Building an Effective Computer Science[*] Student Organization:
The Carnegie Mellon *Women@SCS* Action Plan[**]
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This paper aims to provide *a practical guide for building a student organization and designing activities and events* that can encourage and support a community of women in computer science. This guide is based on our experience in building *Women@SCS*, a community of women in the School of Computer Science (SCS)[1] at Carnegie Mellon University. Rather than provide an abstract "to-do" or "must-do" list, we present a sampling of concrete activities and events in the hope that these might suggest possibilities for a likeminded student organization. However, since we have found it essential to have a core group of activist students at the helm, we provide a "to-do" list of features that we feel are essential for forming, supporting and sustaining creative and effective student leadership.

1: Brief Background
In 1999, the number of undergraduate women students entering Carnegie Mellon's Computer Science Department reached 38% (50 out of 130) --up from 7% (7 out of 96) in 1995. The factors that contributed to this dramatic increase have been well documented by Fisher and Margolis[2] and Blum[3]. (See also Allan Fisher's paper on page ## in this Special Issue.)

Briefly, in 1995 Allan Fisher and Jane Margolis embarked on a longitudinal study (funded by the Sloan Foundation) of the gender gap in computer science at Carnegie Mellon. A number of *key actions* then came into play:

- Summer workshops for high school teachers of Advanced Placement Computer Science were held on campus (run by Fisher and Margolis and funded by the National Science Foundation). In addition to technical information needed to address changes in the AP CS exams, these teachers were provided information and advice on recruiting and retaining women in computer science.
- Allan Fisher, (then) Associate Dean for Undergraduate Computer Science Education, advised the Carnegie Mellon Admissions Office that prior programming experience was not a pre-requisite for success in the computer science major.

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[*] Throughout this article "computer science" is used as an umbrella term for the range of computer sciences and related IT fields such as robotics, human computer interaction, etc.

[**] A version of this articale appears in the SIGCSE Bulletin *Inroads*: *Women in Computing*; vol.34.no.2, 2002, June, p. 74-78.

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- Raj Reddy, (then) Dean of Computer Science, requested that the Admissions Office develop criteria that could help select future visionaries and leaders in computer science.
- The Admissions Office started placing high value on activities that demonstrated commitment to "giving back to the community."

Thus, a new vision for the SCS undergraduate student body was formed that would influence changes in the recruitment of computer science majors ---changes that would lead to the increased enrollment of women and *indeed* to a significant transformation of the culture of computing at Carnegie Mellon.[4] Importantly, these and subsequent developments have been undertaken with ***essential support from top administrators, including the President of the University.***[5]

The new admissions criteria have not affected our students' ability to succeed in the computer science major. Indeed, other than creating various entry points into the freshman programming courses, no major changes have been made in the undergraduate curriculum. We attribute this positive outcome in large measure to the student organization *Women@SCS*, and in particular, to its Advisory Council.

2: Student Leadership: The *Women@SCS* Advisory Council

With the dramatic increase in the number of women entering our computer science program in the Fall 1999, we were faced with a great opportunity ---and a great challenge. It seemed clear we would be in danger of quickly losing many of our new recruits if we were to conduct business as usual within the atmosphere of a traditional computer science department.[6] Hence it seemed critical to work closely with students who might guide us to appropriate action. Fortunately, the seeds for such a core of advisors were already in place. A very small group of women graduate students, who wanted to meet other women in the various SCS departments, had started to organize socials and dinners. They had also developed a rudimentary web site with links to relevant online resources. Several active undergraduate women were eager to see changes and quickly joined ranks. And so, the *Women@SCS Advisory Council* (known here simply as 'the Council') was born.

By the Fall 2000, the Council had a total of 23 students and had separated into a graduate sub-Council of 12 students and an undergraduate sub-Council of 11 students. The separation came about because of divergent interests between the younger students (who preferred a combination of social and mentoring activities) and the more professional/research oriented graduate students (who preferred focused discussions and professional networking activities). Connections between the sub-Councils continued to be maintained by holding regular joint meetings.

By October 2001, the Council had doubled to a total of 46 students (22 undergraduates and 24 graduates). All four years of the undergraduate level are now represented, and most of the graduate departments. We have found that a core group of Council members are extremely active and participate on a regular basis while other members attend

meetings and help out with events whenever they can. This situation has proved to work well. Council members are under no pressure to do Council work but will happily help out when called upon. At the same time, the more regularly active members can hold leadership positions within the Council, direct meetings, instigate discussions, and plan events.

The Council has turned out to be *the* driving force behind our pro-active efforts to improve the academic and social climate for all women in SCS. As the Council has grown and thrived, so have the numbers of women students who attend the Council's programs of events and activities. As the Council has become a respected part of the SCS 'institution,' the atmosphere for all students in SCS has greatly improved. Thus we strongly believe, *building an energetic, action-oriented Advisory Council is key to building a successful community of women in the computer sciences.*

Some Essentials for building an effective Council:

- **Faculty and Institutional Support:** *The Council needs a dedicated Faculty Advisor who is willing to spend time and energy listening, advising, and promoting the interests of the group throughout the department, school and the university*. Our Faculty Advisor has formed strong ties and support networks on behalf of women students. At the same time she has formed a close and mutually respectful relationship with Council members. This gives them a strong sense of self worth. The Faculty Advisor readily acts as a bridge to other faculty and administrators. Initially, Council members give input into curriculum and climate through the Faculty Advisor, and in this way contribute to real change.

- **Program Coordinator:** *Hire a Program Coordinator to help with the day-to-day organization of activities, events, and meetings and work closely with the Faculty Advisor and the Council.* Members of the Council are keen to invest their time, energy, and ideas for the good of the community. In turn, they benefit academically, socially, and professionally from this involvement. However, *it is vital that the Council has organizational support so that its members maintain good academic standing and do not "burn out."* Our Program Coordinator has become a sounding board for the ideas and questions of Council members. She also oversees the Women@SCS web site (see below) and networks throughout the University with staff, faculty, and administrators in arranging the Council's events and activities.

- **Meetings**: *Arrange regular Council meetings with an agenda and a set time*. Our Council holds weekly (one hour) meetings for undergraduate members, twice monthly for graduate members, and joint meetings once a month. At the Council meetings, members organize future events, review past activities, comment on classes and curriculum issues, brainstorm and share ideas, and review the web site. Meetings also provide a safe, non-judgmental environment where members can ask for help, and give it in return. We hold recruiting sessions once a semester to show all women in SCS what being on the Council is all about. We always try

to make the atmosphere casual and enjoyable at all meetings—we have found that this adds to the energy level, creativity and productivity. Occasionally a guest, usually faculty or administrator or campus visitor, is invited along. This allows Council members to meet faculty and administrators on an entirely new level for an exchange of ideas and information. Articles by Cuny and Asprey,[7] and Fox,[8] point out how ***this kind of personal involvement with faculty and administration has been found to be particularly important to women students***.

- **Council Leaders**: *Elect Council leaders.* We have found that Council members are happy to have leadership from the "senior" members, and that it works best to have two leaders (within each sub-Council) who will be responsible for collecting meeting agendas, leading the meetings, acting as general spokeswomen and coordinating with the Faculty Advisor and Program Coordinator.

- **Web site**: ***Set up a student-run web site to represent your organization and increase its visibility.*** The *Women@SCS* web site, with a link from the SCS home page, has become a focal point for announcing activities, for highlighting and celebrating the many special accomplishments of women throughout SCS, and for providing resource information to women students and beyond. We are extremely proud of our web site and have an excellent team[9] of Council members who handle content and coding. The web site is reviewed at Council meetings and all members are encouraged to submit event announcements and items of interest. http://www.cs.cmu.edu/~women/

- **Rooms**: ***Make sure you are given a "real" meeting room*** and not a classroom. We have found that the venue has helped to affirm the worth of the Council and its decision-making.

- **Distribution lists**: ***Set up distribution lists of all women in the department or school*** (faculty, staff, graduates, undergraduates). The D-lists are an essential tool for email communication—and we have found that the Council logs a voluminous amount!! D-lists not only provide an efficient tool for disseminating ideas, getting feedback, announcing meetings and events, but also for tracking the numbers of women throughout the department/s.

- **Funding**: ***Funding from the department, school, and especially from the highest levels within the university, is essential for the Council to put its plans into action. Funding at this level also gives value and credibility to the goals of the Council, credibility to women's issues and the need to improve the quality of life for women in computer science.*** This will prove to be a very positive investment for the department and the university as a whole. We have been fortunate in having administrative support. Our University, via the President, has provided most of the funding for the Council's events and activities. Another excellent source of funding is the institution's Alumni/External Relations Office. After all, *women graduates tend to become the best alumnae* in terms of contributions to the university. Other sources of funding are the many computing-

related companies who are keen to recruit on campus and are often very aware of the need for more women in the field. The Council can connect with campus representatives and see if they are willing to sponsor a dinner/event. In this way, the Council can plan a community-building event that also works to show the students that *they are in demand as computer scientists.*

- **Giving back:** *Your Council can become an asset to the department, school and the university as a whole.* Carnegie Mellon's Computer Science Department has called upon the *Women@SCS* undergraduate sub-Council to provide direct input on issues such as the curriculum, advising, and climate. Recently, members of the Council were invited by the SCS External Relations Office to participate on a panel discussion, held in San Francisco, to examine future practices for Alumni development. This year, the *Women@SCS* Council was featured on public television[10] and in local newspapers.[11] Following the tragedy of September 11, one of our graduate Council members instigated an open-to-all meeting to discuss "Computing Post-WTC". Her initiative met with tremendous response from students and faculty and has since led to the resurrection of the Pittsburgh branch of "Computer Scientists for Social Responsibility." It is clear that our Council, and by extension the community of women in the School of Computer Science, have now become a very articulate and visible asset.

3: Building a Community of Women in Computer Science: Events and Activities organized by the *Women@SCS* Advisory Council:

An important but nevertheless little acknowledged component of professional training, and success, consists of the professional interactions that take place in social settings. These are often taken for granted. But particularly in the scientific and technical arena, they happen much more naturally in the ordinary course of events for men than for women.[12] Thus, the events designed by the *Women@SCS* Advisory Council generally combine professional *and* social activities that help foster community, confidence and growth.[13]

There is no dearth of ideas generated by the Council and, indeed, the level of energy expended is extraordinary. This is mitigated in part by the fact that a fresh crop of students joins forces each year. But even more, we have observed the paradoxical, and yet clichéd, outcome: namely that 'energy produces energy' and that 'to give is to receive.' Indeed, Council members are the greatest beneficiaries of their involvement in running the show, for example, in terms of their increased professional experiences, contacts and growth, their self-esteem, and their academic and leadership successes and awards.

The following events and activities provide opportunities for a combination of professional and social activities among the community of women in SCS. Some events, as indicated, are for Council members only, some for undergraduates, some for graduates, some include women faculty, some are open to both men and women students.

Events and Activities[K]

Professional and/or Mentoring Events and Activities:
(See also, Gloria Childress Townsend on "Mentors and Role Models" p. ## in this Issue.)

- **Freshmen Orientation Session (U):** In a social gathering, Council members talk to freshmen women about their work and life in the Computer Science Department. **[y]**

- **Big Sisters/Little Sisters (U, G):** This program pairs a more "senior" Big Sister with a Little Sister and provides an informal, but organized, set-up for support, mentoring, and friendship. *Women@SCS* provides guidance for effective mentoring (see http://www.cs.cmu.edu/~women/resources/mentoring.shtml). Social events include dinners, movie and popcorn evenings, ice-skating, holiday parties, and shopping trips. Sisters are encouraged to email and meet outside of the organized activities. Usually the pairings works well, occasionally they don't. We have found that some students prefer this one-on-one set up while others prefer group-mentoring activities –we feel both formats are important. (A sample of our initial Sisters' letter/questionnaire can be found on our mentoring web page.) **[f]**

- **Pre-registration Event** and **Passing the Torch (U):** The first event, for both women and men undergraduates, serves as a mid-year opportunity for providing general advice on the class registration process. The second event is held at the end of the academic year as senior women prepare to graduate and others prepare to advance their year. *Words of wisdom* given at these events include tips on succeeding, on what works, what doesn't, and recommendations on classes and professors. We have found that women's confidence is often lowest during the first two years. These events serve to remind students that others have been through similar experiences, have survived/thrived, and are now positioned to embark on exciting and rewarding endeavors. **[y]**

- **SURG--Small Undergraduate Research Initiative Information and Social (U)** This event provides an opportunity for students to learn about the rewards of an undergraduate research experience. The Undergraduate Research Director explains the application process. Students who have been involved in research projects share their experiences. Fall SURG 2001 was sponsored by IBM and included two IBM researchers who were also Carnegie Mellon alumnae. **[s]**

- **(Dessert) Study Breaks (U):** Study breaks, open to women and men, are held during exam time and allow students a chance to share test anxieties and give reassurance. **[f]**

[K] Key: **U**= Undergraduates   **G**= Graduates
y =Once a year (or will be)   **s** =Once a semester   **m** =Monthly   **w** =Weekly
f =Frequently (between **m** and **s**)   **o** =One time event (so far)

- **Invited Speaker Series (G)**: Speakers from academia, business, and industry are selected and invited by graduate sub-Council members to present technical talks, share their stories and experiences, offer professional advice, promote their workplaces, offer mentoring opportunities, and discuss gender and work issues. The Council has favored two formats: single speaker events and industry panels (of 5-7 women). Dinner and social time are included. **[f]**

- **Advice on Graduate School** and **Reading Graduate School Applications (U, G)**: In the first event, graduate students talk candidly to undergraduates about their decisions to go to graduate school, the application process, and their future plans. In the second, graduate sub-Council members read and give feedback to undergraduates, both women and men, who would like help with their applications to graduate school. **[y]**

- **Grant Proposals (G)**: Our graduate Council members have contributed ideas and feedback for several grant proposals for women in IT related projects. **[y]**

Conferences and Outreach:

- **Grace Hopper Celebration of Women in Computing 2000, Cape Cod, Massachusetts (U, G)**: Women @SCS Council members, along with SCS faculty and researchers, presented a panel discussion on the Carnegie Mellon experience in increasing the participation of women in computer science. We hope to present another panel at **Grace Hopper 2002** (see upcoming events).

- **Expanding Your Horizons (U, G):** For the past two years, a team of SCS students, led by women in the Robotics Institute, have run workshops entitled "Is There A Robot In Your Future?" for middle school girls at the local *Expanding Your Horizons* conference. *EYH* is a nationally held one-day event aimed at increasing young women's interest in science and mathematics. **[y]**

- **Girls, Technology, and Education Forum (U, G)**: During the Spring 2001, the *Women@SCS* Advisory Council presented an afternoon forum focusing on girls and technology in education and entertainment. The event successfully brought together more than 160 teachers, academics, students, and members of the business community for a full afternoon of talks and brainstorming. Together, the group discussed topics ranging from girl-friendly classroom strategies, to software game development and beyond. This was funded, and jointly arranged, by the SCS External Relations Office. This event proved to be quite a feat but very worthwhile. We were particularly proud of the contributions from our Council members. It gave them an opportunity to practice their public presentation skills, their teamwork, their organizing abilities, and most importantly, to share their expertise and perspectives. **[o]**

- **The Richard Tapia Celebration of Diversity in Computing**, **Houston, Texas (U)**: A group of five undergraduate Council members attended the first in a series of events designed to celebrate the technical contributions and career interests of diverse people in computing fields. Members returned newly inspired and with ideas for future activities. **[o]**

- **PBS filming of *Women@SCS* (U, G):** Bonnie Erbe, producer of "To The Contrary," a PBS news program on women's issues, came to campus with her crew to film and interview SCS faculty and *Women@SCS* Advisory Council members. Excerpts of the program can be viewed on our web site. The show provoked a lively debate among our Council members and faculty, demonstrating that while we may share many common goals, we also hold a wide range of perspectives on gender/computing issues. **[o]**

Social Activities:

- **Graduate/Undergraduate Socials (U, G)**: Here graduate and undergraduate students meet informally over dinner. We have found that many more undergraduates than graduates tend to participate, but the events are generally well attended—over 70 at the last social. **[s]**

- **Faculty/Student Dinners (U, G):** These dinners provide a chance for students to meet women faculty in a relaxed, non-judgmental atmosphere, and to increase the visibility of successful women computer scientists. We have found that a core group of faculty show up regularly and are very supportive. **[s]**

- **Graduate Women's Welcome Potluck (G)**: Graduate women try to have at least one organized social (**Summer Get-together)** over the summer while the Potluck 'officially' starts off the new academic year. It provides an opportunity for all women graduate students and faculty to get together, share home cooked food, and welcome the new women graduate students and faculty. **[y]**

- **Breakfast** and **Coffee/Dessert Breaks (G)**: These events allow students to start the day and/or take an organized break from their research and classes. Often discussions focus on timely topics, for example, on issues of privacy and security. These events are often open to women faculty. **[f]**

- **The "Carnegie International" Guided Tour (U, G)**: Students attended a guided tour of "The Carnegie International" at the Pittsburgh Carnegie Museum Of Art. "The International" is North America's premier survey of contemporary art. **[o]**

- **Ice cream Event (U)**: The undergraduate Council sponsored a very popular ice cream dessert for all students at the annual SCS Undergraduate Picnic. **[y]**

- **End of Year Picnic (U, G)**: This event, for all Council members, is well attended and heartwarming as we are also saying goodbye to some of our graduating members. **[y]**

Other:

- **T-Shirt, Logo Design** and **T-Shirt Exchange (U, G):** Occasionally undergraduate and graduate student ideas seem incompatible. A very polarized discussion emerged as the Council set about designing a *Women@SCS* T-shirt and a new logo for the web site. The more mature graduate students tended to have a feminist consciousness that affected how they want to be defined/identified. The younger undergraduates tended to see the T-shirt project as a search for a "pretty" fashion statement, and also preferred a "feminine" design for the logo. The T-shirt disagreement was resolved by allowing the undergraduates their choice, modified by input from female faculty. The end result in fact proved to be very popular. *Women@SCS* T-shirts were given out to SCS students (men and women) in exchange for a donated, decent item of clothing for the local women's shelter. Given the initial debate over design, this proved to be surprisingly successful! The more permanent, public web site image was left open to further debate. We are, after all, an evolving community. **[y]**

Upcoming Events and Activities:

- **Grace Hopper Conference 2002, Vancouver, Canada (U, G):** To complement the GH 2002 theme of *ubiquity*, we have submitted a proposal for a panel presentation "FROM BITS TO BOTS: Women Everywhere Leading the Way".

- **Middle School Presentations (U, G):** The Council is working with the local Coordinator of the Girls, Math, Science Collaborative to plan middle school visits aimed at increasing the visibility and work of women in computer science.

- **Women's Self-Defense Event (U, G)**: Undergraduate sub-Council members, together with the SCS Associate Dean for Academic Affairs Jeannette Wing, will teach some basic self-defense moves.

- **Unix Help Session (U):** This will be a help session in which undergraduates who are proficient with Unix help those not so skilled. Many students have expressed a need to learn from their peers in an informal atmosphere. This event will be open to both women and men students.

- **International Student Event (U):** This event, open to all, will give our international Council members an opportunity to share aspects of their culture with the rest of the community.

- **Graduate Retreat (G):** Members of the graduate Council plan to hold a winter retreat for relaxation, inspiration and for planning new community events.

In closing
Our goal has been to foster a supportive community that promotes academic success and professional growth, one that will benefit women in computer science as well as the community-at-large. We endeavor to view problems as challenges to be tackled in creative and constructive ways. With good organization, faculty and administrative support and commitment, a student organization with a student *Advisory Council* at the helm, will provide the talent, energy and innovative ideas to lead the way!

[1] SCS comprises seven departments: The Center for Automated Learning and Discovery (CALD); the Computer Science Department (CSD) which houses the undergraduate program; the Entertainment Technology Center (ETC); the Human-Computer Interaction Institute (HCII); the Institute for Software Research, International (ISRI); the Language Technologies Institute (LTI); and the Robotics Institute (RI).

[2] Fisher A. and Margolis J. "Women in Computer Sciences: Closing the Gender Gap in Higher Education." http://www.cs.cmu.edu/~gendergap/ and
Margolis and Fisher, *Unlocking the Clubhouse, Women in Computing*, The MIT Press, Cambridge, 2002.

[3] Blum, L. "Women in Computer Science: The Carnegie Mellon Experience," to appear in *The Innovative University*, Daniel P. Resnick and Dana S. Scott, Eds., Carnegie Mellon University Press, Pittsburgh, 2002. http://www.cs.cmu.edu/~lblum/women_in_computer_science.pdf (2.5 mb)

[4] Blum L. "Transforming the Culture of Computing at Carnegie Mellon," *Computing Research News*, vol. 13, No. 5, November, 2001, p.2. http://www.cra.org/CRN/issues/0105.pdf

[5] J. McGrath Cohoon stresses the importance of institutional support in "Toward Improving Female Retention in the Computer Science Major," *Communications of the ACM*, May 2000.

[6] At Carnegie Mellon, students enter the computer science major as freshman.

[7] Cuny, J., Asprey, W. "Recruitment and Retention of Women Graduate Students in Computer Science and Engineering: Results of a Workshop Organized by the Computing Research Association," San Francisco, June 21-22, 2000. http://cra.org/Activities/craw/

[8] Fox, M. F. "Organizational Environments and Doctoral Degrees Awarded to Women in Science and Engineering Departments," *Women's Studies Quarterly*, 28 (1 & 2), 47-51, 2000. http://www.rit.edu/~wsqwww/Contents/current0012.htm

[9] The web team currently consists of four (work-study) undergraduates and one graduate representative.

[10] http://www.pbs.org/ttc/hottopics/compsci.html

[11] "Women Compute: Carnegie Mellon's recruiting of females in computer science adds up to change," front page, *Pittsburgh Post Gazette*, Wednesday, April 18, 2001. http://www.post-gazette.com/regionstate/20010418cmu2.asp

[12] Blum, L. "Women in Algebraic Geometry Workshop at MSRI," *Notices of the American Mathematical Society*, September 1993, pp. 960-962.

[13] As you will see from our activities, food often proves to be the social glue!