pursued are used as a criterion for computer assignment, which commonly leaves the undergraduate students sharing computers. The number of undergraduates sharing a computer varies greatly, since some centers do not assign undergraduates to a computer at all. Perhaps it is surprising to find that out of 11 centers, only 1 reported that their computer resources are insufficient. This

particular school said that their resources are insufficient by 50%. This is also one of the schools where the SLC has no input into computer assignments or the computer selection process.

When it comes to computer updates and maintenance, the SLC is only marginally involved in the upgrades of their individual computers, while network and university computers are left to the administration. One center though, said that the final say for some computer upgrades goes through their SLC. Two of the centers said that student needs are accommodated when possible and another SLC offers input on as “as needed” basis.

The table below summarizes what the centers reported as their available peripheral devices. The answers suggest a standard set of tools, and perhaps additional items tailored to to centers’ specific needs. The deviation from this conclusion comes from one center that said computers for data collection are not applicable.

<b>Device</b>	<b>Available?</b>
Lab Computers for data collection	All centers said yes [one N/A]
Printers	All Yes
Digital Cameras	All Yes
Scanners	All Yes
CD Burners	All Yes
Other (Specify)	LCD projector, camera, VCR, scanner, fax, video camera, editing equipment

The selection of peripheral devices for student use falls into the hands of the administration, although three SLCs indicated that they do have input into the process when needed. Of these three, though, two centers said that their input is only “at times” requested by the administration; whereas the third SLC noted that decisions were based on their input. One center also reported that they have a Facilities Director/Network Support Specialist who is in charge of such decisions and will sometimes ask for the input of the SLC.

### *8.11.2.3 Information Exchange*

Also included in the facilities section of the survey was the issue of information exchange among the center students, faculty, administration, and industry partners. E-mail and an Internet website were the most common responses, with almost all schools indicating that one or both were used. Three centers use a file server, and one of the schools listed the file server as their sole means of information exchange. Of particular interest were two

centers that use either a restricted website or an intranet service available in-house only. One of the centers that employs an Internet website noted that their SLC maintains their own web page within that core.

#### *8.11.2.4 Student Area Environment*

The final major area of facilities management 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, some on separate campuses. That being said, this part of the summary of survey results would apply to each individual area or lab, rather than to the center as a whole.

The seating arrangements for the centers reveals that most put the students' office space together, or in close proximity to each other, only three said that this is not the case. One of those three, though, attributed it to a lack of adequate spacing, which the university is working to remedy. The responsibility for desk space and arrangement of lab area workspace varies across the centers. Some schools said that this varies according to department: four centers allow the students to decide or have some SLC input; one center said that this varies per faculty member with no SLC input; and one center said that the students have no involvement.

This raises the question of disputes among the students in shared office space. In all but one of the centers, the students' advisors and/or the administration would handle the dispute, without SLC input. The one center in which the SLC could play a role said that the dispute would be "partially handled by [the] SLC." Also noteworthy here is the fact that some schools simply said that they have had no instances, but did not indicate whether they had made provisions for a dispute between students.

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 or answering machine for taking messages, thus eliminating the responsibility and culpability for message delivery, or lack thereof. Perhaps the more common approach relied on a note or e-mail to the person for whom the phone call was intended. Most centers reported that their methods worked satisfactorily.

Aside from e-mail, one of the most common document exchange methods used in industry may be the fax, and as it turns out, this is reflected in the centers' responses. Only two schools have said that they do not have a fax machine in the student area. One of these two schools has said that their SLC will offer input for new peripheral devices and it will be accommodated when possible. The fact that they do not have a fax machine may lead to the conclusion that it is not necessary. Four centers said that each student area has a fax machine, with one center noting that the student fax machine can only receive faxes, and they must go elsewhere to send a fax. One center also noted that while their research wings do not have a fax machine, there are multiple fax machines available to the students during normal business hours.

All but two centers have given their students individual mailboxes. One school has no mailboxes for the students while the other has mailboxes only for their graduate students.

Meetings and presentations are quite commonplace in almost any center; therefore, reserving conference rooms is an important task. Most schools rely on a sign-up schedule or contact a secretary who will note the reservation. Two exceptional methods, though, are to use Microsoft Outlook to set up the meeting and set the room and audio-visual equipment as resources for the meeting, or to use a web-based reservation schedule.

### **8.11.3 Multi-University Centers**

The multi-university section of the survey did not pertain to issues of facilities management, which were instead handled locally at each school.

### **8.11.4 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. The center that established a student-run co-op store may have done so as the result of student request and the willingness of their administration to allow them to do so, so long as they took responsibility for running it. This is speculation, but it is clear that the store could not exist without the permission of the administration and a degree of trust of their part for the students.

#### *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. Although only one center stated that they would need a 50% increase in computer resources to consider them sufficient, the benefits for most SLCs might arise during discussions of upgrading and replacing existing center technology.

#### *Information Exchange*

While only one school commented on the use of their method of information exchange (a rarely used file server), it seems that, especially in the case of a multi-university center, a website or file server might be the simplest form of mass information exchange. Only one of the multi-university centers did not list a website (public or restricted) as a method of 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.

#### *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 was found to be quite similar from center to center. Locating people according to project or department seems to be working very well for each center, as none of the centers cited problems or grievances aside from the one school that is working to acquire needed space.

Mediating issues that arise between students may be something in which SLCs should not get involved, judging by the responses from the centers. Depending on the nature of the dispute and the persons involved, it may not be a matter that the SLC is prepared to deal with. 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 may be the most impartial, and is 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. Although no system is foolproof, and messages could be deleted in error, this system also allows the intended receiver to hear the caller’s tone of voice, which can sometimes be very important.

There does not seem to be a best practice associated with fax machines or mailboxes, aside from simply making them available to those who need them when they need them.

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, 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.

## 8.12 CONCLUSIONS

The Student Leadership Council, as an entity, generally becomes more active over the life of its center and plays an important role in representing students and solving their problems. Its focus, which was initially to establish itself as a student representative body, evolves to operate more effectively and to live up to the expectations that students have of it. The number of students in a center can continuously 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 used to be held once a month have now 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 requirements of the students, it does not need to restrict itself just to this. Various activities are arranged from time to time, including outreach and social events. These activities not only entertain the students but also benefit other people who are not part of the center. Social activities such as Students' Day, barbecues, potlucks, etc., along with outreach activities such as peer review, LEGO competitions, etc., have become part of the tradition of most SLCs. Various committees are established periodically by or within the SLC to address specific interests. For example, the industry committee at one of the centers organizes LIFE (Learn Industry from the Experts) courses for students and has individual student liaisons for each industry partner. Similarly, the poster committee at many centers assists 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. But along the way there have been certain initiatives that were not as successful as they were expected to be. One example was the creation of a CD-ROM as a resource containing information for high school guidance counselors. It was intended to help prospective students and freshmen who were trying to decide on a major, but ended up costing far too much money and time. Another SLC attempted to arrange a bioengineering-specific job fair with industrial partners. However, during the planning it was determined that the frequency of job openings was insufficient to warrant an entire job fair and it was decided that, instead, information regarding job opportunities could be effectively communicated through student liaisons, the education director, and personal networking.

SLCs are doing an outstanding job, overall. However, the SLC survey indicated there are still some areas that need improvement. One issue that was identified is the need for more student involvement in outreach activities. Another is the organization of outdoor/recreational activities such as hiking, soccer, and volleyball games. The SLCs also need to formulate strategies to motivate new students to get involved with the SLC functions and leadership as soon as they join the center. To improve the attendance at SLC meetings, it would be good to invite new and inactive members to come and speak, hence getting them more involved.

Through this study, we have attempted to ascertain the "best practices" of SLCs from as many centers as possible. Though we naturally hoped to be able to hear from all the centers in the ERC Program, we were nevertheless gratified by the amount of information

obtained from the 11 centers that did respond. 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 study will benefit not only new centers, where nascent SLCs will be able to learn from our findings, but also give mature SLCs an opportunity to borrow ideas that have been tried and successfully tested elsewhere. We hope that this study will be an ongoing process, with new findings being periodically added to what we trust will be a living document.

## 8.13 APPENDICES

### 8.13.1 Appendix A: Survey Questionnaire

#### **SURVEY ON BEST PRACTICES OF ENGINEERING RESEARCH CENTER STUDENT LEADERSHIP COUNCILS**

**Deadline for Completion: March 25<sup>th</sup>, 2002**

**Return Address:** Please e-mail the Word document (preferred) to [siddhart@umich.edu](mailto:siddhart@umich.edu) or fax to the attention of Siddharth Chandramouli at 734-615-0312.

We would like to thank you for taking the time to fill out this survey about best practices in Student Leadership Councils (SLC). Because only you who can help us find SLC best practices, we would like to stress the importance of your involvement and filling out the survey completely. We understand that your time is limited and we hope that you will bear with us in gathering all of the information. One purpose to gathering all of this information is to look for correlations between effective aspects of SLCs and the manner in which they are managed. We also look forward to your use of the open questions to answer unaddressed questions or stress points that we missed in making this survey. We suggest that you divide up the responsibility for answering the different areas to those on your SLC or within your student community that are best able to answer those questions. If you have any questions concerning the survey, please contact Siddharth Chandramouli at [siddhart@umich.edu](mailto:siddhart@umich.edu).

Thank you,  
Committee for SLC Best Practices  
Engineering Research Center for Reconfigurable Manufacturing Systems  
University of Michigan

#### **General**

1. Please provide the name, e-mail address, and phone number of a person on your SLC whom we can contact in case we have questions about your responses to this survey.
2. What Engineering Research Center are you representing?
3. Which University are you representing?
4. What do you feel is the purpose or mission of any SLC?
5. What should the main functions or activities of an SLC include?
6. Does your Center have an active, functioning SLC? If Yes, on a scale of 1-10, with 10 being the highest, how would you rate the overall effectiveness of your particular SLC?
7. On a scale of 1-10, with 10 being the highest, how would you rate the effectiveness of your SLC with regard to the following areas:

<b>Area</b>	<b>Rating</b>
<b>SLC Organizational Structure</b>	

<b>Communications</b>	
<b>Activities</b>	
<b>Site Visits</b>	
<b>Industry Meetings or Visits</b>	
<b>Outreach</b>	
<b>Facilities Management</b>	

### SLC Organizational Structure

1. How many members are on your SLC? Please give a breakdown of student by level currently serving on your SLC.

<b>SLC Student Level</b>	<b>Number</b>
<b>Undergraduate</b>	
<b>Master's</b>	
<b>Ph.D.</b>	
<b>Total</b>	

2. How many total students does your SLC represent? Please give a breakdown of students by level in your Center.

<b>Center Student Level</b>	<b>Number</b>
<b>Undergraduate</b>	
<b>Master's</b>	
<b>Ph.D.</b>	
<b>Total</b>	

3. What incentive, if any, does your Center's administration provide to encourage students to serve on the SLC? Is it effective?
4. Do you take any special effort to ensure undergraduate representation on your SLC? Are they effective?
5. Are SLC members elected or appointed?
6. If SLC members including the President are elected or appointed, briefly describe the process.
7. How are tasks divided among the various SLC members? Are there SLC members dedicated to specific tasks (such as Social Activities, Communications. Etc.)?
8. If so, please list the positions/titles of the SLC members, and their respective responsibilities.
9. If a vacancy occurs on the SLC mid-term, how is the position filled?
10. Do you have a constitution/bylaws for your SLC? If you, please provide a copy.
11. If your answer to 10. was Yes, how often are the constitution/bylaws updated? What is the procedure?
12. How often does your SLC meet?
13. Who presides over the SLC meetings?
14. Do external staff/administration members attend SLC meetings? If so, who, and how frequently?
15. Briefly describe the decision-making process within your SLC. Is it effective?
16. What procedure, if any, does your SLC use to involve the general student body when really important issues need to be resolved? Is it effective?

17. If there is any other information regarding the organization of your SLC that you believe contributes to its effective functioning, please share it here.

**Communication**

1. How do Center administrators and staff members communicate with the students? How do SLC members communicate with other students in the Center?

(Indicate all that apply)

	Center to Students	SLC to Students
E-mail lists		
Websites		
Newsletters		
Written memos		
Meetings		
Personal Communications		
Through Advisors		
Flyers		
Voice-mail		

2. How do students voice their concerns to Center administrators and staff? Is it effective?
3. Have Center administrators and staff responded to issues and problems raised by students appropriately and promptly?
4. Is there a forum such as student meeting where students can voice their concerns to other students and/or SLC members? Please explain.
5. How do students learn about research being conducted in the center other than in their specific area? Is it effective?
6. Do Center students meet together on a regular basis? How frequently, who attends, and what is the format for these meetings?

	<b>Attendance Frequency</b>
<b>Undergraduate Students</b>	
<b>Graduate Students</b>	
<b>Faculty</b>	
<b>Staff</b>	
<b>Education Coordinator</b>	
<b>Other (Specify)</b>	

7. Is there a way for students to express confidential concerns (conflicts with faculty, harassment, etc.) either while they are working for the Center or as they are leaving? Is it effective?
8. How does the Center or SLC communicate openings for new undergraduate positions to non-Center students? Is it effective?
9. How does the Center or SLC communicate openings for new graduate research positions to non-Center students? Is it effective?
10. How do students in the Center or SLC members communicate with industry partners of the Center? How do industry partners communicate with the students? Is it effective?
11. Are resumes and job interests of Center students communicated to industry partners?

12. How does your SLC communicate with the NSF?
13. How many of your SLC members are registered at the national ERC website, [http://www.erc-assoc.org/students/student\\_index.htm](http://www.erc-assoc.org/students/student_index.htm)?
14. How many of the students are registered at the national ERC website, [http://www.erc-assoc.org/students/student\\_index.htm](http://www.erc-assoc.org/students/student_index.htm)?
15. If there is any other information regarding SLC communication that you believe contributes to its effective functioning, please share it here.

### Activities

#### Social Events:

1. How often does your Center have social events?
2. What is the purpose of social events at your Center? Is it effective?
3. Are all social events planned by the SLC, or are others involved?
4. Are RSVPs usually required or encouraged for social events? What approximate percentage of participants sends RSVP replies in advance?
5. What incentives are provided to encourage participation in social events (e.g. food, rides, prepaid deposits for events that cost money, etc.)?
6. What methods are used for advertising social events?
7. How are social events funded (SLC budget, education budget, industry, student contributions, etc.)?
8. For each type of social event in which Center students or the SLC participate or plan, please complete the following:

	Event Name & Description
1	
2	
3	
4	
5	

Approximate Number of Participants					
Event	1	2	3	4	5
<b>Undergraduate Students</b>					
<b>Graduate Students</b>					
<b>Faculty</b>					
<b>Center staff/Admin.</b>					
<b>Spouses/Significant Others</b>					
<b>Children</b>					
<b>University of college admin.</b>					
<b>Non-Center Students</b>					

9. If there is any other information regarding the social activities organized by your SLC that you believe contributes to its effective functioning, please share it here.

#### Site Visits:

1. What are students expected to do to prepare for NSF site visits?
2. How does the SLC help students to prepare?
3. How far in advance do preparations begin?
4. During what portions of the site visit are students expected to participate or be present?
5. How is full student participation in site visits encouraged?
6. Do students have specific jobs during site visits, and if so, what types of jobs are common and are they assigned or voluntary?
7. Does the SLC administer a SWOT or similar analysis annually (a survey of students regarding their opinions about Strengths, Weaknesses, Opportunities, and Threats to the Center, so that the results can be reported to the NSF)? Is it effective?
8. If so, how are SWOT surveys administered (pen & paper, website, e-mail, etc)?
9. What percentage of students respond to the SWOT survey?
10. How does the SLC generate questions that should be included on the SWOT?
11. How does the SLC respond to SWOT survey results? Is the response effective?
12. What types of problems or student concerns have the SLC had to communicate to administrators regarding site visits? Give examples.
13. How were problems and concerns about site visits resolved? Is the resolution process effective?
14. If there is any other information regarding the SLC organization of site visits that you believe contributes to its effective functioning, please share it here.

**Industry Meetings or Visits:**

1. How frequently are industry meetings held?
2. What formats for industry visits at your Center?

<b>Format</b>	<b>Use Frequency</b>	<b>Effectiveness?</b>
<b>Individual Projects</b>		
<b>Groups of Projects</b>		
<b>Entire Center</b>		
<b>Single Day</b>		
<b>Multiple Day</b>		
<b>Single Session Meetings</b>		
<b>Multiple Session Meetings</b>		
<b>Other (Specify)</b>		

3. What are students expected to do to prepare for industry visits?
4. How does the SLC help students to prepare? Is the SLC preparation aid effective?
5. How far in advance do preparations begin?
6. During what portions of industry visits are students expected to participate or be present?
7. Do students have specific jobs during industry visits, and if so, what types of jobs are common and are they assigned or voluntary?
8. Does the SLC assist with the SWOT survey given to industry members (see question 7 of **Activities Site Visit** section)?
9. What types of problems or student concerns have the SLC had to communicate to administrators regarding interaction with industry partners?

10. How are student related problems and concerns about industry visits resolved? Is it effective?

11. If there is any other information regarding the SLC organization of industry meetings or visits that you believe contributes to its effective functioning, please share it here.

**Outreach:**

1. Does your Center plan and participate in outreach activities? In what types of outreach activities does your center participate?

2. Who plans outreach activities in your Center?

3. In what way are students involved in these outreach activities?

4. How do SLC members contribute to outreach activities?

5. How many students participate in outreach activities?

6. How many hours do students contribute to outreach activities?

7. How are students encouraged to participate in outreach activities?

8. If there is any other information regarding the SLC organization of outreach activities that you believe contributes to its effective functioning, please share it here.

**General Activities:**

1. What sort of awards, if any, does your Center or SLC use to recognize outstanding students, faculty, and/or staff?

2. Is the SLC involved in determining who should receive awards?

3. How, if at all, does your Center or SLC recognize students who graduate or otherwise leave the center?

4. Does your Center administration plan workshops or seminars? In what types of seminars has the Center student body participated?

5. Who determines the topics for workshops or seminars?

6. How is the SLC involved with workshops or seminars? Do they sponsor them independently?

7. Are there any other questions or issues relevant to SLC activities that we have not included on this survey?

**Facilities**

1. List the areas of the Center for which the SLC and other students have access and/or responsibility (partial or full), including upkeep and maintenance (e.g., kitchen, computers, etc.)?

2. Does your Center have a store/vending area for students, faculty, and staff to purchase items such as candy, snacks, and soft drinks? If so, please describe its operation and the role played by the SLC/students in maintaining the store.

3. How does your Center handle the recycling of bottles, cans, or office paper, etc., Are the students/SLC involved in this effort?

4. Are students responsible (wholly or partly) for the maintenance and upgrade of computers in your lab? If Yes, please describe.

5. Are all computers in your lab shared by students, or are there computers reserved for individual students as well?

6. If computers are assigned to individual students, on what basis are they assigned (seniority, priority for Ph.D. students, etc.)? Does the SLC have any input in this process?

7. Are other peripheral devices available for student use?

Device	Available?
Lab Computers for data collection	
Printers	
Digital Cameras	
Scanners	
CD Burners	
Other (Specify)	

8. Who is responsible for selecting computers/peripheral devices for student use? Does the SLC provide input ?
9. Are computer resources sufficient for your center? If not, approximately what percentage increase in resources would provide sufficient resources?
10. Does your center have a means for exchange of electronic information between students, projects, and/or industry, e.g., a file server or web site? If so, what?
11. Who selects/upgrades computers for student use? Is the SLC involved in this process?
12. Do most students have office space in close proximity to each other?
13. If there is a conflict among students involving shared office/lab space, how is this usually resolved? Does the SLC play a role in resolving such conflicts?
14. Are students involved in decisions such as assignment of desk space, cabinets, etc. to incoming students, rearrangement of workspace in the lab area, etc. If Yes, please give examples.
15. What is the approximate ratio of phones to students in the student office areas?
16. What is the procedure by which calls/messages are handled?
17. Is there a fax machine available in the student area?
18. Are there individual mailboxes for students?
19. What is the procedure for reserving conference rooms and projectors for SLC meetings and student meetings?
20. Are there any other facilities-related issues that you would like to share with us?

### **Multi-University Centers**

**Fill out only if appropriate.**

1. Do you have a separate SLC at each university or one for the entire center? Is the current organization effective?
2. How often do students from different universities communicate?
3. How often, and under what circumstances, do students from different universities meet in person?
4. How does the administration at your own university respond to student concerns?
5. How does the center administration respond to student concerns at all of the universities?
6. Are there any other questions or issues relevant to multi-university centers that we have not included on this survey?

### **Concluding Questions**

1. How has the SLC evolved since your Center was established?

2. What do you feel are the best aspects of your SLC?
3. What initiatives have your SLC tried that have been unsuccessful?
4. What are the areas for improvement that you see for your SLC in the future?
5. Are there any other questions or issues relevant to SLCs that we have not included on this survey?

## 8.13.2 Appendix B: Bylaws of Selected SLCs

### **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 officer of 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 Re-search 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.

### **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:**

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.

1. Preside over the bi-weekly student meetings.
2. Assist the President in organizing the annual ERC banquet.
3. 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.

### 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.

### 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.
6. 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.

### 8.13.3 Appendix C: Contact Information

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

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