

Assessing the Academic Work Environment for Science and Engineering Faculty at the University of Michigan in 2001 and 2006: Gender and Race in Department- and University-Related Climate Factors
Executive Summary

UM ADVANCE Program
November, 2007

Introduction

The University of Michigan was awarded a five-year NSF ADVANCE Institutional Transformation grant in fall, 2001, to focus on recruitment, retention through climate improvement, and promotion of women science and engineering faculty. More recently the focus has broadened to include other underrepresented faculty, especially faculty of color. It is difficult for us to assess precisely the effect of the ADVANCE Program on the UM campus since activities and initiatives have taken place in an “uncontrolled” environment of other activities, issues, and events as well as the broader political and social context. However, we have collected two sources of information that do allow us to assess change over time and consider ADVANCE’s role in any changes that are identified: these are systematically collected institutional data on the status of women and faculty of color at UM; and the UM climate surveys conducted in fall 2001 and fall 2006.

Institutional Data

Analysis of UM science and engineering faculty data revealed real progress in the representation of women over the course of the NSF ADVANCE award period. Across the University, the percentage of female science and engineering faculty increased overall from 15% in AY2001 to 19% in AY2006. These gains are due in large part to *increased hiring* of female faculty. In AY2002 16% of new faculty hires were female; in AY2006 that number had more than doubled to 34%. Overall the number of science and engineering faculty increased 4% between 2001 and 2006, the number of male faculty decreased overall by 2%, and the number of female faculty increased by 33%. Further assessments of *retentions* reveal that, overall, only 33% of the female hires for this same time period actually replaced women who had left during this period,¹ indicating a relatively high rate of retention for women scientists and engineers. Finally, there are other indications that female science and engineering faculty participate in some activities at about the same rate as their male colleagues (e.g., in tenure and promotion reviews), though not necessarily in all schools and colleges; and that more of them are being asked to serve in *leadership* positions (the number of women chairs has increased from one to seven during the award period).

Efforts to assess the situation for faculty of color are more recent; however, we have examined hiring of faculty of color over the same time period. The number of minority scientists and engineers (including Asian/Asian American) increased from 232 to 297 from 2001 to 2006; the proportion increased from 15% to 19%. However, the proportion of underrepresented minority scientists and engineers in the population did not change from 2001 to 2006 (5% at both times). Similar to women, 39% of new hires went to replace faculty of color who left (50% for underrepresented minorities).

Climate Survey Overview

During the fall of 2001, staff at the Institute for Research on Women and Gender (IRWG) administered the University of Michigan Survey of Academic Climate and Activities. In fall 2006, a second survey was conducted to assess change in the campus work environment for scientists and engineers at the completion of the five-year NSF supported period of UM’s ADVANCE Program. This study was a cross-sectional

¹Based on the Turnover Quotient (TQ). The TQ is defined as 1 minus the ratio of the difference in core faculty between the two times and the total number of new hires during the period time 1 to time 2

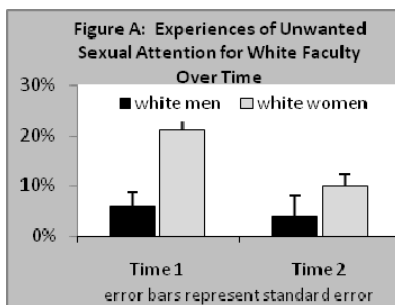
comparison with the 2001 survey data. The initial study was anonymous; therefore, no longitudinal follow-up of identical respondents was possible. This report is limited to assessment of the science and engineering tenure track faculty respondents at the two points in time (2001 and 2006). It describes gender differences (differences between men and women) and racial-ethnic differences (differences between white faculty and faculty of color, including Asian/Asian American), as well as time differences (comparing 2001 ratings to 2006) in the work climate for these faculty.

Findings from the Climate Surveys

University Climate: The survey asked several questions regarding institutional climate that faculty may experience on the UM campus: overheard disparaging comments about women and about racial-ethnic minorities, gender and racial-ethnic discrimination, and unwanted and uninvited sexual attention.

Overall, women scientists and engineers reported hearing more *disparaging comments about women*, but this effect resulted from the fact that white women reported more disparaging comments about women than white men scientists and engineers at both times.

Rates of *felt gender discrimination* for women were also relatively high at both times. There were no differences in experience of gender discrimination between the two groups of women.



At Time 1 white women reported higher levels than white men of their own *experiences of unwanted sexual attention*, as well as of others' reports to them of experiences of unwanted sexual attention. However, rates for both of these items were significantly lower at Time 2 than Time 1 for white women (see Figure A).

Overall, among scientists and engineers, faculty of color reported hearing more *disparaging comments about racial-ethnic minorities* than did white faculty. Male science and engineering faculty of color reported hearing more disparaging comments about racial-ethnic minorities than white male science and engineering faculty at Time 1. This difference did not persist at Time 2, and, in fact, the level of reporting by male science and engineering faculty of color was significantly lower at Time 2 than Time 1.

Faculty of color reported relatively high rates of *felt racial-ethnic discrimination*. Overall, they reported more racial-ethnic discrimination than white faculty at Time 1 and Time 2.

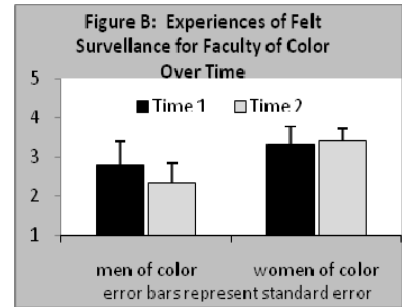
Department Climate: Both groups of men reported more positive overall assessments of the climate than their female counterparts at Time 1 and Time 2. In addition, the mean scores for white women were significantly more positive than those for women of color at both times.

General Department Climate: At both times white male faculty were more likely to report a positive and gender egalitarian climate and less likely to report tokenism and felt surveillance than white female faculty. In addition, at Time 2 white men were more likely to report a more tolerant climate and their department chairs as fair and less likely to report scholarly isolation, even though the scores on this scale were lower at Time 2 than Time 1 for all white faculty (as well as for minority male faculty).

Male and female faculty of color reported significantly different means for all five scales related to general department climate at Time 2; in every instance male faculty of color reported a more positive climate. These findings contrast with those at Time 1 when only two scales were significantly different (in the same

direction): chair is fair and chair creates a positive environment. Part of this difference from Time 2 is explained by the significantly lower reporting of scholarly isolation and felt surveillance by male faculty of color at Time 2 than Time 1 (see Figure B).

Climate for Diversity: In terms of specific ratings on the four scales about the climate for diversity, white men reported a more gender egalitarian climate and less tokenism than white women at both Time 1 and Time 2, as well as a more tolerant climate at Time 2. Male faculty of color were more likely to report tolerance, gender egalitarianism, and that the chair was committed to racial-ethnic diversity than female faculty of color at both times. In addition, male faculty of color also reported less tokenism from Time 1 to Time 2, and less tokenism than female faculty of color at Time 2.



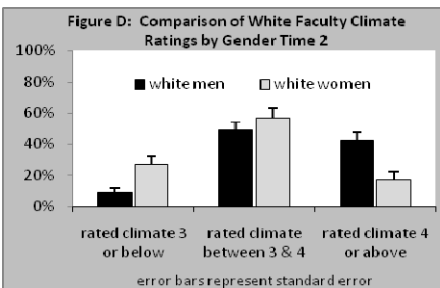
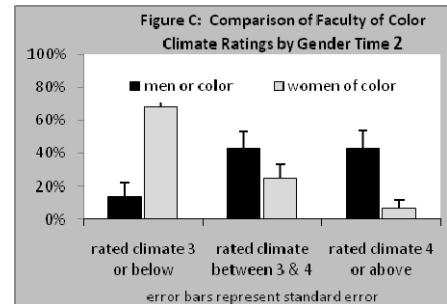
White male faculty reported less tokenism at both times than male faculty of color (even though reports of tokenism from male faculty of color were lower at Time 2 than Time 1). Similarly, there were differences on tokenism and department chair is committed to racial-ethnic diversity at both data collection points (white women reporting more positive scores in all instances).

Do These Differences in Climate Matter?

It is always difficult to address the question of the meaning of a difference found on a survey scale. One way of getting at this is to examine the distribution of scores along the scale. The distributions of ratings do overlap, but they are also quite different (see Figures C and D). There are some women who rated the climate at or above 4,

but far more of the men did. Similarly, some men rated the climate at or below 3, but again, far more women did so.

Thus, we believe it is reasonable to conclude that the difference in felt climate (between white and minority women scientists and engineers and their male comparison groups) is substantial. The difference between white and minority women is also considerable.



Career Satisfaction

Another way to evaluate the importance of the climate differences is to examine career satisfaction. Career satisfaction was assessed with 12 items that were also combined to create an overall career satisfaction score. There were gender differences for both racial-ethnic groups. At Time 2, men of color reported higher overall career satisfaction than women of color. They also reported more satisfaction in areas related to social and academic interactions with faculty than their female counterparts. There were no differences between these two groups on any career satisfaction items at Time 1.

At Time 2, white men also reported more satisfaction with the amount of social interaction with department members and balance between professional and personal life than white women. Their mean score on this last item was also higher than women’s at Time 1. Moreover, white men’s mean scores were higher on three items at Time 2 than Time 1 (current salary, opportunity to collaborate with other faculty, and ability to attract students to work with them) and lower on a fourth (level of funding for research).

There were no differences comparing racial-ethnic groups within gender on any of these items at Time 1 or Time 2.

Relationship of Climate and Satisfaction

Correlations of the overall climate indicator and career satisfaction with overall satisfaction with current position at UM revealed that at Time 1 and Time 2 both career satisfaction and total climate scores were significantly and strongly correlated with overall job satisfaction and with desire to leave UM (asked only at Time 2) for all four groups of faculty (positive total climate scores were associated with higher levels of job satisfaction and lower desire to leave UM).

Summary of Findings

The data suggest very little change over time. In 2006, as in 2001, the University climate appeared to be more positive for white men science and engineering faculty than women science and engineering faculty or science and engineering faculty of color:

- women reported more disparaging comments about women;
- women reported more felt gender discrimination;
- faculty of color reported more felt racial-ethnic discrimination;
- men and white faculty reported a more positive department climate;
- men reported higher job and career satisfactions.

Some findings do point to significant change comparing Time 1 faculty ratings to Time 2:

- overheard disparaging comments about race-ethnicity were lower for men of color;
- unwanted sexual attention (self and others' reports) for white women was lower;
- department climate was mainly better for men:
 - positive and tolerant climate increased for white men;
 - scholarly isolation lower for white men and women and men of color; not for women of color;
 - felt surveillance and tokenism decreased for men of color;
- some career satisfactions higher for white men.

Conclusions

Despite a few areas of positive change identified in this study (as well as those revealed in the institutional data), the overall findings from the survey indicate that the climate is relatively positive (and, in some areas, improving) for white male science and engineering faculty but less so for white women, faculty of color, and especially women of color in the sciences and engineering. It is important to note that the climate survey reports aggregate data and only represents experiences for these four groups of faculty in general. Nevertheless, given the clear relationship between science and engineering faculty ratings of the climate and career satisfaction with their overall satisfaction and desire to leave UM, it is important to redouble our efforts to improve the campus climate. The fact that there is only very limited evidence of an improved climate for women and minority science and engineering faculty after five years of institutional effort suggests both that the change process is slow and that more creative approaches to transforming the work environment may be necessary.