

## Collaborative Research Center to Transform UC Academic Culture: UC-WISE

**Jeanne Ferrante and Jorge Huerta, UCSD**  
**Denice Denton and Lisa Sloan, UCSC**

While gender equity has been achieved in some fields, and educational participation of women has, in general, reached equitable numbers, the number of women in science and engineering (S/E) has persistently and alarmingly lagged far behind the participation of men. Strong institutional and societal efforts are needed to foster change to bring gender equity to S/E. UCSD Chancellor and chemist Marye Anne Fox, and UCSC Chancellor and electrical engineer Denice Denton, both newly inaugurated, are committed to leading the efforts to enact change collaboratively at their campuses, within the University of California (UC) system, and on a national level.

UCSC and UCSD bring a unique partnership towards advancing women in science and engineering S/E that builds on their strengths and their differences. Both UCSC and UCSD are in the midst of substantial growth in faculty and students over the next 15 years, resulting jointly in over 1100 new faculty. Since over 50% of this growth will be in S/E, this increase presents a unique opportunity to foster major changes that advance the representation of women faculty in these areas. As well, both the San Diego and Santa Cruz regions are known for high technology endeavors encompassing biotechnology, communication, software, defense, space, information technology, and multimedia. Both regions are growing, and their ethnic composition is becoming increasingly diverse. While both campuses came into being at the same time, they also have unique and different characters. Thus, our collaborative approach to institutional transformation will be facilitated by our similarities and stimulated by our differences. Most importantly, our institutional collaboration provides the opportunity for a “living laboratory” where some of the same activities can be instigated separately on both campuses and the outcomes can be examined in a comparative framework. Sharing and comparing our results can lead to a better understanding of what variables influence their success. At the same time, we will share jointly some activities to create a broader network of support, and . We expect with the cooperation of the UC President’s Office, we will use the best of that these activities will ultimately help us to institute change across UC in the future.

We envision the UC-WISE (Women in S/E) Collaborative Center as a major force to advance women and underrepresented minorities in science and engineering in the upcoming period of faculty growth. Faculty-led and project oriented, UC-WISE will drive multifaceted and multilayered transformation at our UC institutions by focusing upon activities that (1) transform the perceptions and practices in faculty recruitment, retention and promotion, (2) provide support, mentoring and career development for women and underrepresented minority faculty in S/E at each career point, and (3) promote and retain women and underrepresented minority faculty as their academic careers evolve, including improving the academic climate.

UC-WISE will impact the science and engineering community by making permanent changes to academic culture of universal benefit. The **intellectual merit** of this proposed work is to advance research and knowledge on academic culture transformation for promoting women in S/E, particularly in academic careers. The **broader impacts** of our proposed activities include the enhanced participation of women across the spectrum of academia in S/E at UCSD and UCSC, and enhanced networks of women faculty across the UC campuses, and an increase in the number of women faculty mentors for the next generation of scientists and engineers. The collaborative approach also has the potential to lead to changes that can be more readily exported to other campuses.

## **1. Introduction and Motivation**

### **1.1 National Context**

Innovations in science and engineering (S/E) continue to change the very fabric of our nation and our world. Progress in these disciplines is advanced by the contributions of diverse minds and perspectives; however, the diversity of the nation's technical workforce is not reflective of the diversity of our society. In order to meet future national needs, more women and underrepresented minorities (URM) must be recruited and retained in S/E [NSB2003]. This under-representation in the S/E workforce at large is mirrored in our universities, where the training of our future generations takes place. Women faculty continue to lag behind men in terms of salary, and since the late 1970s, the percentage of full-time tenured women faculty has remained at about 47% (vs.70% for men) [AAUP2005]. In S/E, while the number of bachelor's degrees awarded to women has reached equitable numbers overall [NAE2004], the complex pathways of many women's lives in our society have led to fewer and fewer who go on to earn more advanced degrees and who persist in S/E fields. At all career points, the percentage of women in the technical work force lags behind the percentage of degree recipients [XieShauman2003]. Overall, the number of women at all levels in specific technical fields such as engineering, computer science, and the physical sciences, has persistently lagged far behind the participation of men [NAE2004]. Strong institutional and societal efforts are needed to foster change to bring and retain gender equity to academic S/E.

### **1.2 California Context**

California is the most diverse state in the nation, and its economy is fifth largest in the world. According to the 2000 state census, California is both growing and becoming ethnically more diverse, with minorities comprising 53% of the population, up from 43% in 1990. Latinos represent 31% of the population, more than double the national representation. California's job production and economy is fueled by the University of California (UC) system, and UC produces 7% of the nation's Ph.D. graduates [UCStatistics05]. In fact, UC is involved in every level of education, from K-12 through its research universities. The combined diversity and size of California should provide potential for increasing the number of women and underrepresented minorities in S/E.

### **1.3 University of California Context**

UC was founded as the state's land grant institution in 1868, and has grown to encompass ten campuses, including Santa Cruz (UCSC) and San Diego (UCSD). UC currently trains more than 200,000 students annually, with support from over 160,000 faculty and staff. Many students remain in the UC system for their full academic education, and 94% of entering freshmen are California residents. S/E faculty represent 35% of the total, with health sciences at 18% and social sciences at 19%. UC is widely recognized in research (for example, with 28 Nobel Prize recipients and over 450 National Academy members) and for its technical impact upon society (e.g., 2500 patents as of 2002).

While distinguished in S/E, UC's representation of women and minority faculty in these areas is low, and much needs to be improved. Immediately after the passage of California Proposition 209 [Prop.209] in 1998, the number of new women faculty hires decreased from 36% to 26%, and has only now reached its pre-Prop. 209 levels [UCDavis05]. In 2004, overall at UC, 27% of the ladder-rank faculty were women, with 22% at UCSD and 38% at UCSC.

Despite these troubling numbers, there is a real commitment to diversity at UC, and the time is right for strategic, focused efforts to change institutional climate and practices across UC. For example, the UC Affirmative Action Guidelines for Recruitment and Retention of Faculty [UCAA02] specify best practices for recruiting, retention and diversity at UC, and individual campuses have put in place their own efforts to address these activities (for example, the 2003 UCSC Physical and Biological Sciences study on faculty gender issues, and the 2002 UCSD Gender Equity Report). In addition, a Presidential Task Force on Faculty Diversity has just been initiated at UC, with a report expected in early 2006. Two of our PI's, Lisa Sloan at UCSC, and Jorge Huerta at UCSD, are two of the ten members of the UC-wide Task Force.

## 1.4 Why a Collaboration?

UCSC and UCSD propose to form a unique partnership for advancing women in S/E. We will build a collaborative approach to institutional transformation based on our strengths, facilitated by our similarities, and stimulated by our differences. Both UCSC and UCSD are young campuses of similar age and are in the midst of substantial growth in faculty and students that is expected to continue over the next 15 years. This expected growth of over 1100 new faculty between the two campuses, with over 50% in S/E, presents a unique opportunity to foster major changes that advance the representation of women faculty in these areas. While both campuses have strong similarities, they also have unique and different characters. UCSD was founded with the aim of creating a strong science school by recruiting already highly established (predominantly male) scientists as a core group to attract others. UCSC was originally envisioned as an “alternative” campus emphasizing excellent undergraduate education and interdisciplinary approaches. From these diverse beginnings, both UCSC and UCSD have grown into nationally recognized research universities. However, discipline-wise, our institutions have some large differences. For example, engineering at UCSD represents about 20% of the student body, whereas at UCSC, it is younger and smaller, but slated for near-term growth. UCSD has a School of Medicine, which UCSC does not. UCSC has a combined division of Physical and Biological Sciences, while at UCSD they are separate schools.

The overall goal of our collaboration is to increase the number of women, and the success of women, in S/E on our two campuses. Our collaborative approach will facilitate this goal by providing the opportunity to establish a “living laboratory” where some of the same activities can be instigated separately on both campuses and the outcomes can be compared. For example, how will institutional transformation evolve on our two campuses, when we consider that at UCSD, Biological Sciences (with 23% women faculty) is separate from Physical Sciences (with 11%), while at UCSC, they are a joint unit, with 18%? What is needed to motivate institutional transformation in the mature school of engineering at UCSD, versus in the relatively young state of engineering at UCSC? Is the nature of barriers to institutional transformation related to maturity of an academic program? Likewise, does the degree of interdisciplinary activity help or hinder transformation of institutional practices such as gender equity? Sharing and comparing our results will help us to better understand what variables influence their success and lead to the positive changes that we seek. As an added value, in our combined effort we can produce a resource base that is both broader and deeper than if each campus made this effort separately. Lastly, creating a new network based on collaboration and trust across our campuses will provide a broader base of support for instituting UC change.

Upon establishing the practices that will help us reach our goals, we will export our gained knowledge, procedures and assessment practices, thereby increasingly expanding the inclusion of women in S/E academia. Because UC campuses share many of the same general policies, data and practices, the opportunity to export our UC-WISE (Women in S/E) endeavor to our sister UC campuses has tremendous potential for transformation. In our collaborative effort, we also will work with UC Irvine ADVANCE (<http://advance.uci.edu/>) to evaluate their Equity Advisor program for dissemination to our campuses, we will work with the UC Berkeley team, who are submitting *ADVANCE: Synergy, Sustainability, and the UCB Network of Change*, to promote the UC Family Friendly Edge Initiative, and we will jointly convene several UC-wide meetings focused upon women in S/E academia. Collaboratively, we can accomplish much that can broadly impact women in S/E.

### 1.5 A Collaborative Center for Change

As the basis for our collaboration, we propose to create the UC-WISE Collaborative Center. We envision UC-WISE as a major force to advance women in S/E in the upcoming period of UCSC and UCSD growth. Faculty-led and project oriented, UC-WISE aims to “change the institution, not the women” [Rosser2004]. UC-WISE will determine problem issues by collecting and analyzing data, sharing and fostering knowledge, and promoting, implementing, and evaluating strategies to overcome problems. UC-WISE will pursue the goals listed in Table 1 (also discussed in more detail in the listed sections).

These goals represent multifaceted and multilayered changes to academic culture that will provide benefit across the spectrum of S/E academia on our campuses. Our successful UC-WISE program will create a “living laboratory” to promote academic careers for women in S/E in the post-affirmative action world, working with social scientists to measure and evaluate methods and outcomes, and actively disseminating the results. In addition, we will work with and build on what we learn from other ADVANCE programs. Upon establishing the practices that will help us reach the goals outlined in Table 1, UC-WISE will share our procedures and assessment practices nationally.

**TABLE 1 Goals and Activities**

| Goal   | Sec. | Activities  |
|--|------|---|
| Transform perception and practices in recruiting, promotion and retention of women and underrepresented minority (URM) faculty | 4.   | <ol style="list-style-type: none"> <li>1. Develop training and toolkits in effective recruiting, promotion, and retention practices</li> <li>2. Develop knowledgeable cadre of respected, influential faculty (WISE Advocates)</li> <li>3. Create Faculty Fellows program</li> <li>4. Work to broaden the criteria for appointments and promotions, including greater recognition for mentoring and service for diversity</li> <li>5. Establish detailed gathering of recruiting, retention, and promotion data</li> <li>6. Develop progress monitoring, collective agreements, and institutional feedback</li> </ol> |
| Expand women and URM faculty mentoring and development   | 5.   | <ol style="list-style-type: none"> <li>1. Improve junior faculty mentoring, professional development</li> <li>2. Create Junior Faculty Fellows program</li> <li>3. Develop leadership &amp; professional development workshops</li> <li>4. Hold Graduate and Postdoctoral academic career workshops, and provide enhanced mentoring at that level</li> </ol>  |
| Support career evolution and retention of women and URM faculty  | 6.   | <ol style="list-style-type: none"> <li>1. Work to enhance partner and family-friendly policies</li> <li>2. Facilitate networking activities</li> <li>3. Promote increased data gathering and dissemination on faculty workloads, salaries, tenure and promotion, resources, climate and life issues</li> <li>4. Annual UC Summit of women and URM faculty in S/E</li> </ol>   |
| Evaluation   | 7.   | <ol style="list-style-type: none"> <li>1. Carry out continual evaluation via campus and UC records, surveys, interviews, and comparison to baseline data</li> <li>2. Establish ongoing and comparative analyses of UC, UCSD and UCSC practices and results</li> </ol>   |
| Dissemination  | 9.   | Disseminate information between campuses via UC-WISE activities, meetings, workshops, UC-wide meetings, and via website, multimedia, reports, and publications  |
| Sustainability   | 10.  | Establish permanent policies and programs at UCSC and UCSD based on our results, and export throughout UC   |

## 2. Baseline Data of Women and Underrepresented Minorities in Science and Engineering

### 2.1 UCSD

UCSD is known in the UC system as an innovator and for its focus on excellence in S/E. UCSD is ranked 10<sup>th</sup> nationally on the quality of its faculty and graduate programs by the National Research Council, 5<sup>th</sup> in the nation in federal R&D expenditures by the National Science Foundation, and is 6<sup>th</sup> in the nation in National Academy of Sciences membership. UCSD faculty and students have helped bring economic prosperity to the region by spawning over 200 high technology companies, notably in telecommunications and biotech. Diversity continues to be a strong campus commitment (for example, campus-wide recruiting best practices [UCSDBP]). With newly inaugurated Chancellor and renowned scientist, Marye Anne Fox, as its head, UCSD is poised to effect innovative academic culture change. The basis of this change is the data collected on gender and underrepresented faculty equity. A current profile of ladder rank faculty follows (there are currently no American Indian faculty at UCSD, so we have omitted that group from our table).

| UCSD Faculty<br>10/31/2004                 | Men      |     | Women |    | Ethnicity                          |            |          |       |    |    |    |    | New Faculty Appts.<br>04-05 |   |            |   |     |
|--|----------|-----|-------|----|------------------------------------|------------|----------|-------|----|----|----|----|-----------------------------|---|------------|---|-----|
|  | Total    |     | Total |    | Detailed Count by Ethnicity (#, %) |            |          |       |    |    |    |    | Women                       |   | Minorities |   |     |
|  | #        | %   | #     | %  | White                              | Afr. Amer. | Hispanic | Asian | #  | %  | #  | %  |                             |   |            |   |     |
| <b>Jacobs School of Engineering</b>        |          |     |       |    |                                    |            |          |       |    |    |    |    |                             |   |            |   |     |
|  | Subtotal | 143 | 94%   | 9  | 6                                  | 98         | 64%      | 0     | 0% | 5  | 3% | 49 | 32%                         | 2 | 25%        | 3 | 38% |
| <b>Physical Sciences</b>                   |          |     |       |    |                                    |            |          |       |    |    |    |    |                             |   |            |   |     |
|  | Subtotal | 126 | 89%   | 15 | 11                                 | 109        | 77%      | 1     | 1% | 7  | 5% | 24 | 17%                         | 3 | 27%        | 4 | 36% |
| <b>Biological Sciences</b>                 |          |     |       |    |                                    |            |          |       |    |    |    |    |                             |   |            |   |     |
|  | Subtotal | 56  | 77%   | 17 | 23                                 | 56         | 77%      | 2     | 3% | 2  | 3% | 13 | 18%                         | 3 | 30%        | 2 | 20% |
| <b>Social Sciences</b>                     |          |     |       |    |                                    |            |          |       |    |    |    |    |                             |   |            |   |     |
|  | Subtotal | 136 | 69%   | 62 | 31                                 | 165        | 83%      | 11    | 6% | 14 | 7% | 8  | 4%                          | 4 | 31%        | 2 | 15% |
| <b>Arts &amp; Humanities</b>               |          |     |       |    |                                    |            |          |       |    |    |    |    |                             |   |            |   |     |
|  | Subtotal | 116 | 64%   | 66 | 36                                 | 145        | 80%      | 9     | 5% | 14 | 8% | 14 | 8%                          | 7 | 50%        | 4 | 29% |
| <b>School of Medicine</b>                  |          |     |       |    |                                    |            |          |       |    |    |    |    |                             |   |            |   |     |
|  | Subtotal | 172 | 86%   | 28 | 14                                 | 175        | 88%      | 1     | 1% | 0  | 0% | 24 | 12%                         | 4 | 33%        | 3 | 25% |
| <b>Scripps Institution of Oceanography</b> |          |     |       |    |                                    |            |          |       |    |    |    |    |                             |   |            |   |     |
|  | Subtotal | 73  | 84%   | 14 | 16                                 | 81         | 93%      | 0     | 0% | 0  | 0% | 6  | 7%                          | 0 | 0%         | 0 | 0%  |

While the numbers of women and minorities detailed in the table in S/E, and particularly in engineering and physical sciences, are grim, and have been for some time, the table shows in 2004-05 there has been progress in both units. Additionally, the Jacobs School of Engineering made 10 academic appointments for 2005-06, including 3 women.

The UCSD Gender Equity Report [UCSDGER02] determined that the major challenge facing UCSD general campus is to recruit and retain women faculty in proportion to the available pool in S/E, and that retention is a more serious issue for women. Progress has already been made on many of the recommendations in the report: annual reviews of faculty salary, implementation of two new mentoring programs, initiation of a Career Equity Review process [UCSDCER], launching of the Partner Opportunities Program [UCSDPOP], Deans' evaluation on progress towards faculty diversity, as well improvements in childbearing benefits, including automated and extended leave, university cost sharing for childcare, and publication of a family accommodation pamphlet [UCSDFAP]. The follow-up UCSD Gender Equity Summit [UCSDGES04] resulted in additional recommendations, including a leadership training program and formalization of leadership and outreach activity recognition, more proactive attention to recruiting, respectable part-time positions, strengthening the Partner Opportunities program, and increased support for child care. The UCSD Health Sciences Gender Equity Report and Equity Action Plan [UCSDHSP04] identified the continued under-representation of women faculty, and a considerable gap (25%) between men's and women's salaries, after accounting for years since receiving their degrees and years at UCSD. The UCSD Underrepresented Faculty Task Force Report [UCSDUFR04] summarized the unacceptably low number of underrepresented faculty, and cited recruitment and retention as major issues. Recommendations included a high-level diversity officer (resulting in the appointment of Chief Diversity Officer and Co-PI, Jorge Huerta), and better education of academic leaders relating to diversity issues.

## 2.2 UCSC

UCSC is widely known for its commitment to undergraduate education and its innovative and interdisciplinary research. As one example of the latter, the integration of biology and computer science has made UCSC a leading center in bioinformatics. Led by David Haussler, UCSC investigators assembled the first complete version of the human genome from sequence data collected from around the world. These scientists now play a leading role in comparative analysis of human, mouse, rat, and other genomes. In other arenas, UCSC ranked 1st in the nation for its academic research impact in the field of space sciences, according to the Institute for Scientific Information (ISI) in 2003, and UCSC ranked as the 2nd most influential research institution in the world in the physical sciences, according to a 2001 ISI report. And, in a survey of 60 elite Association of American Universities member schools, UCSC ranked 15th for the percentage of its students whose bachelor's degrees led to doctorates. In 2001, *U.S. News & World Report* ranked four UCSC graduate offerings among the best in the country, including earth sciences and astrophysics/space. Most recently, on February 14, 2005, Denice Denton became the ninth Chancellor of UCSC. Denton has a national reputation for effective advocacy supporting access to science, math and engineering

opportunities for women and minorities, including during her most recent tenure as Dean of the College of Engineering at the University of Washington. Denton plans to address these same issues at UCSC, as evidenced in part by her role as co-PI on this proposal.

| UCSC Faculty<br>As of 10/31/04                        | Men   |     | Women |     | Ethnicity |     |            |    |          |     |       |     |          |    |         |     |
|---|-------|-----|-------|-----|-----------|-----|------------|----|----------|-----|-------|-----|----------|----|---------|-----|
|   | Total |     | Total |     | White     |     | Afr. Amer. |    | Hispanic |     | Asian |     | Am. Ind. |    | Unknown |     |
|   | #     | %   | #     | %   | #         | %   | #          | %  | #        | %   | #     | %   | #        | %  | #       | %   |
| <b>School of Engineering</b>                          |       |     |       |     |           |     |            |    |          |     |       |     |          |    |         |     |
| Subtotal  | 59    | 84% | 11    | 16% | 45        | 64% | 0          | 0% | 6        | 9%  | 12    | 17% | 0        | 0% | 7       | 10% |
| <b>Division of Physical &amp; Biological Sciences</b> |       |     |       |     |           |     |            |    |          |     |       |     |          |    |         |     |
| Subtotal  | 125   | 82% | 27    | 18% | 128       | 84% | 1          | 1% | 3        | 2%  | 16    | 11% | 1        | 1% | 3       | 2%  |
| <b>Division of Arts</b>                               |       |     |       |     |           |     |            |    |          |     |       |     |          |    |         |     |
| Subtotal  | 32    | 48% | 34    | 52% | 51        | 77% | 3          | 5% | 3        | 5%  | 6     | 9%  | 1        | 2% | 2       | 3%  |
| <b>Division of Humanities</b>                         |       |     |       |     |           |     |            |    |          |     |       |     |          |    |         |     |
| Subtotal  | 50    | 52% | 46    | 48% | 67        | 70% | 9          | 9% | 8        | 8%  | 10    | 10% | 1        | 1% | 1       | 1%  |
| <b>Division of Social Sciences</b>                    |       |     |       |     |           |     |            |    |          |     |       |     |          |    |         |     |
| Subtotal  | 79    | 53% | 71    | 47% | 106       | 71% | 6          | 4% | 15       | 10% | 21    | 14% | 2        | 1% | 0       | 0%  |

Comparative studies show that UCSC has the most diverse faculty of all UC campuses (see above table), but that does not mean that efforts to increase women and URM in S/E are unnecessary. Across engineering at UCSC (which includes Computer Engineering, Computer Science, Electrical Engineering, and Biomolecular Engineering) in the past 10 years, the percentage of women receiving Ph.D.'s has varied from 0% (in 3 of 10 years, reflecting the youthfulness of the engineering program) to 26.7%. (In comparison, from 1982 to 1996, doctoral degrees across engineering and computer science averaged 15.4% annually. (UCOP, May 2005)) The percentage of women in faculty positions across the same departments has varied from 8-15 % over the same period. And, despite nearly a doubling of faculty numbers in the UCSC School of Engineering over the past 5 years (from 40 to 71), the percentage of women faculty during that same period of time has varied little, between 14-16%. Across the physical and biological sciences in the past 10 years, the percentage of women receiving Ph.D.'s has varied from 23.9% to 47.6%, whereas the average number of national doctorate degrees awarded annually (1982-96) was 30.25% (UCOP, May 2005). The percentage of women in faculty positions in the physical and biological sciences over the past 10 years has varied between 17 and 19%. Two internal studies carried out by the UCSC Division of Physical and Biological Sciences to assess the professional and academic climate for women in that division [UCSCPBSci03, UCSCPBSci05] articulated three issues that women faculty identified as important to address. First, women faculty should be supported in maintaining a productive scholarly career while concurrently engaged in child rearing. Second, there should be the establishment of promotion and institutional reward policies that recognize the varied career trajectory of women scientists and engineers. Third, there needs to be institutional recognition of the successes of women in S/E professions, which may be different in nature from those of their male counterparts. In addition, the second study [UCSCPBSci05] recommended that UCSC seek support and change through the NSF ADVANCE program.

### 3. Plans and Conceptual Framework

What emerges from the studies on our respective campuses as well as studies at other institutions is a set of recommendations that form the basis of our plans. In broad outline, we will drive transformation of our UC institutions by focusing upon activities that transform the perceptions and practices associated with recruitment, retention and promotion (Section 4), activities that provide support, mentoring and professional development for women and URM faculty (Section 5), and activities that promote and retain women faculty throughout their evolving academic careers, including the issues of faculty climate (Section 6). For all of these activities, our Evaluation Team will annually assess progress so that we may make adjustments to optimize the learning and transformational activities on each campus. This analysis will include multi-campus comparisons of the factors that influence the success of each activity.

Our conceptual framework is based on the hypothesis that we will gain greater understanding of how to institute transformation at our academic institutions by comparative analysis, and that a multi-faceted approach to institutional change is needed. Another underlying concept is the life course ladder [XieShauman2003], a more complex view than the previous “pipeline” concept, useful for understanding and remedying the gender gap for women in science and technical fields. At each step in their life course, there are different and multidimensional forces influencing women in S/E, and their presence has to be taken into account to work towards increasing the number of women at that level. Based on their work, one can view our approach as a Ladder in which we aim to advance women at each step, from graduate student to faculty member. At each level, we propose slightly different strategies. For example, at the graduate and postgraduate level, we are proposing area-driven academic training workshops, and the use of electronic media to facilitate networking and community building at that level. For junior faculty, we are emphasizing focused mentoring by senior faculty toward a specific goal (proposed by the junior faculty member). For more senior faculty, the Women’s Leadership Alliance (WLA), the creation of WISE Advocates, and leadership and professional development, are central components. In addition, UC-WISE will designate Junior Faculty and Faculty Fellows, 1 each level per year on each campus. Junior Faculty Fellows can provide more immediate role models for the graduate and postdoctoral scholars, and Faculty Fellows can likewise provide inspiration for junior faculty. As well, they can serve as hubs between each level. Several activities we propose are common across levels, such as enhanced mentoring. Another important overall goal is the creation of new social networks for grass-roots change, based on common activities and trust [Stephenson2005].

An additional part of our conceptual framework is the amplification of positive vectors for change that already exist [SterninChoo2000]. We will identify those individuals and groups in the current organizations that are succeeding in terms of diversity goals (increasing numbers, creating a positive atmosphere) and amplify their effects by giving them resources and publicity. When appropriate, we also will scale up what they are doing to different or larger settings, with their involvement and help. An example of this amplification is the proposed expansion of the focused mentoring model of UCSD Health Sciences National Center for Leadership in Academic Medicine (NCLAM) [NCLAM04] for junior faculty in S/E at both campuses.

We expect that our dual-campus approach to institutional transformation will amplify the network and the numbers of advocates for change. “Critical mass” is defined as “the discrete point at which the presence of a sufficient number brings about qualitative improvement in conditions and accelerates the dynamics of change” [Etzkowitzetal1994]. Our collaboration will create networks that approach critical mass, or at least get beyond tokenism (less than 15% representation, according to [Kanter1977a, b]) in helping to create a better and more successful climate and basis for change. Being a token can adversely affect women more than men [Budig2002]. While increasing the numbers by itself is not adequate to erase negative effects of being in the minority or a token, it can nonetheless help to accelerate change.

#### **4. Goal 1: Transforming Perception and Practices in Recruiting, Promotion and Retention**

**Barriers:** Unconscious and conscious bias [WennWold1997, Valian1999, TrixPsenka2003], cognitive errors [Moody2004, 2005], tokenism [Bell1992], lack of faculty training, advice and coaching in process [Moody2005].

##### **4.1 Develop Training and Toolkits**

Following [Moody05], it is important that all faculty and administrators learn how to recognize and overcome (un)conscious biases and *cognitive errors* that may be employed during recruitment and promotion. According to Moody, these biases and errors bring about the undervaluing of women and underrepresented minorities. In addition, *dysfunctional* departmental and institutional practices can undercut effective recruiting, mentoring, and retaining of non-majority faculty, and faculty must learn to understand and determine what *good practices* should replace them. We propose that Consultant Moody help us develop two workshops to train and increase awareness in these issues:

##### **Workshops on Cognitive Errors made by Individuals (Initiated in Year 1)**

Purpose: Help individual faculty and administrators to overcome cognitive errors, leading to evaluation processes that are more vigorous, fair, and evidence-based. Negative and positive stereotyping are two of the biggest errors

commonly made but there are a number of others, such as seizing a pretext, longing to clone, and so on. While these errors can at times hurt any candidate, the errors almost always result in the shortchanging of non-majority faculty.

### **Workshops on Dysfunctional Practices followed by Committees, Departments, and Campuses (Start Year 2)**

**Purpose:** Help faculty and administrators learn to recognize organizational practices that inadvertently hamper effective recruiting, retaining, and mentorship of colleagues (especially non-majority colleagues). Then help faculty and administrators brainstorm—and then concretely plan-- how to replace these dysfunctional customs and practices with "good" departmental and campus-wide practices.

Moody's methods are highly interactive and present participants not only with scenarios and short case studies for their analysis and critique but also with practice situations where they can actively struggle with replacing bad practices with good ones. Her approach is to draw participants into reflection and dialogue, with examples (drawn from her diversity consulting, research and publications [Moody2001, 2004, 2005]) of how other organizations are already changing business-as-usual procedures, in order to achieve faculty diversity. The first workshop will take place on each campus twice the first year, and the first and second workshops will be held annually for the next 2 years. The workshops and their impacts will be assessed by our Evaluation Teams. We will keep records of participant feedback and activities to track attitude and climate changes over time. After evaluation, if deemed successful, Moody's approach will also help train trainers so that the practice on each campus can be sustained. In this, we follow the example of ADVANCE at Wisconsin in both giving, and training for leading, workshops.

**Institutional awareness training:** Under the guidance of Academic Human Resources and Academic Affairs on each campus, annual training of Deans, Assistant Deans, and Departmental Chairs on issues related to recruitment, hiring, and promotion issues will be carried out. We will adopt the techniques and tool kit materials (Recruiting, Retention) produced by U. Washington in their ADVANCE program, and tailor them to specifically serve the communities within UC. These activities will be overseen by the Leadership Team on each campus, and their effects, both formative and summative, assessed by the Evaluation Team.

## **4.2 Develop WISE Advocates**

Two of the current ADVANCE teams, at U. Michigan and at UC Irvine, have worked to develop a group of dedicated campus champions. At Michigan, the STRIDE committee advises and educates chairs, search committees, and other faculty leaders regarding recruiting, retention and promotion, with particular attention to gender and ethnicity issues. At Irvine, 1-2 respected faculty leaders at each school work with search and promotion committees and chairs as Equity Advisors. Each Advisor reports directly to their Dean, and has signature approval on searches. We intend to adopt this type of advising strategy and build on both experiences in our UC-WISE efforts, by creating WISE Advocates.

Specifically, working with Deans, Chairs and other administrators, and in the course of running the workshops on Cognitive Errors discussed in the previous section, we will identify faculty with notable commitment, empathy, and/or understanding for/of diversity. On each campus these leaders will be encouraged to become WISE Advocates, along with others identified as having made positive contributions to change. While those in this group may not be department chairs or hold other administrative positions, they nonetheless should possess considerable standing and persuasion with their peers. These potential WISE Advocates will be invited to attend the second workshop as well, which will serve as their initial training. At least half of the advocates should ideally be male, given their majority in S/E. WISE Advocates will continue their training via readings and discussions with other Advocates. We envision as well that Advocates will serve as "hubs" [Stephenson2005] in the greater social network being created.

Like the STRIDE committee, each year, in consultation with the Divisional Deans, WISE Advocates will be designated to meet with Chairs and search committees in their units. We will tune this meeting to practices already ongoing on each campus; for example at UCSD, a Diversity Advocate from the appropriate division will join Chief Diversity Officer Huerta and Academic Affirmative Action Director Welch at the initial faculty meeting about diversity practices. UC-WISE will help the Advocates develop presentations (based on research studies, as well as departmental data) covering recruiting, retention and promotion. Designated WISE Advocates will be compensated for their time, and their activities can also be considered service to the university as a whole.

The WISE Advocates will play an important role in UC-WISE sustainability. To sustain diversity requires a broad and enlarging base of supporters. If diversity efforts are seen as the project of a small group, then these efforts will be predictably resisted or overturned. Once Advocates become comfortable in their roles, they will be encouraged to reach out to other faculty and administrators, and help coach and prepare these potential advocates. The Leadership Team on each campus will oversee this *continuous enlarging* of the cadre by working with Deans, Chairs and existing Diversity Advocates, and consultant Moody. As long-term change agents, Advocates will help to improve the departmental and school-wide climate for all faculty. Because Chairs, Deans, and ADVANCE program directors can have relatively short tenures, they alone cannot sustain the movement towards faculty diversity. A core of senior faculty becomes the staying power for equity, and investment in their development is essential for the long-term success of our institutional transformation goals.

#### **4.3 Develop Faculty Fellows**

Faculty Fellows will be funded to work on specific UC-WISE activities that they propose, as well as their own professional development. Faculty Fellows will be role models for more junior faculty, and will join with WISE Advocates to create an enlarging cadre of diversity champions. They will also be expected to share their experiences on their own campus and beyond. Faculty Fellows will be designated annually on each campus, via an application process that includes a short proposal of their UC-WISE and personal development activities, and recommendations. We anticipate 1 Faculty Fellow on each campus per year.

#### **4.4 Broaden Appointment and Promotion Criteria, Including Diversity**

Very narrowly focused recruiting can lead to a reduced pool of applicants with little diversity. Interdisciplinary hiring can also help enlarge the applicant pool. We propose to eliminate narrowly focused recruiting at UCSC and UCSD, working directly with Deans and the Chancellor of each campus. In addition, we will also work with each Dean to expand criteria for appointments and promotions in their units to include factors such as leadership and contributions to diversity in recruiting decisions, deemed legal under Proposition 209. We follow the recent experience at UCSD, where the Jacobs School of Engineering, made a commitment to broaden faculty searches. Starting in 2004-05, every faculty recruiting advertisement requires (1) a statement that exceptional candidates at all levels in all areas will be given serious consideration, and (2) a request for applicant's summary of leadership efforts and contributions to diversity. We will also work with the divisional Deans to promote a reserve of FTE's to respond to departmental requests for faculty hires not in any of the focus areas for that year. This tactic has served UCSD's Engineering School well in the past year; after a decade of only male hires, 4 new women ladder rank faculty and one female (tenurable) lecturer were hired.

#### **4.5 Gather and Disseminate Data**

We propose staff support to perform data-gathering on the departmental level to generate detailed information on recruiting and hiring. Our purpose is to gather information on what procedures are followed in successful and unsuccessful departments, including a more detailed account, such as offers not made, who dropped out and why. We propose to include such data as a regular reporting item for Deans, Chairs, and the ADVANCE Co-Directors, so that departments whose underlying practices are substandard can be identified and helped in the right direction. Both campuses will include this data in the bi-annual progress monitoring activity, described next.

#### **4.6 Progress Monitoring, Collective Commitment, and Institutional Feedback**

Successful institutional change depends on three features: (1) pervasive, top-down administrative commitment and support, (2) clear and challenging goals, and (3) capacity for monitoring and acting on goal attainment. Twice yearly, on each campus separately the UC-WISE Leadership and Evaluation Teams will come together with responsible administrative officials (hereafter referred to as campus administrative leadership) including the Chancellor and Vice Chancellors, Deans, Associate and Assistant Deans, Academic Senate leadership (including the Chair and Vice Chair), and at UCSC, the Vice Provost for Academic Human Resources and the Vice Provost for Academic Affairs. At these meetings, the Evaluation Team will provide feedback and planning sessions focused upon our UC-WISE goals and efforts

Administrative commitment and support will be provided by a collective agreement by campus administrative leadership, overseen by each Chancellor, to support and be held accountable for achieving program goals. Specific, clear, and challenging goals will be developed by the administrative leadership with the help of UC-WISE, in the

three target areas of Work/Home Interface; Career Advancement; and Leadership Development. Action and surveillance will be accomplished by the development of empirical tracking measures of goal attainment that will provide the basis for feedback and action, monitored by the UC-WISE teams. Following these meetings on each campus, virtual meetings (or in-person gatherings, if budgets permit) of the teams on each campus will take place so that information can be shared and ongoing assessment and mid-course corrections of activities can be carried out.

## **5. Goal 2: Expanding and Improving Mentoring and Professional Development**

**Barriers:** Lack of time [Freyd1990], lack of role models, not enough departmental support [MIT1999], early discouragement, lack of faculty training and coaching in mentoring, unconscious bias [Moody2004, 2005], isolation and tokenism [Kanter1977b], imposter syndrome [Clance1985], generational and cultural differences with new and minority faculty [Wasserman2000, BickelBown2005], women self-selecting not to be leaders, lack of confidence [MarFis2002].

### **5.1 Improve Junior Faculty Mentoring and Professional Development**

Most NSF ADVANCE programs include support for mentoring, and many have specific junior faculty programs. Creating a cohort of faculty at the same career point and with many of the same issues can provide a peer support group for participants. A primary vehicle for enhancing junior faculty development will be mentoring to provide knowledge, skills, and social and emotional support in career advancement, leadership development, and life balance.

Our plans for junior faculty development build on the UCSD NCLAM program mentioned above. NCLAM provides a coordinated program to support junior faculty through their initial years in academic medicine. The program includes faculty development workshops, a junior/senior mentoring relationship based on a professional development contract, strategic career planning, and individual counseling sessions. Founded in 1999, NCLAM has a track record for helping their participants, over 50% women, succeed in academia [NCLAM04], and it has been institutionalized in the UCSD Health Sciences. NCLAM has a special component in partnership with the UCSD Hispanic Center of Excellence, and retention of URM faculty increased from 60% in 1993 to 87% by 2004. Based on this positive success, we plan to expand this program for junior faculty beyond medicine into S/E. In anticipation of this effort, a survey of junior faculty was conducted at UCSD, and will be used to tailor the expanded program at both UCSC and UCSD. The proposed expansion will be carried out in consultation with NCLAM's Co-Directors.

At UCSD and UCSC, specific plans include junior faculty workshops for professional development, such as increased grants success, and focused mentoring by senior faculty, based on a professional development contract. UCSC will also offer monthly "brown bag" meetings, led by Professor Martin Chemers, which will provide formal mentoring and training to assist faculty in facing the most demanding aspects of personal and professional life at this junior faculty stage. On both campuses, junior faculty participants will receive support in compensation for their time, to help them advance their development or research. Comparative analysis of the programs on both campuses will be studied throughout the duration of the ADVANCE program and beyond.

We will also create, expand and improve mentoring programs, since different programs appeal to different participants at different points in their careers. For example, at UCSC, under the direction of Professor Faye Crosby, senior women professors will provide mentoring to cohorts of junior women faculty. A similar UCSD program will be expanded to all women faculty, and will be evaluated alongside this new program at UCSC.

We will also develop and support mentorship training for the above programs, and promote the regularization of mentor meetings [Boice2000]. The mentorship training will be in the form of a workshop and subsequent handbook; if successful, we will also develop a training program for workshop leaders. For the workshops, we will consider the addition of a theatre component, with the Michigan Advance CRLT players to train trainers for our campuses. We will also work to create specific opportunities for crediting contributions to mentoring and other contributions to diversity (such as an additional entry on the current UC Bio/Bibliography form, which is used for academic reviews). We will work with the Academic Review committees on each campus to given more recognition to such contributions for appointments and promotions [BickelBrown2005].

## 5.2 Develop Junior Faculty Fellows

Junior Faculty Fellows will be funded to work on specific UC-WISE activities that they propose, as well as their own professional development, like Faculty Fellows. The emphasis for Junior Faculty Fellows will be towards activities that further their own development, but some plan for furthering the goals of UC-WISE will also be expected and used for selection. Junior Faculty Fellows will be designated annually on each campus, via an application process that includes a short proposal of their UC-WISE and personal development activity, and recommendations. We anticipate 1 Junior Faculty Fellow on each campus per year.

## 5.3 Leadership and Professional Development

We seek to advance women and URM faculty leadership on our campuses and across UC. To do so, we propose several activities. We will enhance networking to build grass-roots women faculty leadership and professional development on each campus and across UC, based on the example of existing groups such as the UCSD WLA, many of whose members are senior personnel on this proposal. Arising from recommendations of the UCSD Gender Equity Summit, WLA is an informal network of senior women faculty whose aim is to advance leadership development, networking and recognition of women faculty at UCSD. Meeting quarterly, the group sponsors workshops, speakers and joint events with the Chancellor's Advisory Committee on the Status of Women (such as Professor Angelica Stacy on the UC Family Friendly Edge efforts). Such networks are vital to helping initiate real change in the UC system. We plan to expand this model for leadership development across campuses, as appropriate. UCSC will establish its own WLA, with guidance from UCSD. The senior personnel identified in this proposal at UCSC will form the initial cohort of the UCSC-WLA, and we anticipate that the establishment of such an alliance will be well received on the UCSC campus.

In addition, we plan to hold joint Women's Leadership Development workshops between UCSD and UCSC in years 2 and 4 of the ADVANCE project. For example, we plan to repeat for different groups a very successful Negotiation Skills workshop held in 2004 with Nancy Houfek of the American Repertory Theatre, originally sponsored by WLA. Gender differences in negotiation often disadvantage women disproportionately [BabcockLashever2003]. Given the success of these leadership workshops and the use of theatre techniques, we would add training for workshop givers on each campus to sustain this activity, either with Nancy Houfek or other leaders, with advice from the Michigan ADVANCE theatre group, the CRLT Players. The workshops will alternate between campuses to enhance network building.

## 5.4 Academic Career Workshops and Enhanced Mentoring for Graduate and Postdoctoral Students

It is important to enlarge the S/E pool of academic applicants, and to provide women and URM with the support to be successful when they move to academia. A large proportion of our graduate students are in this potential pool: for example, in 2004, 41% of new UCSD doctoral degree recipients took postdoctoral positions, and 23% took faculty positions. We propose graduate student and postdoctoral workshops (aimed at national and UC-local women) to help women and minority participants *almost ready* to make academic career decisions. The purpose of the workshops is to encourage and mentor participants towards academic careers, increase their job interview skills, build confidence, create a cohort group, as well as increase the applicant pool [PAESMEM2005]. These workshops would occur annually, alternating between the UCSD and UCSC campuses to foster networking among cohorts and campuses.

We also propose to use electronic means to foster communication and a sense of community for this group, given their familiarity [MooreMooreFowler2005, BickelBrown2005]. We will facilitate online email bulletin boards, chat lists, and/or wiki's to discuss relevant issues; we will support a website, listing support services and opportunities, and use it to promote successes. The Assistant Co-Directors on each campus will oversee these communication activities.

We also propose to enhance graduate and postdoctoral mentoring programs with relevant professional organizations such as the Association for Women In Science (AWIS), which has a strong San Diego chapter, and with professionals from industry. The WLA will also play a role in showing graduate and postdoctoral women in S/E that academic careers can be a positive reality. Faculty who train and mentor need to be aware of cognitive errors and unconscious bias, and we will also include this component in mentorship training workshops [Fox 2001].

## **6. Goal 3: Supporting Career Evolution and Retention**

**Barriers:** Balance and family conflicts [Blair-Loy2004], lack of flexibility in academia with regard to tenure and promotions, lack of respect for part-time positions [XieShauman2003], isolation and super visibility [Kanter1977b, Reins1999], and lack of transparency in workload and resource decisions [MIT1999].

Many studies show that climate is an issue for women and URM [HallSandler1982, Rossiter1995], and adverse climates affect them disproportionately [Davis1996, MarFis2000]. Besides the obvious effects (dissatisfaction and retention), climate also has an indirect effect in our university setting. While reasons for losses at different career points are complex [Hanson 1996], students looking at their current role models, male or female, may opt out because they believe that they cannot have a balanced life in academia. To remedy this, many changes are needed.

### **6.1 Expand Partner and Family Friendly Policies**

As part of our activities, we will convene UC-wide meetings on best practices to bring together the Deans of S/E from all 10 UC campuses to discuss challenges, actions, and best practices associated with issues that are critical to surmounting the barriers faced by women in the S/E academic workforce. Surveys to date indicate that these issues include childcare, partner hires, “active duty/modified service” periods, and support during periods of transitions [UCSC PBSci03, UCSC PBSci05, UCSDGER02]. By convening such gatherings, UC-WISE will provide leadership on these topics and will be in a strong position to export our ADVANCE findings and practices to our sister UC campuses. UCSC and UCSD will take turns hosting these meetings, which will be held in years 1, 3 and 5 of the program. If useful, we anticipate these gatherings will continue beyond the life of the ADVANCE project.

We will continue to work with UC Berkeley and our other campuses in support of the UC Family Friendly Edge (see [UCFFE, UCFEESD, UCFEESC]). The Family Friendly Edge effort at UCB provides an excellent basis of data to work for UC-wide changes in this area. We propose as well to work with the Academic Senate leadership on each campus to promote more general part-time faculty positions (for eldercare, easing into retirement, divorce or separations, adoptions, family illness) as well as for child-rearing. The data collected in the UC climate survey for the Family Friendly Edge supports such a move, and it is important for younger faculty [BickelBrown2005], [UCSCPBSi2003]. We will also work with Deans and campus leadership to improve current policies in support of 2-body issues throughout UC. For example, at UCSD, the current policy does not apply if the partner is in the *same* department. Current Partner Opportunity Assistance programs will be evaluated and compared to what technology companies’ offer, and a case made (through our WLA and other groups) for improving them if warranted.

### **6.2 Enhance Networking**

We propose enhancing networking on each campus and across UC in support of retention and improved climate for different academic career levels. We will help sponsor gatherings for women and minorities, to include research symposia, workshops, and retreats. We will work with existing groups on each campus to solicit their suggestions and support for these activities. We also propose quarterly lunches on each campus for groups of women and URM faculty, or postdoctoral scholars, as well as more general gatherings, e.g. to celebrate accomplishments. We will also work with outside organizations, such as AWIS, as appropriate. In addition, the joint UCSD and UCSC gatherings in years 2 and 4, described above, will focus on different areas of S/E. These activities follow the example of many ADVANCE programs, for example, U. Washington.

### **6.3 Increase Data Gathering and Dissemination**

We propose to gather data on individual faculty workloads, salary, and associated details and make it more transparent to the campus communities. As well, we propose to gather summary data on major “life” issues (such as children and marital/partner status, and other family issues) to help us better understand what change is needed. We propose staff support in each Chancellor’s office to monitor data, and make publicly available more detailed salary information, including UC step-system data. We will carry out this work in conjunction with the Chief Diversity Officer at UCSD, Jorge Huerta, and P. Hiramoto, the Director of the Equal Employment Opportunity and Affirmative Action Office at UCSC.

### **6.4 Annual UC Summit**

We propose to hold UC-wide summits, alternating between campuses, which will bring together women and underrepresented minority faculty in S/E from all campuses to focus on career and policy issues. Summits will be organized with the UC Office of the President (as communicated by UC Assistant Vice President Ellen Switkes) in conjunction with UCB, and will alternate between Santa Cruz, San Diego and Berkeley, in the first three years. Summits will promote the sharing of ideas, experience and practices, and foster networking between campuses. They will also be used as a vehicle for building consensus for change.

## **7. Assessment and Evaluation Plan**

Using the data already collected on each campus and UC-wide, we will establish the baseline of pertinent data, activities, and climate on each campus. New activities, such as workshops, require both formative and summative evaluation. Surveys and interviews (anonymous and confidential, in keeping with campus Human Subjects policy, and as approved by campus Institutional Review Boards) will be used as noted in Table 2. Surveys will be administered both to targets (e.g. workshop participants) and at least two non-targets selected to match on department and rank, if possible. Since the climate is determined by campus, as well as by the particular department, data collection and other activities will not be limited to S/E. Surveys will be ongoing, and will be analyzed and shared with administrative leadership. The Evaluation Team of each campus bears the primary responsibility for this activity, coordinating their activities via the Joint Evaluation Team. Plan highlights are shown in Table 2, where primary indicators are the increase in numbers, e.g. applicants interviewed and hired; increased awareness and satisfaction, and other tracking of goals; and secondary indicators are activity reports. Activity entries are followed by the section number (*italicized*) in which they appear.

Not included in the table are our plans for external evaluation. The role of the external evaluator is to ensure that the evaluation design is professional and effective, in light of project and evaluation objectives, and to verify that internal evaluators are independent observers. In this role, they have access to confidential evaluation data, along with the Evaluation teams. In the task of project oversight, the external evaluator participates in team and progress monitoring meetings as desired, providing the opportunity to understand the project, meet the players and observe their interaction. They may serve in a consulting role to the internal evaluators, reviewing documents or consulting with the Evaluation teams by phone or e-mail as the evaluation plan is developed, particularly in the project's early stages. They will report their findings verbally or in writing. We anticipate annual external evaluation visits.

## **8. Management Plan**

In broad terms, the center leadership will be collaborative across the two campuses with equal responsibilities for success. Two faculty co-Directors, one on each campus, will work closely and continuously to oversee UC-WISE. They will report directly to their respective Chancellors, and will be assisted by two full-time Assistant Directors (one at each campus) who will be responsible for administration and day-to-day management of the project. A joint Leadership Team, working with both Chancellors, will set directions, monitor activities, and work with the Joint Evaluation Team, which will oversee assessment of project activities and outcomes.

Initial Co-Directors will be Jeanne Ferrante (UCSD) and Lisa Sloan (UCSC). With the Co-Directors and Assistant Co-Directors, the Joint Leadership Team will oversee and monitor UC-WISE, set mid-course corrections, make funding decisions, and work with the Evaluation Team. The Joint Leadership Team will report to both Chancellors to help ensure its success, and will be composed of members of each campus' Leadership and Evaluation Teams. UCSD's Leadership Team will include the Co-Director, Assistant Co-Director, an Evaluation Team member, with other members to include Deans, Vice Chancellors, and at least one each of junior faculty, senior faculty, graduate and postdoctoral scholars. UCSC's Leadership Team includes the Co-Director, Assistant Co-Director, and one Evaluation Team member, along with the Deans or Associate Deans of Engineering and Physical/Biological Sciences, the Assistant Vice Chancellor of Academic Human Resources, and Professor of Psychology Martin Chemers.

The Cross-campus Evaluation Team, lead by a to-be-designated social scientist, with two members per campus, will oversee evaluation and assessments conducted primarily by campus Evaluation Teams. The UCSD Evaluation Team members include Sociology Professor Maria Charles, Vice Chair of Chemistry and Biochemistry Barbara Sawrey, and Associate Vice Chancellor (Undergraduate Affairs) and Psychology Professor Mark Appelbaum, with

administrative support. The UCSC Evaluation Team members include Psychology Professor Martin Chemers (an expert in leadership and team organization and effectiveness), Education Department Chair and Professor Rod Ogawa (an expert in educational reform and leadership), and EEO/Affirmative Action Director Patty Hiramoto.

**TABLE 2. Evaluation Methods**

| Goal  | Activities   | Evaluation   | Measures of Success   |
|---|--|--|---|
| Transform practices in recruiting women and underrepresented minority (URM) faculty                               | <ul style="list-style-type: none"> <li>• Work to broaden criteria for appointments 4.4</li> <li>• Gather detailed data on recruiting, retention, and promotion; 4.5</li> <li>• Monitor progress, collective campus administrative agreements of goals, and institutional feedback. 4.6</li> </ul>              | <ul style="list-style-type: none"> <li>• Review job ads starting with base year;</li> <li>• Collect dept and campus records</li> <li>• Interview search chairs;</li> <li>• Semi-annual analysis of institutional data;</li> <li>• Empirical tracking of collective goals.</li> </ul>                       | <p>Sustained, institutionalized, and internalized efforts to recruit female and URM faculty.</p> <p>Evidence may include: increase in female/URM applicants interviewed, made offers, and hired, and increasing “yield” rates on offers; development of increasing number of knowledgeable, influential faculty on diversity issues; validation of collective goals.</p>  |
| Transform perceptions in recruiting, retention and promotion of women and underrepresented minority (URM) faculty | <ul style="list-style-type: none"> <li>• Develop training, toolkits in effective recruiting, promotion, and retention practices 4.1</li> <li>• Monitor progress and feedback 4.6</li> <li>• Develop WISE advocates 4.2</li> <li>• Develop Faculty Fellows 4.3, 5.2</li> </ul>                                  | <ul style="list-style-type: none"> <li>• Track attitude changes of participants;</li> <li>• Track recommended changes to practice;</li> <li>• Track attitude change of search committees, key administrators;</li> <li>• Track number of advocate and fellow activities.</li> </ul>                        | <ul style="list-style-type: none"> <li>• Increased awareness of individual errors and dysfunctional practices within units;</li> <li>• Increased institutional awareness via news, web pages, and other media;</li> <li>• Increased understanding of how these negatively affect women and URM faculty;</li> <li>• Changes in practices and their effects;</li> <li>• Increased no. of advocates, increased satisfaction of Fellows &amp; advocates.</li> </ul> |
| Expand women and URM faculty mentoring and development  | <ul style="list-style-type: none"> <li>• Improve junior faculty mentoring, and career development; 5.1</li> <li>• Faculty networking 6.2</li> <li>• Hold leadership and professional development workshops; 5.3</li> <li>• Host graduate, postdoctoral career workshops, and enhance mentoring. 5.4</li> </ul> | <ul style="list-style-type: none"> <li>• Maintain record of activities (who and how many participants, feedback from attendees);</li> <li>• Ongoing feedback and interviews of participants.</li> </ul>  | <ul style="list-style-type: none"> <li>• Expansion of successful strategies and activities from each campus, and to other UC campuses;</li> <li>• Increase in number and satisfaction of women and URM participants.</li> </ul>   |
| Support career evolution development of women and URM faculty   | <ul style="list-style-type: none"> <li>• Work to enhance partner, family-friendly policies 6.1</li> <li>• Work to broaden criteria for promotions 4.4</li> <li>• Hold annual UC summit 6.4</li> <li>• Provide increased data gathering on workloads, salaries, etc. 6.3</li> </ul>                             | <ul style="list-style-type: none"> <li>• Track partner accommodations; why, where lose recruits;</li> <li>• Surveys, exit interviews for all retention cases, with random comparisons;</li> <li>• Maintain central record of data on workload, salary, tenure, promotion, retention, resources.</li> </ul> | <ul style="list-style-type: none"> <li>• Increase in retention and promotion rates;</li> <li>• Increase in satisfaction of women and URM faculty;</li> <li>• Twice-yearly evaluation and feedback reports to campus administrators;</li> <li>• Increased awareness and dissemination of data gathered.</li> </ul>   |
| Dissemination   | <ul style="list-style-type: none"> <li>• Disseminate information via joint center activities, meetings, and workshops, UC-wide meetings, and via website, multimedia, reports, and publications.</li> </ul>  | <ul style="list-style-type: none"> <li>• Monitor website usage;</li> <li>• Monitor activities;</li> <li>• Monitor faculty knowledge of policies and procedures.</li> </ul>   | <ul style="list-style-type: none"> <li>• Active, well-used website;</li> <li>• Increase in awareness and understanding of information;</li> <li>• Pertinent information disseminated across UC, and available to other institutions.</li> </ul>   |
| Sustainability  | <ul style="list-style-type: none"> <li>• Establish permanent policies, programs on each campus and UC.</li> </ul>  | <ul style="list-style-type: none"> <li>• Monitor and document relevant changes in policy and programs.</li> </ul>  | <ul style="list-style-type: none"> <li>• Permanent institutional support for new programs and policies ;</li> <li>• Achievement of ‘critical mass’.</li> </ul>  |

Annual external evaluation will be conducted; evaluators, may include Liane Pedersen-Gallegos, Director of Ethnography & Evaluation Research at University of Colorado, Sandra Laursen, a senior member of the group who worked with Colorado Advance; Professor Laura Kramer from Montclair State University, who evaluated UC Irvine; and Professor Ann Austin from Michigan State University, who worked with the New Mexico State ADVANCE group.

Twice yearly the UC-WISE monitoring program will provide feedback and planning sessions focused upon our UC-WISE goals and efforts with campus administrative leadership on each campus, held jointly between the campuses (the latter via conference calls or short visits between campus personnel). External evaluators will be invited as deemed necessary.

Because of the complex and distributed nature of this project, we need a good communication strategy to make it work. The Campus Leadership and Evaluation Teams will meet monthly on each campus to monitor project success, identify barriers, and solve communication issues. The Evaluation Team will also meet regularly with the Leadership Team on each campus to review intermediate progress. The Joint Leadership and Evaluation Teams will meet quarterly, rotating between each campus, with virtual meetings via specially equipped meeting rooms on each campus. A wiki will also be put in place for use of the Evaluation and Leadership Teams. We will also hold yearly UC-WISE retreats of the combined teams, alternating between the two campuses, and annual cross-campus summits.

## **9. Dissemination: Sharing Best Practices**

Dissemination between campuses will be carried out via joint center activities, meetings and workshops, UC-wide meetings, and via website, multimedia, reports, and publications. We will actively work with the network of current ADVANCE Institutional Transformation recipients to learn from their experience, and work to disseminate ours, both within the UC system and nationally. Many of our joint activities, meetings, and workshops have already been described in Sections 4, 5 and 6. Additional plans include: videos to document and publicize our collaborative process, perhaps transferred to television, and available on our web page; and an active Web presence, monitored for usage, linked from every UCSD and UCSC S/E department and school's or division's home page.

## **10. Sustainability**

With the strong support and involvement of Chancellors Denice Denton and Marye Anne Fox, the UC-WISE Center will be a catalyst for comprehensive change that fosters the participation of women in academic S/E at both campuses, across UC, and nationally. The emphasis in our proposal is primarily on permanent changes to our institutions for universal benefit. For example, the UC-wide gatherings on best practices will continue beyond ADVANCE, and thus help to sustain the results of our program beyond the lifetime of the program award. Sustainability will be furthered as well by our plans for training efforts on each campus for successful programs, strong networks built by our collaboration, and by the growing cadre of WISE Advocates. Chancellors Denton and Fox are committed to increasing the numbers of women in science in engineering, and creating a more supportive faculty environment for all. Those projects that cannot be funded by state monies, such as Faculty Fellows, but that UC-WISE deems should continue as part of its assessment, will be targets for fundraising. We also note the support indicated by UCSD Vice Chancellor for Research Richard Attiyeh, UCSD Acting Senior Vice Chancellor, Academic Affairs David R. Miller, and UCSC Vice Chancellor for Research Robert Miller as evidence of the institutions' intent to sustain the proposed Center.

## **Results of Prior NSF Support**

### **Jeanne Ferrante**

NSF DLR Planning Grant, NSF DLR 6466987, \$100,000, award period 2004-2005

EPICS: Engineering Projects in Community Service, NSF Purdue subcontract, \$165,000, award period 2004-2008

With these two NSF grants, the Teams In Engineering Service (TIES) program was launched in September, 2004. TIES brings together multidisciplinary teams of undergraduates to partner with non-profit community organizations to help solve their technological problems. See <http://ties.ucsd.edu/> for further information. While it is early to have evaluation data, we can report that we are consistently enrolling more women and underrepresented minority students than their average percentages in engineering. Most notably the percentage of underrepresented minorities increased from 10% in the first quarter to 22% in the third quarter of enrollment. The feedback from the community clients, students, and faculty are all quite positive. Professor Ferrante is PI on both these grants and TIES Executive Co-Director.

### **Denice D. Denton**

NSF Advance Grant, NSF-ADVANCE 0123552, \$2,947,127, award period 10/01 – 9/06

Denice Denton served as the Principal Investigator for the University of Washington's NSF ADVANCE grant from 10/2001 – 2/2005. Initiatives focused on: 1) leadership development; 2) department cultural change; 3) mentoring; 4) policy transformation; and 5) transitional support. (For more information, go to <http://www.engr.washington.edu/advance/>). Summary of progress to date, midway through the grant: 1) between Fall 2001 and Fall 2003, there was over 20% increase in the number of tenured or tenured-track women faculty in ADVANCE departments; 2) 47% of women in ADVANCE departments are full professors; 3) 5 of 8 NSF CAREER proposals by women reviewed by the ADVANCE staff were funded; 4) more than 33% of the women in the faculty interview pool were offered positions resulting in 19 new women faculty (more than 25% of new faculty hires were women); 5) there were 31 Transitional Support Program awards given, totaling \$602, 000.00; 6) 69 emerging leaders have attended at least 1 of the 8 quarterly leadership workshops, 28 of the emerging leaders are women faculty and 17 are faculty of color.

### **References**

- [AAUP 2005] *The Annual Report on the Economic Status of the Profession 2004-05*, AAUP, <http://www.aaup.org/surveys/05z/z05tab.htm>
- [BabcockLashever2003] Babcock, L. and S. Lashever, *Women Don't Ask: Negotiation and the Gender Divide*, Princeton University Press, 2003.
- [Bell1992] Bell, D., *Faces At the Bottom of the Well*, Basic Books, 1992.
- [BickelBrown2005] "Generation X: Implications for Faculty Recruitment and Development in Academic Health Centers", *Academic Medicine*, 80:3, 2005.
- [Blair-Loy2003] Blair-Loy, M. *Competing Devotions: Career and Family among Women Executives*, Harvard University Press, 2003.
- [Boice2000] Boice, R., *Advice for New Faculty Members*, Allyn and Bacon, 2000.
- [Budig2002] M. J. Budig, "Male advantage and the gender composition of jobs: Who rides the glass escalator?" *Social Problems*, 49, 258-277, 2002.
- [Clance1985] Clance, P., *The Imposter Syndrome: When Success Makes You Feel Like a Fraud*, Bantam Books, 1985.
- [Davis1996] Davis, C.-S. et al., *The equity equation : fostering the advancement of women in the sciences, mathematics, and engineering*, Jossey-Bass Publishers. 1996.

- [Etzkowitzetal1994] Etzkowitz, H., C. Kemelgor, M. Neuschatz, B. Uzzi, and J. Alonzo, “The paradox of critical mass for women in science”, *Science*, 266, 51-54, 1994.
- [Fox2001] Fox, M. F., “Women, Science, and Academia: Graduate Education and Careers.” *Gender and Society* 15:5, 654-666, 2001.
- [Freyd1990] Freyd, J.J., “Faculty members with young children need more flexible schedules,” *Chronicle of Higher Education*., 1990.
- [HallSandler1982] Hall, R. M. and B.R. Sandler, “The classroom climate: A chilly one for women?” In the Student Climate Issues Packet, available from the Project on the Status and Education of Women, Association of American Colleges, 1818 R St. NW, Washington, D.C. 20009.
- [Hanson1996] Hanson, S. L. *Lost Talent: Women in the Sciences*, Temple University Press, 1996.
- [HolmesO’Connell2004] Holmes, M.A. and S. O’Connell, *Where are the Women Geoscience Professors, Report on a Workshop*, Sponsored by NSF and the Association for Women Geoscientists, 2004.
- [Kanter1977a] Kanter, R. M., “Some effects of proportions on group life: Skewed sex ratios and responses to token women”, *American Journal of Sociology*, 82: 965-990, 1977.
- [Kanter1977b] Kanter, R. M., *Men and Women of the Corporation*, Basic Books, 1997.
- [MarFis2002] Margolis, J. and A. Fisher, *Unlocking the Clubhouse: Women In Computing*, MIT Press, 2002.
- [MIT1999] “A Study on the Status of Women Faculty in Science at MIT”, *The MIT Faculty Newsletter*, XI (4), March 1999. On line at <http://web.mit.edu/fnl/women/women.html> (15 October 2001).
- [Moody2001] Moody, J., *Demystifying the Profession: Helping Junior Faculty Succeed*, University of New Haven Press, 2001.
- [Moody2004] Moody, J., *Faculty Diversity: Problems and Solutions*, RoutledgeFalmer, 2004.
- [Moody2005] Moody, J., *Rising Above Cognitive Errors: Guidelines for Search, Tenure Review, and Other Evaluation Committees*, 2005.
- [MooreMooreFowler2005] Moore, A.H., J. F. Moore, and S. B. Fowler, “Faculty Development for the Net Generation”, *Educating the Net Generation*, Educause e-book, 2005. [http://www.educause.edu/content.asp?page\\_id=6071&bhcp=1](http://www.educause.edu/content.asp?page_id=6071&bhcp=1)
- [NAE2004] The National Academies website, Statistics on Women in Science and Engineering, [http://www7.nationalacademies.org/cwse/S\\_E\\_stats.pdf](http://www7.nationalacademies.org/cwse/S_E_stats.pdf)
- [NCLAM04] “Facilitating Faculty Success: Outcomes and Cost Benefit of the UCSD National Center of Leadership in Academic Medicine” *Academic Medicine*, 79: S9-S11 2004.

- [NSB2003] National Science Board, “The Science and Engineering Workforce, Realizing America’s Potential”, August 2003.  
<http://www.nsf.gov/nsb/documents/2003/nsb0369/nsb0369.pdf>
- [PAESMEM2005] *Mentoring for Academic Careers in Engineering: Proceedings of the PAESMEM/Stanford School of Engineering Workshop*, Edited by E. Riskin, M. Ostendorf, P. Cosman, M. Effros, J. Li, S. Hemami, and R.M. Gray, Grayphics Publishing, 2005.
- [Prop.209] [http://www.ucop.edu/sas/sfs/programs\\_and\\_policies/guidelines](http://www.ucop.edu/sas/sfs/programs_and_policies/guidelines)
- [Reins1999] Reins, F., “Dancing on the Sharp Edge of the Sword: Women Faculty of Color in White Academe”, *Everyday Knowledge and Uncommon Truths*, Edited by L. Smith and K. Kellor, Westview Press.
- [Rosser2004] Rosser, S. *The Science Glass Ceiling*. New York: Routledge, 2004.
- [Rossiter1995] Rossiter, M., *Women Scientists in America: Before Affirmative Action, 1940-1972*, Johns Hopkins University Press, 1995.
- [SD Facts] <http://www.signonsandiego.com/bookoffacts/2004/>
- [Stephenson2005] Stephenson, K., *A Quantum Theory of Trust*, (forthcoming, FT Prentice Hall)  
<http://www.netform.com/html/s+b%20article.pdf>
- [SterninChoo2000] Sternin, J. and R. Choo, “The Power of Positive Deviancy”, *Harvard Business Review*, January-February 2000.
- [Taulbee2005] 2003-04 Taulbee Survey, Computing Research Association, 2005.  
<http://www.cra.org/CRN/articles/may05/taulbee.17to23>
- [TriXPsenka2003] Trix, F. and C. Psenka, “Exploring the Color of Glass: Letters of Recommendation for Female and male Medical Faculty”, *Discourse and Society*, 14:191-220, 2003.
- [UCAAA02] UC Affirmative Action Guidelines for Recruitment and Retention of Faculty, 2002  
<http://ucop.ucsd.edu/acadadv.fgsaa/affirmative.pdf>
- [UCPPF] UC President's Postdoctoral Fellowship Program, <http://www.ucop.edu/acadadv/ppfp/>
- [UCStatistics05] <http://www.universityofcalifornia.edu/economy/welcome.html>
- [UCDavis05] West, M. et. Al, *Unprecedented Urgency: Gender Discrimination in Faculty Hiring at University of California*, <http://www.law.ucdavis.edu/PDFs/unprecedented.pdf>.
- [UCFFE] UC Family Friendly Edge <http://ucfamilyedge.berkeley.edu> (see also <http://ucfamilyedge.berkeley.edu/ucfamilyedge%20campus%20data.pdf>)
- [UCFFESD] UC Faculty Family Friendly Edge at UCSD,  
<http://ucfamilyedge.berkeley.edu/san%20diego.htm>

- [UCFFESC] UC Family Friendly Edge at Santa Cruz,  
<http://ucfamilyedge.berkeley.edu/santa%20cruz.htm>
- [UCSDBP] UCSD Best Practices, <http://academicaffairs.ucsd.edu/offices/aaa/bestpractices/>
- [UCSDCER] UCSD Career Equity Review, <http://adminrecords.ucsd.edu/Notices/2003/2003-7-7-1.html>
- [UCSDFAP] UCSD Family Accommodations Policy Pamphlet,  
<http://academicaffairs.ucsd.edu/offices/apo/FamilyAccomPamphlet.pdf>.
- [UCSDHSP04] UCSD Health Sciences Faculty Equity Action Plan,  
[http://facultycouncil.ucsd.edu/var/uploads/FacEqActionPlan4\\_HANDOUT\\_10-04.pdf](http://facultycouncil.ucsd.edu/var/uploads/FacEqActionPlan4_HANDOUT_10-04.pdf),  
2004
- [UCSDGER02] UCSD Gender Equity Report,  
<http://academicaffairs.ucsd.edu/offices/apo/reports/GETF/GenderEquityReportTextOnly.pdf>,  
2002
- [UCSDGES04] UCSD Gender Equity Summit,  
<http://advance.ucsd.edu/news/ges/FinalReport09-24-04revisedJF.pdf>, 2004.
- [UCSDPOP] UCSD Partner Opportunities Program,  
<http://academicaffairs.ucsd.edu/offices/partneropp/>.
- [UCSDUFR 04] UCSD Task Force on Underrepresented Faculty Report,  
<http://academicaffairs.ucsd.edu/offices/apo/reports/UFTF/UFTF.htm>, 2004.
- [UCSC PBSci03] Kenyon, K., "Assessing the Professional and Academic Climate for Women in the Division of Physical and Biological Sciences," University of California at Santa Cruz, July 28, 2003 (internal report).
- [UCSC PBSci05] Switkes, E., "Report of Women in Science Task Force," University of California at Santa Cruz, June 23, 2005 (internal report).
- [Valian1999] Valian, V., *Why So Slow? The Advancement of Women*, MIT Press, 1999.
- [Wasserman2000] Wasserman, E., *The Door In the Dream: Conversations With Eminent Women In Science*, National Academies Press, 2000.
- [WennWold1997] Wennerås and A. Wold, "Nepotism and sexism in peer-review", *Nature* 387:341-343, 1997.
- [XieShauman2003] Xie, Y. and K. A. Shauman, *Women in Science: Career Processes and Outcomes*, Harvard University Press, 2003.