AC 2009-1845: FUNDING AGENCIES LOOK FOR INDICATORS OF A POSITIVE ENVIRONMENT FOR FACULTY MEMBERS

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Introduction

The Clare Boothe Luce Program of the Henry Luce Foundation; The Workplace, Work Force and Working Families Program of the Alfred P. Sloan Foundation; the New Scholars Program of the Elsevier Foundation; and the ADVANCE Program of the National Science Foundation make grants to improve the work environment for female and male faculty members in engineering and the sciences. The review criteria developed for these programs and components of successful grants suggest indicators of a positive environment for female and male faculty members. Similar to the proverbial "canary in the coal mine", females' decisions not to pursue careers in academia, or their premature departures from academic environments, suggest that negative conditions in the work environment may be one factor for the ever-declining proportions of women at each rank of academia.

Background

Research on factors that may account for the lower proportion of women in the various ranks of science, technology, engineering and mathematics (STEM) faculties includes the effects of implicit and explicit bias; differential effects on women of conflicts between work and family demands; unequal access to resources such as space, salary, and supporting facilities; and underrepresentation of women in academic leadership and decision-making positions.[1] The cumulative effect of such diverse factors has been to create formidable barriers to the participation and advancement of women in academic STEM careers. Overcoming and eliminating these barriers and challenges, as well as addressing emerging challenges such as the increasing emphasis on a globally engaged STEM academic workforce and the increasing interdisciplinarity of STEM research and education, is critical to support the full participation of women in academic STEM careers.

The full participation of women in academic STEM careers is important given the pivotal roles that faculty members and administrative leaders have as intellectual, professional, personal, and organizational role models who shape the experiences and expectations of many prospective scientists and engineers. Persistent underrepresentation of women faculty, especially in leadership positions, may affect all students' critically important relationships with mentors, participation as members of research and education teams, and self-identification as potential researchers.

Henry Luce Foundation

The Clare Boothe Luce (CBL) Program has two goals—to support women who are studying or teaching in the sciences and engineering and to serve as a catalyst for institutional change so that women can thrive and reach their full potential. In order to better understand the experiences of high quality female faculty members, current and former CBL Professors were surveyed by Rosser and Daniels[2]. The outcomes of this research suggest two major areas of influence on the career development of outstanding faculty members—broad access to success and a positive working environment where no individual or group of faculty members feel isolated, undervalued, or unintentionally excluded from information[3]

The task then was to translate research findings into selection criteria and grantmaking decisions. The CBL Program has a three-tiered selection process for CBL Professorship grants. The first part requires a two-page Information Form required to be considered for an invitation to submit a proposal. The form must be completed by a university-level administrator since the CBL Programs encompasses the sciences, mathematics and engineering. The first page of the form requests statistical information for the previous ten years so that the Selection Committee can ascertain if an institution is hiring female and male faculty members at proportions comparable to the national Ph.D. production proportions during that time period. The statistics requested also indicate if retention, tenure and promotion results are similar for female and male faculty members. The second page of the Information Form requests evidence of the institution's strength in the sciences and engineering and evidence of institution's commitment to the goal of the Clare Boothe Luce Program to increase the participation of women in the sciences and engineering. The key word is "institutional" commitment. Some institutions write about a female faculty member, several female faculty members or a student organization who implement pre-college, retention or mentoring activities. Such examples describe activities which may be admirable, but are taking faculty and student time away from important teaching, research, or learning responsibilities. True **institutional** commitment is evident through the significant commitment of institutional resources to counteract factors that limit the progress of women; efforts to increase the participation and advancement of women that are proactive and institutionally sponsored; and programs, policies or practices that have equitable results for the recruitment, retention and career development of students and faculty.

The second tier of the CBL grantmaking process is the consideration of invited proposals. A CBL Professorship may be proposed only for a <u>new</u> tenure-track faculty position (not an existing vacancy) to be filled by a woman who is beginning her academic career. The intent of this award is to identify women scientists and engineers of the highest caliber and to guarantee early in their academic career, opportunities commensurate with their considerable talents. The candidate must be external to the institution's existing faculty. The proposal must describe how the institution plans to increase the recipient's external visibility and nurture her professional development (e.g. mentoring by senior faculty, resources for research, additional travel funds, relief from administrative duties). The proposal must also provide evidence that administrators understand factors that may hinder a woman's career advancement and describe how institutional policies and practices have evolved to successfully recruit, hire and advance women faculty members. The grant is for the first five years of the professor's academic career and covers salary, benefits and a career development fund (20% of base salary) to cover professionally

related expenses (e.g. instrumentation, attendance at professional meetings, and child-care). The recipient of the professorship acts as the principal investigator of this allocation and should be mentored by an experienced faculty member who is knowledgeable about how to leverage these funds. This allocation may not replace normal start-up funds. The institution is expected to provide the facilities and resources required by the nominee for her research equal or greater in value to those provided to comparable faculty.

The final tier of the CBL grantmaking process is for members of the committee to make a site visit to the colleges and universities receiving final consideration for a CBL Professorship. During this visit discussions are held with senior administrators; department chairs of potential CBL Professor placement; and female faculty members. Discussions with senior administrators and department chairs focus on hiring processes and procedures, work/life/family policies, and career development activities. The discussions with female faculty members focus on their knowledge of those same topics and their opinions of the effectiveness of those programs, policies and procedures. Through all of these discussions the committee members hope to gain an understanding of the environment that exists for a potential CBL Professor.

Institutions that received a CBL professorship grant in recent years include Agnes Scott College; Boston College; Colorado School of Mines; Columbia University; Northwestern University; University of Colorado, Boulder; University of Maryland, Baltimore County; University of Portland; University of San Diego; University of Texas at Austin; University of Wisconsin, Madison; and Wellesley College. Many of these institutions shared common attributes:

- Senior administrators and department chairs have studied their institution, understand where gender differences exist within the institution and are working to eliminate those differences (e.g. the M.I.T. study investigating the allocation of resources to faculty members[4]).

- Senior administrators and department chairs have discovered ways to eliminate or mitigate feelings of isolation and stereotyping frequently related by low representation of any group. Examples of such programs include mentoring of all new faculty members by senior faculty members; networking events for female faculty members across the college/school or the entire university to diminish feelings of isolation; and structuring of departmental/college symposia to ensure the inclusion of distinguished female speakers.

- Senior administrators and department chairs have some knowledge of research on gender and value the understandings they have discovered from that research. They work closely with social scientists and education faculty members who have more expertise in this area of research.

- Promotion and tenuring processes are stated openly so that they are clearly understood by both the beginning faculty members who must negotiate them and the senior faculty members responsible for their implementation.

- Department chairs and faculty members have developed a positive environment in which the individual talents of new faculty are recognized and appreciated; in which communication is collegial rather than argumentative; and in which faculty members trust one another and affirm new ideas rather than forcing new faculty members to conform to old patterns of interaction.

Alfred P. Sloan Foundation

As part of a larger $118 million grant-making program focused on work-family issues, the Alfred P. Sloan Foundation has funded a number of seminal studies examining what life is like for faculty members who try to balance the demands of an academic career and a family. Mary Ann Mason and Marc Goulden of the University of California, Berkeley report that women are most likely to drop out of the academic pipeline immediately following completion of their Ph.D.s, frequently because they cannot see how to advance an academic career and have children. Robert Drago and Carol Colbeck, in a Pennsylvania State University study, find that significant numbers of female faculty, and to a lesser extent their male colleagues, on tenured/tenure-track lines have fewer children than they want, including having no children, and engage in behaviors, such as not using available leave policies, out of fear of biased treatment. Furthermore, additional research shows that as the population ages, many faculty members are called on to care for their elderly parents and relatives. Given that these work-family demands now occur at all ages and career stages, flexible career policies and programs are becoming increasingly necessary. They provide a means of helping to meet the needs of an increasingly diverse faculty, as well as helping to advance institutional goals, such as improved recruitment and retention and maintaining academic competitiveness in a global market.

In recognition of the need for more career flexibility in higher education, the foundation partnered in 2005 with the American Council on Education (ACE) and Families and Work Institute (FWI) to design and administer a competitive awards program to recognize those universities and colleges making significant headway in implementing, without jeopardy to those using them, policies, practices, and programs related to career flexibility. The resulting *Alfred P. Sloan Awards for Faculty Career Flexibility* also provide to the winning universities and colleges accelerator grants of $200,000 or $250,000 to further advance and institutionalize their faculty career flexibility efforts.

The rigorous application process is three staged: an institutional survey completed by the provost or chief academic officer; a faculty survey requiring a minimum 40 percent response rate by faculty members; and a detailed accelerator plan that details how, if the award is won, the award monies will be spent to further accelerate institutionalization, through policy and culture, career flexibility on their campus. To be successful candidates, applying institutions must show that their efforts will meet the needs of both the institution and the faculty and that flexibility will be made available to faculty at all stages of career and life course. Winners of the awards are selected by a panel of judges, chosen on the basis of their distinguished careers in higher education, usually as college or university presidents.

For purposes of the *Sloan Awards for Faculty Career Flexibility*, the foundation suggests the following policies as examples of best practices in career flexibility:

- on- and off-ramps, through leave policies;
- extended time to tenure (tenure clock adjustment);
- shortened time to tenure, with prorated standard of productivity;
- active service, modified duties (full-time service, with selected reduced duties);

- part-time appointments (allowing mobility between full-time and part-time work);
- phased retirement (partial appointments for finite periods of time); and
- delayed entry or re-entry opportunities (including practices that foster later-than-usual career starts).

ACE and the foundation currently are in the third cycle of the *Alfred P. Sloan Awards for Faculty Career Flexibility.* The first cycle focused on the 259 research universities, as defined by the 2000 Carnegie Classification. The five winners who each received $250,000 to further institutionalize their efforts through changes in policy and campus culture were Duke University, Lehigh University, University of California (Berkeley and Davis campuses), University of Florida, and University of Washington. In addition to these five winners, Iowa State University and University of Wisconsin-Madison each received $25,000 awards for their innovative practices in career flexibility.

As part of the initial appropriation for the Sloan awards, the foundation was charged with evaluating the success of this awards program at the end of its first year to determine if it would be continued. On a number of counts, the first year of the awards program was viewed as a success: a significant percentage (20 percent) of eligible institutions applied; these universities represented a wide spectrum of the academy in terms of status and selectivity; a distinguished panel of educators agreed to serve as judges, further increasing the status of the award; and both winners and non-winners reported using the benchmark reports they received as part of their application process to make changes within their institutions. Furthermore, all winning institutions had to agree to resurvey their faculty two years after the initial award to determine if the campus had made progress in implementing policies and practices for career flexibility. These awards not only recognize leaders in higher education, they also provide a means to raise the legitimacy of career flexibility. Based on the success of the first cycle of the awards program, second and third cycles were approved by the Trustees.

The second cycle, which was completed in 2008, focused on the 349 large master-focused universities. The winners were Boise State University, Canisius College, Santa Clara University, San Jose State University, Simmons College, and the University of Baltimore. In addition, Benedictine University and Plymouth State University received $25,000 awards in recognition of innovative practices in career flexibility.

The third cycle, which is currently underway, is focused on liberal arts colleges. The winning liberal arts colleges will be announced in September 2009.

The foundation's efforts to promote faculty career flexibility benefit from the continued involvement of ACE. ACE has become a vigorous advocate for career flexibility, as it continues its efforts to promote career flexibility in a wide range of institutions.

The Elsevier Foundation

In 2006 the Elsevier Foundation established the New Scholars grant program aimed at helping scholars balance childcare and family responsibilities with the demands of early-stage academic careers in science, health and technology.

The program is consistent with the broader mission of the Foundation – to support institutions in the global health and science communities that are working to advance scholarship and improve lives through scientific, technical and medical knowledge. Other areas of funding under the Elsevier Foundation include grants to libraries addressing key issues of global health and development, and a program to support the development of new faculty in nursing education.

In establishing funding priorities for a corporate philanthropic program, there is typically an emphasis on identifying societal needs that are both compelling and of particular interest and concern to stakeholders. The Elsevier Foundation is funded by Elsevier Inc, a scholarly publisher with a corporate mission centered on its contributions to the scientific and health communities. Current stakeholders include: 7,000 journal editors; 70,000 editorial board members; 300,000 reviewers: and, 600,000 authors. The company and the Elsevier Foundation therefore have a long-term stake in the development of a wide range of diverse talent in academic science, technology and medicine. Corporate foundations often have the opportunity to help inform and draw from the expertise of such stakeholders on the programs they fund. They are also often able to provide funding in important niche areas, including areas involving risk, experimentation and model-building.

In the process of developing the new grant program, the Elsevier Foundation surveyed the research on the role of women in science, technology, and medicine and focused on several recognized trends. While women have entered science and engineering classes in larger and larger numbers, the growth of the ranks of female professional scientists continues to lag globally, with the proportion of women "on track" to potentially becoming top scientists falling off at every step of the way, both in degree attainment, tenure and proportion of research funding.

Parenthood has been identified as a primary factor in determining whether a woman with science or engineering training pursues or advances an academic career, with common professional challenges that include: the challenge of balancing career and family responsibility and cost where household responsibilities are not equally shared; relocation decision-making; and difficulty in re-entering an interrupted career. In their submissions and reporting to the Foundation, institutions consistently refer to a common set of challenges associated with scholarship in the scientific, technical and medical fields in particular:

- the intense and often protracted laboratory or experimental activity together with the need for regular communication with colleagues in the field,

- the pre-tenure expectation to establish an international profile, which involves sustained productivity, success in grant funding, and evidence of research impact, and which is often coincident with a peak period of family responsibility,

- the critical role that participation in conferences and meetings play in to career advancement, as an audience for sharing findings, establishing a professional identity among senior scientists, and building a peer network for future collaboration, and

- the limitations of family-friendly policies, e.g. explicit limits on funding for childcare for conferences or meetings and gaps in departmental and institution-level mentoring and support networks.

The guidelines established for the Elsevier Foundation grants therefore focus on programs aimed at doctoral candidates and scholars in the first five years of their post-doctoral careers, with particular emphasis placed on programs that:

- enable scientists to attend conferences, meetings, workshops and symposia that are critical to the development of a career in science by helping them with childcare and other family responsibilities when attending scientific gatherings;

- encourage networking and mentorship within the institutions and disciplines in ways that support the challenges of faculty and staff with family responsibilities;

- demonstrate innovative program ideas;

- demonstrate a strong institutional commitment to advancing women in science;

- have the potential to serve as models and encourage continued efforts to advance women in science; and

- promote partnerships and knowledge sharing among institutions.

The Foundation provides one, two and three year grants. By design, the scope of eligible grantees includes a wide range of institutions that play a role in career development and achievement. These include academic and research institutions, as well as learned societies, professional associations, advocacy organizations, and governmental and non-governmental agencies.

To date, there have been two rounds of proposals funded, which include projects completed or underway with the University of Rhode Island, the University of California – Irvine, Rensselaer Polytechnic Institute, the University of Amsterdam, Princeton University, the American Society for Cell Biology, the University of Illinois at Champaign-Urbana, the Association for Women in Science, the American Physical Society, the University of the Pacific, the European Molecular Biology Organization, and the Maternal and Childcare Union of Tbilisi, Georgia.

Funded projects include a range of approaches to addressing issues of work/family balance:

- models for providing childcare support for conference attendees, including both on-site childcare and stipends to cover childcare expenses for the traveling scholar;

- establishing a prototype onsite lactation room and advisory resources for lactating faculty mothers;

- creating a regional network of PhD-hiring institutions to address barriers to relocation that affect the recruitment and retention of new women scholars;

- professional mentoring programs to be implemented in connection with society conferences;

- programs to address the distinct work-family balance issues faced by post-doctoral fellows;

- institutional forums and networks to provide a social reinforcement, advice and peer-counseling for families, as well as venues to facilitate faculty discussion of work-life issues; and

- development and dissemination of educational materials, supporting resources, and coaching on managing personal and professional lives.

Outcomes reports for the first round of grants are currently being evaluated along with plans for sustaining and disseminating results. The program is expected to continue and new proposals will be solicited in mid-2009 for the 2009-2010 grant cycle.

National Science Foundation

The goal of the National Science Foundation's (NSF) ADVANCE program is to increase the representation and advancement of women in academic science and engineering careers, thereby contributing to the development of a more diverse science and engineering workforce. The NSF has invested over $130M since 2001 to support various ADVANCE projects at more than one hundred different institutions of higher education and STEM-related not-for-profit organizations in forty-one states, the District of Columbia, and Puerto Rico. ADVANCE currently supports three different program components: 1) Institutional Transformation (IT), 2) IT-Catalyst, and 3) Partnerships for Adaptation, Implementation, and Dissemination (PAID).[5] IT projects, the largest ADVANCE awards and the focus of this section, are specifically designed to address the organizational and cultural barriers at universities and colleges that have been identified as impediments to the full participation of women in STEM academics and leadership.[6] Unlike the CBL Professorship and the *Sloan Awards for Faculty Career Flexibility* programs which recognize institutions that have positive environments for female and male faculty, the ADVANCE program provides support to institutions to implement activities to establish positive academic environments for faculty.

ADVANCE IT grantees are selected via the NSF's merit review process, through which the intellectual merit and broader impacts of the proposal are evaluated. For ADVANCE IT proposals these broad criteria translate into an evaluation of several institutional factors that demonstrate an understanding of the current institutional context, culture, and barriers that may adversely affect STEM women faculty and indicate a readiness and commitment to undertake institutional transformation:

- relevant and appropriately disaggregated data on STEM faculty and leadership;

- identification of and commitment to the review, revision and monitoring of relevant institutional policies, procedures and practices;

- commitment to consistent enforcement of policies and long term monitoring of the use and appropriateness of new and revised policies and programs;

- involvement of key stakeholders in the development and proposed implementation of the proposed project;

- demonstrated commitment of institutional leadership to the ADVANCE goals; and

- commitment to sustainability and institutionalization of new programs

These and other institutional indicators of readiness have been studied by several authors who have implemented ADVANCE projects.[7, 8, 9] In addition to these institutional factors, IT proposals are also evaluated by how well the proposed set of project activities are justified by: the institutional data; the long-term institutional strategic plan; the results of the policies, procedures and practices review; and the relevant organizational change and gender equity social science research. The proposed project is also evaluated on the project's potential to make a significant contribution to the understanding of organizational change and gender equity in academics.

To date, thirty-seven universities have received five-year ADVANCE IT awards to implement comprehensive and innovative institutional transformation strategies. Example projects awarded in 2001 at the University of Michigan at Ann Arbor (UM) and the University of Wisconsin at Madison (UW), both include activities that focus on educating and empowering decision-makers, but in different ways. The UM peer-to-peer training model focuses on minimizing the effects of implicit bias in decision making of search committees and promotion and tenure committees. UM's Strategies and Tactics for Recruiting to Improve Diversity and Excellence (STRIDE) committee works with faculty and academic leaders to maximize the likelihood that diverse, well-qualified candidates will be identified and recruited for faculty positions, and are, if offered positions, actively recruited, retained and promoted.[10] The STRIDE committee is composed of male and female senior faculty who are trained on unconscious bias and empowered by the upper administration. UM reports an increase in the percent of women hired in science and engineering tenure-track positions from 14% in 2001 to 34% in 2006. Moreover, the STRIDE committee model is being adapted at several other institutions that are seeking to achieve institutional transformation. UW's approach, in contrast to the institution-wide UM model, focuses on the critical role departmental leaders play in setting the local departmental culture. UW's Climate Workshops for Department Chairs are designed to provide chairs the tools and resources needed to identify departmental issues and to develop action plans to address issues.[11] As a result, the departmental leaders are now empowered with the skills to utilize climate survey data and to consult their faculty to inform their decision making. Indicators of the success of the UW project include the increase from two to ten female department chairs over three years, as well as positive changes in faculty climate surveys where more women faculty reported that they "fit" in their department and less women reported isolation within their department and UW.

ADVANCE IT projects are comprehensive and include many strategies for institutional transformation and cultural change in addition to educating and empowering decision-makers, such as work-life satisfaction, professional development, and policy review, revision and clarification. ADVANCE IT grantees have discovered that the organizational changes achieved with the ADVANCE projects result in significant improvements in job satisfaction and faculty retention avoiding the high costs of attrition.[12] An external program-level evaluation of ADVANCE started in 2008 which will identify institutional indicators of transformation and cultural change in order to evaluate the impacts of the NSF ADVANCE program. Although it is too soon for results from this evaluation, it is clear from grantee reports and numerous peer-reviewed publications that this institutional transformation approach to addressing gender equity has resulted in the creation of more positive and supportive work environments that support the recruitment, retention, and advancement of all faculty, including women, men, and underrepresented minority faculty.

Conclusion

While each of the programs described in this paper have developed different criteria and procedures for making grants focused on the support of STEM faculty members, some common institutional indicators of positive academic environments for female and male faculty have surfaced among successful grant recipients.

- Self study including relevant and appropriately disaggregated data on STEM faculty and leadership and an identification of inequities or barriers derived from that study. This type of data is essential for the institution to determine if paths narrow in certain places (specific departments), at critical junctures (recruitment, tenure, promotion to full professor, prestigious awards, or influential committees) or over specific issues (salary, space, graduate student assignment or ability to have a family and a successful career).

- Mentoring and networking programs to eliminate or mitigate feelings of isolation and stereotyping of any particular group of faculty members. These kinds of career support programs are important for the retention and promotion of both female and male faculty, however it is important that these programs are formally structured since women are typically disadvantaged with respect to their male colleagues when career support activities are only informal.

- Increased flexibility as evidenced by adjustments to the tenure clock, modified duties, part-time appointments and delayed entry or re-entry opportunities. It is important that the institutional and departmental climates encourage faculty to take advantage of career flexibility programs and that leaders ensure that there are no negative career impacts on individuals for participating in the programs.

- An understanding of research related to faculty development, particularly issues of equity. Faculty, department leaders, and institutional administrators are empowered when introduced to the scholarly findings on gender equity barriers and given the tools and resources to address barriers in their decision-making.

- An institutional commitment of resources and administrative leadership to foster development and change where appropriate. Institutional commitment is apparent when equity and diversity responsibilities and accountability is incorporated into existing institution-wide administrative positions, departmental leadership and faculty roles. In some cases, the establishment of new administrative positions dedicated to equity and diversity are also warranted.

- Identification of and commitment to the review, revision and monitoring of relevant institutional policies, procedures and practices. Transparent and consistently implemented policies and procedures (particularly recruitment, promotion and tenure policies) are critical for the success of all faculty members. The long term monitoring of the use and appropriateness of new and revised policies and programs is also critical to ensure that the changes have resulted in the desired outcomes, and to identify emerging issues that may need to be addressed.

Although, the programs discussed here are targeted toward women, it has become clear that positive work environments that support the recruitment, retention, and promotion of women in academic positions also improve these outcomes for other underrepresented groups and for men.

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