
AC 2011-1687: ISU ADVANCE SUSTAINING AND INSTITUTIONALIZ- ING EFFORTS TO ENHANCE RECRUITMENT, RETENTION AND AD- VANCEMENT OF WOMEN FACULTY IN ENGINEERING

Kristen P. Constant, Iowa State University

Kristen P. Constant is a Professor in Materials Science and Engineering. Her physical research is in the area of photonic materials and her academic research is related to Gender in the Sciences.

ISU ADVANCE – Sustaining and Institutionalizing Efforts to Enhance Recruitment, Retention and Advancement of Women Faculty in Engineering

ISU is in the final year of a 5-year NSF-funded ADVANCE ‘Institutional Transformation’ grant with a focus on changing the academic environment to be more conducive to the recruitment, retention and advancement of women faculty in STEM disciplines. The program has involved a multilevel collaborative effort to transform departmental cultures (views, attitudes, norms and shared beliefs), practices (what people say and do), and structures (physical and social arrangements), as well as university policies, through participation of individuals and units across the university. Findings based on ISU ADVANCE research reveal key areas of strength that will be the focus of institutionalization and sustainability beyond Year 5 of the program. Areas of strength include the role of the college Equity Advisor, the use of Institutional Research data and surveys as a dashboard for progress, and the process of departmental collaborative transformation. Training activities that have been identified as crucial to sustainability include department chair training, search committee training, and training to avoid systemic unintended bias. Additionally, ISU has been awarded an NSF Innovation through Institutional Integration (I³) grant entitled “Strengthening the Professoriate at ISU”, (SP@ISU) which includes goals in common with the ISU ADVANCE program. The plan for transition and institutionalization will be described and the anticipated challenges discussed.

Institutional Context

Iowa State University of Science and Technology is a land grant institution with strength in science and engineering. The university, with about 28,000 students and 1,750 faculty, has 8 colleges, the second largest of which is the College of Engineering with a faculty of 225. Iowa State’s faculty is 28.9% women in tenured or tenure eligible positions, but the College of Engineering (COE) has only 10.1% women faculty.¹ Additionally, the attrition rate for ISU women faculty in STEM fields (Science, Technology, Engineering and Mathematics) is significantly higher for women as compared to men (especially in the first three years).² Although these numbers are less favorable than national averages, ISU has demonstrated a strong commitment to increase the diversity of the faculty and has invested significantly in various campus climate surveys and other studies to better understand faculty satisfaction and the factors that differentially impact women and minorities.³ Indeed, the demonstration of an environment conducive to change was one of the factors influencing the National Science Foundation’s decision to award ISU the ADVANCE grant in late 2006 and an I³ (Innovation through Institutional Integration) grant in 2010.

General Program Description

ISU is in the final year of a 5-year NSF-funded ADVANCE Institutional Transformation Grant. A more complete program description has been previously reported, and a comprehensive program description and evaluation is planned after the completion of the funded grant.^{4,5} The intent of the present paper is to convey the approach to identifying the program components most suited for institutionalization although a brief description of the goals, approach and strategies is included here to place the effort in context. The focus of the work of this grant has been towards meeting four program goals.⁶ The first goal is to overcome four *known* barriers to the

advancement of women faculty in STEM disciplines.⁷⁻¹¹ These known barriers include lack of transparency and consistency in hiring practices, tenure and promotion, and work assignments. The second barrier is isolation of women faculty. The third is inconsistencies in quality and/or lack of mentoring both for assistant professors and associate professors, and the fourth barrier relates to the difficulty of the management of work/life issues and lack of faculty job flexibility. The second goal is to first identify and then reduce or eliminate department-specific barriers to the advancement of women faculty in STEM disciplines. The program seeks to do this through a process called collaborative transformation (CT) that involves detailed study of a selected ‘focal department’ climate through guided discussions with faculty.^{12, 13} The third goal is to increase the representation of women and underrepresented minorities at senior faculty and leadership ranks. Finally, the fourth goal is to institutionalize positive change across the university so the work of ISU ADVANCE can be sustained beyond the life of the grant. It is this final goal that is the focus of this paper. Note that while some of the goals are directed toward barriers that are specific to women, (e.g. unintended bias) many are related to issues that are common to all faculty, but differentially affect women (e.g. work-life management, and transparency in promotion and tenure expectations).

The general approach includes both leadership at the college level, a ‘top down’ strategy, and gaining grass-roots buy-in, a ‘bottom up’ strategy. (Fig. 1) To accomplish this, there are several embedded change agents (faculty and administrators) that work within the existing culture at the departmental (ADVANCE Professors), college (Equity Advisors) and university (ADVANCE PIs and Provost Fellow) levels. In the program, there are 9 focal departments in 3 colleges including 3 in the College of Engineering. Within a particular focal department, collaborative transformation is facilitated by ISU ADVANCE researchers and a professor who is a member of the department (called an ADVANCE Professor) through focus group discussions with departmental faculty at all ranks. Researchers process the data collected identifying salient themes, and deliver it back to the faculty for consideration and development of action items. At the college level, the ADVANCE Equity Advisor serves to coordinate ADVANCE activities and efforts between departments – both focal departments and those not directly involved in ADVANCE research and also serves to coordinate with other existing groups at the college level (e.g. the COE Diversity committee) and the university level. The Equity Advisor also works closely with ADVANCE PIs and the University level administration to coordinate activities (especially trainings and workshops) and report progress. In addition to the CT research in selected departments, there are a number of other program components, some designed to target key constituents (e.g. department chairs, search committee members, promotion and tenure committees), and others developed for the broader University community. Programs targeting department chairs are considered to be of critical importance, as previous research (both ours and others) have shown that the department chair is one of the key factors in faculty satisfaction.^{13,14} Topics for chair workshops have included cognitive errors in evaluating faculty, unconscious bias in mentoring and promotion and tenure decisions, faculty flexibility and work-life balance, mentoring associate professors toward promotion to full and understanding departmental culture. Workshops for search committees on avoiding cognitive errors and unintended bias in evaluating candidates were held. In the College of Engineering, the equity advisor has presented best practices and information about unintended bias to 10 search committees, including three for the position of department chair. The purpose of this effort was not only to motivate a broad search to identify a diverse candidate pool, but also discuss best practices in identifying candidates with commitment to supporting and expanding the diversity of the faculty. Other targeted activities

include college specific meetings and networking events for women faculty in each college, for example, a breakfast meeting for women faculty in the College of Engineering. Activities directed toward educating the larger University community (and beyond) range from hosting a national conference to small group meetings. These events are usually either designed to disseminate results of our collaborative transformation efforts, or to educate faculty and administrators on a particular topic important to enhancing participation of women.

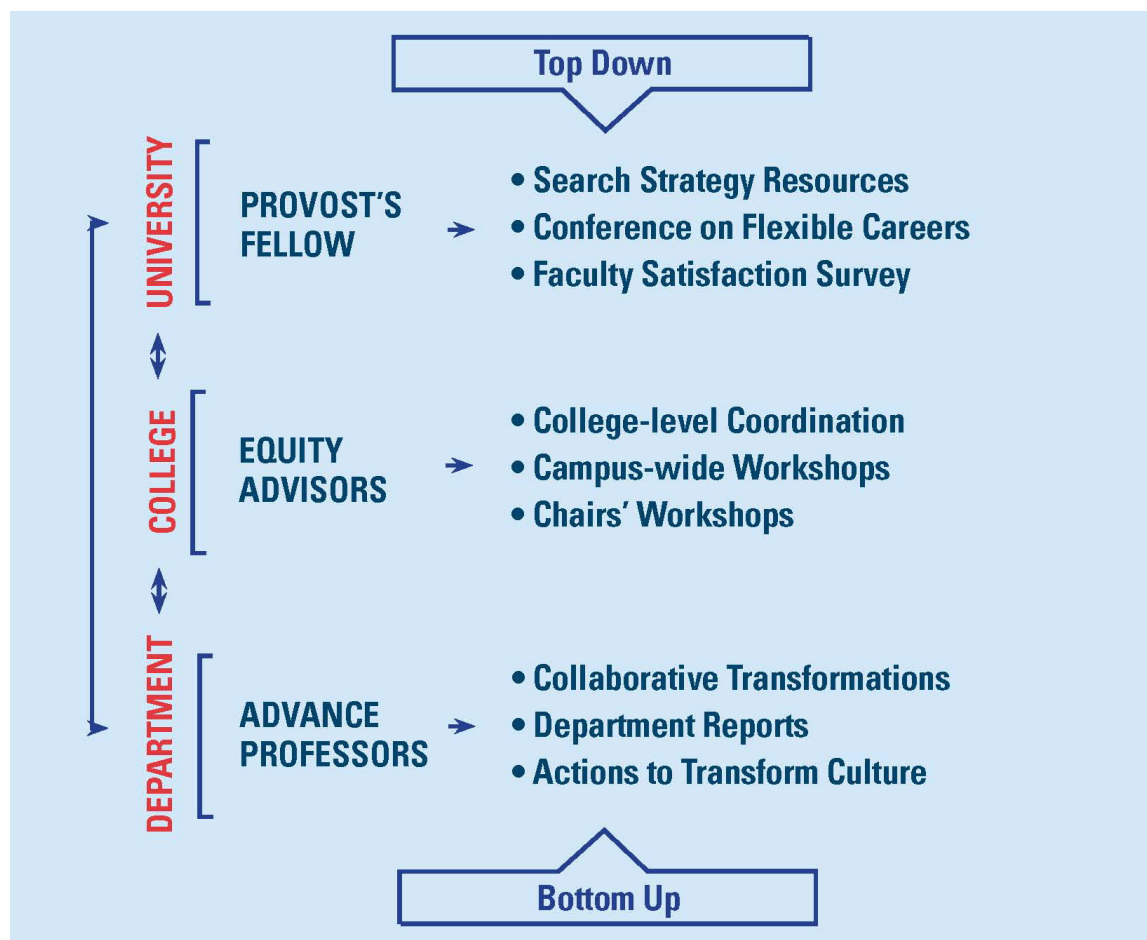


Fig. 1 Organizational structure and Strategy of the ISU ADVANCE Program

To broaden our impact and learn from other experts, ISU ADVANCE hosted a national conference on increasing flexibility in faculty careers (in October, 2008). To broaden the reach of ISU ADVANCE within ISU, Equity Advisors from each of the three colleges spoke to non-focal department faculty in their college (usually at a departmental faculty meeting) to discuss ISU ADVANCE activities and efforts in other departments and colleges – focusing specifically on how they can make use of the results of research in their own departments. To improve access to these results, a number of electronic resources have been developed (in Web and sometimes CD-ROM format). Topics include best practices for faculty searches¹⁵, faculty flexibility¹⁶, and the pathways to promotion¹⁷ (mentoring associate professors), and making the most of institutional transitions (a document intended to guide best practices for departments and units that are undergoing restructuring – in a large part due to economic forces).

Each of these program elements has been evaluated (both internally and by external program evaluators), and those with the greatest impact have been carefully examined for their potential sustainability beyond the life of the grant.

Key Areas for Institutionalization and Sustainability

Identifying the key areas for institutionalization requires consideration of both the effectiveness of various program components and the practicality of institutionalization within the constraints of the current economic environment. While most program efforts have had evident success, not all can be sustained beyond the life of the grant. Although institutionalization has been a primary goal (see goal 4, above) from the beginning, it has not been possible to fully address sustainability before the results of our efforts were carefully scrutinized. To do this, in addition to self-evaluation, we have received input from internal constituents including an internal advisory board constituting faculty and administrators at all levels and external constituents including, external advisors, external evaluators, and NSF program directors. Through careful consideration of all input, the ADVANCE leadership team (including PIs and Co-PIs) has identified three components (and three related activities) that are central to making ISU conducive to the recruitment, retention and promotion of women and underrepresented minorities in STEM. These areas of strength are: (1) the role of the college-level Equity Advisor (EA), (2) the collection, analysis, dissemination and use of Institutional Research (IR) data and related surveys and (3) departmental Collaborative Transformation (CT). Three related areas of activities (program components) include: (1) department chair training, (2) search committee training regarding gender and underrepresented minorities and related recruitment, retention and promotion issues and (3) training (all faculty) to avoid systemic unintended bias.

ISU ADVANCE has already made impressive progress in institutionalizing a number of work-life policies that are crucial to improving job satisfaction of all faculty, an effort informed and catalyzed by the 2008 National Conference on Faculty Flexibility hosted by ISU ADVANCE.

Each of the 6 key areas is described with respect to institutionalization with a discussion of the anticipated challenges.

EQUITY ADVISORS IN FIVE STEM-FOCUSED COLLEGES:

Equity Advisors serve as representatives of ADVANCE at the college level. They provide leadership for the institution to create a climate conducive to recruitment, retention, and promotion of women faculty and underrepresented minorities at ISU. Not all of their current activities will continue after NSF funding for ISU ADVANCE has expired, but the intent is to maintain those roles that are critical to sustaining the goals of ADVANCE. The project focused on just three colleges (College of Agriculture and Life Sciences (CALS), Engineering (ENG), and Liberal Arts and Sciences (LAS)), and the Deans of these colleges have approved a plan for three additional years of continued support (from 2011-14).

Recently (2010), ISU was also awarded an NSF grant in the competition for Innovation through Institutional Integration (I³), which is administered through the program on Research on Gender in Science & Engineering. Funding will support a new initiative at ISU, “Strengthening the Professoriate at Iowa State University” (SP@ISU), which will focus on Broader Impacts (BI) components of the research enterprise. The proposal for this award (SP@ISU) also includes support for the Equity Advisors, and adds activities relating to SP@ISU to the current

responsibilities of EAs. SP@ISU also includes the creation of EAs in two additional colleges: Human Sciences and Veterinary Medicine. Deans of each of these five colleges express enthusiastic support for the EA role. The specific duties of EAs within each college will necessarily vary somewhat according to the existing culture, mission, vision and strategic plan of each college. Even so, certain activities led by the EAs across the colleges will be fairly uniform which will help to maximize efficiency and accountability towards meeting the agreed upon goals of both ISU ADVANCE and SP@ISU.

The EA role is crucial to ADVANCE, especially with respect to providing leadership within the college and offering training opportunities on best practices and policies for enhancing the recruitment, retention and promotion of women and underrepresented minority faculty. The EA role is also crucial to SP@ISU, especially with respect to coordinating communication between the colleges and the SP@ISU program. There exist some significant challenges in the transition post award. The EAs in the three current colleges are well versed in much the existing literature related to equity and are familiar with the prior efforts of ADVANCE-ISU. Educating and training a new person is a significant challenge. This situation also exists when a current EA leaves the position. A second challenge exists in the coordination of EA efforts. The existence of a large (funded) network of ADVANCE personnel to facilitate EA activities and communication has enabled efficient and effective use of their time. If these activities must be taken on by the EAs themselves, less time is available for fulfilling other roles. For the short term, the SP@ISU grant may provide some necessary administrative support. Current activities of equity advisors include: leading the development and implementation of workshop and training opportunities (especially for department chairs and search committees), facilitating communication between ADVANCE and college administration through presentations and discussions with leadership, facilitating the implementation of best practices in transparency (in evaluation and assignments) and work-life management (both in policies and their use).

INSTITUTIONAL RESEARCH, CONTINUATION OF DATA COLLECTION AND MONITORING AREAS OF IMPROVEMENT AND NEED:

The ISU Office of Institutional Research (ISU IR) collects, analyzes, manages and reports data that are crucial to understanding issues of faculty recruitment, retention and promotion. ISU IR also manages and utilizes databases necessary for assessing the effectiveness of policies pertaining to faculty equity, job satisfaction and work-life management. The director of IR is a Co-PI and member of the ISU ADVANCE Leadership Team and as such has been partially supported through the grant. ISU IR has annually compiled the eight key indicator tables required by NSF (which are also used for other purposes on campus) as well as a number of other reports and analyses that are critical in monitoring the transformation process begun by ISU ADVANCE. In addition, ISU ADVANCE funds have supported a senior graduate student each year to help prepare the tables and reports.

Important ADVANCE analyses/activities conducted under the guidance of or in consultation with the Office of Institutional Research include:

- a cost/benefit analyses of implementing faculty work-life policies, including on-going monitoring of policy usage;
- faculty retention, salary, and start-up packages analyses by gender and race/ethnicity;

- faculty promotion analyses using longitudinal data sets maintained by the IR Office;
- the development, analysis and reporting of surveys and/or survey items related to faculty satisfaction and department culture (e.g., the COACHE and AAUDE faculty surveys);
- coordinating efforts with the Equal Opportunity and Diversity Office and Human Resources to assess search committee and hiring data;
- and fulfilling requests by ISU ADVANCE Equity Advisors for data pertinent to the achievement of equity-related goals within each college

While some of this data collection and manipulation is somewhat automated, its compilation and presentation are fairly time consuming. The data and analysis are useful to Executive Vice President and Provost to monitor the hiring and retention trends and distribution of resources for all faculty at ISU. The ISU ADVANCE program has suggested that many of the reports and indicator tables that have been developed for ADVANCE should continue to be analyzed and monitored in order to determine the long-term progress in institutional transformation. Also, because the “broader impacts” requirement by NSF and other federal funding agencies requires researchers to discuss how a proposed activity broadens the participation of underrepresented groups, these data will be critical to the successful funding of future research projects by ISU faculty.

COLLABORATIVE TRANSFORMATION:

Collaborative Transformation projects have been implemented in 9 focal STEM departments in three Colleges as previously reported.⁵ The full departmental CT process involves the collection of data from focal department faculty members and the Chair for use in the development of projects aimed at increasing faculty job satisfaction, commitment, and productivity and for improving the recruitment, retention and promotion of women faculty. Focal department data are analyzed by members of the ISU ADVANCE CT Research Team and a report is drafted based on the analyzed focal department data. CT reports are tailored to each department. The reports focus on areas of strength and need for ensuring that departmental work climates are as conducive as possible to all faculty productivity. An “ADVANCE Professor” (AP)—a faculty member and a small departmental advisory group presents departmental findings to departmental faculty for discussion and feedback. An action plan for addressing areas of improvement is developed and implemented under the leadership of APs and/or the department chair (or, where appropriate, an existing departmental committee).

The results of all departments are being collected for synthesis reports—one summarizing the key issues of strength and need across all 9 focal departments, and one summarizing the successful strategies for enhancing departmental work climate, which are currently being prepared.

Findings based on the ISU departmental Collaborative Transformation project are also being used to develop practical tools for training and assisting department Chairs across *all* ISU colleges and academic departments. The menu of tools being developed for training and assisting department chairs includes:

- Department Chair’s Guide to Enhancing Departmental Work Climate & the Recruitment, Retention and Promotion of Excellent Faculty
- Collaborative Transformation as a Model for Enhancing Departmental Work Climate & the

Recruitment, Retention and Promotion of Excellent Faculty – Departmental Retreat Version

- Collaborative Transformation as Model for Enhancing Departmental Work Climate & the Recruitment, Retention and Promotion of Excellent Faculty – Departmental Faculty Meeting Version (series of 3-4 departmental faculty meetings)
- Department Chair Training Guide: Enhancing Departmental Work Climate & The Recruitment, Retention and Promotion of Excellent Faculty

Of all of the ADVANCE efforts at ISU, CT is perhaps the most resource intensive and cannot be sustained in the post-grant period without modification. department chairs and ADVANCE Professors emphasize that the CT process itself has been crucial to the success of transforming departments. Faculty members in the focal departments note that CT focus groups and interviews led to discussions that faculty do not ordinarily have regarding workplace climate, unconscious gender and race biases in recruitment and promotion of faculty, job satisfaction, and work-life management. Thus, the menu of options for sustaining CT (so that it can be used in non-focal colleges and departments) include more succinct methods that economize the program but that may also reduce its effectiveness. Such methods are being piloted in 2011. Departments seeking to engage in the CT process will need assistance in determining which of the options from the menu of CT tools best meets their needs and support in coordinating and implementing the chosen option(s). Even so, implementing the menu of CT tools that are currently being developed will require the leadership and time of experienced experts. It is also essential to keep resources and training models up to date based on the needs of the ISU community and coordinate these efforts with current related research findings.

To sustain these three areas of strength and institutionalize ADVANCE successes, three areas of training have been identified – some focused on audience (e.g. department chair or search committee training), some on the training topic (systemic unintended bias).

DEPARTMENT CHAIR TRAINING:

In collaboration with the university level administration, ADVANCE-ISU has provided training workshops for all department chairs on issues pertaining to the recruitment, retention, and promotion of women and underrepresented minority faculty. During the past four years, training has been provided to department chairs in the three focal colleges on the topics of unintentional bias, preparation of candidates for promotion and tenure and identifying and responding to departmental culture. This training has complemented the chairs workshops that ISU already has in place, namely a one-day orientation for new chairs and administrators and two annual lunches with the president and provost that highlight a relevant topic (e.g., resource management model for budgeting, conducting effective searches, etc.). ISU senior leadership recognizes that the role of department chairs has become more complex in the past decade while their training and professional development opportunities has not kept pace. ISU ADVANCE has filled a critical role in the development of chairs training and workshops that provide needed professional development. Our institutional focus has largely been on new chairs, but ADVANCE has extended workshops to all chairs as part of an Effective Leadership Series that will continue to be sponsored by the Provost's office. The challenge includes maintaining the infrastructure of expertise of people to develop and run these workshops and the administrative burden of their coordination.

SEARCH COMMITTEE TRAINING AND TRAINING ON RECRUITMENT/ RETENTION/ PROMOTION:

The ISU ADVANCE program has engaged in a number of activities focused on educating faculty search committees about best practices. Collecting, preparing and disseminating resources for optimizing the faculty search process was the focus of the Year 3 Faculty Fellow. The result is an extensive set of resources to aid faculty search committees in planning and executing an effective, efficient and fair faculty search. In addition to links to literature and other information, this includes 20 short documents, with guidelines and suggestions for the search process, sample evaluation forms, and ideas for discussions to have with departmental faculty. These resources are available on a DVD, which has been broadly disseminated, and via the ISU ADVANCE website.¹⁵ In addition to these resources, ISU ADVANCE Equity Advisors have given presentations to search committees and department chairs. These short training sessions include discussion of unintended bias, best practices for broadening the pool and evaluating candidates, and information on additional resources. Continued work in this area includes:

- Revising existing web and electronic resources to be more inclusive of recruiting underrepresented minorities.
- Reviewing current national data and literature related to best practices for faculty searches.
- Working with Equity Advisors to develop strategies for reaching all faculty search committees.
- Developing and delivering a curriculum to get best practices on recruiting underrepresented minorities in STEM to search committees and department leadership.
- Using newly developed materials to train a select number of search committees as a pilot study
- Designing an assessment plan for the pilot process and adapting it for inclusion in standard search procedures
- Planning and delivering a department chair/senior faculty workshop on best practices in recruiting a diverse faculty.

There are a number of challenges in implementing this training. Choosing who to train is problematic. The structure of search committees varies by department and sometimes by the individual search. Some departments have standing search committees; others constitute a new committee for every search. It is possible that we can train a cadre of people to become ‘trainers,’ but this would require resources to initiate and maintain. Some departments or individuals have long standing practices and procedures that may be inconsistent with the best practices we are trying to promote. It is reasonable to anticipate resistance to change. For this reason it will be necessary to motivate change by providing data regarding the success of the proposed approaches. These data are difficult to obtain. Additionally, it is unclear whether training can be or even should be made mandatory. It is difficult to determine the most effective and efficient mechanism by which to deliver training. Options include DVD-based productions, interactive online training programs that can be completed individually, personal (face-to-face) training and discussions led by a trained facilitator, or a combination of approaches. Our efforts to capture data related to ongoing searches (candidates, finalists, interviewees) is made very difficult by the fact that information on ethnicity and gender are self-reported and are voluntary, which results in a low rate of reporting. Data on the number of available women and/or underrepresented minorities in sub-disciplines are often very difficult, if not impossible, to extract from general data. This makes it difficult for committees to know whether their applicant pool is

representative of the available population. In general, there is a lack of accountability of search committee members with regard to broadening the pool or applying best practices. There is also a lack of continuity from year to year.

TRAINING ABOUT SYSTEMIC UNINTENDED BIAS:

ISU ADVANCE has provided training for all ADVANCE personnel on systemic unintended bias. Systemic unintended bias is at the heart of the challenge in creating work cultures that promote the satisfaction and success of women and underrepresented minority faculty members. It involves the unintentional and often overlooked ways that job satisfaction and career success of women and underrepresented minority faculty are negatively impacted by biases at individual, interpersonal and institutional levels of the organization. These workshops introduce participants to national and institutional data on the status of women and underrepresented minorities and to the latest research on how systemic unintended bias affects the job satisfaction and success of women and underrepresented minority faculty. Workshop participants use this information to work through case studies on topics that participants are likely to face including mentoring, recruiting and hiring, and promotion and tenure. The need for continuing this training supports institutionalization at all levels. Equity Advisors and ADVANCE Professors themselves need training in order to conduct or participate in training and workshops for chairs and search committees. The major challenge in continuing this training is in finding and supporting personnel with the expertise, skill and time to conduct these trainings and keep trainings up to date based on the needs of the ISU community and with current related research findings.

Other key factors to success in institutionalization – people and space

It is also important to recognize that all program successes have occurred contingent upon leadership and collaboration at multiple levels, including the PI, the Executive Director, the Director of Research, the Steering Committee and the ADVANCE Co-PI team. Additionally, the ADVANCE Program has office space in the Office and Lab Building and a program assistant. An office space with campus visibility, and a director serving the role of the campus contact for these efforts and leading the day-to-day activities of the program is essential for continued success, even for a scaled-down version of ISU ADVANCE. Continuing leadership of ADVANCE activities could be the responsibility a person (director) who also provides leadership for other programs and efforts with similar goals. A strong long-term commitment from the Executive Vice President and Provost's office is essential to providing the credibility needed for these efforts. Discussions to address these issues are underway.

Financial resources for future efforts are a significant challenge: NSF funds that supported the ISU ADVANCE Program were used primarily for salaries and benefits for faculty, staff, and students. Of \$2.2 million direct costs, \$1.9 million (85%) was spent on salaries and benefits for the PIs and program staff, but also for release time for the faculty involved. Nevertheless, participation of faculty, staff, and administrators is vital to continuing and enhancing the institutional transformation that has occurred in the past 5 years. As a funding plan develops for future support of ADVANCE efforts, it will be necessary to recognize that the people who have contributed to the success of the ISU ADVANCE Program have been able to do so, in part, because the allocation of their time has been acknowledged with financial resources. If those

resources are not available in the future, the work may not get done. Undoubtedly difficult choices will need to be made about where to allocate scarce resources.

Summary

To sustain the institutional transformation begun through this grant, six key areas of institutionalization have been identified. These include the Equity Advisor – a key coordinator, advocate and resource for colleges; accurate data – through consistent collection and evaluation from Institutional Research; and departmental buy in – through Collaborative Transformation. These can only be achieved with effective leadership - through chair training; inclusive hiring practices – through search committee training; and cultural change – through understanding systemic unintended bias. The challenges are formidable – and progress likely to be slow (as it must be in any sustainable long-term cultural change). Key challenges include maintaining activity, commitment, and visibility in an environment where all expenditures across the university are being carefully scrutinized. Allies in this effort include strong administrative support both at the university and college levels and the leveraging of additional resources represented by the recently funded SP@ISU grant.

References

1. Iowa State University Fact Book, 2009-2010, Office of Institutional Research, Iowa State University, 2009-2010 <http://www.ir.iastate.edu/factbk.html>
2. Iowa State University Office of the Provost. 2003. *Taskforce on the Recruitment and Retention of Women and Minority Faculty Report*. <http://www.provost.iastate.edu/faculty/diversity/> Iowa State University Website
3. Rankin, Susan. (2004) ISU Campus Climate Assessment Project Final Report. Rankin and Associates. <http://www.hrs.iastate.edu/AAO/eod/finalreport.pdf>
4. Constant, K. P., Bird, Sharon, Hamrick, Florence (2008). "Advancing Women Faculty in Engineering through Institutional Transformation: the Iowa State University ADVANCE Program in the College of Engineering." *ASEE Proceedings of the Annual Conference, Pittsburgh, PA*
5. Constant, K.P, (2010) "ISU ADVANCE – Transformation Across the University Hierarchy to Enhance Recruitment, Retention and Advancement of Women Faculty in Engineering", *Proceedings of the ASEE Annual Conference, Louisville, KY*
6. ISU ADVANCE Grant Proposal, (2005) accessed through ISU ADVANCE Web Page Jan. 9, 2011 <http://www.advance.iastate.edu/homepage.shtml>
7. Bystydzienski, Jill M. and Sharon R. Bird (eds.). (2005) *Removing Barriers: Women in Academic Science, Technology, Engineering and Mathematics*. Bloomington: Indiana University Press.
8. Iowa State University Committee on Women. 2002. *Status of Women Report*. Task Force on Data Analysis, August.2002<http://www.public.iastate.edu/~ucw/Reports/homepage.php>
9. Women Faculty in Engineering at Iowa State University, ISU University Committee on Women, (2005) accessed Jan. 8, 2011, http://www.public.iastate.edu/~ucw/Reports/final_engr_rpt_2005.pdf
10. Callister, Ronda Roberts. 2006. "The Impact of Gender and Department Climate on Job Satisfaction and Intentions to Quit for Faculty in Science and Engineering Fields." *Journal of Technology Transfer* 31:367-375.
11. Bird, Sharon R., Jacquelyn Litt, and Yong Wang. 2004. "Creating a Status of Women Report: Institutional Housekeeping as Women's Work." *National Women's Studies Association Journal*, 16 (1):194-206.
12. Bird, Sharon R. and Florence A. Hamrick. 2008. *ISU ADVANCE Collaborative Transformation Synthesis Report of Year 1 Department-Level Findings*. Iowa State University ADVANCE Program, Ames, Iowa.
13. Bird, Sharon R., Laura Rhoton, Carla Fehr and Lisa M. Larson, 2010. "ISU ADVANCE Collaborative Transformation Project: Focal Department Synthesis Report Round 1 and 2)." 16 pages. Ames, Iowa: Iowa State University ADVANCE Institutional Transformation Program. Available at <http://www.advance.iastate.edu/reports/reports.shtml>, Accessed Jan. 8, 2011

14. Bilimoria, Diana, Susan R. Perry, Xiangfen Liang, Eleanor Palo Stoller, Patricia Higgins, and Cyrus Taylor. 2006. "How Do Female and Male Faculty Members Construct Job Satisfaction? The Roles of Perceived Institutional Leadership and Mentoring and their Mediating Processes." *Journal of Technology Transfer (Issue on Women in Science)* 31:355-365.
15. Iowa State University's ADVANCE Website Resources for Faculty Searches accessed Jan. 8, 2011
http://www.advance.iastate.edu/resources/fac_search.shtml.
16. Iowa State University's ADVANCE Website Resources for Work Life
17. <http://www.advance.iastate.edu/worklife/worklife.shtml>
18. Iowa State University's ADVANCE Website Resources for Pathways to Promotion
<http://www.advance.iastate.edu/>
19. Bird, Sharon R. "Unsettling the University's 'Incongruous, Gendered Bureaucratic Structures': A Case Study Approach." *Gender, Work and Organization*. Online early publication 19 Jan 2010
20. Iowa State University Office of the Executive Vice President and Provost Website University Life Survey,
<http://www.provost.iastate.edu/reports/universitylife2007/> Accessed Jan. 8, 2011
21. Iowa State University 2008 Faculty Satisfaction Survey conducted by Institutional Research Report in cooperation with AAUDE. <http://www.advance.iastate.edu/reports/reports.shtml> Accessed Jan 8, 2011