

## **Women in Computer Science: The Carnegie Mellon Experience**

The environment for women in computer science at Carnegie Mellon University has been undergoing extensive changes over the past year. We've had a dramatic increase in the numbers of women entering the undergraduate program, efforts to foster a more cohesive community for graduate women, and a pledge of long-term institutional support. How did this come to be, and what are we doing to help ensure successful experiences for women in computer science at CMU?

We propose a panel in which we will present 1) the background research and outreach efforts of our colleagues at CMU, 2) our current activities to help create a community of women with the goal of enhancing the educational and social experiences of both graduate and undergraduate students, 3) ongoing research and evaluation results and their implications for CMU and other educational institutions, and 4) the students' own perspectives.

After a brief overview, the panel will begin with a presentation of the background research conducted during the four years, 1995-99. The heart of the research was hundreds of interviews with CMU students about their history (both at school and home) with computing, experiences in the undergraduate program, their interests in computing, their attachments and detachments. The research was done by an interdisciplinary team, composed of Dr. Allan Fisher from the CMU Computer Science Department, Dr. Jane Margolis, a social scientist and expert in gender equity in education, and Faye Miller, a research associate with a background in women's studies. In their panel presentation, they will discuss their pertinent research findings and observations of how computer science has been and continues to be claimed as male territory. In addition, they will discuss how their findings were incorporated into a multi-summer program for high school teachers of advanced placement computer science. (Since approximately 20% of all such AP CS high school teachers in the US participated in this program, it is likely that, both directly and indirectly, this has played some role in the increased numbers of high school women considering majors in computer science and at Carnegie Mellon. We are currently investigating this.)

In the second part of the panel, Lenore Blum will report on the manifold response to the dramatic increase in the number of women in the CMU freshman computer science class (37 % up from 8% five years ago). The response has included the formation of an active and articulate student based women@scs\* Advisory Committee and its myriad of activities (with initiatives that include a Big Sister/Little Sister program and a women@scs web site). There has been growing support amongst key administrators and faculty who view change in the culture of computing as inherently positive, indeed necessary, for the institution as well as for the field. As a consequence, there has been increased recognition of the importance of paying attention to attitudinal issues and the need for fundamental curricular reform. Pragmatically, it has been the numbers and the highly visible presence of the women themselves, more than prior research and studies, that has inspired the faculty to take notice. The studies now become an invaluable

resource, as the faculty is motivated and inspired to better understand the issues.. Faye Miller will report on an evaluation of the current developments.

The panel will conclude with perspectives from undergraduate and graduate women students in the School of Computer Science at CMU who will identify positive changes as well as areas in need of improvement in light of their own experiences and observations.

In summary, our panel will demonstrate how research findings and action strategies can work hand in hand to create change at the institutional level and where that the resulting change in the culture of computing is viewed as a positive outcome for the institution and community-at-large.

### **Panel Structure (1.5 hours).**

- Brief overview
- Research background, Allan Fisher and Jane Margolis (max 20 min.)
- Current activities and evaluation, Lenore Blum and Faye Miller (max 20 min.)
- Undergraduate and graduate student perspectives (2-3 speakers, max 20 min.)
- Discussion: What next? Future directions. Q.& A. (30 min. over the course of the panel)

### **Speakers.**

- Allan Fisher, President and CEO of Carnegie Technical Education, CMU.
- Jane Margolis, Social Science Researcher on Gender and Education, UCLA.
- Lenore Blum, Distinguished Career Professor of Computer Science (and faculty advisor to the womens@scs\* Advisory Committee), CMU.
- Faye Miller, Research Associate, Computer Science Department, CMU.

In addition, the following members of the CMU womens@scs\* Advisory Committee will contribute to the material presented at the panel; a subset will be speakers.

- Tiffany Chang, Erin Rabe, freshmen, CS
- Jenny Rappaport, freshman, CS
- Leah Miller, sophomore, CS
- Ika, Aristiwidya B Hardjanto, junior, CS
- Elaine Kwong, junior, CS
- Elena Balestreire, junior, CS
- Lisa Nelson, senior, CS
- Jorjeta Jetcheva, graduate student, CS
- Brigitte Pientka, graduate student, CS
- M. Bernardine Dias, graduate student, Robotics Institute
- Alice Oh, graduate student, Language Technologies Institute

\* scs = School of Computer Science, Carnegie Mellon University (which includes the Computer Science Department, the Robotics Institute, the Languages Technologies Institute, the Human Interaction Institute, Center for Automated Learning and Discovery, Institute for Software Research International and the Entertainment Technology Center).