

Recruiting and Retaining Engineering Female Faculty at Utah State University

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Introduction

ADVANCE at Utah State University (USU) is a five-year institutional transformation project funded by the National Science Foundation to increase the participation and advancement of women faculty in the sciences and engineering. A multi-disciplinary team of faculty members from the Colleges of Business; Engineering; Humanities, Arts, and Social Sciences; Natural Resources and Science work on the project. The project addresses problems that impact the effectiveness and satisfaction of all faculty members, but weighs more heavily on women and underrepresented minorities. Our research strives to identify the bottlenecks to advancement, initiate change procedures and track outcomes. ADVANCE efforts focus on three main areas: Departmental Climate, Policies and Procedures and Faculty Recruitment. The ADVANCE program has been in place at Utah State for 2 years. Research on ADVANCE topics has been on-going for 3 years.

The ADVANCE team at Utah State University is lead by Ronda Callister, an Associate Professor of Management and Human Resources. Professor Callister is serving as the principal investigator on this project because of her background in improving and changing organizations. Co-Principle Investigators include Christine Hailey, Associate Dean in the College of Engineering, Christine Hult, Associate Dean in the College of Humanities, Arts and Social Sciences, Robert Schmidt, Associate Professor in Environment and Society, and Kim Sullivan, Associate Professor in Biology. Mary Feng serves as the ADVANCE project leader. Ryan Dupont is the leader of the Science and Engineering Recruitment Team (SERT).

Initial Conditions

As the ADVANCE team developed the Utah State ADVANCE project, we realized that we needed to know the local issues concerning recruitment and retention that were important to women faculty in the STEM fields (Science, Technology, Engineering and Mathematics) at Utah State. In 2002 and 2003, the ADVANCE team interviewed current and recent women faculty (n = 42) and a matched sample (n = 40) of male faculty from the Colleges of Agriculture, Engineering, Natural Resources and Science.¹ We asked each faculty member:

- 1) What factors at USU contributed to your career success and job satisfaction?
- 2) What factors at USU were obstacles to success or sources of job dissatisfaction?

3) What changes would you like to see at USU to improve the recruitment and retention of faculty?

Comments made by faculty were categorized into nine categories of positive or negative remarks. Four researchers independently scored each interview transcript and came to consensus on whether or not a faculty member included a category in their remarks. The major findings from our interviews are presented below.

a) Sources of success and job satisfaction were similar for male and female faculty. We found no significant differences (chi square analysis) between male and female faculty in sources of career success and job satisfaction at USU. The top four sources of success and satisfaction in descending order were interactions with colleagues, campus resources, support of administrators, and positive teaching experiences.

b) Male and female faculty were equally likely to identify resources, administrators, teaching and salary as obstacles to success and sources of job dissatisfaction. The responses of male and female faculty were similar for many of the categories of obstacles to career success and job satisfaction. The most frequently reported sources that did not differ between men and women in descending order were lack of resources on campus, negative interactions with administrators, negative teaching experiences, and low salary.

c) Significant gender differences were identified in four obstacles to career success and sources of job dissatisfaction categories. We found significant gender differences ($P < 0.02$) in four categories of obstacles to success and sources of dissatisfaction. Women faculty were more likely to report negative interactions with colleagues, negative experiences with the process of evaluation, promotion and tenure, difficulty balancing work and family life, and overwhelming workloads.

d) Discussion

The experiences of men and women are similar in many respects. The differences arise from interactions with colleagues, larger advising and committee workloads, balancing work and family, and bias in tenure, promotion and evaluation. These factors are interrelated in that women faculty advise more students and serve on more committees; neither of these activities were valued for promotion and tenure. Women faculty reported being left out of collaborations and informal networks and receiving little mentoring; all of this negatively impact promotion and tenure.

A clustering analysis¹ of the specific comments made by male and female, tenured and untenured faculty revealed several patterns where interactions with colleagues become a key component to overall job satisfaction.

- Untenured male and female faculty had similar perceptions about USU, these perceptions diverged over time with tenured men becoming more satisfied with their experiences at USU and tenured women becoming less satisfied.

- Untenured faculty viewed tenure and evaluation as an administrative process while tenured faculty viewed it as a decision made by colleagues, with women reporting many more negative interactions than men.
- Women associated access to resources with administrators while men associated access to resources with networking among colleagues.

The patterns detected at Utah State are not unique. Similar concerns were reported by STEM faculty in the landmark 1999 Study on the Status of Women in Science at MIT². At MIT, untenured women reported similar perceptions as untenured men but tenured women reported increasing marginalization with time spent at the university. In addition, faculty climate surveys conducted at other NSF ADVANCE institutions including the University of Wisconsin (Madison)³ and the University of Colorado⁴ have also identified similar issues brought up by USU faculty.

The issues expressed during the faculty interviews helped shape the ADVANCE proposal submitted to NSF. Utah State's ADVANCE team quickly realized the fundamental importance of day to day collegial interactions in determining career success and job satisfaction. A main thrust of the Utah State Advance project is departmental intervention to improve collegiality and collaboration and to enhance work/life balance. Utah State's ADVANCE research on institutional transformation also focuses on updating policies that affect work/life balance, promotion and tenure, and access to resources, as well as administrator development to promote faculty success.

Department Transformation through the Dual Agenda Program

Based on the structure of academic institutions, ADVANCE believes that the greatest change to benefit faculty members will be at the department level. To address dissatisfaction among faculty ADVANCE has implemented a "Dual Agenda" program, developed by Rapoport, Bailyn, Fletcher, and Pruitt⁵, at the department level. The Dual Agenda model focuses on both gender equity and work effectiveness. This approach uses work/personal life integration issues as a lever for change that can enhance productivity, improve gender equity, ease conflict between work and personal lives, and strengthen working relationships within departments. The model goes beyond work/personal life to make the workplace more equitable and improve the quality of working people's lives. This approach has been successful in business organizations such as Xerox and is modeled to work for other organizations. ADVANCE is experimenting with the model for the first time in a university setting.

The method of the Dual Agenda model is designed to uncover gendered assumptions, such as those about competence and commitment, which underlie work practices that are both inequitable and ineffective. Once found and analyzed, action plans can be put into place. The underlying approach to the method is to focus on joint inquiry, collaboration, and commitment to change. None of these characteristics are new or unique but what differentiates the Dual Agenda model from other models is that change must link organizational goals of equity and effectiveness, usually assumed to be adversarial. As far as model structure, there are three main elements: research, action, and interactive collaboration. The research step surfaces underlying

assumptions, the action step reflects commitment to learn and take action to make things better, and the interactive collaboration step brings the Dual Agenda expertise together with the internal expertise of the organization's members in exploration. Prior to implementing the model, it is imperative to begin with the Dual Agenda change itself – establishing a link between equity and effectiveness.⁵

To facilitate adaptation of Dual Agenda techniques to an academic setting, a highly experienced consulting team, having previously addressed issues in a number of business organizations, has been hired to facilitate the program. These outside consultants have now worked with three departments, separately, to assess department climate, identify issues, and develop programs which enhance the climate. Work was performed through individual faculty interviews and through department discussions. To date, intervention has occurred with one engineering department and two science departments.

The consultant Utah State uses to interview and engage faculty members in discussion has worked extensively in the area of organizational change and effectiveness using the Dual Agenda model and has an excellent working knowledge of academic institutions. Preparation in department history and culture combined with the ability to listen to faculty and understand what gets in the way of having a better quality work-personal life is critical in her ability to engage faculty in the process. She identifies key leverage points for change in culture and work practice and develops a set of focal points for change. She engages faculty through questions on the feedback she provides and encourages the flow of ideas and solutions.⁶

After individual interviews were conducted and feedback provided, as a group, faculty members came up with programs specific to their department to resolve climate and efficiency issues. But as with any faculty member, the largest issue of all is the already overburdened workload of faculty members and lack of time to work on these issues. ADVANCE works with each department and specific faculty members to construct an implementation process for change that includes temporary relief of time and workload to make time for department change.

To measure the changes within departments, we have implemented a climate survey. The survey will be implemented again after 5 years as a measure of change that might actually have occurred within the department. To support department changes, ADVANCE has provided regular communication to college Deans on the process and status of the program.

Through this department transformation process, engineering tenure-track faculty expressed the need to:

- reduce isolation,
- increase communication,
- increase connectivity and collaborations (especially as subfields shift and funding for research shifts, ensuring that all faculty continue to feel engaged in the department and with each other),
- have strong mentoring and leadership that promotes mentoring at the university and department level,

- have a dialog and confirmation that resources are scarce and address the dynamics of internal strife this causes within a department, and
- address transparency of resource allocations.

Apparent in the dual agenda department intervention, those issues needing the most attention within a department were also the greatest sources of dissatisfaction of women tenure-track faculty in the job satisfaction interview results - isolation, collaboration/communication.

The dual agenda department intervention program is still underway with more departments to participate over the next year to two years. Final results of this program will not become apparent for a few more years but initial results indicate the program has had the following positive effect on:

- informal communication within a department,
- empowering faculty to address department issues not otherwise discussed,
- allowing for faculty-grown solutions,
- spreading ownership and workload of improving department climate among the members (reducing the work burden of any one particular person),
- awareness to administration (Department Head/Chair) the obstacles to success and satisfaction of faculty members (our work has frequently found gaps in what administration believes versus what faculty believe), and
- empowering faculty to keep issues alive and drive progress on issues.

A critical factor for the ADVANCE dual agenda program is the ability for a department or institution to provide modest one-time financial resources to support the change process and provide relief to faculty on service, teaching, or in other areas. Another key to success is also the required need by the Department Chair/Head to be open to change and to the belief that change will improve the department and benefit all faculty members.

In addition to departmental changes, ADVANCE is working at making work/personal balance a priority at the institutional level as well. ADVANCE is working at the administrative level on changing policies and procedures towards recruiting, P&T, dual career assistance, research grantmanship, research networking, child care and other activities important to faculty careers and their personal life.

Policies and Procedures

Research has shown that implementing policy and procedure changes provides a base for institutional change. To support department change, the ADVANCE team is reviewing university policies to reduce gender-related conflicts and to provide training for administrators (Deans, Department Head/Chair) and faculty committees to eliminate biased decisions and procedures. Policies related to promotion and tenure and dual career hires have been recommended for change. To address the results of low job satisfaction among tenured women faculty, changes to the P&T policy have been submitted which provide more mentoring, initiated by the department, after a faculty member has received tenure. In addition, a new child care

program is underway and a new faculty mediation program has been piloted to provide an informal method for conflict resolution.

Other programs made available by ADVANCE to help with work/personal balance and collaborations are the transitional program and collaborative seed grant program. Both programs are pilot programs and provide modest amounts of funding for women faculty members going through life transitioning events or looking for collaborative research, respectively. If these pilot programs prove successful, ADVANCE hopes they will be adopted as permanent programs for all faculty members across the university.

Another major part of our institutional change effort is improving the recruitment of women and under-represented minorities into tenure-track faculty position. As of October 2004, USU has 5 tenure-track women faculty members out of 73 total tenure-track faculty in the College of Engineering and 42 tenure-track women faculty members out of 238 total tenure-track faculty in the Colleges of Agriculture, Natural Resources, Sciences and the department of economics, combined.⁷

Faculty Recruitment

ADVANCE has created a faculty based Science and Engineering Recruitment Team (SERT) which works specifically to build an environment that attracts and supports faculty on a personal level. SERT is a team made up primarily of faculty members. They collaborate with hiring committees to attract a broad and diverse pool of qualified candidates, provide recruiting strategies, and act as an information resource.

SERT's main goal is to develop more formalized responsibility and accountability for improving diversity within colleges, departments, and search committees. Through research and interviews, the team has developed recommendations for change to the search process which include accountability for contacting qualified minority and women candidates and availability of researched sources to help committees find qualified candidates. These recommendations have been discussed with all the engineering and science colleges and SERT hopes to make them part of the formal process.

Over the last 2 years, SERT has collected a wealth of knowledge related to how searches can be run more effectively and ways in which search committees can expand their candidate pool. The SERT team continues to work to be more proactive with search committees by providing a SERT member for each search. SERT has found the most effective time to be involved with a search is during the development of the job announcement. This early participation in the search process helps provide time and resources to identify effective avenues for attracting a qualified and diverse applicant pool. The team also acts, upon request, as a resource in seeking out available financial resources to support improving pool diversity. Once the search process has started, SERT actively participates in a non-voting manner through:

- Active support in steps leading to applicant review and selection
- Distribution of job descriptions
- Development of applicant pool

- Development of evaluation matrix and review/evaluation process.

(Recruiting methodology procedures, forms and checklists can be found at the ADVANCE website, www.websites.usu.edu/advance).

One of SERT's most valuable services is their ability to visit with on-campus interviewees as a non-biased information resource during the interview process, thereby helping sell the university and the academic/local community with diversity in mind.

SERT has spent a great deal of time and effort communicating their services to Department Heads and Search Committees. In addition to the team's on-going activities, the team is beginning to develop a best-practices guide for the on-campus interview process, and formalize the procedures for data collection on success and effectiveness of SERT and their impact on faculty diversity.

Initial implementation of SERT involved a great deal of research, planning and communication to the engineering and science colleges. Implementation of SERT has highlighted the importance of administrative support. The following key administrative factors have been found necessary for success in recruiting and the effectiveness of SERT.

- Focus and accountability in the job search process
- Global goals for diversity improvement
- Clear articulation of these global goals from administration to deans, departments, and search committees
- Recruiting must be taken seriously
- Diversity improvement needs to be viewed as a critical issue down to the individual search level
- Resources and time must be made available to properly conduct the search
- There must be top down administration support for the goals of SERT
- There should be consistent implementation of SERT services across all searches

ADVANCE has also discovered through an informal interview process that women faculty members are not eager to apply and move to a new faculty position if they are more established in their current position. So higher-level positions such as Department Head/Chair, Dean, and even senior faculty positions require even more proactive involvement in the search process.

When hiring for a more senior position, ADVANCE and SERT recommends that:

- Senior faculty contact senior candidates (regardless of field of study, having a Provost or Dean from another college call candidates to encourage them to apply),
- Senior women contact senior women candidates (this provides candidates the opportunity to understand the dedication and commitment the university, college and/or department has to women/minority groups and individuals)
- Higher level senior administration (Presidents and Provosts) contact senior administrative candidates (Deans and Department Head/Chair positions)
- Early marketing of the position allows for minority or women candidates more time to consider making a move from their established current position

- Administrative positions may require modified interview tactics (meeting in airports, prior invite as a guest speaker)

An easy trap to fall into is to have a woman or underrepresented minority faculty member serve on every search committee and for this member of the committee to do the legwork required in identifying minority and women candidates. Obviously, this is not recommended and will mostly likely result in no beneficial results and a risk to job satisfaction by that search member.

Through SERT activities, it has been discovered that a more proactive process and attitude toward recruiting is required to change the way faculty are recruited. This new proactive process must be embraced by all members of the search committee and most importantly led by the search committee chair. Through various exercises with administration and faculty at Utah State it has been proven that old habits are hard to abandon. Moving from a reactive recruiting process to a proactive recruiting process takes a leadership change, department change, search chair change, and individual change.

The following recommendations are provided to other institutions if they are trying to change their recruiting process and results to include more diversity.

- a. Make diversity recruiting at the faculty level a clearly defined university priority (through a Strategic Planning or Compact Planning Process, if available).
- b. Make new recruiting procedures and processes consistent throughout targeted colleges.
- c. Incorporate diversity recruiting goals into performance evaluations at the Dean, Department Head/Chair, and faculty member level to associate responsibility and rewards with actions and accountability.
- d. Administration and faculty must take a proactive, hands-on approach to change recruiting and committee attitudes.

Findings/Summary

ADVANCE is entering its third year of activities as part of a 5-year institutional transformation project funded by the National Science Foundation to increase the participation and advancement of women faculty in the sciences and engineering. To date, the ADVANCE team at Utah State has found the following items must be in place to support institutional transformation.

- Administrative support and leadership - the need for this support and leadership to transform into accountability is critical,
- Support for the program at the faculty level,
- Collection of impact data that is specific to your institution,
- Support of institutional changes with modest financial resources
- Consistent communication at all levels,
- Awareness and training at all levels: faculty, Department Head/Chair, Dean, Administration
- Policy change that supports institutional change

- Clear, consistent, frequent communication of policy across the university/colleges/departments,
- Changes at the department level (this can be the most difficult but also the most rewarding and of most impact to individual faculty), and
- University support for institutional changes necessary for work-personal life balance

ADVANCE at Utah State University is working on other programs such as part-time tenure track, clear communication and application of the tenure and promotion process and measures, and the effect of family friendly policies across the U.S. public institutions ability to attract and retain women engineering faculty. As results come in and new findings develop, Utah State will share what we learn. We hope that other institutions can extract useful information from our work as they pursue their own quest for improving the climate and effectiveness for faculty at their own institution.

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6. Extracted and interpreted from written text provided by Maureen Harvey, Dual Agenda consultant for ADVANCE at Utah State University.
7. Based on data gathered from university and college records. Figures includes administrative faculty who hold positions in their academic college. The total number of faculty members is an estimate due to a handful of faculty who may have left the university but records were not completed at the time of data collection.

Biographical Information

MARY FENG is the program lead for the ADVANCE program at Utah State University. She has an engineering background and has been leading projects for over 10 years. She also serves as a liaison to the USU Women's Center and serves on the university's diversity council.

CHRISTINE HAILEY is an Associate Dean in the College of Engineering and Director of the National Center for Engineering and Technology Education, an NSF-funded Center for Learning and Teaching. She also serves in a part-time capacity as Associate Vice-Provost for Women's Issues and as a Co-PI on the ADVANCE team. She is Chair of the Rocky Mountain Section of ASEE for the 2004-05 academic year.

R. RYAN DUPONT is a Professor of Civil and Environmental Engineering, a Research Associate at the Utah Water Research Laboratory, and the Head of the Division of Environmental Engineering. He leads the ADVANCE Science and Engineering Recruitment Team. His research interests focus on the bioremediation of petroleum and chlorinated solvents contaminated soil and groundwater.

KIM SULLIVAN is a Professor of Biology at Utah State University and a fellow of the American Ornithologists' Union. Her research focuses on ornithology, animal behavior, and women in science. She led the original research conducted by Utah State for the NSF ADVANCE proposal and is a co-PI on the ADVANCE team.