

THE UNIVERSITY OF WISCONSIN-MADISON ADVANCE PROGRAM: PROGRESS TO DATE

Jennifer Sheridan¹, Molly Carnes², and Jo Handelsman³

Abstract — The University of Wisconsin (UW)-Madison has completed the first year of its 5-year National Science Foundation (NSF) ADVANCE project. We have created a multi-disciplinary research organization, the Women in Science & Engineering Leadership Institute (WISELI), which is evaluating existing initiatives on campus; organizing research projects assessing the status of women in science and engineering on campus; implementing new initiatives that address gaps in the support for women in science and engineering; evaluating the success of new initiatives; and evaluating the overall success of the ADVANCE project at UW-Madison. In this paper, we discuss the first year data collection efforts; the new initiatives WISELI will undertake in Years 1-3; and the evaluation strategy we will undertake, including the introduction of a theoretical framework for understanding institutional change. In our presentation, we plan to include some preliminary results from our Study of Faculty Worklife at UW-Madison surveys, fielded in early 2003.

Index Terms — NSF ADVANCE, Women in Science and Engineering.

OVERVIEW

In response to the concerns that we as a nation are not training enough or sufficiently diverse people to meet the growing demands of our scientific workforce and that there are already critical shortages in some fields, the National Science Foundation launched the ADVANCE program. The goal of this program is to increase the participation and advancement of women in academic science and engineering, with particular emphasis on increasing the number of women in positions of leadership. Under this program, 9 sites were awarded Institutional Transformation Awards (\$3.75 million over 5 years). The UW-Madison project, which began January 1, 2002, has established the Women in Science and Engineering Leadership Institute (WISELI). WISELI is approaching the issue comprehensively and with an evidence-based framework designed to answer the questions: What are the barriers impeding the participation and advancement of women in

science and engineering? How can we eliminate or overcome these barriers?

We have assembled a broadly interdisciplinary Leadership Team that includes faculty from departments of Medicine, Plant Pathology, Electrical Engineering, Industrial Engineering, Mechanical Engineering, Physics, Ob/Gyn, Sociology, English, Chemistry, and the Schools of Education and Nursing. The Leadership Team will provide direction for the design and implementation of initiatives and for evaluation of new and existing initiatives that are intended to enhance the participation of women in science and engineering. Leadership Team members may also embark on studies of their own. One member is doing a discourse analysis of men and women scientists in informal meeting settings; another is doing ethnographic research in the laboratory setting. The evaluation scheme includes quantitative and qualitative approaches, drawing on campus expertise in statistics, sociology, anthropology, and linguistics. Our evaluation strategy also includes a new theoretical framework for understanding institutional change.

BASELINE DATA COLLECTION

Considerable efforts were placed on the collection of baseline data in Year 1 of the UW-Madison ADVANCE project. Data were collected in three main efforts.

- **Town Hall Meetings:** In April, 2002, we invited women scientists and engineers on campus to come and learn about our grant, and to rate the importance of our proposed campus initiatives. We found in these meetings that work/life issues were of overwhelming importance to the women in attendance. A report of these meetings is available online at: <http://wiseli.engr.wisc.edu/reports.html>.
- **Personal Interviews:** In-depth personal interviews were conducted with 15 women scientists and engineers on the academic staff (both teaching and research staff), and 26 women faculty in the biological and physical sciences in the summer of 2002. These interviews covered a range of topics, from early experiences in science, through the hiring process and tenure process, to current climate in their units. A report of the findings

¹ Jennifer Sheridan, Research Director, Women in Science & Engineering Leadership Institute (WISELI), University of Wisconsin-Madison, 2640 Engineering Hall, 1415 Engineering Drive, Madison, WI 53706, (608)263-1445, sheridan@engr.wisc.edu

² Molly Carnes, Professor, Department of Medicine, WISELI, and the UW Center for Women's Health and Women's Health Research, University of Wisconsin-Madison, 6W Meriter-Park, Madison, WI 53706, (608)267-5566, mlcarnes@facstaff.wisc.edu

³ Jo Handelsman, Professor, Department of Plant Pathology and WISELI, University of Wisconsin-Madison, 589 Russell Laboratories, 1630 Linden Drive, Madison, WI 53706, (608)263-8783, joh@plantpath.wisc.edu

from these interviews will be available at: <http://wiseli.engr.wisc.edu/reports.html>.

- **Mail Surveys to Faculty and Academic Staff:** Using findings from the personal interviews, WISELI evaluators and staff constructed an 11-page mail survey, to be administered to all faculty and a 50% sample of selected academic staff at UW-Madison. These surveys were fielded in early 2003. Data will be disaggregated by gender, race/ethnicity, and other important variables such as divisional affiliation or rank, as long as respondents remain unidentifiable as a result of the disaggregation. The results will inform the creation of new initiatives, will provide a baseline of campus climate to which we can compare the climate at the end of the grant period, will evaluate several new and ongoing campus initiatives, and will provide a longitudinal database from which additional studies may be pursued.

WISELI should be receiving the data from the UW Survey Center in May for the faculty portion of the study, and we expect to have preliminary results from the survey by the WEPAN conference in June 2003.

INITIATIVES

In addition to measuring and monitoring the working environments of women in science and engineering at UW-Madison, WISELI is using the NSF ADVANCE grant to introduce and study new initiatives designed to address the lack of diversity in academic science and engineering at UW-Madison. We have grouped our initiatives into five main subject areas. In Year 1, we began work on initiatives based upon (1) their rated importance in the Town Hall Meetings; (2) the interest and schedules of Leadership Team members who could lead the initiatives; and (3) the perceived importance of the initiatives to the goals of the grant. All of the initiatives listed below are new to campus—they were proposed in the ADVANCE grant proposal as ways to fill perceived gaps in campus programs.

Below, we summarize all of the new initiatives we are considering. Initiatives on which we are currently working are noted.

Group 1: Resources

- **Examine the patterns of assigning institutional resources for uneven distribution by gender.** We will collect information on start-up packages, assigned space, access to administrative support, assignment of teaching assistants, type of class (e.g. undergraduate vs. graduate), number of graduate students and postdocs, and location of office and laboratory. Data not available in existing records will be gathered in interviews with departmental administrators, faculty, and on-site inspection. Taking into account the complex factors involved in assignment of institutional resources, we

will look for patterns that might disadvantage or advantage women faculty. If patterns are found, we will interview department chairs regarding the reasons for such assignment. We will compile a report of the results to present to the deans and senior administrators as a means to promote equitable distribution of institutional resources. This initiative will likely become active in Year 3 of the grant period, and data will be merged with the survey results collected in early 2003, allowing for more complex models of resource distribution.

Group 2: Workplace Interactions

- **Climate Improvement Workshops for Chairs and Directors.** We are currently developing a workshop program in collaboration with the Provost's office. The proposal accommodates two beliefs about climate: (1) climate is a global problem, but the manifestations and language are local, and therefore solutions must be tailored to the local environment; and (2) many chairs and directors do not perceive a climate problem in their units. To accommodate these realities, we will form cohorts of chairs and directors to study and analyze the manifestations of climate in their own units and work as a group with the help of facilitators to address the problems they discover. The goals are for chairs to emerge with a better understanding of climate, immediate improvements in climate in their departments, and a "toolbox" of methods to address future climate issues.
- **Training of Search Committee Chairs.** The goal of this initiative is to increase the diversity of candidate pools for faculty and administration positions. In collaboration with the Provost's office, Office of Human Resources, and the Equity and Diversity Resource Center, we are developing a three-session training program for chairs of search committees. At the first meeting, which will be before the first meeting of the search committee, we will share strategies for running efficient meetings, gaining participation of all committee members, and building a diverse pool. Before the application deadline, we will meet again to share results and find out what strategies were successful for each search. At that meeting we will also discuss strategies for ensuring equitable and thorough review of candidate files. The final meeting will take place before the list of candidates to interview is finalized. We will discuss how to balance efficiency with interviewing broadly, how much recruiting to do during the interview, and design of interview questions. These sessions are intended to make search chairs aware of successful strategies to broaden their pools, of the biases and assumptions that all people bring to the review process, and techniques to reduce the impact of these biases and assumptions. We will match a group of search committee chairs who are in the training program

with a group that will not be trained and determine whether the training affected the composition of the pools, outcomes, or processes of the searches.

- **Workshops on Laboratory Management.** A workshop series on laboratory management will be developed for principal investigators. The focus will be on issues that affect women disproportionately, but will be advertised on the basis of improving the overall functioning of the laboratory. Topics will include motivating members of a team by positive approaches, resolving conflict, providing a supportive, respectful, and safe environment, and building cohesive, collegial teams. Development of the workshops will be led by the Office of Human Resources and Development and facilitators will include faculty who run research laboratories and are known to be supportive of women, deans, experts in conflict resolution and respect in the workplace, and graduate students. The workshops will be in two parts. The first session will include a discussion of methods to assess climate and productivity of a lab group. PIs will then return to their labs to gather information by survey or other methods. In the second session, participants will discuss their findings and strategies to improve their groups' productivity. The workshops will be offered on campus every semester. We will work with deans and department chairs to encourage attendance by all faculty. Development of these workshops is expected to begin in Fall 2003.

Group 3: Life/Career Interface

- **Life Cycle Grants.** In collaboration with The Graduate School, WISELI announced the Life Cycle Research Grant Program in Fall 2002. These funds will be available at critical junctures in the research career, when research productivity is directly affected by personal life events (e.g., a new baby, parent care responsibilities, illness of a spouse, etc.) These grants are meant to be flexible and faculty may apply for varying amounts and academic purposes. We are working with the Graduate School to ensure that receipt of these grants do not count against faculty in future Graduate School grant applications, and to increase the number of awards that can be made. If the program is successful, the Graduate School will assume full funding of this program by 2004.
- **Time-Stretcher Services.** Balancing career and personal life are important issues for both men and women in academe, but particularly for women who continue to assume the predominant responsibility for household management and childcare. WISELI will 1) work with Joan Gillman (Director, Special Industry Programs) and a student in Journalism to compile available time-saving services currently available (e.g., all home delivered services) and make this publication

available to everyone at UW-Madison and 2) work with Professor Anne Miner (UW Business School) to explore a UW-Community partnership to develop a Time-Stretcher Service. This service would enable women and men working for UW-Madison to hire individuals to perform simple tasks that would take time away from activities important to their personal or professional development. This initiative is still in the early stages of development.

Group 4: Development/Leadership/Visibility

- **Senior Women Faculty Initiative.** UW-Madison has 82 women full professors in the biological and physical sciences and engineering. WISELI's intention is to meet with each one over the 2002/03 academic year (in small groups of 3-4 or individually as dictated by schedules and preference). These meetings will enable WISELI to become familiar with the research being conducted by our senior women as well as their career goals, interests, and thoughts on women in science and engineering at UW-Madison and nationally. This will increase our ability to:
 - Identify eligible women faculty to nominate for awards, search committees, and administrative positions.
 - Connect women faculty members across schools and colleges, using academic collaborations to decrease professional isolation.
 - Understand in more depth the issues at Madison.A WISELI representative will also be meeting with current UW-Madison administrators, and past successful women administrators, to discuss motives for entering administration, who is being "groomed" for entrance into administration, and specific ways that current administrators might encourage women and minorities to enter such positions.
- **Celebrating Women in Science and Engineering Grants.** This grant program is the result of a collaboration between WISELI and the following Schools/Colleges: CALS, L&S, Pharmacy, Medical, Veterinary Medicine, and Engineering. This program provides funds to departments, centers, or student groups (in collaboration with an academic unit) wishing to enhance their own seminar schedules or especially to create new workshops, symposia, lecture series, or similar events in line with the goals of WISELI: to promote participation and advancement of women in science and engineering. The maximum award is \$5,000, and the maximum time frame for the award is one academic year. In the first year, 8 awards were made.
- **Endowed Professorships for Women in Science.** In response to the NSF ADVANCE program, the Chancellor has included 10 professorships (\$20 million) for women in science and engineering on the select list

of targets for fundraising. This list sets priorities for the \$1 billion capital campaign recently launched by the campus and therefore appearance on the list demonstrates a clear commitment to the Institutional Transformation initiative. Each professorship will be competitively awarded through a campus peer review process. Selection criteria will include quality of contributions to science and teaching, past impact on women in science, and future plans for a leadership role in science. Each recipient will be provided financial support for 10 years but will retain the title of the endowed chair for the duration of her career. We will pursue this initiative in later years of the grant.

- **Track Conversions for Non-Tenure-Track Women Scientists and Engineers.** Examination of data on staff positions indicates that we could increase the number of women faculty in many departments simply by converting academic staff positions to faculty positions for women who wish to expand their roles. A number of women on our campus who hold academic staff titles pursue independent research and have teaching reputations and credentials equivalent to those in faculty positions. Many of these women entered science at a time when nepotism rules, prejudices, or their own life choices prevented them from entering tenure-line faculty positions. In the present era, a number of these women might have become faculty members through dual career recruitments. We will explore the development of a program that would offer faculty appointments to selected non-tenure line women in science and engineering. WISELI will establish a working group, including representatives from the Academic Staff Council and administration, to determine the number of possible track switches and identify administrative, financial, and attitudinal barriers to accomplishing conversions. If such a program would have a positive impact, WISELI will work with campus administration to develop a systematic process for such track conversion.
- **Leadership Development of Non-Tenure Line Women in Science and Engineering.** The scientific community contains a number of outstanding staff scientists who could be contributing more to the leadership in their respective fields. WISELI will promote the leadership development of these staff women in science and engineering by including them in the proposed initiatives and developing special leadership training modules for staff scientists.

Group 5: Overarching

- **Establishment of the Women in Science and Engineering Leadership Institute (WISELI).** The Women in Science & Engineering Leadership Institute (WISELI) has the overall mission of increasing the participation and advancement of women in academic science and engineering at UW-Madison. The long

term goal is to have the gender composition of the faculty, chairs, and deans in the sciences and engineering reflect the gender composition of the student body in these fields. WISELI will use UW-Madison as a “living laboratory” to study the problem of the lack of diversity in the sciences and engineering, by centralizing collected data, monitoring the success of initiatives (both existing and new), implementing a longitudinal data system, and ensuring dissemination of best practices. WISELI will be funded by a grant from the National Science Foundation (NSF) of \$3.75 million, which will support the planned initiatives for five years.

- **Documentary Video.** WISELI is working with a videographer to develop a documentary to capture the issues at UW and nationally, inform viewers about WISELI and the NSF initiative, and document the institutional transformation. It will include interviews with UW faculty and administrators.

EVALUATION

Evaluation is a cornerstone of the WISELI mission. Each of the initiatives we introduce to campus will be evaluated in order to assess the effectiveness of the intervention. In addition to evaluation of each individual initiative (including evaluation of programs already existing on campus such as the dual career hiring program; sexual harassment training seminars; gender pay equity exercises; etc.), we are evaluating the success of the WISELI program overall. We are doing this overall evaluation in four main ways:

- Pre/post comparisons of gender climate on the faculty surveys;
- Pre/post comparisons of women’s experiences using in-depth interview methods;
- Yearly phone or face-to-face interviews with randomly selected faculty, staff, and administrators in the sciences and engineering; and
- Monitoring of institutional indicators (such as tenure rates, percentage of women faculty in science and engineering departments, salary differentials by gender, and others determined by the other ADVANCE programs and NSF) throughout the grant period.

We recognize that it is highly unlikely that major change will occur in the small five-year window of the grant period. For that reason, we are working to develop intermediate indicators of institutional change that would indicate the success of the program in changing attitudes, even in the face of unchanging numbers of women on the science and engineering faculty.

“Stages of Change” Model

Considerable research has been done on effecting intentional behavioral change in health risk behaviors, particularly smoking cessation [1]-[2]. Prochaska and DeClemente [3]

put forth a useful paradigm based on the observation that individuals generally go through a series of five stages as they prepare for and then engage in a new behavior. They call this “stages of change” concept the “Transtheoretical Model” because it incorporates aspects of several theories of behavioral change [4]. These five stages are precontemplation (unaware that a problem exists), contemplation (aware that a problem exists and thinking about making a behavioral change in the future), preparation (feeling confident that making a change is possible and planning to make such a change in the immediate future), action (making a change), and maintenance (continuing to engage in the new, desirable behavior and avoiding relapse).

We are working to adapt this model for use in an organizational setting, to measure attitudinal change that will ultimately result in the diversification of the scientific labor force. We would like to identify, for a particular topic area (for example, hiring), where an organization is on the 5-stage continuum. For example, a department might be at a pre-contemplation level in regards to hiring decisions if they have few or no women faculty in their department, and do not see this as a problem or as a situation that needs to be remedied. A department might be at the contemplation stage—they recognize that the lack of women on their faculty is a problem, but they have not made any overt actions that might address the situation. A department in the preparation stage might call in a consultant to evaluate the hiring process in the department, might gather resources on how to diversify the faculty, or might arrange for exit interviews of women who have left the department to understand what is not working for women employed in their department. A department in the action stage might take active steps to recruit women to their faculty—they identify individual women to hire; they call colleagues asking if they have any suitable female Ph.D.s to recommend; they pay attention to unconscious biases that might have caused them to disregard a female’s application in the past. Finally, a department at the maintenance stage has recruited enough women into their department, and they constantly monitor the gender climate in the department, so as not to lose the women they have recruited.

This is but one example of how the Stages of Change model, used so successfully in understanding how people make intentional behavioral health changes, might apply to people making intentional behavioral change to diversify the scientific and engineering academic leadership. If this approach is successful, a further advantage of identifying an organization’s placement along the Stages of Change is that interventions can be matched to the stage at which the organization exists. An intervention that would work for a department in the action stage (providing access to the names of women receiving Ph.D.’s in a given year, for example) would have no effect for departments still in precontemplation.

We are exploring the feasibility of this approach by weaving it into many different initiative evaluations. We are

hopeful that it will be a useful framework not only for evaluating the UW-Madison ADVANCE initiative, but also for the ADVANCE program overall.

CONCLUSIONS

During the first year of our NSF ADVANCE grant, we have been successful at launching our new WISELI organization and making it visible to campus administrators and women scientists and engineers. We have laid the groundwork for future research and evaluation efforts by holding Town Hall meetings, performing in-depth interviews, surveying faculty and academic staff in science and engineering units, and adapting the Stages of Change model as a theoretical basis for understanding our institutional transformation at UW-Madison. And we have implemented and/or begun development of several new and exciting campus initiatives that should fill some of the gaps in our network of programs addressing the different workplace needs of women in academic science and engineering.

We are optimistic about our chances to create lasting institutional change at the University of Wisconsin-Madison, as we have the support of the University administration (even in this uncertain fiscal environment.) UW-Madison is committed to creating a more diverse faculty and a respectful climate for all members of the University community, and WISELI is an important and visible organization helping the University reach its goals.

REFERENCES

- [1] Zimmerman GL, Olsen CG, Bosworth MF, “A ‘Stages of Change’ approach to helping patients change behavior”, *Am Fam Physician*, 61, 2000, pp. 1409-16.
- [2] Prochaska JO, DiClemente CC, Norcross JC, “In search of how people change: applications to addictive behaviors”, *Am Psychol*, 47, 1992, pp. 1102-14.
- [3] Prochaska JO, DiClemente CC, “Stages and processes of self-change of smoking: toward an integrative model of change”, *J Consul Clin Psychol*, 51, 1983, pp. 390-395.
- [4] Prochaska JO, Velicer WF, “The transtheoretical model of health behavior change”, *Am J Health Promotion*, 12, 1997, pp. 38-48.