Excellence in Science and Engineering (*EXCELinSE*) at Washington State University

Washington State University (WSU) is primed for institutional transformation consistent with the objectives of the NSF ADVANCE Institutional Transformation Program. Dr. Elson Floyd joined WSU in May 2007 as the institution's first African American President. He will move WSU to the next level of academic excellence. Recruiting and retaining the best faculty will play a critical role in this effort. The finest leadership teams and faculty are diverse, and President Floyd has a well qualified, diverse team of leaders to assist him in institutional transformation. Five of the nine people currently at the Vice Presidential level or above are people of color and two are women (President Floyd; Vice President for Student Affairs and Equity and Diversity Tate; Vice President for Information Services and Chief Information Officer Murali; Vice President for Recruitment and Retention Fraire; and Senior Vice President, WSU Foundation, Hale). The efforts of Vice President Tate, who oversees the new Office of Equity and Diversity, were applauded in the *Chronicle of Higher Education (Sept. 29, 2006,)* and Provost Bates (PI on this proposal) was recognized in *The Chronicle of Higher Education (July 12, 2002)* for his efforts to diversify the faculty while he was Dean of Arts and Sciences at Virginia Tech. Diverse leadership at WSU also exists below the Vice-Presidential level. Women, in particular, are solidly represented in upper leadership positions (i.e., three of five Vice Provosts are women—Vice Provost McSweeney (Co-PI on this proposal), Vice Provost Wack and Vice Provost Doyle; and five of thirteen Deans are women, including Dean Claiborn, College of Engineering and Architecture (Co-PI for this proposal).

Although diverse representation exists in upper administration, this is less evident for the leadership in science, technology, engineering and mathematics (STEM) disciplines. In addition to Dr. Candis Claiborn, Dr. Mary Sanchez-Lanier (Co-PI) is an associate dean in the College of Sciences. In sciences, only the chemistry department has a female chair (Dr. Sue Clark, Co-PI). There are no female department chairs in engineering. One female faculty member in engineering holds an endowed chair (Dr. Diane Cook, Computer Science). There are no women faculty members holding endowed chairs in other STEM disciplines at WSU. Finally, only 11% (i.e., 23 out of 202) of tenure-track and tenured faculty in our STEM departments are women. Clearly, we still face barriers to recruiting, retaining and advancing women at all levels in the STEM disciplines.

This proposal will concentrate on women in three colleges, where the need for focused effort is greatest. These are College of Sciences (COS); College of Agricultural, Human, and Natural Resource Sciences (CAHNRS); and the College of Engineering and Architecture (CEA). Within these Colleges, 10 STEM departments will be targeted. These 10 departments are: Chemistry (CHEM); School of Earth and Environmental Sciences (SEES); Mathematics (MATH); Physics (PHY); Biological Systems Engineering (BSE); Chemical Engineering and Bioengineering (CBE); Civil and Environmental Engineering (CEE); Electrical Engineering and Computer Science (EECS); Mechanical and Materials Engineering (MME); and Engineering and Computer Science (EnCS), at WSU in Vancouver, WA.

Our overarching **vision** is to develop an inclusive research institution whose faculty are supported by a system that promotes career-long excellence for women and men. We recognize that to achieve this vision, we must address issues associated with career pipeline "leaks" (i.e., places were women are lost from the academy.) We pay special attention to career transitions and those points in the career pipeline where we face obstacles to recruiting, hiring, retaining, and advancing a diverse faculty.

The **project goals** are to: (1) increase representation of women in 10 STEM disciplines at WSU by providing institutional support through programs, policies, procedures and climate change at critical points in the academic pipeline (e.g., recruitment, pre-tenure, and post-tenure advancement and leadership); (2) develop and disseminate innovative strategies that can be applied in similar institutions – research-intensive, rural, land grant universities – as well as other institutions, in general; and (3) put in place an infrastructure that gives these efforts highest institutional support and visibility and allows for transformation to continue past the lifetime of this grant.

In support of these goals we have developed the following **4 major initiatives**:

(1) The *Preparing and Recruiting a Diverse Faculty Initiative*, including our *Summer Doctoral Fellows* program, is aimed at recruiting new women PhD graduates in sciences and engineering to academic careers at WSU or at other research academic institutions.
(2) The *Work/Life Initiative,* including our *Dual-Career Partnership* with University of Idaho (UI), our *Infant Care Placeholder Program*, and an imported version of the University of Washington's (UW) ADVANCE "Transitions" program*,* addresses institutional and individual barriers to retention and advancement, and provides opportunities for success for all university faculty members.
(3) The *Leadership Training Initiative* builds on our current training for department chairs, and addresses climate and leadership barriers to recruitment, retention and advancement. This includes our *External Mentors Program*, the *Emerging Leaders Training Program,* and importing the UW's ADVANCE LEAD Training Program for current faculty leadership.
(4) The *Institutionalizing Transformation Initiative* is aimed at organizing, monitoring and assessing institutional progress, and disseminating results and best practices to the broader academic community. This initiative includes establishing the *Center for Excellence in Sciences and Engineering* (*EXCELinSE).*

These initiatives will be implemented and integrated across the Pullman campus and the broader WSU system through the establishment of the above noted *Center for EXCELinSE*. The *Center for EXCELinSE* Co-Directors will jointly report to the Vice President for Student Affairs and Equity and Diversity to facilitate the broadest dissemination of best practices across the institution and provide the greatest visibility and institutional commitment for hiring, retaining, and advancing a diverse faculty.

Innovations

The initiatives we are proposing include programs that we intend to import from successful ADVANCE programs, as well as innovations that either address our unique situation, or have the potential of impacting our peer institutions as well. The major innovations in this program are:

(1) The *EXCELinSE Summer Doctoral Fellows* program, in which women PhD candidates from other research institutions are given summer fellowships to allow them to spend the summer on the WSU-Pullman campus, where they attend workshops on research and academic careers, receive mentoring from faculty members in closely related fields to their course of study, and work on completing their dissertations.
(2) The *Dual-Career Partnership* with UI, to provide reciprocal partner accommodation resources at one university, to facilitate the hiring of a tenure-track or tenured faculty at the other university.

(3) The *Infant Care Placeholder* program, in which several infant care positions are reserved in the WSU Child Care Center by the *Center* for *EXCELinSE* for women in the target disciplines.

(4) The *External Mentoring* program, in which STEM faculty women are linked with successful, high-ranking women faculty members at other higher education institutions, preferably those with ADVANCE grants, for mentoring for future leadership.

BACKGROUND

WSU is a land grant, research-intensive university, with a total student population of 22,000, distributed across 4 campuses statewide. The main campus (WSU-P) (17,000 students) is located in Pullman, WA, a small, rural, agricultural community (population ~27,000, including students). Moscow, ID (pop. also ~ 25,000), home of the University of Idaho (UI) with a student population of ~ 11,000, is 8 miles away. The second largest WSU campus is located in Vancouver, WA (WSU-V), close to Portland, OR, with ~ 2,500 students and growing rapidly. Two other urban campuses are located in Spokane, WA (75 miles north of Pullman) and Richland, WA (130 miles southwest of Pullman). The characteristics that make WSU unique (i.e., land grant, research intensive, rural main campus) also can create distinct challenges and opportunities when it comes to recruiting and retaining diverse faculty.

Our small, rural environment with its high quality schools makes for an attractive place in which to have family; however, because the University is the main employer in Pullman, addressing dual careers of faculty members and their partners can be challenging. Dependent care (in particular, infant/toddler and elder) is especially limited. Attracting a diverse workforce is further complicated by the small size and remote location of the Pullman campus, which is located 75 miles from the nearest major city. These problems of size and isolation are somewhat less acute on our urban campuses, but STEM disciplines throughout the system face similar issues in faculty recruitment and retention. Among these are lack of career opportunities for partners; limited, on-site childcare; inadequate mentoring after tenure; and lack of a supportive network of colleagues. In addition, like STEM women faculty at other institutions, those at WSU encounter stress in balancing teaching, research, and service; unintentional biases, and an institutional environment that does not always facilitate the involvement of women (and under-represented minorities), particularly in leadership positions. Nevertheless, with the reality that approximately half of the on-track faculty in physical/mathematical sciences and engineering at WSU will become eligible to retire during the next decade, the timing of the proposed STEM project is optimal for strategic institutional change. WSU is committed to capitalizing on areas of identified strengths (e.g., family friendly environment, anticipation of significant number of new hires, and administrative commitment at the highest levels) and addressing areas of weakness through innovative policies, procedures, programs and climate change.

National Context

Transition points are critical moments for women in the academic pipeline (e.g., Mason & Goulden, 2003), at which "leaks" occur. These transition points include: the transition from graduate school to faculty position at a research institution (recruitment), the transition from assistant professor through successful completion of tenure requirements (retention through tenure,) and the transition into full professorship and into institutional leadership (advancement). This phenomenon of "leaks" in the academic pipeline suggests that something about the science and engineering environment is problematic for women (Preston, 2004, 2004b; Settles et al., 2006).

Recruitment: Although women are graduating in greater numbers from STEM disciplines, this increase is not reflected in increases in women being hired by universities (NSF, 2004, 2007; Bird et al., 2004; Kohlstedt, 2004; Prochaska et al., 2006), especially research universities. The need for role models for women students in STEM to encourage women graduates to seek employment in academia is well known (Prochaska et al., 2006). The acute under-representation of women in academic STEM disciplines at all levels is troubling and hinders our ability to respond to the nation's needs for increasing the numbers of STEM professionals.

Several factors contribute to STEM women's decisions to opt out of academia after the PhD. One significant obstacle is a system that compels women to choose between family and career (Byko, 2005). Working mothers still bear disproportionate responsibility of attending to family and child care (Yeung et al. 2001) and therefore it is not surprising that women are more likely than men to leave science because of family responsibilities (Sonnert and Holton, 1996). The research university environment traditionally does not make a woman's decision to enter academia easy. Studies show that there is substantial conflict between scientific careers and family life for women (Grant et al., 2000).

Women scientists are also much more likely than men scientists to be in dual-career marriages (Shauman and Xie, 1996; McNeil and Sher, 1999; Sonnert and Holton, 1995a, 1995b, 1996). Being a member of a dual-career couple has a disproportionately negative effect on women's careers (McNeil and Sher, 1999) because of their greater family and child care responsibilities. Women are more likely than men to place their partner's career first (Sonnert and Holton, 1996). Creating opportunities for dual-career couples thus is likely to increase a woman's ability to pursue an academic career.

Retention Through Tenure: Within academia, tenure and promotion rates are slower and attrition rates are higher for women scientists than men scientists, even after controlling for time-since-doctorate (Settles et al., 2006). Less than 15% (for some STEM disciplines the figures are as low as 3%) of women scientists have achieved full professorship at the top science and engineering institutions (Commission on the Advancement of Women and Minorities in Science, Engineering, and Technology, 2000; Etzkowitz et al., 2000; Massachusetts Institutes of Technology, 1999; National Science Foundation, 2001). Some of this can be attributed to continuing family and work balance issues, as well as inadequate mentoring.

A national study from the University of California at Berkeley found that women's chances for tenure are greatly reduced if they have children (Mason and Goulden, 2003). Shauman and Xie (1996) found that family constraints on women scientists' careers are generally minimal unless they have children. Even if the partners in a dual-career marriage are equally driven and committed to their careers, the arrival of children often leads to a division of family duties along gender lines. Therefore, women in this situation are likely to assume the traditional role of a primary care giver and opt for work roles that are less demanding (Shauman and Xie, 1996). Moreover, the effect of children on women's academic careers is negative but has little (or positive) influence on men's academic careers (Shauman and Xie, 1996; Mason and Goulden, 2003).

Many universities have transitional support programs, such as stopping the tenure clock for childbirth, or generous childbirth leaves, which allow women to balance between their work and family roles. However, often there is a stigma attached to taking advantage of these programs (Byko, 2005). If women perceive that using these options would negatively impact their career advancement, then they are less likely to use work-family programs provided by the institution

(Joshi and Kuhn, NSF #1). This is more pronounced in male-dominated occupations because men are less likely than women to have a need for such programs. Therefore, it is not enough for universities to create programs that allow women to balance parenthood and academic careers, but they must also create a climate where these programs are institutionalized into its culture (Mason and Goulden, 2003). Those academic institutions that are able to demonstrate that they are truly family responsive will have a strategic advantage in attracting qualified women faculty.

Regardless of individual opportunities and support systems, without institutional support and leadership it will be difficult to reduce the barriers facing women (Schein 1992). A large body of research on work-life initiatives shows that immediate supervisors play key roles in creating family-responsive work environments (Moen and Roehling 2005, Valcour and Batt 2003, Secret 2000). Supervisors influence the implementation and use of work-life policies, and they shape the broader work-life climate for employees (Harrington and James, 2006).

Advancement/Leadership: The disparity between women and women at full professor rank at doctoral universities is particularly significant – 19% among all doctoral universities in 2003 (Gibbons, 2006), and even sharper for the engineering ranks (6.3% of full professors). This relative lack of women at the full professor level is the "cumulative result of multiple barriers at many points along the career path…" (West and Curtis, 2006). Again, this is in part due to difficulties balancing work and family life (ACE, 2004). This trend continues into leadership roles, so that the higher one goes in the academy, the fewer women one sees, again especially in doctoral-granting institutions (www.diversityweb.org/Digest/SP01/research2.html). Women comprise 10% of the engineering department chairs and 13% of mathematical and physical science chairs, nationwide (Niemeier and Gonzalez, 2004). Mentoring has been noted as being valuable for increasing women's "persistence" in engineering (and presumably the sciences as well) (Frehill et al., 2006), and is important both for providing guidance and role models, as well as helping women move successfully through the critical transition points.

WSU Context

WSU has focused a number of efforts on the needs of faculty women. In 2005 the Council on the Advancement of Women (CAW) completed an action plan and in 2007 the Commission on the Status of Women released their 5-year report. A campus research group, Gendering Research Across Campuses (GRACe), examined barriers to advancement from assistant to associate to full professor levels. WSU has also conducted a benchmark climate survey, and recently participated in the COACHE survey, conducted by Harvard Graduate School of Education, that assesses the job satisfaction of pre-tenure track faculty. These reports and studies generated recommendations regarding tenure and promotion, annual review, mentoring, childcare and partner accommodation. In response, a number of actions have been taken to "plug the leaks" along the academic pipeline – in recruitment, retention through tenure, and advancement and leadership.

Efforts Aimed At Recruitment

1. The Office of Equity and Diversity has just published a hiring manual and a companion summary brochure, on "Best Practices for Recruiting and Hiring a Diverse Workforce" (http://www.chr.wsu.edu/default.asp?PageID=890). This was done in response to the well-known need for broadening candidate pools to ensure the most diverse and most qualified candidates possible for filling faculty vacancies.

2. The College of Engineering and Architecture hired a faculty recruitment coordinator to assist faculty search committees in implementing best practices and other strategies as identified by other ADVANCE institutions. We have seen some payoff for these efforts: the 2007 EEO/AA goals for women in engineering departments were met, for example. In STEM disciplines at WSU in general, women in on-track positions, have increased by 3% (e.g. 8% of total in 1996 to 11% of total in 2007, Figure 1). Still, the overall numbers of women in STEM disciplines are small, so recruitment remains a top priority.
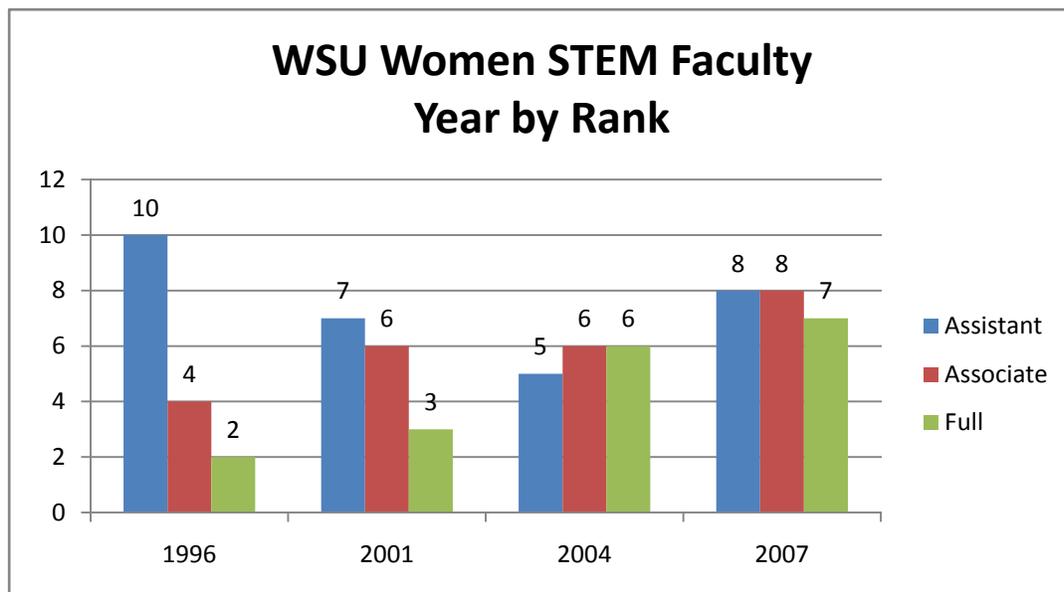

Figure 1: WSU Women STEM Faculty, by rank, from 1996 – 2007.

3. The Provost's Office awarded 4 grants worth $200,000 each, to 4 colleges, for "opportunity hiring," which enabled programs to hire multiple women and URG faculty at once, as a way to reduce the isolation often reported by members of these groups. These grants resulted in cluster hires in the sciences and bioinformatics, for example.

4. WSU has had a partner accommodation program for a number of years, in which partial salary support for a partner is provided for a period of two years (matched by the department), *as long as a suitable position vacancy can be identified*. The Provost allocates $350,000 per year for facilitating partner accommodations, and since 2001 has invested over $ 2 M centrally. Since these funds must be matched, WSU has invested over $4 M in partner accommodations since 2001. This investment has been well-worth it; a recent assessment of the partner accommodation program showed that it also improves retention of faculty; the original hires that received partner accommodations were retained at 6 years at a higher rate (77%) than their peers that did not receive partner accommodations (53.8%). The program is over-represented by minority group members, and minority faculty members that received partner accommodations were retained at higher rates that Caucasian faculty members that received partner accommodations. About 20% of partner accommodation funding from 2001 through 2005 was allocated to STEM disciplines.

This is an important program that is limited primarily by our ability to find appropriate career fits for the partner of the target faculty member. It is also over-subscribed. For this program to be

even more successful, it will require both additional resources, as well as more opportunities for placement of partners.

Efforts Aimed At Retention through Tenure

1. An extensive department chairs training program is offered every year. This program was developed to train chairs on policies and procedures on mandatory mentoring, annual reviews, tenure and promotion, faculty workloads, and personnel issues. This starts to address some of our most important issues for tenure-track faculty; for example, results from the COACHE survey indicate that our junior faculty does not always understand the institution's expectations for tenure.

2. Policies are in place for family leave and tenure clock extensions. These are being used by women faculty, and becoming more widely accepted by colleagues and department chairs.

3. Several of our self-studies identified child care, particularly infant care, as a critical need (the waiting period for an infant care slot on campus is about 18 months). According to our COACHE survey results, only 5% of our faculty found our childcare policies and procedures to be effective. WSU has an accredited, on-site, child-care center, and in 2006, the WSU Childcare Center increased the number of classrooms from one to two for infants under 1 year of age, with a total of nine new infants slots for faculty *and* staff. In 2007, President Floyd committed $1 M for expansion of the on-site child care facility, particularly for infant care. The concerns over availability of child care are likely to continue; the recent 2007 Commission on the Status of Women report found that childcare was important to nearly all WSU employees, 64% of which have children and 16% anticipate having children in the next 5 years.

Efforts Aimed At Advancement and Leadership

1. The Office of Equity and Diversity (OED) has made training programs available from the National Coalition Building Institute and DiversityWorks to all senior faculty leadership. This was in response to several studies: our COACHE survey results suggested that junior faculty like what they are doing, but the climate in which they work needs improvement, and the results of the GRACe survey showed that men were more likely than women to agree that WSU's campus was free from intimidation, harassment and discrimination.

2. Mentoring is required for all assistant professors at WSU and recommended for associate professors. While we have made some progress in mentoring, there is room for improvement; the COACHE results suggested a need to improve our formal mentoring process (32nd percentile), and the reports by the Council on the Advancement of Women and the Commission on the Status of Women have also identified this need.

Continuing Barriers to Progress

Despite these efforts, recruitment, retention, and advancement of women faculty members in STEM disciplines, remain a significant challenge at WSU (Table 1).

Table 1: (2007) WSU Female STEM Faculty Department by Rank					
Department	Female/Male Ratio	Female (%)	Assistant	Associate	Full
Bio Systems Engineering (BSE)	1:9	10%	0	1	0
Chemical and Bioengineering (CBE)	3:12	20%	2	0	1
Chemistry (CHEM)	4:24	17%	1	0	3
Civil & Environmental Engineering (CEE)	2:25	7%	2	0	0
Math (MATH)	3:27	10%	1	2	0
Physics/Astronomy (PHY/A)	2:17	10%	0	2	0
School of Electrical Engineering & Computer Science (EECS)	3:36	8%	1	0	2
School of Mechanical & Materials Engineering (MME)	4:26	13%	0	3	1
School of Earth & Environmental Sciences (SEES)	0:16	0%	0	0	0
WSU-V Engineering & Computer Science (ENCS)	1:10	10%	1	0	0
TOTAL	23:202	10%	8	8	7

Continuing Recruitment Challenges. Identification and successful recruitment of women faculty members continue to be challenges, despite our efforts to broaden our searches and make use of "opportunity" hiring practices. This is a national problem as well and the need exists to better inform women graduate students of the opportunities to pursue successful academic careers.

Continuing Dual Career Issues. In the College of Engineering and Architecture, in the last two years, we were unable to hire 3 of our top candidates for faculty vacancies, directly because of partner accommodation issues, and we are still in negotiations with a 4th candidate, specifically over a partner accommodation. Two of the 3 candidates that we were unable to hire were female. In the last two years, we hired 19 new engineering faculty members on the Pullman campus, 4 of which were female. These numbers clearly show that partner accommodation issues have more serious implications for our efforts to recruit female faculty members than for recruiting male faculty members, consistent with observations at the national level. Although resources are limited for partner accommodations, in most of these cases the limiting factor was identifying a "home" for the partner.

Continuing Dependent Care Issues. As mentioned earlier, one of President Floyd's first commitments was for a significant expansion of the childcare facility, with particular focus on infant care. Nevertheless, even a 100 percent increase in infant care would yield only 9 more slots, for a total of 18 available for 7,308 employees (1,970 full-time faculty; 3,250 staff; 12 graduate; 2,076 part-time employees.) Despite our efforts to date, availability of quality child care, particularly for infants, is still needed. Compounding the issue for research faculty is that childcare is often needed during non-traditional hours (.e.g., early mornings, late evenings, week-ends) as well as for a sick child and care for children while traveling. In addition, because many faculty women have postponed childcare until the mid thirties to early forties, they may also be dealing with the care of aging parents. Creating a responsive resource service that is actively connected with a consortium of dependent care providers (tradition and nontraditional, infant through elder care) would be particularly helpful to women STEM faculty at WSU.

Continuing Leadership Issues. Issues associated with climate and mentoring still affect the advancement of women faculty, particularly in STEM disciplines. An examination of the data shown in Figure 1 suggested that there may be a need for additional mentoring, not only to tenure, but also in advancement beyond. One of the recommendations from our various self-studies was to require mentoring to full professor. Ongoing professional development for chairs and senior faculty is needed, as are programs aimed at cultivating new leadership.

APPROACH

Here, we describe four major initiatives that target strategic career pipeline "leaks" that still exist and that will be of interest to other research universities dealing with these same issues. These initiatives are:

- *Preparing and Recruiting a Diverse Faculty Initiative*
- *Work/Life Initiative*
- *EXCELinSE Leadership Training Initiative*
- *Institutionalizing Transformation Initiative*

Preparing and Recruiting a Diverse Faculty Initiative

Proposed Innovation: EXCELinSE Summer Doctoral Fellows Program. We propose to complement the broader university "best practices" recruitment effort and address the nation-wide pipeline problem concerning limited numbers of female applicants for STEM faculty positions by using NSF ADVANCE funding to expand the WSU *Summer Doctoral Fellows* program. In this program, diverse Ph.D. candidates are recruited nationally to receive summer fellowships to be in residence on the Pullman campus. While in residence, they attend workshops on research and academic careers, receive mentoring from faculty members in closely related fields to their course of study, and work on completing their dissertations. This highly successful program dates back to 1993, when its original intent was "to underscore the importance of mentoring minority doctoral candidates for future careers in teaching, research, and service at the university level." In 1998, the program was renamed to the WSU Summer Doctoral Fellows Program. It is currently coordinated centrally, and supported jointly by the Graduate School and the Provost's Office. Program participants are better informed and prepared for academic careers. The University benefits because current faculty become familiar with the work of potential future faculty, and the Fellows have an opportunity to become familiar with WSU in particular, and a research university environment, in general. The broader academy benefits because the program contributes to the recruitment of a diverse faculty nationwide.

This program is unique in the country. Unlike the Preparing Future Faculty programs offered through the Council of Graduate Schools, our program is not limited to certain institutions and it occurs in the summer only. Moreover, other similar programs across the country are aimed at their own PhD students, rather than PhD students from outside their institutions. The WSU program also differs from the American Society for Microbiology's Kadner Institute in that the Summer Doctoral Program concentrates on preparing "future faculty" while the Kadner Institute aims to prepare students for many different types of careers in microbiology.

With the ADVANCE grant, we will double the number of Summer Doctoral Fellows by specifically increasing the number of women Fellows in STEM disciplines to 10 per summer. To insure that this effort is successful, we need to: (1) provide funding for the additional 10

EXCELinSE Summer Doctoral Fellows: (2) establish an incentive-based STEM Faculty Mentor program; (3) Work with the Graduate School in recruiting STEM Summer Doctoral Fellows; and (4) track Summer Doctoral Fellows after they finish, with regard to their satisfaction with the program, their success in obtaining faculty positions at WSU or in other research institutions, and eventually their success in obtaining tenure. We will provide honoraria for WSU faculty mentors for these Fellows, as well as mentoring workshops, to ensure that the Fellows have the very best experience possible while they are on the WSU campus. We will also provide additional recruitment support for the program. We hope to recruit 3 EXCELinSE Summer Doctoral Fellows, (women specifically from STEM disciplines), in the first year, and 5 in the second year of this grant. Ultimately, our goal is for all 10 of these Fellows, each summer, to enter academia at a research university, and some portion of them to join the faculty at WSU.

Work-Life Initiative

This initiative addresses several of our most pressing issues related to recruitment and retention of women faculty, as well as climate issues that hamper advancement of women faculty in STEM disciplines. This initiative includes our *Dual-Career Partnership* with the UI, and our *Infant Care Placeholder Program*.

Proposed Innovation: Dual-Career Partnership with UI. Our partner accommodation program was described in detail earlier. Its success for STEM disciplines is not only affected by availability of resources, but more importantly is primarily limited by identifying "home" departments for partners of target faculty candidates.

Meeting the needs of dual-career couples when trying to hire a diverse faculty is also a challenge for the UI, 8 miles away. WSU and UI have a long history of collaboration, including joint listing of courses, and even an initiative to develop an interstate academic department. A recent donor endowed a small fund to enable various joint university ventures; the fund was recently used in the recruitment of a female math professor at the UI, by providing funds to hire her spouse at WSU, in the College of Engineering and Architecture. The Dual-Career Partnership providing partner accommodation support at other institutions beyond WSU is critical, given Pullman's isolated location. In partnership with the UI, we will pilot this program that we intend to grow into a regional consortium to include other area academic institutions within a 50-mile radius, as well as other regional employers and our urban campuses. With this grant, we will provide an additional $125,000 per year for partner accommodations. These funds will allow us to hire approximately 3 to 4 female faculty in STEM disciplines, at either WSU or UI, with the expectation of matching funds from the institution/college/department in which the partner is placed. The funding is extremely important to the success of this initiative because it provides an incentive for the other institution to accommodate the partner. This program would be administered by the *Center for EXCELinSE.*

Proposed Innovation: The *Infant Care Placeholder* program is a priority concern identified by multiple groups on campus that have studied WSU women faculty issues. With this ADVANCE grant, we will reserve infant care positions and prioritize these for: (1) STEM faculty women; (2) STEM research women; and (3) Non-STEM faculty women. We will not use federal funding for paying for these positions, but would only reserve the slots. Recipients would reimburse the costs associated with "holding" the child care position for them. This program would be administered by the *Center for EXCELinSE*.

Dependent Care Consortium. This will build on an established local Child Care Directors network to include providers of elder care. The objectives of the consortium would be to provide a Dependent Care Referral program that would provide up-to-date referral to resources for both traditional and non-traditional (e.g., extended, weekend, or sick dependent care) services for both youth and elderly dependents.

Imported Version of UW "Transitions" Program. WSU currently offers tenure clock extensions for parental and family leave. However, faculty members sometimes require different kinds of accommodations for work-family issues, such as release time or support for research personnel to keep a research program on track. The intent of the Transitions Program is to provide greater flexibility for STEM women who need additional assistance with work-family issues.

EXCELinSE Leadership Training Initiative.

This initiative builds on our current training for department chairs, addresses training needs for both current and future faculty leadership, promotes institutional policy and leadership attitudes that create a culture that promotes achievement by all faculty members, and provides for leadership succession planning. This includes our *External Mentors Program*, our *Emerging Leaders Training Institute*, and importing the UW LEAD workshop to be offered for faculty and administrators at both WSU and the UI.

Importing training programs from past successful ADVANCE programs: The ADVANCE program at UW has developed an excellent leadership training program. Their Leadership Excellence for Academic Diversity (LEAD) workshops include training that improves departmental climate. We will draw on their expertise by enrolling administrators in their LEAD workshops and sponsoring a LEAD workshop on our Pullman campus for both WSU and UI faculty and administrators as well as representatives from other regional academic institutions. LEAD workshops focus on topics like communication skills and holding difficult discussions; recognizing and dealing with the unintentional biases; achieving work-life balance; and mentoring faculty. *We will also make this training available to UI faculty and administrators, and will cover the cost of their attendance with the funds requested with this grant proposal.*

Emerging Leadership Training and Succession Planning. The Faculty Senate has proposed a program to identify and develop leadership qualities in 20-30 mid-career faculty members across the system, annually. Suggested topics for this training program include leadership and communications styles; small group facilitation; assessment, metrics, and benchmarking; conflict resolution and negotiation; networking, impact and change agents; and leadership ethics. The Senate recommended that an outside consultant be hired to develop and deliver the training program. We estimate that the cost of developing and delivering this training program will be approximately $25,000. The workshop will be organized each year by the *Center for EXCELinSE* administrative staff. We will build on successful leadership training programs developed by UNC Charlotte and other ADVANCE institutions.

Proposed Innovation: External Mentoring. Our *External Mentoring* program is designed to provide strong, senior, women role models and mentors to tenured women faculty members. Funding will be provided for 5 external mentor relationships per year. This funding will be made available through a competitive application process that will allow STEM faculty women to "host" an expert in their specific field of study. It is anticipated that the expert will be a resource for further mentoring and networking, as well as feedback for promotion and advancement. This initiative will help tenured faculty women through the promotion process, help with encouraging

more women to seek administrative responsibilities, and play a role in leadership succession planning. It will broaden the host's visibility and provide her with valuable "expert" time, advice, and support. ADVANCE funds will be used to cover the costs of the mentor's travel, visit, and if appropriate, honorarium.

Institutionalizing Transformation Initiative*.*

This initiative is aimed at institutionalizing the efforts of this ADVANCE program, monitoring and assessing institutional progress, and disseminating results and best practices to the broader academic community. As part of this initiative, the *Center for EXCELinSE* will be established and a management plan put in place. Both formative and summative data and faculty surveys will be collected to track the effectiveness of these initiatives, and special research projects will be conducted specifically on why leadership matters to institutional climate and faculty recruitment, retention and advancement, and the effects of work-life policies on family life.

Center for EXCELinSE. This will provide a high-level infrastructure that integrates the efforts and initiatives resulting from this ADVANCE grant and provides these efforts a greater visibility than the individual initiatives would be afforded, on their own. The co-directors will report jointly to the Provost and to the Vice President for Student Affairs and Equity and Diversity, and the Pullman-based co-director will reside in the Office of Equity and Diversity. The Center for EXCELinSE will be responsible for administering the initiatives outlined here, as well as for data collection, including faculty surveys, evaluation and assessment, and publications. The Center for EXCELinSE will also monitor and report on grant expenditures, coordinate personnel attending PI meetings, and provide interim and final program reports to NSF.

Center for EXCELinSE Management Plan

Dr. Robert Bates, Provost and Academic Vice President, and Principal Investigator on this proposal, is ultimately responsible for the success of the project. As Provost, he implements institutional academic policies. The responsibilities of the rest of the team of co-PIs and senior personnel include introducing, piloting, and assessing initiatives aimed at increasing the participation of faculty women, including women from URGs, in the STEM disciplines. As such, the following co-investigators comprise the Steering Committee.

Steering Committee Composition
Dr. Robert Bates, Provost and Academic Vice President
Dr. Fran McSweeney, Vice Provost for Faculty Affairs
Dr. Candis Claiborn, Dean, College of Engineering and Architecture
Dr. Mary Sanchez-Lanier, Associate Dean, College of Sciences
Dr. Sue Clark, Chair of the Chemistry Department
Dr. Amy Wharton, Director, Liberal Arts, WSU-V
Dr. K.D. Joshi, Associate Professor Department of Information Systems
Dr. James Petersen, Vice Provost for Research

The initiatives outlined in this proposal will be developed in consultation with the Steering Committee, and implemented and assessed by the Center for EXCELinSE personnel. The Center for EXCELinSE will be directed by two co-directors whose experience, talents, and positions complement each other: Dr. Alexis Tan (Professor of Communications, and Faculty Diversity Fellow, in the Office of Equity and Diversity) and Dr. Amy Wharton (Director of Liberal Arts, WSU-Vancouver and Professor of Sociology). Dr. Wharton is located on the Vancouver

campus (the fastest growing newer WSU campus), while Dr. Tan is located in Pullman (the main WSU campus). Both co-directors will share in the roles of communicating with the rest of the Steering Committee, disseminating best practices information, and working with institutional and regional collaborators. Communications between WSU campuses are routinely carried out using PolyCom and/or the WSU WHETS systems. Dr. Wharton's research interests are in the areas of gender, work, and family, and she is currently studying workers' use and perceptions of work-family policies. She is also interested in the causes and consequences of work group composition on outcomes such as organizational commitment.

Executive Board
An Executive Board, led by Provost Bates (PI), will include Dr. Michael Tate (letter attached); Dr. Michael Griswold, Dean of the College of Sciences (letter attached); and Dr. Candis Claiborn, co-PI and Dean of the College of Engineering and Architecture. The Executive Board will make decisions regarding priorities and follow-up actions following collection and analysis of data and recommendations by the Steering Committee. The Executive Board will provide project legitimacy; provide direction and prioritization of action items; disseminate information across multiple levels and campuses; and resolve systems problems that may emerge.

Reporting to the co-directors will be Dr. Gretal Leibnitz, who will serve as Program Manager for the ADVANCE grant. Dr. Leibnitz has served as chair-elect of the CSW and led the WSU Family Friendly Focus Initiative, which addresses institutional practices that create barriers to the advancement of both women and men that seek both successful academic careers and fulfilling family lives. She has been an important contributor to the development of this ADVANCE proposal, and is currently working for the Dean of the College of Engineering and Architecture as a Faculty Recruitment Specialist, with responsibilities that include assisting search committees develop larger, more diverse candidate pools for new faculty hires.

A full-time administrative assistant will assist the co-directors and program manager, and will handle administrative requirements associated with fulfilling the objectives of our ADVANCE program. Under the direction of the program manager, the administrative assistant will work with a web design consultant that will develop and maintain the Center for EXCELinSE website for the life of the grant.

External Advisory Board
An external advisory board (EAB) will be established, for objective feedback and guidance. The EAB will be comprised of co-investigators from other ADVANCE Institutional Transformation programs, as well as representatives from industry and the national laboratories. EAB members will include Dr. Doug Baker, Provost, University of Idaho; Dr. Chris Hailey, Associate Dean in the College of Engineering at Utah State University, Director of the National Center for Engineering and Technology Education, and co-investigator on the USU ADVANCE Institutional Transformation grant; and Dr. Allison Campbell, Director of the Environmental Molecular Sciences Laboratory at Pacific Northwest National Laboratory (letters included). Others will be added if the grant is funded.

Institutional Data Enhancement and Formative and Summative Assessment Tools.

Funding will also be used to access existing survey instruments as needed (such as the COACHE survey or the New Mexico State University survey), for data collection and analysis, and to report and disseminate results. Graduate student research assistants will be hired to assist with data collection and analysis, and will work with *Center for EXCELinSE* personnel or steering committee members on publishing the results. Funding is specifically requested in the

first and final years of the grant, to cover the costs of participating in the COACHE survey (approximately $25,000 each time).

Special Research Grants.

Small research projects will be funded annually throughout the life of the grant. The research grants would be awarded on a competitive basis, and the recipients will serve as EXCELinSE Research Fellows. In addition to research funded by these grants, we will also undertake a larger research project designed to examine how new initiatives that are introduced as part of the ADVANCE grant are enacted at the department level and the role of chairs in this process. To better understand the processes through which chairs and departments respond to ADVANCE initiatives, a team of social scientists (lead by Co-PI Wharton) will conduct a longitudinal study of STEM departments and their respective chairs. The study will involve climate surveys in years 1 (baseline), 3, and 5 of the grant, supplemented by in-depth interviews with chairs. We will model our climate survey on the Faculty Work Climate Survey developed by the University of Illinois at Chicago. We will pay special attention to chairs' responses to ADVANCE initiatives, including how these initiatives are implemented, communicated to department members, and incorporated into departmental culture.

We expect this study to provide insights into how new initiatives and practices diffuse through an organization and the impact of departmental cultures and front-line leadership on this process. By identifying the departmental-level factors that enhance and inhibit the institutionalization of organizational-level initiatives, this research should be of benefit to other institutions seeking transformation. This research will also have broader impact: Although much is known about the adoption of work-life and diversity policies, we know less about the factors that lead to their successful implementation and the roles that leaders play in facilitating culture change (Kossek and Friede 2006; Harrington and James 2006; Kalev et al., 2006; Blair-Loy and Wharton 2002).

Plans for Institutionalization

Washington State University is in the silent phase of a major capital campaign, so the opportunity exists to raise funds to endow certain aspects of this ADVANCE program. We will seek additional private funds to increase the existing, small endowment that enables joint WSU/UI efforts so that the dual career partnership can continue beyond the life of this grant. We will also seek private funding for the EXCELinSE Summer Doctoral Fellows program. Leadership training developed with this grant will be incorporated into the regular training programs at WSU. The Center for EXCELinSE will continue to report jointly to the Provost and to the Vice President for Student Affairs and Equity and Diversity. This joint reporting line works well for us, as we currently have a Faculty Diversity Fellow reporting in a similar fashion (Dr. Alexis Tan, co-Director for the Center for EXCELinSE). Finally, we will continue the External Mentoring with college and/or department funding, as well as provide travel funding our own faculty members to serve as mentors for women faculty at other institutions.

PLAN AND METHODOLOGY

At the initiation of this ADVANCE program, we will formally establish the Center for EXCELinSE, implement climate and resource inventory data collection to develop our baseline data, and launch work on the majority of our initiatives. Both of the co-PIs and the Program Manager are on the WSU faculty and available immediately to launch the Center for EXCELinSE. We will

adopt and adapt the New Mexico State University NSF Toolkit. Data collection will continue throughout the life of the ADVANCE program, as well as beyond. The COACHE survey will also be implemented in the first year of this grant. In the final year we will conduct another climate survey and the COACHE survey. These data, along with the quantitative data we collect throughout the life of the ADVANCE grant, will be used to assess our progress and success.

Recruiting efforts will be initiated for the EXCELinSE Summer Doctoral Fellows program, with the goal of recruiting 3 Fellows from STEM disciplines in year 1. In the second year, we will grow this number to 5, and by year 3, we will be at 10 Fellows from STEM disciplines.

We will offer the UW ADVANCE LEAD workshop on campus in the first year of this program, and will develop the Emerging Leaders Training Program in the first year, for offering starting in year 2. In year 2, we will offer the first Emerging Leaders Training Program, and continue to offer Leadership training workshops yearly thereafter. These training programs will be incorporated into our regular training opportunities offered annually, beyond the life of the grant.

ANTICIPATED RESULTS

We are very excited about this ADVANCE grant proposal. The initiatives presented here have been developed in response to the deliberations of multiple groups on campus that have addressed our recruitment, retention, and advancement issues, as they pertain to faculty women, and particularly to women in STEM disciplines. WSU has been proactive in implementing many of the recommendations made by these groups. With this proposal, we have identified several, key initiatives that address some of our most difficult issues, such as recruitment of women into STEM faculty positions, the dual-career issue, infant care, and current and future leadership.

Intrinsic intellectual merit. The research component of this project will provide insights into diffusion of new practices through academic organizations and the impact on departmental cultures and leadership. By identifying the departmental-level factors that enhance or inhibit the institutionalization of initiatives, this research will benefit other institutions seeking transformation. We will both import successful ADVANCE initiatives from other institutions and demonstrate our own innovative initiatives that are: unique to our situation (e.g., the Dual Career Partnership with the UI); that will benefit both WSU and the broader research university community (e.g., the EXCLEinSE Summer Doctoral Fellows Program); that are applicable to research-intensive, rural, land-grant institutions (e.g., Infant Care Placeholder program); or that are applicable to the general academy (e.g., the External Mentoring program).

Broader impacts. Addressing the special challenges associated with women faculty in STEM disciplines at small, rural communities has implications for other, similar institutions. For example, the Summer Doctoral Fellows program will benefit not only WSU but other research institutions that hire these women after they complete the program. This project will advance our understanding of the impact of preparing future faculty for the professoriate, creating a work/life responsive workplace, and leadership initiatives on attraction, recruitment, and advancement of women in academic STEM disciplines. Finally, improving the climate for all results in retention and advancement of a diverse faculty, this in turn provides more role models for students. Ultimately, there will be increases in students pursuing careers in STEM, thus addressing a national need.