# Faculty Awards at a Large Private Institution: An Indicator of Evolving University Values?

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Sharon is a co-PI on a $3.2 million grant from the National Science Foundation for the project "CONNECT: Increasing the Representation and Advancement of Women Faculty at RIT." The NSF ADVANCE IT project, Creating Opportunity Networks for Engagement and Collective Transformation: Increasing the Representation and Advancement of Women Faculty @ RIT (Connect@RIT), is an effort across RIT's nine colleges, all of which include STEM/SBS disciplines. The project's goal is to increase the representation and advancement of women STEM/SBS faculty, widely represented across ethnic, social, and cultural backgrounds, by removing barriers to resources that support career success and creating new interventions and resources. An additional emphasis will be upon adapting interventions to address the needs of key sub-populations including women of color and deaf and hard-of-hearing women faculty. The project aims to: 1) refine and strengthen targeted institutional structures; 2) improve the quality of women faculty's work life; 3) align institutional, administrative, and informal systems of power and resources to support and sustain progress towards the project goal; 4) enhance the working environment and support career advancement for women faculty; and 5) establish a sustainable, inclusive, accessible RIT network that supports career goals for all RIT faculty.

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Professor Margaret Bailey, Ph.D., P.E. is the Principal Investigator (PI) for the Rochester Institute of Technology's NSF ADVANCE Institutional Transformation grant, Connect@RIT. The goal of this large-scale university-level organizational transformation effort is to increase the representation and advancement of women STEM faculty. At the university level, Dr. Bailey serves as Faculty Associate to the Provost for Female Faculty and she co-chairs the President's Commission on Women. Dr. Bailey is a Professor of Mechanical Engineering within the Kate Gleason College of Engineering. Dr. Bailey teaches courses and conducts research related to Thermodynamics, engineering and public policy, engineering education, and gender in engineering and science. She is the co-author on an engineering textbook, Fundamentals of Engineering Thermodynamics.

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Dr. Stefi Baum joined the Rochester Institute of Technology (RIT) in July 2004 as Professor and Director of the Chester F. Carlson Center for Imaging Science, after serving one and a half years as an American Institute of Physics Science Diplomacy Fellow at the U.S. Department of State where she worked to promote agricultural biotechnology in developed and developing countries. Before that she spent 13 years at the Space Telescope Science Institute (STScI) located at the Homewood Campus of Johns Hopkins

University in Baltimore. While at STScI, Dr. Baum was most recently the Head of the Engineering and Software Services Division where she led up to 140 scientists, engineers, and computer scientists responsible for the development and maintenance work for the science ground systems of The Hubble Space Telescope and James Webb Space Telescope. Earlier, she led the science operations center's development and deployment of a major astronomical instrument, the Space Telescope Imaging Spectrograph. Prior to that, she served as systems scientist on the development of the Hubble Space Telescope archive. Dr. Baum earned a BA in physics with honors from Harvard University and a PhD in astronomy from the University of Maryland. Her personal research focuses in two areas: (i) the study of activity in galaxies and its relation to galaxy evolution and (ii) the development of image processing and statistical algorithms applied to functional magnetic resonance brain imaging for the diagnosis of schizophrenia. Dr. Baum is active in the development of new mission concepts and has published more than 200 papers in refereed journals. Dr. Baum is also very active in education and public outreach and is committed to the engagement of youth and the public in science, technology, engineering, and mathematics.

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**Abstract**

Once faculty are established in an academic career, awards provide a means to recognize and highlight their achievements. From the faculty perspective, both the achievements and the awards are part of the context for promotion, advancement and appointment to new positions. From the university perspective, awards provide an opportunity to actively promote individual faculty members while simultaneously demonstrating university commitment to advancing its faculty.[1] Within the context of Bolman and Deal's symbolic framework, awards can be one of the symbolic strategic leadership approaches that deliberately highlight institutional commitment to advancing faculty, including women faculty, while providing a context for leaders to articulate thoughts on campus culture and the climate for women.[1, 2] This symbolic perspective focuses on the organization's cultural norms, customs, and accepted practices,[1, 3] and includes the institution's commitment to a welcoming and supportive environment for both women and men faculty and an academic setting that is conducive to their career success. Examining award recipients is one method of ensuring that evolving university values reflect the diverse faculty composition and the university's dedication to that diversity. [4]

This paper examines the faculty award structure at a large private university as an indicator of evolving university values that esteem the achievements of faculty and support them in their career advancement.[1] Data on university awards for faculty since the 1964-65 academic year were examined with regard to recipient gender. For the academic years 2007-08 through 2011-12, the percentage of awards received by female faculty is compared to a weighted percentage of females in the faculty population (based on the number and type of awards and data provided by institutional research). This analysis indicates that, over the five-year period examined, women at the university were underrepresented, at 12.1%, as award recipients, when by their representation among the faculty one would expect 30.5% ± 8.0%.

This study is part of a large NSF ADVANCE IT project (Grant No. 1209115), which focuses on women faculty in science, technology, engineering and mathematics (STEM), including those in the social and behavioral sciences (SBS). The project's goal is to increase the representation and advancement of women STEM/SBS faculty, widely represented across ethnic, social, and cultural backgrounds, by removing barriers to resources that support career success and by creating new interventions and resources. The faculty awards study supports the overall project goal by examining the university's award recipient history, identifying patterns that may have existed and if necessary suggesting strategies to identify areas for change.

This paper sets a context for the awards study by first providing a framework for the rewards and recognitions for STEM academic women in Section 1. Section 2 reviews barriers for STEM women in academia, from their beginnings as students to their experiences as mid-career faculty. An analysis of faculty awards at the university under study is found in Section 3. Sections 4 and 5 provide discussion and conclusions/next steps, respectively.

## 1. Introduction

***Rewards and Recognition***

While it is widely understood that women are underrepresented in the STEM workforce, there has been less focus on the fact that women are further proportionally underrepresented as recipients of professional rewards and recognition. For example, in 2011, women made up 48% of the total U.S. workforce[5], and although 39% of science and engineering graduates were women, only 24% of the STEM workforce was female.[5] The RAISE project, Recognition of the Achievements of Women In Science, Engineering, Mathematics and Medicine, sponsored by the Society for Women's Health Research, tracks data on awards made to men and women in STEM plus medicine fields.[6] Data has been collected since 1981 and is updated as more data becomes accessible. The project reports that for nearly a quarter of the over 1900 awards tracked, less than one percent of the awards were made to women. Furthermore, of the gender neutral awards, nearly 50% are rarely awarded to women. Thus while women are 24% of the overall STEM workforce, awards rarely reflect their representation.

According to the RAISE Project, the numbers are especially alarming for many of the computing awards (with results recorded from 1981 onward). Computer occupations represent 50% of STEM employment,[5] yet according to the U.S. Department of Labor, the percentages of women in computing occupations, depending on subfield, ranges from 9-47% in 2009, with the field of computer hardware engineering at 9%.[7] While women are notably underrepresented in the professional computing field, the number of female award recipients is below their overall representation. For the A.M. Turing Award, the Association for Computing Machinery's (ACM) most prestigious award, only 7% of the awards have been made to women. The ACM and the Institute of Electrical and Electronics Engineers (IEEE) Computer Society jointly administer the Eckert-Mauchly Award, first awarded in 1979. It recognizes contributions to the computer and digital systems architecture and has never been awarded to a woman. Only 4.3% of the ACM Gordon-Bell awards, which recognize outstanding achievement in high-performance computing, have been made to women. Particularly surprising is the ACM's Grace Murray Hopper Award, which annually recognizes an outstanding young computer professional on the basis of a single recent major technical or service contribution. Since 1981, 13% of the awards have been made to women.[6]

Not only are the number of women in the STEM workforce lower than the graduate percentages, but the challenges faced by women in STEM overall and specifically in academia is a well recognized issue.[8] Barriers to the advancement and promotion of women in academia have been researched and published with the prospect that awareness is a step toward affecting positive change. Part of this awareness recognizes that some of the principal barriers include gender-biased evaluation of curriculum vitae and resumes, fellowship awards, promotion and tenure materials, and professional achievement awards. Each of these areas plays a critical role in the overall representation of academic women in STEM, from the entrance of women into their professional academic careers, to their persistence and advancement throughout their professional careers and their recognition by their professional communities.

This paper examines the faculty award structure at a large private university as an indicator of evolving university values that esteem the achievements of faculty.[1] The university is one of the

largest technical institutions of higher education in the United States and a leading career-oriented university. The university offers a broad array of undergraduate and graduate programs in its nine colleges: Applied Science and Technology, Computing and Information Sciences, Engineering, Health Sciences and Technology, Imaging Arts and Sciences, Business, Science, Liberal Arts and National Technical Institute for the Deaf. Gender diversity has historically been a challenge for this university with a 2:1 ratio of male to female students. However, in the past fifteen years, this university has committed substantial resources to diversifying the university population.[9]

This paper is the third in a series that examines data from a NSF ADVANCE sponsored Catalyst self study (NSF Award No. 0811076) conducted from 2008-2010.[10] The goal of the study was to identify barriers for current female STEM faculty in regards to career progression. The first paper reported on the distribution of STEM faculty, outcomes of institutional processes of recruitment and advancement, distribution of STEM faculty in leadership positions, allocation of resources for STEM faculty, barriers to the recruitment and advancement of women, success of existing structures at addressing these barriers, accomplishments over the grant period, and plans for institutionalizing various initiatives.[11] The second paper focused on distillation of climate survey data to obtain useful and meaningful measures related to work/life balance, climate, value and influence.[12] This paper extends the work done as part of the NSF Catalyst self study project to examine evolving university values as part of institutional transformation that may influence the success and advancement of women faculty.[4] We focus on an analysis of the gender distribution of university awards as a signature of the progress towards achieving parity for women faculty at a single large technical university.

## 2. Barriers for Women in Academia

### *From the Beginning: As a Student*

The disproportionately low numbers of female students in the STEM disciplines is a well-known issue. Copious research has been published on the limiting factors of why students may not choose to study in a STEM discipline[13]. While no single cause can be cited in any area, numerous studies have demonstrated that both social and environmental barriers arise from childhood through senior career stages.[14-16] St. Rose and her co-authors Catherine Hill, American Association of University Women's director of research, and Christianne Corbette, a research associate examined hundreds of studies and identified "eight factors that helped depress the numbers of girls and women in STEM: beliefs about intelligence, stereotypes, self-assessment, spatial skills, the college student experience, university and college faculty, implicit bias, and workplace bias."[17]

These factors manifest themselves in the fact that women are less likely to indicate an intention to major in a STEM field. Despite the fact that girls and boys take math and science courses in roughly equal numbers during pre-university schooling, by the time they graduate college, women are outnumbered by men in nearly every STEM field. In some STEM fields such as physics, engineering and computer science, women earn 20% or less of the bachelor's degrees awarded. Although recent studies show that women undergraduate students may be closing the retention rate gap in college,[18] they continue to be underrepresented in engineering. In 2011 women earned 18.4% of bachelor's degrees in engineering.[19] This decline of women in STEM continues at the graduate level and then even further in the professional workplace transition.[13]

As Cheryan notes, while doing well in math classes may now be stereotyped as feminine, seeking out math-related careers is still a stereotyped gender role violation for women.[15] Research suggests that negative math attitudes are powerful determinants for women. They diminish women's math performance,[20] drive women away from math-related domains,[21] and interfere with their self-evaluation of math skills.[15, 22] Gunderson et al. suggests that by transmitting negative social attitudes to children about math such as anxiety, stereotypes, success and failure attributions and perceptions about math intelligence, parents and teachers contribute to the disparities in math-related domains. [15, 23]

Of the female students who choose an academic STEM program, succeed academically and persevere socially, many still face hurdles of gender bias that reach beyond the classroom and their social circles. A recent study of faculty participants at three private large, geographically diverse research-intensive universities indicates that female students in the sciences are less likely to be hired and are viewed as less competent than their male peers when applying for lab manager positions.[24] In a randomized double-blind study, student application materials for a lab manager position were randomly assigned a female or male name. Science faculty from research-intensive universities rated the male applicant as "significantly more competent and hirable than the (identical) female applicant."[24] The faculty reviewers also indicated a higher starting salary and more career mentoring for the male applicant, and gender of the faculty reviewers did not have an impact.[24]

Despite efforts by faculty and administration, the daunting national data is echoed at the university under study in this paper where gender diversity has historically been a challenge with a 2:1 ratio of male to female students.[9] Female enrollments ranged from 33-35% during the period from 2010-2013 with some STEM colleges within the university reporting approximately 10% female students.[25]

***Breaking into a Career: Faculty Hiring Patterns***

Similar to the student experience, female faculty may well begin their academic careers at a disadvantage as they continue to be faced with gender bias even if it is implicit rather than explicit. For those who persist and advance toward a career in academia, developing a strong academic record is critical. However, implicit bias in the evaluation of the curriculum vita presents yet another hurdle for women. Research conducted by faculty at the University of Wisconsin-Milwaukee in 1999 examined the influence of an applicant's gender on the hire-ability of a candidate in the field of psychology.[26] The academic psychologist participants each rated one of four curriculum vitae (CV). The CVs were from one real-life scientist at the start of her career and at mid-career, with name changes to traditional male and female names. The results of the study demonstrated that for the men, there was an "increased likelihood of offering the tenure candidates a job, granting them tenure, and greater respect for their teaching, research, and service records. Both men and women were more likely to vote to hire a male job applicant than a female job applicant with an identical record. Similarly, both sexes reported that the male job applicant had done adequate teaching, research, and service experience compared to the female job applicant with an identical record. [26]

This trend of challenges posed to female job applicants is echoed in numerous studies and extends beyond whether or not a candidate will be hired to the question of whether or not they will be hired with the same status as their male peers. Bailey, et al. (2011) found that female

STEM faculty were less likely to be hired above the rank of assistant professor and less likely to receive credit towards tenure than their male counterparts. These results are consistent with research dating back 40 years showing that department heads were significantly more likely to indicate that given identical credentials, they would hire female candidates at the assistant professor level and male candidates at the associate professor level.[26, 27]

The implications of these studies are realized at the study university where in 2012 data shows a 25% representation of women among STEM/SBS T-TT (tenured and tenure-track) faculty, which is unchanged from 2010. While the representation of STEM faculty has nearly tripled over the past twenty years, the representation of female STEM T/TT faculty has grown more slowly— from 16% in 1995 to 25% in 2012. This continues to be significantly below the mean 35% representation of women among STEM/SBS faculty at Master's-granting colleges and universities in the US.[28]

***Establishing Credentials: Early and Mid-Career***

Some women are able to break through the faculty-hiring barrier and further establish scientific credentials. Career-oriented awards provide an important recognition of professional accomplishments and a means to legitimatize accomplishments as part of those scientific credentials. Although some women are able to persist in their domain field and build their credentials, they continue to face a gender-biased disadvantage in their early and mid-career professional lives.

National borders do not confine this problem. In 1997, researchers in Sweden investigated the rate of awards made to women scientists applying for postdoctoral fellowships under the Swedish Medical Research Council (MRC). The historical success rate of female applicants during the 1990s was less than half that of the male applicants, therefore leading to the investigation.[29]

Fellowship candidates were reviewed in three areas: scientific competence; relevance of the research proposal; and the quality of the proposed methodology. "The results indicated that female applicants were "deemed … particularly deficient in scientific competence."[29] The research group investigated further by conducting an analysis of the number and quality of scientific publications, a common indicator of scientific competence. The results of their study showed that "a female applicant had to be 2.5 times more productive than the average male applicant to receive the same competence score."[29] "The peer reviewers over-estimated male achievements and/or underestimated female performance," indicating that peer reviewers were not able to judge scientific ability independently of gender. [29]

***Persistence, Perseverance and Advancement: Career Continuation***

Some professional academic women are able to persist in STEM despite the barriers faced as a student, as they enter their career and as they establish their credentials. Steinpreis, et al. reports that the discriminatory barriers women face in academia are well established[30] and likely include "isolation, lack of peer and administration support, increased likelihood of having to balance child-care responsibilities, lower income than their male counterparts, and lower status in their institution."[26] Despite the overall increase in number of faculty over the past 20 years, the percentage of women faculty has remained flat. Women faculty leave their careers at a higher rate than men,[31] even after they are tenured.[26, 32] Women also face hurdles in their career

advancement. Even when adjusting for productivity factors, and given the same number of years in the field, women are less likely to be associate or full professors.[26, 33]

Research at the study university indicates that female faculty are tenured at approximately the same rate as male faculty. This is supported in the research from Steinpreis, et al. which studied the impact gender has on search committee member's and outside reviewer's decisions to hire a prospective job applicant or tenure candidate.[26] The Steinpreis results indicated "that potential female tenure candidates are [not] evaluated more negatively than potential male tenure candidates, although participants were four times as likely to write cautionary comments in the margins of their questionnaire if they had reviewed a female tenure candidate than if they had reviewed a male tenure candidate."[26]

Despite the results at the study university that female faculty are able to persist through the tenure barrier, they still face career hurdles. The results from Bailey et al. (2011) echoed the previous research and found that female faculty leave the institution at almost twice the rate of male faculty. Their study also showed that women hold a significantly lower percentage of the rank of full professor. Additional data collected at the study university shows that women experience a career barrier regarding time in rank at the associate professor level. In 2012, 36.6% of women STEM faculty spent more than years at the rank of Associate Professor, compared with 27% of men STEM faculty.

**3. Award Analysis**

***Background***

This study of the university awards was prompted by impressions of the university NSF ADVANCE team that noticeably low percentages of female faculty were receiving university-level awards. Awards play an important role in recognizing faculty accomplishments and providing a context for academic career credentials as part of promotion and career and leadership advancement. Thus a statistical analysis was conducted.

***Methodology***

Data on university awards for faculty since the 1964-65 academic year were examined in regards to recipient gender. It is important to note that nominations, processes, award criteria, committee membership and recipients by ethnicity or disability were not examined. Also of note is that the number of awardees varies from year to year as some awards allow for multiple recipients and all awards are not required to be granted every year. Awards specifically recognizing gender-diversity efforts at the university were excluded. The following seven awards[34] were examined:

- *Eisenhart Award for Outstanding Teaching,* established in the 1964-65 academic year (AY).
- *The Richard and Virginia Eisenhart Provost's Award for Excellence in Teaching,* established in the 1989-90 AY.
- *The Trustee's Scholarship for outstanding academic scholarship*, established in AY 2005-06.
- *The Provost's Awards for Excellence in Faculty Mentoring*, established in AY 2011-12.

- *The Provost's Innovative Teaching with Technology Awards*, established in AY 2011-12.
- *The Outstanding Teaching Award for Non-Tenure-Track Faculty*, established in AY 2011-12.
- *The Isaac L. Jordan, Sr. Faculty Pluralism Award*, established in AY 2011-12. (Note: From its inception in AY 2001-02 through AY 2010-11, the award was open to both faculty and staff. In this period of time, the award was presented to four faculty members. In AY 2011-12, separate awards were established for faculty and staff. Only the Faculty Pluralism Award (AY 2011-12) is included in this analysis.)

***Award Activity by Gender***

The graphical display in Figure 1 shows the total number of university awards granted to faculty each year since AY 1964-65.

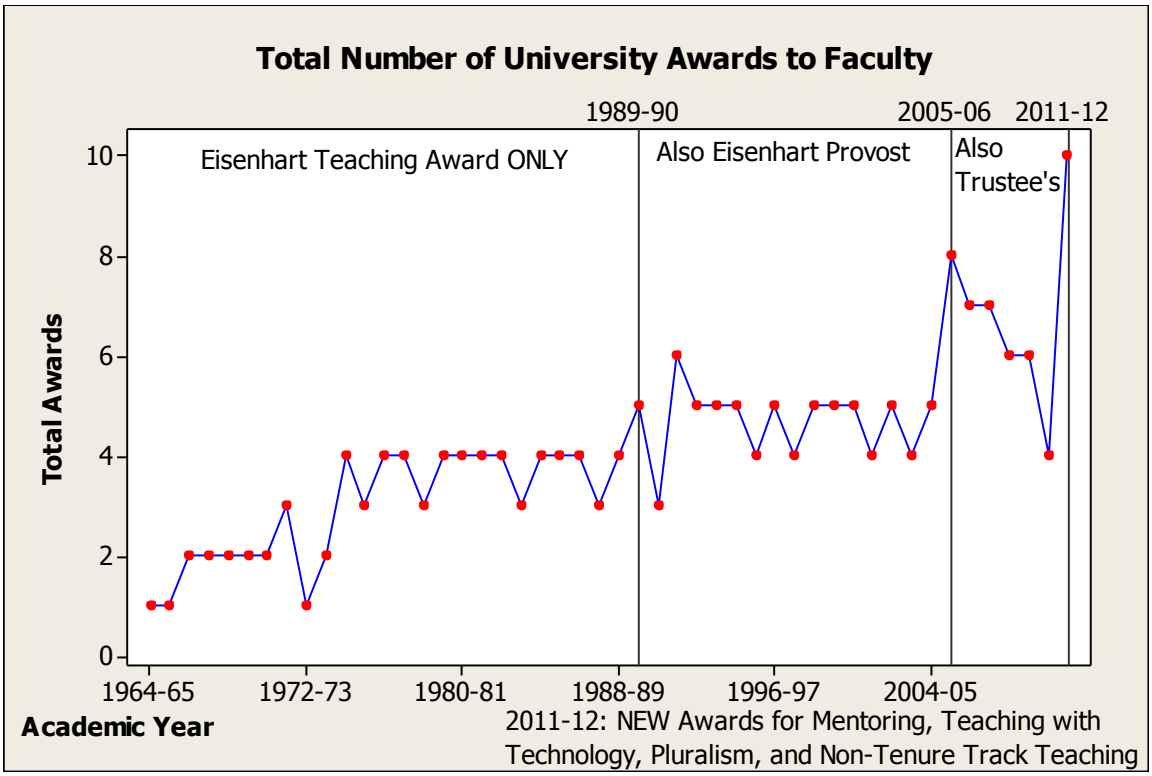


**Figure 1. Total Number of University Awards to Faculty (AY's 1964-65 through 2011-12)**

Of the awards presented each year, a percentage of these have been received by female faculty – see Figure 2 below. This percentage has varied from year to year, from a steady 0% in the early years, to 75% in AY 1995-96. Overall, 19.8% of the awards were made to women. Prior to AY 1989-90, 14.9% of the awards were made to women. From AY's 1989-90 through 2004-05, the rate was 26.07%. The period of AY's 2005-06 through 2010-11 saw a rate of 18.4% and in AY 2011-12 the awards to women faculty stood at 10%.

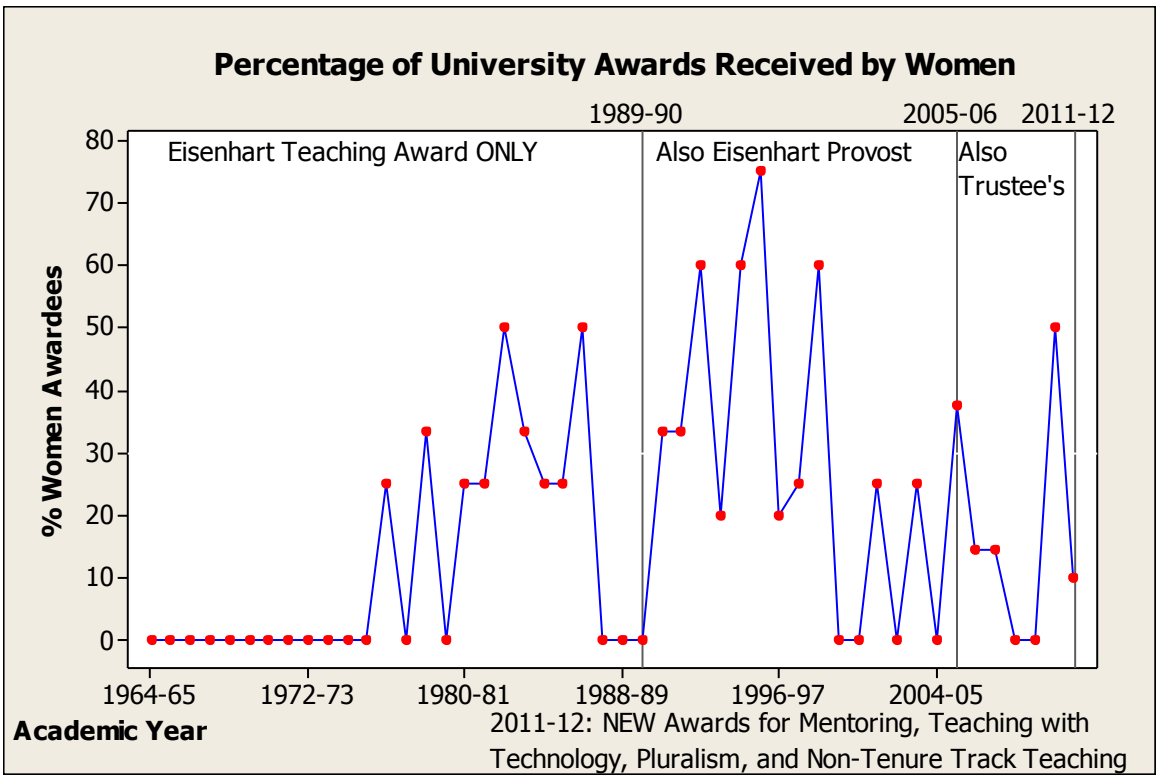


**Figure 2. Percentage of University Awards Received by Women**

One may assume that early in this time period, the percentage of female faculty was very low. More recently, the percentage of female faculty (tenure track, tenured, and non-tenure track) is approximately 33% as indicated in the Table 1. During the period from AY 2007-08 through AY 2011-12, we see that:

- Among tenured faculty, the percentage of females remained at approximately 28%.
- Among tenure-track faculty, the percentage of females has increased from 34% in AY 2007-08 to 41% in AY 2011-12.
- The percentage of females in the combined tenured/tenure-track faculty has increased slightly to 31.5% in AY 2011-12.
- Among non-tenure track faculty, the percentage of females has dropped from 45% in 2007-08 to 41.5% in AY 2011-12.

**Table 1. Percentage of Women Among Full Time Instructional Faculty (Academic Years 2007-08 through 2011-12)**

| Percentage of Women Among Full Time Instructional Faculty, Academic Years 2007-08 through-2011-12 (Institutional Research, 08/27/12) | | | | | |
|---|---|---|---|---|---|
| Academic Year | Tenured faculty: | Tenure Track faculty: | Tenured/ Tenure Track faculty: | Non-Tenure Track faculty: | All faculty: |
| 2007-08 | 28.5% | 34.3% | 29.8% | 45.0% | 32.6% |
| 2008-09 | 28.4% | 35.4% | 30.1% | 42.9% | 32.6% |
| 2009-10 | 27.8% | 37.0% | 30.1% | 40.1% | 32.1% |
| 2010-11 | 28.3% | 38.1% | 30.7% | 40.8% | 32.9% |
| 2011-12 | 28.4% | 41.0% | 31.5% | 41.5% | 33.9% |

For the academic years 2007-08 through 2011-12, the percentage of awards received by female faculty (see Table 2) is compared to a weighted percentage of females for the faculty population (based on the number and type of awards, and data provided by institutional research). Adding reference lines to the graphical display for percentage of university awards received by women allows one to see how this percentage varies around the expected value as shown in Figure 3. The center line represents the approximately 30.5% of tenured/tenure-track faculty who are female, the upper and lower lines represent one standard deviation above and below this value (11.7% and 49.3%, respectively), based on n=6 award recipients, since the average number of awards presented since 2007-08 is 6.667.

**Table 2. Percentage of Women Awardees, Academic Years 2007-08 through 2011-12**

| Percentage of Women Awardees, Academic Years 2007-08 through 2011-12 | | | |
|---|---|---|---|
| Academic Year | Number of Awards | # Women Awardees | % Women Awardees |
| 2007-08 | 7 | 1 | 14.3% |
| 2008-09 | 6 | 0 | 0.0% |
| 2009-10 | 6 | 0 | 0.0% |
| 2010-11 | 4 | 2 | 50.0.% |
| 2011-12 | 10 | 1 | 10.0% |
| **TOTAL** | **33** | **4** | **12.1%** |

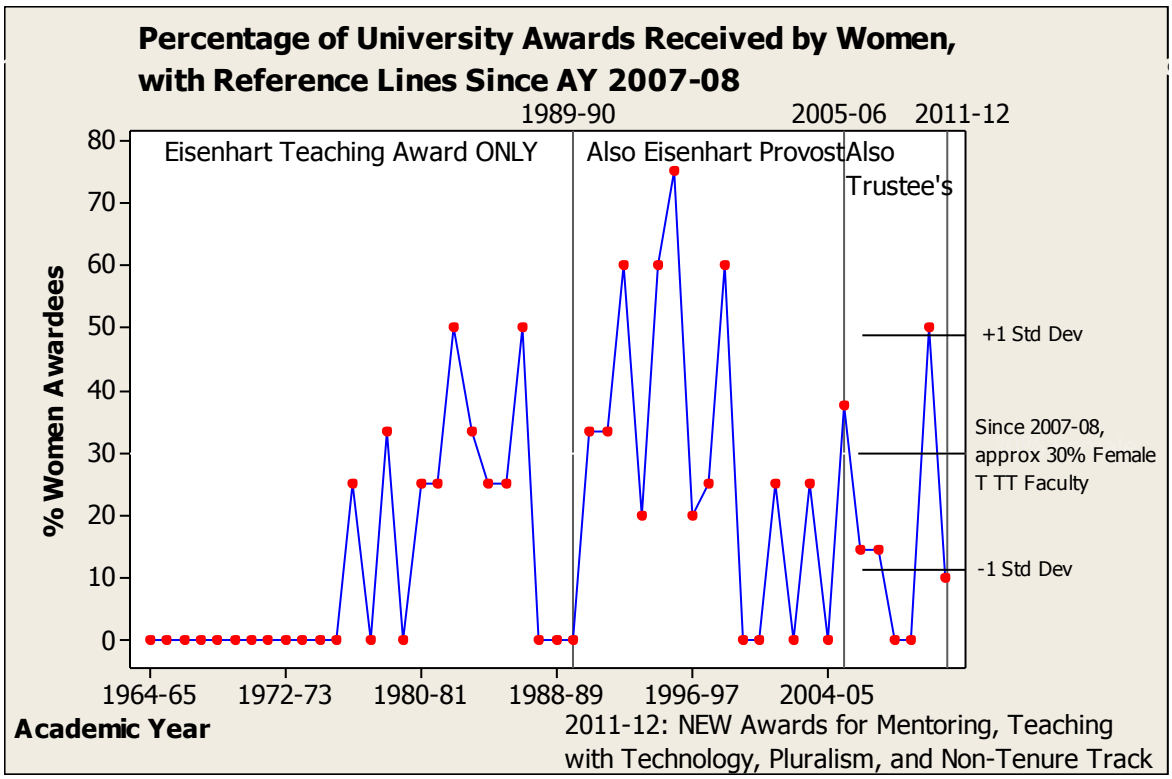


**Figure 3. Percentage of University Awards Received by Women, with Reference Lines Since AY 2007-08**

In the more detailed analysis that follows, we consider the varying number of awards presented each year, as well as the percentage of women in the pool of faculty for each award. Table 3 and Figure 4 show the weighted percentages of women, standard deviation limits, and percentages of women awardees for each of the past five years. *Establishing separate limits for each year (based on the number of awards presented and a weighted percentage female population), we see that for three out of the past five years, the percentage of awards presented to women was further than one standard deviation below the expected value and only once (AY 2011-12) was the percentage above the expected value (yet within one standard deviation above expected).*

In addition, over the five-year period in total, women at the university were underrepresented, at 12.1%, as award recipients, when by their representation among the faculty one would expect between 22.5% and 38.5% (or 30.5% ± 8.0%).

**Table 3. Reference Values for Percentage of Women Awardees, AY's 2007-08 through 2011-12**

| Reference Values for Percentage of Women Awardees, Academic Years 2007-08 through 2011-12 | | | | | |
|---|---|---|---|---|---|
| Academic Year | Weighted % of Women | Number of Awards | -1 SD | +1 SD | % Women Awardees |
| 2007-08 | 29.35% | 7 | 12.1% | 46.6% | 14.3% |
| 2008-09 | 29.60% | 6 | 11.0% | 48.2% | 0.0% |
| 2009-10 | 29.37% | 6 | 10.8% | 48.0% | 0.0% |
| 2010-11 | 30.73% | 4 | 7.7% | 53.8% | 50.0.% |
| 2011-12 | 32.16% | 10 | 17.4% | 46.9% | 10.0% |
| **Total** | **30.47%** | **33** | **22.5%** | **38.5%** | **12.1%** |

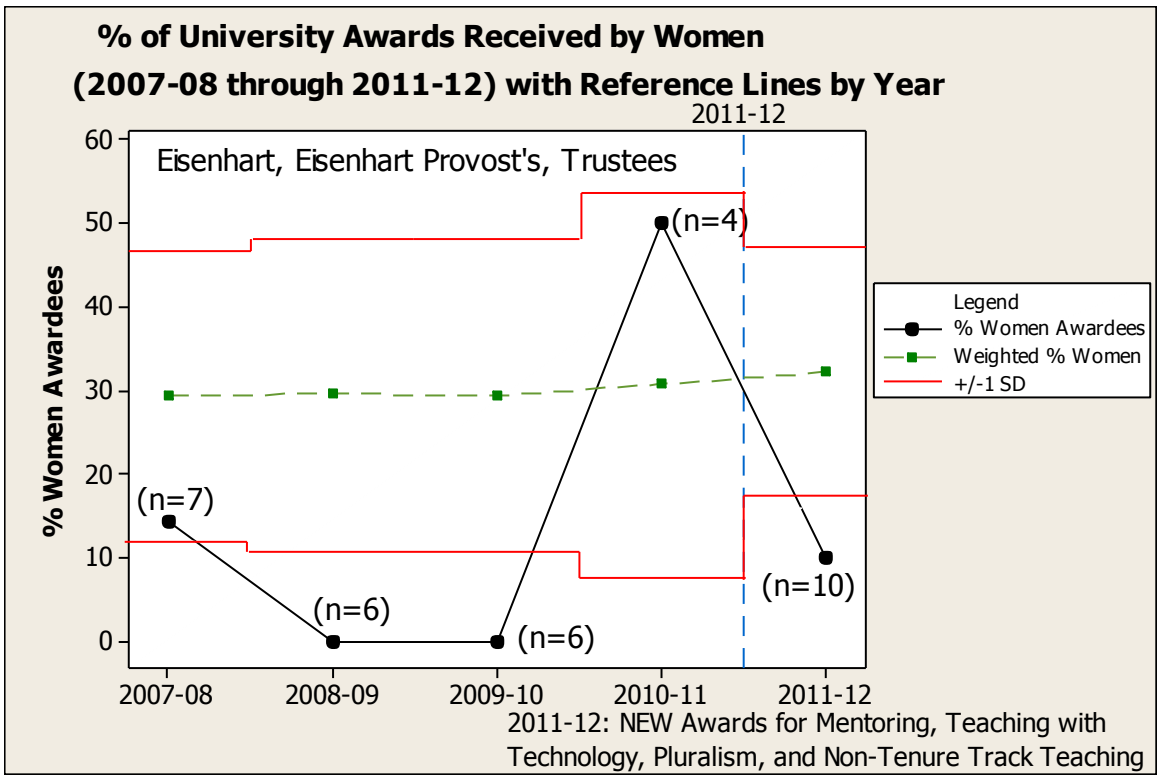


**Figure 4. Percentage of University Awards Received by Women, with Separate Reference Lines by Year**

## 4. Discussion

Research has indicated problems all along the way for women in STEM. But what are some of the peripheral issues that may come into play when looking at a particular problem like that of bias in an award system? In this section, we examine potential influencers of the awards outcomes.

### *Defining Unbiased Criteria and Processes*

One complication of resolving the award system bias may be the criteria that are used in evaluating candidates for awards. Some awards have well defined criteria while others have minimal criteria. Research indicates that more clearly defined criteria can help in combatting gender stereotypes. Biases are worse when: criteria are vague and when evaluators are rushed, tired or otherwise cognitively burdened.[35]

Earlier, the problems associated with hiring, promotion and career progression were reviewed. Research suggests that greater objectivity in evaluations combats the effects of lingering prejudice in both hiring and promotion. To ensure fairness, criteria should be explicit and evaluation processes designed to limit the influence of decision makers' conscious and unconscious biases.[36] Perhaps in addition to implementing explicit criteria for hiring and promotion, criteria for awards and recognition could also be examined.

Whether that criteria is clearly defined or not, student evaluations are also often used in evaluating award candidates, particularly in the area of teaching awards. This raises yet another area of concern. Data shows that "Female professors matched in rank and teaching experience

receive lower teaching evaluations from students, particularly from male students, yet male faculty members are more likely than female faculty members to exhibit such behaviors as willingness to cancel class. Teaching style does not influence evaluations of male faculty to the same extent."[26, 31] With an environment such as the study university, where there the student population ranges up to 90% male in some STEM colleges, with some classes at 100% male, the questions arise as to the impact. Are women faculty being equally evaluated by their male students, and what impact does this have on their overall academic portfolio and therefore on the materials put forth in consideration of awards?

Letters of recommendation are also often included in award material submissions. Trix and Psenka studied letters of recommendation for medical school faculty who were successfully hired at a large medical school in the U.S. Important differences in the letters written for women were discovered.[37, 38] Most notably, the letters written for women were shorter, included four times more references to personal lives, and used fewer standout adjectives such as *outstanding* and *excellent*. Letters for men included more frequent references to them as *researchers* and *colleagues* whereas women were referred to as *teachers* and *students*. The letters for women also included more gendered terms and more "doubt raisers."[37, 38]

***Strategies for Minimizing Bias***

Research has been conducted for decades on the problems of gender bias, particularly in STEM fields. Recognizing where the problems exist is critical to alleviating the inequities. But what are the next steps to ensure that the process moves beyond the problem-reporting phase? In her keynote address to the 2012 NCWIT Summit, Dr. Shelley Correll promoted six organizational solutions to break the innate tendencies of both males and females to use gender stereotypes.[35] These criteria are intended for a broad application, yet they are particularly well suited for consideration in regards to academic and professional career awards. The criteria are:

1. Arm the choir by giving the groups the tools they need to avoid bias
2. Establish clear criteria to use for evaluation and commit to that criteria
3. Evaluate the criteria to determine if it is the right criteria
4. Hold decision makers accountable
5. Be transparent, measure, track and manage numerical progress
6. Legitimatize women leaders to establish the basis for positive ratings

Providing evaluation groups with the tools required for recognizing and addressing bias are positive steps to alleviating the bias. While these tools are often provided for hiring committees, perhaps another opportunity exists for positive impact by providing these tools to the awards committees at a university. This study of awards did not examine the criteria being used for award evaluation. Evaluating the clarity of the criteria as well as the legitimacy of the criteria would prove reasonable next steps.

This current study of awards also did not review the accountability of the awards committee in justifying final determinations. Research shows that when decision makers are held accountable for explaining their decisions, the available information as well as the decision is more closely examined. Likewise, low levels of accountability lead to cultural presumptions regarding

women's capability, despite equitable performance.[39] Again, a review of the accountability systems in place at a university would prove as a legitimate next step.

Oversight of the awards might also include measuring and tracking the awards in a formal and systematic way. This would provide a university with the data required to make informed decisions regarding awards and manage the progress towards an unbiased system. This should include the pool nominated as well as the outcomes of the evaluation and selection process.

Leaders at a university often have opportunities to recognize the achievements of women faculty. Taking opportunities to present women as achieving high levels of success outside of the formal awards process legitimatizes their receipt of awards.

Yet another resource to be considered includes the "Strategies for Minimizing Bias and Assumptions" presented by the Women in Science and Engineering Leadership Institute (WISELI) during their Searching for Excellence & Diversity Workshop.[38] Again, while the strategies specifically target faculty search committees, the application to awards committees also appears appropriate. The strategies are:

1. Replace your self-image as an objective person with the recognition and acceptance that you are subject to the influence of bias and assumptions.[40]
2. Diversify the search committee.[41]
3. Increase the proportion of women and minorities in the applicant pool to achieve critical mass.[42]
4. Develop and prioritize criteria *before* evaluating applicants.[43]
5. Spend sufficient time and attention on evaluating each application.[44]
6. Focus on each applicant as an individual and evaluate the entire application package.[45]
7. Use inclusion rather than exclusion decision making processes.[46]
8. Stop periodically to evaluate your criteria and their implementation.
9. Hold yourself and each member of the search committee responsible for conduction fair and equitable evaluations and for basing decisions on concrete information gathered from candidates' records and interview, rather than on vague assertions or assumptions about promise/potential.[47]

Recognizing our own biases is often challenging. Training is often required for search committees. The university might also consider training for awards committees. Diversifying the search committees should not necessitate that the few departmental or university women are required to serve on every committee. Creative solutions can be solicited from the committee members themselves and may include utilizing students. Increasing the proportion of women in the applicant pool may be challenging, but not impossible. Creative solutions might include encouraging nominations for awards where they might otherwise not be considered or noticed due to busy schedules. This may also include encouraging and allowing for self-nominations. Faculty suffer from busy teaching and research schedules. Careful planning with detailed schedules may alleviate the biases that increase due to hurried processes. Sufficient time will also allow for candidate's entire application package to be evaluated. Most committees utilize an exclusive decision making process. By evaluating materials with an inclusive mindset, the final

selection pool may look very different. Reevaluating criteria and processes provides and opportunity to refine the implementation and move toward an unbiased system.

## 5. Conclusions and Next Steps

The award structure at a university provides an opportunity to affect positive change as part of an institutional transformation to promote the success and advancement of women faculty. The university awards provide an area of opportunity to symbolically demonstrate that institutional transformation has taken place. It was in this light that the award structure was examined. But awareness is not enough. A plan for institutional transformation is currently in place at the study university. Action to move towards an unbiased awards system ***could*** include a strong partnership between institutional transformation change agents and university administrators to examine the current structure, including award criteria, committee composition, committee timelines, processes and reporting. Currently, the ADVANCE team at the study university is exploring the formation of a campus committee of interested faculty (who independently noticed the award disparity) to explore these issues. In addition, the President's Commission on Women (PCW) included mention of the award related findings in their recently released report, "Female Undergraduate Enrollment at RIT: Data Discussion, Preliminary Recommendations" which is accessible for viewing by members of the RIT community only. This on-campus level of dissemination has generated discussions on the issue and motivated interest in raising the visibility of the findings. The NSF ADVANCE team is exploring how to address the issues raised through the introduction of workshops on unconscious bias for award committee members and systematic data collection and dissemination on award activities.

Some of the proposed strategies for working towards an unbiased awards system do require significant investment; i.e. workshops on unconscious bias for award selection committees, data collection system creation, and the review of policies, procedures and practices has an impact on budgets and schedules. However, other practices have little to no impact on resources, i.e. the opportunistic practices of legitimizing women's accomplishments costs very little and may have significant positive impact. Although alone it is not a solution, it is an important step that may be significant enough to make an impact. In her recent book, *Lean In*, Facebook Chief Operating Officer Sheryl Sandberg noted that small interventions could encourage people to behave differently.[48] Sandberg explained that Google (her former employer) used a system where engineers nominated themselves for promotion. The data showed that the men nominated themselves more quickly than the women. When the management team noticed this, they shared the data openly with the female employees. As a result, the women's self-nomination rates rose to roughly equal the men's.[48] Sandberg writes, "talking can transform minds, which can transform behaviors, which can transform institutions."[48] Perhaps raising the issues in this paper specifically revolving around the awards is a positive step in the transformation of this study university.

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