Interim Report for

ADVANCE Institutional Transformation Project

University of Michigan

*for Public Release**

Year 3: June 2004

*Data reported for Engineering, LS&A, and Medicine at the college level; reported for the 6 smaller colleges (Dentistry, Information, Kinesiology, Natural Resources, Pharmacy and Public Health) combined.

Table of Contents

SECTION I: SUMMARY OF PROJECT ACTIVITIES JANUARY-JUNE, 2004

A. PARTICIPANTS

Project Staff

Abigail Stewart, Principal Investigator, is responsible for ADVANCE project oversight. She represents the project to the larger University of Michigan community, offering presentations on findings, and consultations on mentoring and recruitment strategies to units and administrators across campus. She directs all project interventions and consults on all ADVANCE-related activities involving the project's collaborators.

Janet Malley directs all project evaluations. She supervised the analyses and drafted the report on the climate survey results regarding faculty of color. She directs the ongoing collection of data used to evaluate the project's progress in NINE different UM colleges. She designed and administered web surveys to evaluate the activities and initiatives of ADVANCE and prepared reports.

Ching-Yune Sylvester manages and coordinates ongoing project evaluation and data collection activities under Janet Malley's supervision. She designed web surveys and wrote reports on ADVANCE activities and initiatives.

Robin Stephenson manages and coordinates the project's intervention activities, including committee meetings, presentations, and intervention activities. She is also responsible for drafting many reports, overseeing the project website, and drafting materials for University publications. She provides staff support for the STRIDE committee.

Laura Reese ended her temporary employment with ADVANCE in January, 2004. She updated the web pages and produced promotional materials regarding the Crosby Awards.

Lisa Parker keeps financial records, writes budget reports, and manages ongoing account activities for the ADVANCE grant.

Patricia Smith reviews ADVANCE account activities and, along with Lisa Parker, negotiates with administrators in units cooperating with the Institute for Research on Women and Gender when difficulties arise in administering the grant.

Partners

Jean Waltman and Carol Hollenshead from the Center for the Education of Women (CEW) are conducting qualitative evaluations of the Departmental Transformation Grant. They are also conducting exit interviews with female faculty who have left science and engineering departments at the UM.

Jeffrey Steiger and other staff at the Center for Research on Learning and Teaching (CRLT), directed by Connie Cook, presented an interactive theater sketch called the "ADVANCE Faculty Meeting" to audiences of faculty and administrators to illustrate experiences of female faculty and the negative climate issues. STRIDE members attended the presentations to help ensure some constructive audience participation in discussions after performances of the sketch. CRLT Players have also developed a new sketch about Mentoring Junior Faculty illustrating poor mentoring techniques. This was previewed to the Network of Women Faculty and will be in use next year with wider university audiences.

Jane Hassinger, director of the Interdisciplinary Program in Feminist Practice, will conduct a Women Talking Science and Engineering (WTS&E) seminar in August, 2004 and is planning another workshop on career-mapping/life-planning that will be launched in late June 2004.

Cinda-Sue Davis, director of Women in Science and Engineering (WISE), developed templates documenting the status of women in various engineering departments. These documents show the percentage of women students, both undergraduate and graduate, in a given engineering department at Michigan compared to other departments; the number of women faculty in various departments; and the number of women working nationally in a given engineering discipline compared to other disciplines. International data, if available for a given discipline, are also provided. The data are presented in graphical form, making it easy to compare and contrast data. Preliminary versions of this handout were shared with faculty who hosted a WISE sponsored women seminar speakers this year. These faculty members critiqued the handouts and final versions are currently being created.

This summer in July and August, Cinda-Sue Davis will be meeting individually with each College of Engineering department chair. The data for their department will be shared with them at that time. She will also ask for 10 to 15 minutes of time at a departmental faculty meeting in the fall, in order to share information about the WISE Program in general but also to share this comparative information about women students in their departments.

Comparable data for the status of women in science and mathematics departments within the College of Literature, Science and the Arts is currently being collected and similar handouts will be developed.

Pamela Smock, Associate Director of ISR and Associate Professor of Sociology and of Women's Studies, has provided expert consultation for junior female faculty in the natural sciences in the College of Literature, Science, and the Arts. She is preparing to meet with faculty in the College of Engineering regarding mentors and mentoring needs, and is discussing development of a handbook for mentors and mentees.

Lorna Hurl, Staff Counselor at UM's Faculty & Staff Assistance Program developed a series of programs with her staff , the Office of Institutional Equity (OIE), and the

Human Resource Development (HRD) office to offer coaching sessions about topics identified by the Network of Women Scientists and Engineers: work/family balance and time management. One session occurred in February and future sessions are being planned for the next academic year.

Other Collaborators or Contacts

Two new members joined the Science and Technology Recruiting to Increase Diversity and Excellence (STRIDE) Committee. This committee was formed in 2002 and provides information and advice about practices that will maximize the likelihood that well-qualified female and minority candidates for faculty positions will be identified, and, if selected for offers, recruited, retained, and promoted at the University of Michigan. The committee works with departments by meeting with chairs, faculty search committees, and other departmental leaders involved with recruitment and retention. They advise chairs on search committee composition and search practices, work with search committees throughout the search process, and offer recruitment presentations to departments, search committees, and other groups. The membership is comprised of senior faculty in sciences and engineering and is chaired by Abby Stewart. Members are: Anthony England, Electrical Engineering and Computer Science; Carol Fierke, Chemistry; Melvin Hochster, Mathematics; Gary Huffnagle, Internal Medicine*; Wayne Jones, Materials Science and Engineering*; Samuel Mukasa, Geological Sciences; Martha Pollack, Electrical Engineering and Computer Science; Pamela Raymond, Senior Counselor to the Provost, Cell and Developmental Biology; and John Vandermeer, Ecology and Evolutionary Biology (* denotes new member since December 2003).

The ADVANCE Leaders in Science Seminar Series (ALISSS) developed a speaker series presenting outstanding women in science during which each speaker presents her current research and meets with interested faculty to discuss mentoring and faculty development to help transform the environment of women faculty in the biomedical sciences at the University of Michigan. ADVANCE funded this endeavor. Three speakers have given presentations to date and an additional five are planned for the coming academic year. They are: Florence Haseltine, NIH; Nancy Craig Johns, Hopkins University; Nancy Hopkins, MIT; and in Fall/Winter 2004-2005: Jennifer Doudna, University of California, Berkeley; Beatrice Hahn, University of Alabama, Birmingham; Judith Kimble, University of Wisconsin, Madison; Katherine Jones, Salk Institute; and Joan Brugge, Harvard University.

A Crosby Award recipient, Smadar Karni, Professor of Mathematics, continues her speaker series celebrating the achievements of women in applied mathematics. Two speakers visited the math department during winter term for lunches and talk: Cathleen Morawetz, New York University; and Linda Petzold, UCSB. Two speakers are planned for Fall 2004: Konstantina Trivisa, University of Maryland and Suzanne Lenhart, University of Tennessee.

Ben Hansen (Statistics) and Rich Gonzalez (Psychology) continue to work on developing analytic statistical strategies for assessing space equity and other data.

B. ACTIVITIES AND FINDINGS

Research and Education Activities

ADVANCE staff completed the report "Assessing the Academic Work Environment for Faculty of Color in Science and Engineering" from the data collected from the original climate survey. The report was widely disseminated throughout the University and discussed at presentations to dean's groups. The President asked the deans and chairs to distribute the report to all faculty. The STRIDE Committee is in the process of developing further educational tools and PowerPoint Slides to address the issues raised in the report pertaining to discrimination. ADVANCE is planning an event for the next academic term in concert with raising awareness of the report's findings. This report is attached in Appendix A.

ADVANCE staff conducted a study on science and engineering faculty attrition in the Medical School and the colleges of Engineering, and Literature, Sciences, and the Arts examining why faculty leave the UM. The data were collected from a 10-year time span and analyzed by gender according to seven categories. The data were checked by sources within each individual department to provide a narrative background for categories of leaving that were not explicit. This report is attached in Appendix B.

Major findings resulting from these activities

Specific findings from the race and ethnicity study are outlined in the executive summary and the full report, which are attached. In brief, the report states that although U-M's commitment to diversity is clear, over 25% of science and engineering faculty of color reported experiencing racial-ethnic discrimination at UM within the last five years.

The attrition report suggests that there were no significant differences in the frequencies of men and women who left due to tenure issues or better opportunities. In some cases, there did appear to be a greater proportion of women who left due to dissatisfaction than men, although with such small numbers of women and large numbers of men on the faculty, it is very difficult to assess differences in attrition rates. Moreover, the University does not record information about attrition in a uniform manner.

The Committee for Science and Technology Recruiting to Improve Diversity and Excellence (STRIDE) developed a data-based PowerPoint presentation about non-conscious bias and the low numbers of women faculty in science and engineering called "Recruitment and Retention of Women Faculty" which is available on the ADVANCE website, and presented using an interactive method to departments and search committees.

Opportunities for training and development

The Committee for Science and Technology Recruiting to Improve Diversity and Excellence (STRIDE) conducted five formal presentations from January through June, 2004 to groups across campus to educate them about bias and disadvantage of women. Participating departments included the School of Public Health faculty, the Associate Provosts and Associate Deans' Group, the Dental School faculty, the Biomedical Scholars at the Medical School, and the deans of the schools of Public Health, Natural Resources, Pharmacy, Information, and Dentistry. Approximately 140 people attended in total. Committee members also met informally with Madeleine Jacobs, Executive Director of the American Chemical Society, for a discussion about trends in academia and business and information sharing.

An Advanced Negotiation Workshop was conducted for the Network of Women Scientists and Engineers by Barbara Butterfield, formerly Chief Human Resource Officer for Academic and Staff Human Resources and Affirmative Action at the University of Michigan, and Jane Tucker, Senior Manager, SAP – Administration Systems Management Group at Duke University, in March, 2003. Twenty-three faculty members attended. Butterfield and Tucker are planning further follow up sessions devoted to personal development.

A Leadership workshop was conducted for the Network by Sandra Shullman, Executive Development Group, Columbus, OH, to identify/develop areas for skill enhancement. The program involved a variety of instructional approaches, including presentation, small group discussion and experiential learning.

A session regarding work-life balance was conducted for the Network, research scientists, post-doctoral students and graduate students to address the emotional dimensions for women scientists in managing multiple work/life roles. This session was organized through a consortium of ADVANCE and UM's Faculty & Staff Assistance Program, The Office of Institutional Equity, and Human Resource Development.

Outreach activities

Abby Stewart organized the presentation of the findings of the Gender and Science Sub-Committees to the Deans, Provost and President in April and is spearheading the implementation efforts in the institutional policy changes the report recommends. The three faculty subcommittees comprised of deans and faculty explored policy changes in: 1) Faculty Tracks and Work/Family Integration, 2) Evaluation and Promotion of Faculty, and 3) Recruitment, Retention and Leadership. Upon careful study and debate they made sweeping recommendations on policies in: Hiring, Dual Career, Mentoring, Leadership, Retention, Flexible Tenure Clock, Third Year Reviews, Faculty Annual Reviews, Faculty Development, Faculty Tracks, Modified Duties, and Day Care. The recommendations were presented to the parent Committee on Gender in Science and Engineering (including the President and Provost), as well as to the Academic Program Group (all deans, chaired by the Provost) in April, 2004. In June 2004, Abby Stewart and Pamela Raymond met with the Provost to assess items for approval and implementation. These implementation meetings will continue through the summer months; the aim is development of a detailed

plan for implementation in the next academic year. The executive summary of the subcommittees' recommendations is attached as Appendix C.

Abby Stewart consulted at the University of Illinois in February about mentoring based on her experiences with ADVANCE and its initiatives.

Abby Stewart and Jan Malley presented talks about ADVANCE in February at the AAAS/Mini ADVANCE PI meeting in Seattle. On February 12, Jan Malley presented information on "Leadership Development and Best Practices." During the February 13 AAAS meeting, Abby Stewart spoke about "Impact on Policy Transformation."

In April, Mel Hochster, Professor of Mathematics, presented the UM annual Sokol lecture to a public audience entitled: "Women in Mathematics: We've Come a Long Way, Or Have We?" The situation of women mathematicians and other women scientists was discussed, partly from a historical perspective, and partly in terms of problems that exist today in evidence of gender bias coupled with the accumulation of disadvantage.

In April Abby Stewart, along with President Coleman and Deans McDonald (LS&A) and Director (Engineering) attended the Washington DC conference of the nine Universities originally convened by MIT. All four presented UM ADVANCE materials.

Abby Stewart, Jan Malley, Ching-Yune Sylvester and Robin Stephenson attended the Georgia Tech ADVANCE conference in Atlanta in April. On April 20, Jan Malley spoke about "ADVANCE Institutional Data", and Abby served as session coordinator and presenter for "Assessment and Evaluation of Impact." On April 21, Abby spoke on "Mentoring and Faculty Development."

The CRLT players presented their sketch "ADVANCE Faculty Meeting" twelve times at faculty events hosted by the Colleges of Engineering and of Literature, Science and the Arts, a special session for graduate students, the UM Dearborn Humanities faculty, UM Dearborn Senior Officers, Deans, and Department Chairs, the Institute for Social Research administrators and staff, and the Business School Deans and Chairs. These performances were attended by approximately 220 faculty/staff members and 60 graduate students.

ADVANCE staff met with Dr. Nancy Hopkins, Amgen Professor of Biology, Biology Department and Center for Cancer Research, Massachusetts Institute of Technology, regarding MIT's response to a "Study on the Status of Women Faculty in Science" in May.

ADVANCE held a lunch in June with all UM female department chairs in science and engineering to build a support network for this group of five women.

Abby Stewart met with several individual women in private consultation about renewal packages, accepting committee assignments and appointments to chairs and other related issues.

C. PUBLICATIONS AND PRODUCTS

A booklet entitled "*Elizabeth Caroline Crosby Research Fund Grant Winners 2002 and 2003"* was published; it highlights and summarizes the projects conducted so far by winners. The book was distributed to all Network members, deans, chairs and president and provost. The booklet is attached in Appendix D.

Further resources have been added to our web page, including the STRIDE data-based PowerPoint, links to all other ADVANCE programs, and news of developments and initiatives with the program and accomplishments of female faculty. The web address is: http://www.umich.edu/~advproj/stridepresents_files/frame.htm

D. CONTRIBUTIONS

The Elizabeth Caroline Crosby Fund awarded grants to ten women faculty in science and engineering in 2004. Most of these women hope to increase their chances of attaining tenure or promotion through the research supported by these funds. Details of some of the special needs of women this year included support needed due to a difficult pregnancy followed by parent illness and death during which time the faculty member's research had not thrived; getting a research career back on track after adoption of two children from Guatemala with no maternity leave and difficult adjustment of the children to a new environment, and a creative sabbatical solution of flying a mentor to Ann Arbor so a family of four did not need to relocate. The press release is attached in Appendix E.

The Lydia Adams DeWitt Research Fund awarded grants to two women faculty on the Primary Research Scientist track in 2004. Funding for these awards was provided by the UM Provost. We expect these awards to contribute not only to the careers of the women who receive them, but also to the morale of the women on the research science track in general.

An additional *Departmental Transformation Grant* proposal, submitted by a group of three male junior faculty in Physics, was funded in January. The proposal, entitled "Visitor Program for Young String Theorists," is to develop a visitor program that will bring outstanding young women scientists to the department for visits of a week or two in duration. The program is geared towards highlighting successful women and identifying potential targets for faculty recruitment. One particularly attractive feature of the proposal was the goal of involving the visitors in a range of ongoing departmental activities (courses, graduate seminars, etc.) to ensure that the visibility of women theorists in physics is increased.

The Network of Women Scientists and Engineers held nine events during the winter term.

- January
    - We held a reception to honor the women who received Elizabeth C. Crosby awards in the past two years. Professor Emerita Sarah Newman offered comments about the life, research and advances achieved by Elizabeth Crosby. This event was attended by twenty-five women faculty and three male chairs in science and engineering.

- February
    - Sandra Shullman, Executive Development Group, Columbus, OH, conducted a workshop, "The Chemistry of Leadership: A Women's Leadership Development Program," designed to give participants some basic concepts and tools to further develop their leadership skills. Twenty-two women faculty participated.

- March
    - We had four events or activities. We held an advanced workshop on negotiating effectively through teamwork, conducted by Barbara Butterfield, formerly Chief Human Resource Officer for Academic and Staff Human Resources and Affirmative Action at the University of Michigan, and Jane Tucker, Senior Manager, SAP – Administration Systems Management Group at Duke University, in March, 2004. Twenty-four faculty members attended.

    - We held a lunch for a smaller subset of the Network, the LSA junior women faculty, for a discussion about mentoring with Pam Smock of ISR, who is serving as a mentoring liaison for ADVANCE, to discuss topics important for successful mentoring. Fourteen women attended.

    - We hosted a lunch for the Network College of Engineering women to talk about ADVANCE and socialize. Twenty women attended.

    - We also collaborated on a session entitled "Creating Work/Life Balance: Choices and Challenges for Women Scientists" as an informative panel discussion of issues and strategies for developing a realizable work-life balance. Two panelists were from the Network. This session was sponsored by ADVANCE, The Office of Institutional Equity, The Faculty and Staff Assistance Program and Human Resource Development and was attended by 28 women.

- April
    - We had three events. We presented a talk by Madeleine Jacobs, American Chemical Society Executive Director and Chief Executive Officer entitled, "Opening the Doors to Women in Chemistry: Why We Need Keys to the Doors." Approximately 400 students and faculty attended.

    - We hosted the Network of Women Scientists and Engineers Spring Dinner; it provided a chance to socialize. In addition, the CRLT players previewed their new Mentoring Junior Faculty sketch, which elicited a lively discussion and feedback. Sixty-four faculty women attended.

    - We held a lunch for the Network to meet with Karen Uhlenbeck, Professor of Mathematics at University of Texas who received an honorary degree

from UM in 2004. She shared ideas about mentoring women, an interest she is deeply committed to. Sixteen women faculty attended.

Members of the Network continue to become more involved in their own programming and events planning and provided several suggestions for the future including: another topic-oriented retreat, more opportunities to socialize and network, more workshops on topics including: negotiating, writing, funding, leadership, career, coping. The Network also would like more meetings with top university administrators.

D. INTEGRATIONS OF THE ADVANCE PROGRAM INTO THE ADMINISTRATIVE SYSTEM

Abigail Stewart, Project PI, continued to serve as the Associate Dean for Academic Affairs in the College of Literature, Science and the Arts for a second year. This enabled her to contribute to policy development, and support change in recruitment, hiring, promotion, and other decisions in the college.

Ellen Meader, a research associate in the dean's office of the College of Literature, Science and the Arts, was hired in part to institutionalize data collection and organization of indicators for NSF and ADVANCE, as well as for internal LSA institutional research.

Pamela Raymond, ADVANCE Co-PI, continues to serve as Senior Counselor to the Provost, maintaining crucial communication between ADVANCE and the central administration.

Abby Stewart was invited to present information about bias and recruitment to committees searching for deans in the schools of Law, Public Health, and Education.

The Gender and Science Subcommittee recommendations are undergoing serious evaluation and work towards regent and administrative approval where necessary. The ADVANCE Steering Committee, composed of co-PIs Abby Stewart and Pamela Raymond and the Deans of LS&A, Engineering and Medicine, have spearheaded this process and are continuing to shepherd institutionalization. A copy of the executive summary is attached as Appendix C.

The institutionalization of data collection procedures that will help ADVANCE collect needed information on hiring, retention, and promotion continues in each of the three colleges with the largest number of women scientists and engineers at the UM. (These are the College of Engineering, the School of Medicine, and the College of Literature, Science and the Arts.)

SECTION II: REPORT ON BASELINE INDICATORS AND PROGRAM EVALUATION

Indicators:
Second Year of ADVANCE (2003)
First Year of ADVANCE (AY2002)
And Baseline Year (AY2001)

A. INTRODUCTION

The data reported here are for the academic year 2002-2003 (September 2002-August, 2003, referred to in this report as AY2003); the second year of ADVANCE funding (in January 2003) occurred midway through the academic year of interest. Note that the ADVANCE project activities we are reporting on have taken place between January-June, 2004. For this report, then, outcome measures are reported for a year behind the activities that are discussed in the preceding section. We plan to make up for this time lag by reporting on the NSF indicators for AY2004 in December 2004.

We are reporting on all science and engineering faculty (instructional, research and clinical tracks) with budgeted (i.e., greater than 0% time equivalence) appointments in science and engineering departments in the College of Engineering (COE)[1], the Medical School's Basic Science departments[2], and the College of Literature, Sciences and Arts' (LS&A) Natural Sciences Division[3]. In addition, individual faculty members in six smaller Schools that have science faculty at the University are included. These smaller Schools are the School of Dentistry, the School of Information, the Division of Kinesiology, the School of Natural Resources, the College of Pharmacy, and the School of Public Health. Faculty in these Schools were determined to be scientists by examining the field of study in which they received their highest degree. A list of degrees considered science degrees is included in Appendix F. For those degrees that might afford research in both science and non-science areas, we evaluated the individual cases and included faculty based on their research areas.

For each College or School, we included faculty from the following three tracks where applicable: the instructional (tenure) track, the primary research track and the clinical instructional track. These generally refer to the titles of assistant/associate/professors, assistant/ associate/research scientists[4], and assistant/associate/clinical professors respectively; instructors, research investigators, and supplemental faculty were not included.

---

[1] COE: Aerospace Engineering; Atmospheric, Oceanic & Space Sciences; Biomedical Engineering; Chemical Engineering; Civil & Environmental Engineering; Electrical Engineering & Computer Science; Industrial & Operations Engineering; Materials Science & Engineering; Mechanical Engineering; Naval Architecture & Marine Engineering; Nuclear Engineering & Radiological Sciences.

[2] Medicine: Biological Chemistry; Cell & Developmental Biology; Human Genetics; Microbiology & Immunology; Pharmacology; Physiology.

[3] LS&A: Astronomy; Chemistry; Ecology & Evolutionary Biology; Geological Sciences; Mathematics; Molecular, Cellular & Developmental Biology; Physics; Statistics.

[4] On the research track, after assistant research scientist level, faculty can pursue two different track paths. One is designated by the titles associate research scientist and research scientist, the other by either research associate professor and research professor, or senior associate research scientist and senior research scientist. For our purposes, research faculty at the associate rank are considered together, as are faculty at the full rank (regardless of title).

In the report, we discuss the state of female scientists and engineers at the University of Michigan for AY2003. We review the changes in the gender composition from the previous two academic years (AY2001 and AY202). However, given the small number of female faculty and corresponding small changes in numbers, we did not compute statistics on these comparisons.

Following this section of the report are tables representing all of the outcome measures required by the National Science Foundation. A list of the tables is included in the table of contents. In extracting data from the University's databases, the effective date of March 1, 2003 was used. We have taken this to reflect conditions in effect during the 2003 academic year. These data were verified by the individual Colleges to ensure we did not miss any faculty who may have been present in the Fall of 2002 and not in Winter 2003; they also ensured that we included all additional positions (e.g., administrative positions) held in either semester.

For changes in status such as new hires and terminations/retirements, the effective dates used were between 3/1/2002 and 3/1/2003. That is, we report on those who started their instructional tenure track position between those dates, or those who left their positions between those dates. While this means that the data for new hires and terminations/retirements do not match exactly with the academic year, this was done to facilitate reconciling the changes in the number of faculty from AY2002 to AY2003. With regard to faculty promotions, we report here faculty whose promotions were effective in AY2003 (and thus were reviewed in the previous year, AY2002).

B. Tenure Track Faculty

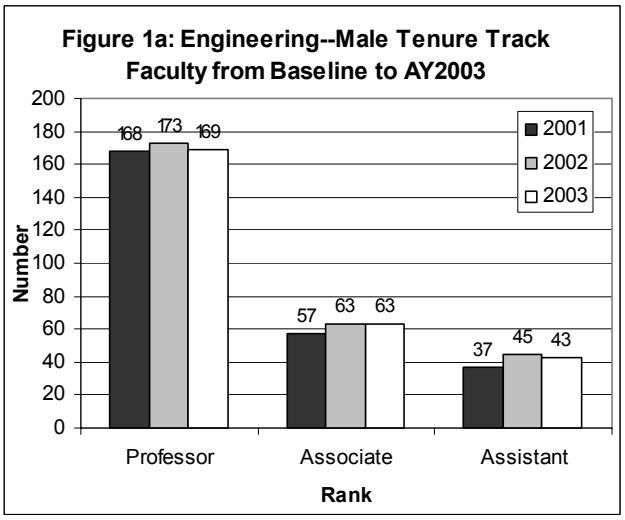
OVERVIEW

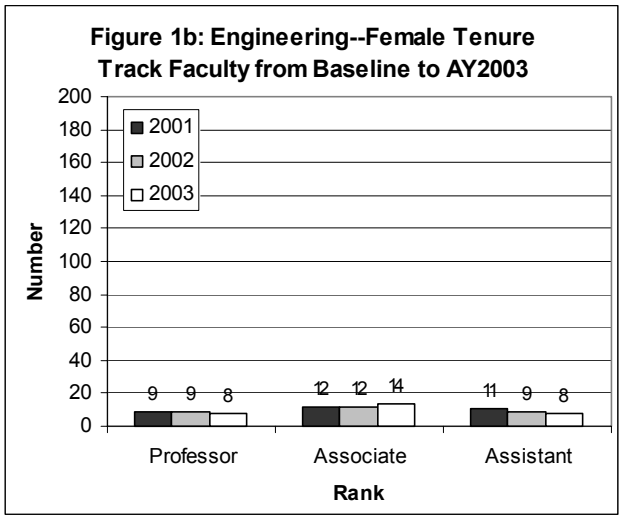
In this section we discuss the numbers of men and women science and engineering instructional (tenure) track faculty in each College. The percentages reported here are based on the number of men and women in each department (i.e., headcount), and not based on time equivalents (FTE). Head counts are easier to conceptualize, and in most cases do not differ much from the number of FTEs (percentages based on FTE can be found in Tables 1a-1d). Where the percentages based on head counts and those based on FTEs differ by more than 2 points, the percentage based on FTE will also be reported in brackets [ ].

COLLEGE OF ENGINEERING

In AY2003, the College was 90% male (N = 275) and 10% female (N = 30)[5] (see white bars in Figures 1a and 1b; see Table 1). The small proportion of female faculty is particularly apparent at the professor level, where only 8 out of 177 (5%) of the faculty at this highest rank were women. At the associate professor level, women comprised 18% of the faculty, and at the assistant professor level, they comprised 16%.

Compared to the baseline year of AY2001, Engineering has experienced an overall increase in the number of male faculty at all ranks (net gain of 13 faculty across all three ranks). In contrast, there has been a net loss of 2 female faculty since AY2001.





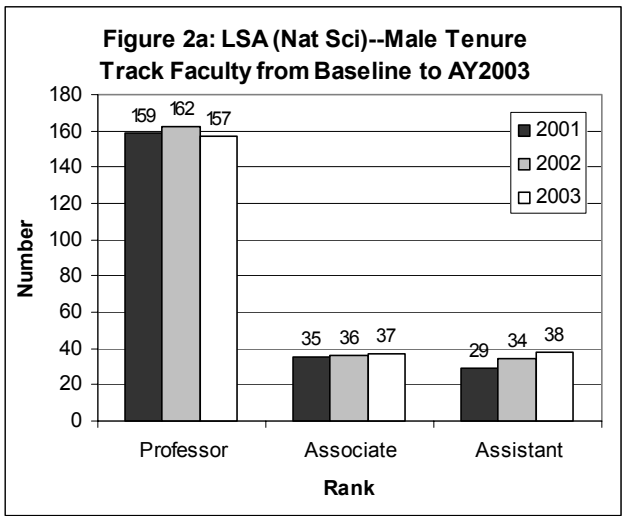
Of the new hires in Engineering for AY2003, 8 were men (80%) and 2 were women (20%); see Table 2. At the same time, Engineering lost 16 men and 2 women to retirements and other terminations (see Table 3). In terms of faculty promotions, 10 faculty were evaluated for promotion: 7 men and 1 woman were promoted and 2 men were denied promotion (see Table 4).

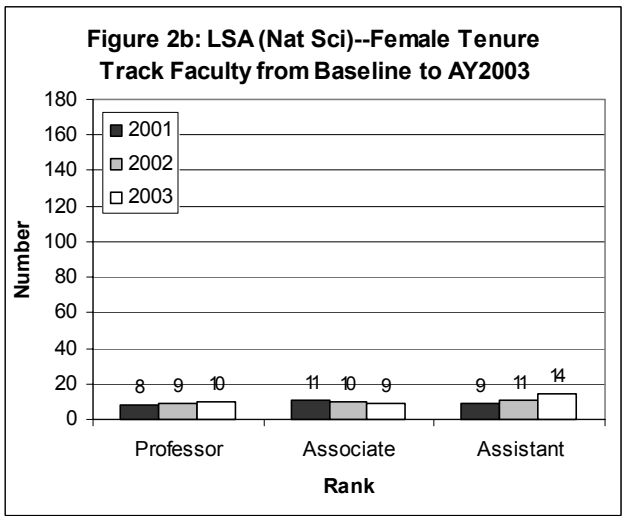
[5] All percentages are rounded to the nearest whole number. Also, while percentages are used throughout this report for ease of comparison across colleges and sub-populations that vary widely in number, the reader must keep in mind that due to the small number of female faculty, an addition/loss of one female will result in a larger corresponding percentage change than if that addition/loss had been one male. Please refer to the tables and figures for raw numbers.

COLLEGE OF LITERATURE, SCIENCE & THE ARTS
(Natural Sciences Division)

The overall composition of faculty in the Natural Sciences Division for AY2003 was 88% male (N = 232) and 12 % female (N = 33). At the highest rank, this gender disparity was the greatest: only 6% of the professors were women. At the associate professor level, 20% of the faculty were women, and at the assistant professor level, 27% of the faculty were women (see Table 1). Figures 2a and 2b depict the number of faculty at each rank in AY2003 (white bars) across the 7 departments in LS&A's Natural Sciences Division.

In relation to AY2001 (baseline year), LSA Natural Science division has seen a gain of 9 male assistant professors, and a net gain of 5 female assistant professors; there were no net changes in the combined number of associate and full professors combined.



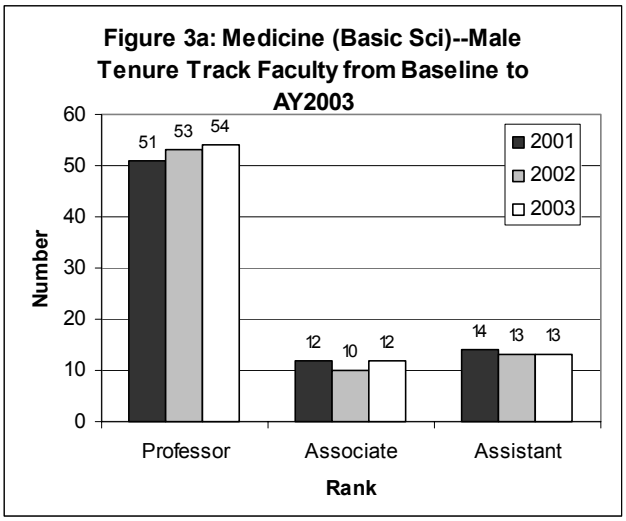


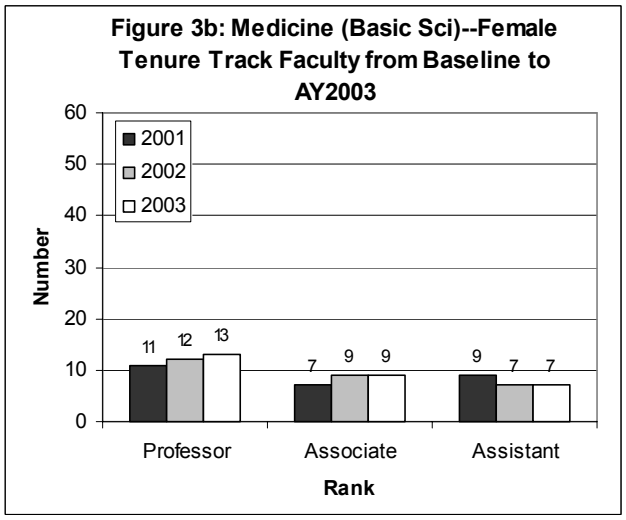
Of the new hires in the LSA Natural Sciences for AY2003, 16 were men (84%) and 3 were women (16%); see Table 2. In the same year, LSA Natural Sciences lost 13 male faculty (see Table 3). Of the 9 faculty who were considered for promotion, 7 men and 1 woman were promoted, and one man was denied tenure (see Table 4).

MEDICAL SCHOOL
(Basic Science Departments).

The basic science departments in the Medical School were comprised of 73% men [70% of FTE] (N = 79) and 27% women [30% of FTE] (N = 29) in AY2003. At all ranks, women were in the minority: they comprised only 19% of professors, 43% of associate professors [53% of FTE] and 35% of assistant professors. Figures 3a and 3b shows the actual number of men and women at each rank in AY2003; see Table 1 for percentages based on FTE.

In part due to the fact that the Basic Science departments in the Medical School are smaller than either Engineering or LSA (Natural Sciences), they have not experienced much change since AY2001. Medicine saw a net gain since AY2001 of 2 male faculty members and 2 female faculty members.

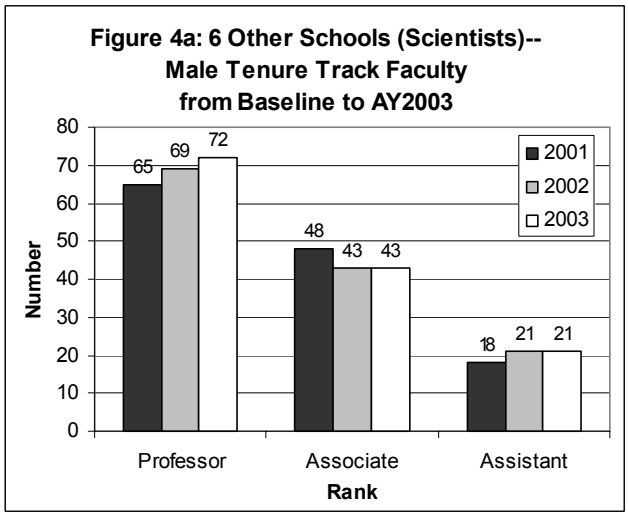


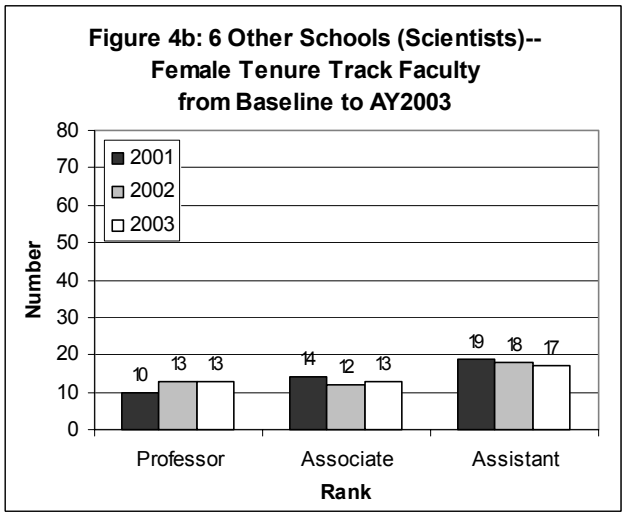


In AY2003, 5 men (83% of hires) and 1 woman (17% of hires) joined the faculty in the Medical School (Basic Science departments); see Table 2. At the same time, 4 men left the faculty in AY2003 (see Table 3). With regard to promotions, all 4 faculty who were evaluated for promotion (2 men and 2 women) received it (see Table 4).

SIX SMALLER SCHOOLS
(Dentistry, Information, Kinesiology, Natural Resources, Pharmacy, Public Health)

In AY2003, the overall proportion of female (scientist[6]) faculty across all six additional Schools was 24% (see Table 1). This proportion ranged from 0% female in the School of Information to 40% female in the Division of Kinesiology. Looking at all six Schools by rank, we see that while almost half of all assistant professors were female (45%) [41% of FTE], this proportion dropped as we moved higher up the ranks; only 23% of associate professors and 15% of professors were female (see Figures 4a and 4b).





Considering all 6 schools together, there was a net gain of 5 male faculty members, and no net change for female faculty members since AY2001.

[6] Only scientists in each department were included; non-scientists (based on highest degree or research area) were not included.

SUMMARY OF CHANGES FOR ALL SCHOOLS/COLLEGES

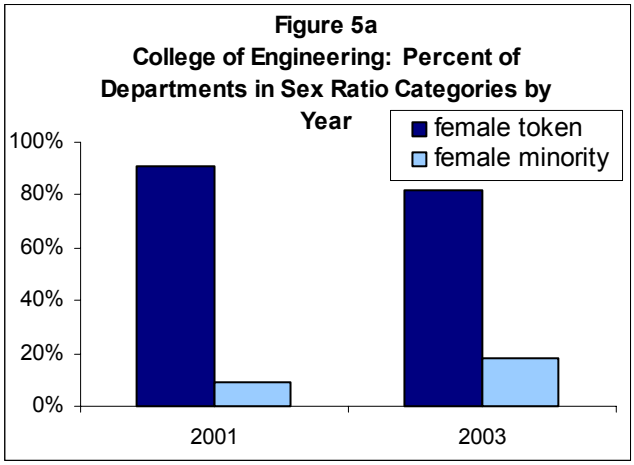
Looking across the Colleges and Schools, the most striking fact is the relatively low numbers of women faculty in all ranks in comparison to their male colleagues. In a pattern unchanged from that reported in December 2003 and December 2002, the majority of instructional track science and engineering male faculty were found to hold the highest rank of professor, while the female faculty were relatively evenly distributed across all ranks, and in some cases, more likely to hold the lowest rank of assistant professor.

One method to significantly change the gender composition of the faculty is through balanced hiring. However, for the colleges on which we have hiring data (Engineering, LSA and Medicine), women comprised only 16-20% of new hires.

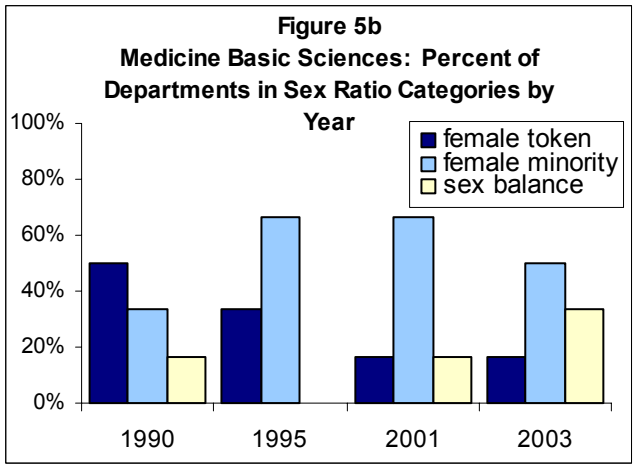
OVER TIME CHANGE ON THE TENURE TRACK BY GENDER

Now that we have begun to accrue some longitudinal data, we thought it important to develop a more systematic process for assessing change over time. Our initial efforts were directed at the tenure track faculty, looking specifically at the ratio of women on the science and engineering faculty by department within each of the three major schools (Engineering, LSA, and Medicine). Following Lisa Frehill's suggestion (Georgia Tech Conference panel presentation, "Measuring the Status of Women: Toward Cross-Institutional Analysis to Understand Institutional Transformation," April, 2004) we assessed the sex ratio of each department in the three schools for AY2001 (pre-award year) and AY2003 (reported here). For some schools we also had readily available data for AY1990 and AY1995 that we also included in our analyses. The sex ratio categories used by Frehill are: female token; female minority; sex balance; male minority; and male token. We defined the categories as follows: female token (0-17% female); female minority (18-35% female); balance (36-64% female); male minority (65-82% female); male token (83-100% female). Others (e.g., Valian, 2000) have identified the female minority category as a critical mass that may be an important goal for us to strive for in each department.

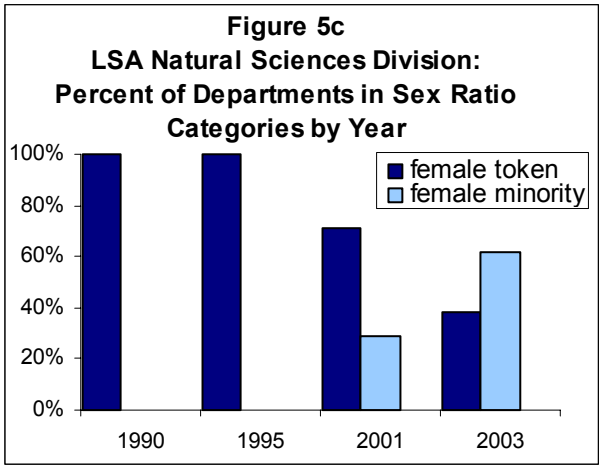
Engineering. Looking first at the College of Engineering (we currently only have data for AY2001 and AY2003; we plan to compile earlier data for future reporting), we found that all but one of the 11 departments reflected a female token sex ratio in AY2001. The one remaining department represented a female minority sex ratio. By AY2003, the situation had improved slightly; two departments had a female minority sex ratio and the remaining 9 were still coded female token. The graph (Figure 5a) depicts the percentage of departments in each category for the two academic years.



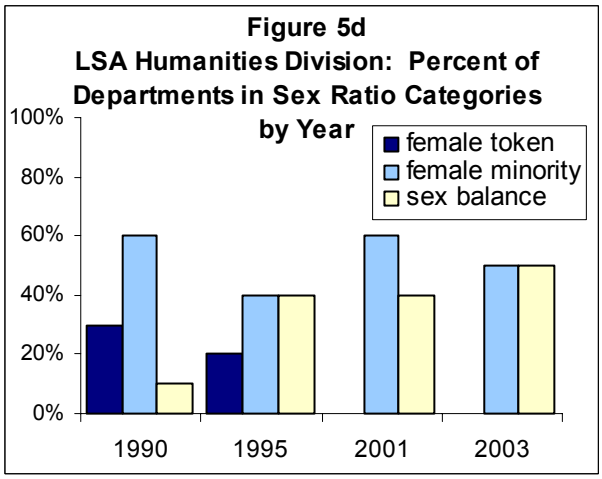
Medicine. We had readily available data by department for the Medical School for AY1990 and AY1995 as well as AY2001 and AY2003 and report on all four years for the six basic science departments (see Figure 5b). We found a decline in the percentage of departments with a female token sex ratio between AY1990 and AY2001 as well as some fluctuation between the percentage of departments with female minority sex ratios and those with sex balanced ratios. By AY2003 the trend appears to reflect an increase in sex balanced departments and a decrease in female minority departments. It will be important to see if this trend continues.



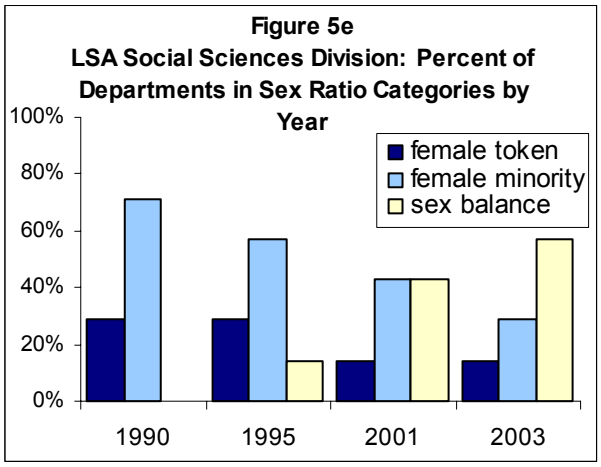
LSA. Again we had readily available data for AY1990 and AY1995 as well as AY2001 and AY2003 by department for LSA. We first looked specifically at the departments in the Natural Sciences Division and found a pattern of improvement for the two most recent years during which the number of female minority departments increased from two to five (it should be noted that the total number of departments also increased in AY2003 because the biology department split into two separate departments the previous year). In the earlier two years 100% of the departments had a female token sex ratio. The graph (Figure 5c) depicts the percentage of departments at each sex ratio category for the four academic years.



For comparative purposes we looked at the two other LSA Divisions (Social Sciences and Humanities) to see how the Natural Sciences Division compared to each of them. The Humanities Division shows a remarkably different pattern from the Natural Sciences Division, with no female token sex ratio departments by AY2001 and an equal number of female minority and sex balanced departments by AY2003 (see Figure 5d).



The LSA Social Sciences Division shows an even more impressive pattern, moving from a predominance of departments with a female minority sex ratio and no departments with a balanced ratio in AY1990 to a predominance (60%) of sex balanced departments (see Figure 5e) by AY2003.



Since AY2003 represents the first full academic year of the NSF ADVANCE award, it is too soon to draw conclusions about ADVANCE project efforts to recruit and retain women scientists from these numbers. However, we find this analytic approach to be a useful tool for understanding the situation of women scientists within their respective departments and colleges and will continue to assess all science and engineering departments in this way for each of the subsequent years reported to NSF.

OVER TIME CHANGE ON THE TENURE TRACK BY RACE/ETHNICITY

We conducted a similar set of analyses looking at the racial/ethnic breakdown by department in each of the science and engineering departments for AY2001 and AY2003. In the University data base faculty ethnicity is coded using five mutually exclusive categories (American Indian/Alaskan Native; Asian/Pacific Islander; Black/African American; Hispanic/Latino; and white). We looked specifically at the percentage of faculty who were identified as a member of an underrepresented minority group (American Indian/Alaskan Native, Black/African American, and Hispanic/Latino) compared to all faculty in the department and established ethnicity ratios based on the same percentages used for the gender ratios analysis (0-17% underrepresented ethnic/racial group token; 18-35% underrepresented ethnic/racial group minority; 36-64% ethnic/racial balance; 65-82% white/Asian/Pacific Islander minority; 83-100% white/Asian/Pacific Islander token). It was perhaps not surprising, but still disturbing to learn that every science and engineering department in Engineering, LSA and Medicine was coded as ethnic/racial group token for both years using this coding scheme.

However, one could argue that the percentages used for the gender ratio categories are inappropriate for assessing representation of racial/ethnic minorities in the departments since they constitute a much smaller proportion of the total U.S. population than women do. Using U.S. census data as our guide, we reassessed the data using 25% as an estimate of "full representation" rather than 50% or "balance" as used in the gender analyses. The basis for this figure was the 2000 US Census, which reported that African American constituted 12% of the US population; Hispanics 12% and American Indians 1%, for a total of 25% in these underrepresented groups. Accordingly, we designated 0-9% as underrepresented ethnic/racial group token; 10-19% as underrepresented ethnic/racial group minority; and 20% and over as ethnic/racial group full representation. This reanalysis demonstrated very discouraging information: while some departments were moved from the “token” to the “minority” coding category, the number of them *declined* from AY2001 to AY2003. In Engineering 2 of 11 departments were coded as “minority” in AY 2001 and only one achieved that code in AY2003. In LSA the results were repeated: 2 of 7 departments were coded “minority” in AY2001 and 1 of 8 departments was so coded in AY2003 (in AY2002 the biology department split, creating one

additional department in LSA's Natural Sciences Division). Again, in Medicine the change went from 1 in 5 departments coded as "minority" in AY2001 to no departments in AY2003.

These data suggest that the University has not been successful either in recruiting underrepresented minority faculty in the sciences and engineering or in retaining those faculty already here. We are hopeful that the policies and procedures being institutionalized at the University of Michigan through the NSF ADVANCE project, and in many other efforts, will also help to address the serious problem of underrepresentation of ethnic/racial minorities on this campus. It is something that we will continue to monitor.

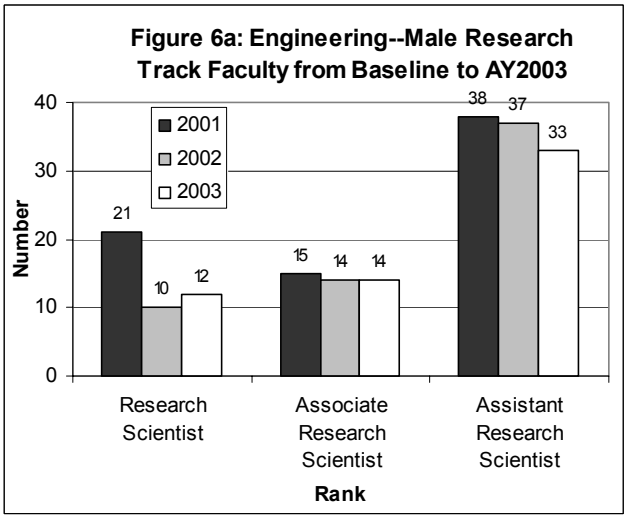
C. Research Track Faculty

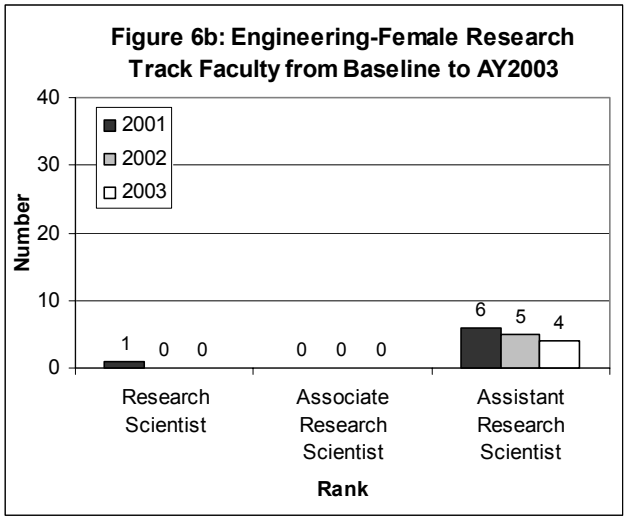
In this section we discuss faculty on the research track at the University. While there are actually two (not entirely separable) research tracks and colleges may elect to use one or both of these tracks, we do not distinguish between them for this report. Thus the ranks we consider are 1) Assistant Research Scientist 2) Associate Research Scientist (including Senior Associate Research Scientist and Associate Research Professor) 3) Research Scientist (including Senior Research Scientist and Research Professor).

COLLEGE OF ENGINEERING

In AY2003, of the 63 faculty on the research track, 4 (or 6%) were female—all of whom were assistant research scientists (see Figure 6b); the 59 men were distributed across all ranks (Figure 6a), although the majority were at the assistant rank (see also Table 1).

Since AY2001, there has been an overall decline in the numbers of faculty on the research track in Engineering, for both men and women. The college has seen a net loss of 15 male faculty and 3 female faculty.

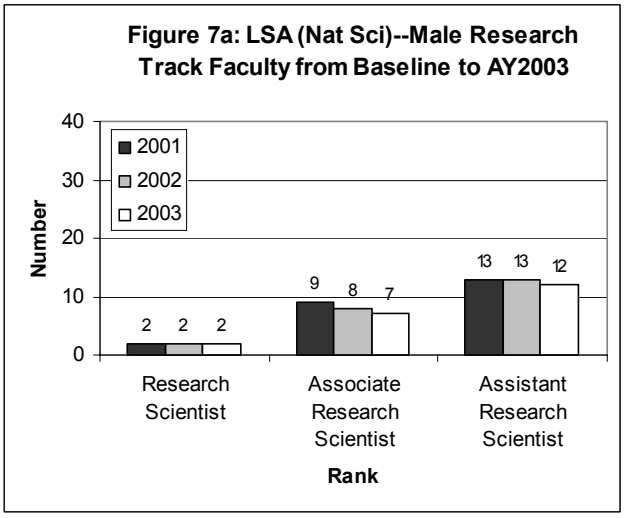


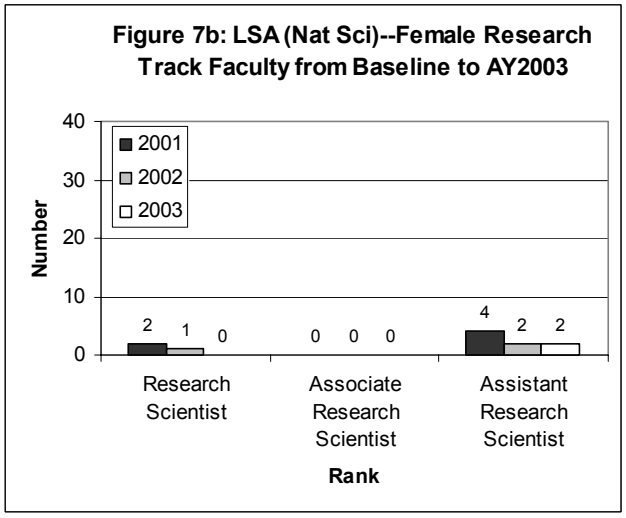


COLLEGE OF LS&A
(Natural Sciences Division)

In AY2003, 11% [6% of FTE] of the research track faculty in the LS&A Natural Sciences Division were women (n=2; see Fig. 7b and Table 1), and all of these women were at the lowest rank—that of Assistant Research Scientist. Similar to the pattern observed for Engineering, the male faculty were distributed across the ranks, with the highest concentration at the assistant rank (Figure 7a).

Similar to that observed for Engineering, LSA (Natural Sciences) has also seen a reduction in the number of research track faculty since AY2001. Since that time, the college has lost 3 male faculty and 4 female faculty.

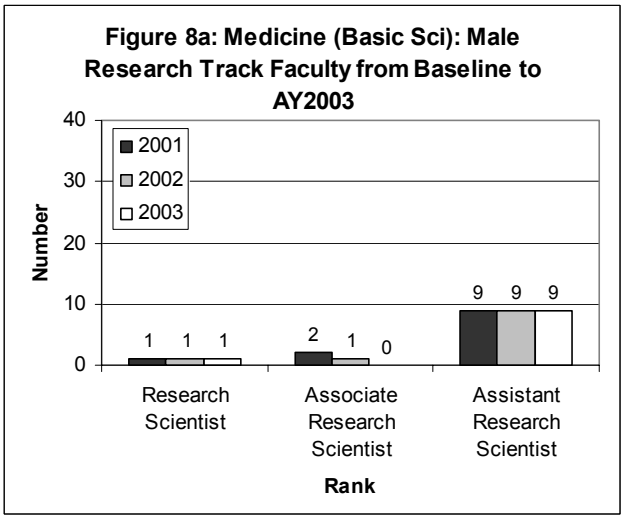


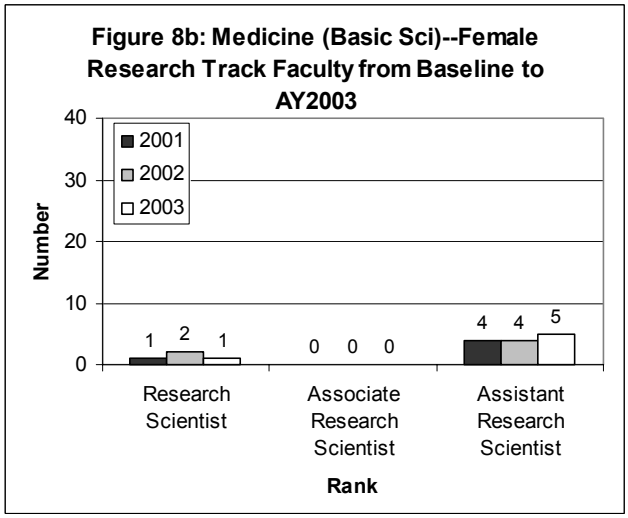


MEDICAL SCHOOL
(Basic Science Departments)

38% of the research track faculty in the Medical School's Basic Science departments were women in AY2003 (n=6; see Figure 8b and Table 1). As observed in the other Colleges, the distribution of research scientists in the Medical School was bottom-heavy, with the greatest proportion of faculty at the lowest rank, assistant research scientist, for both men and women (see also Figure 8a).

Since AY2001, the Medical School has experienced a net loss of 2 men and a no net change of women on the research track.

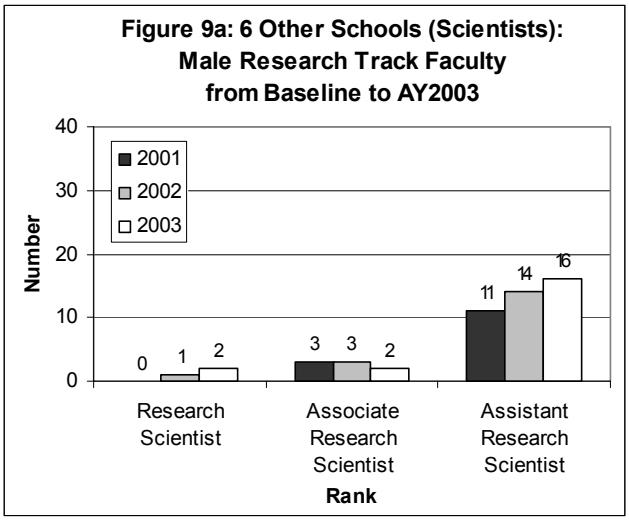


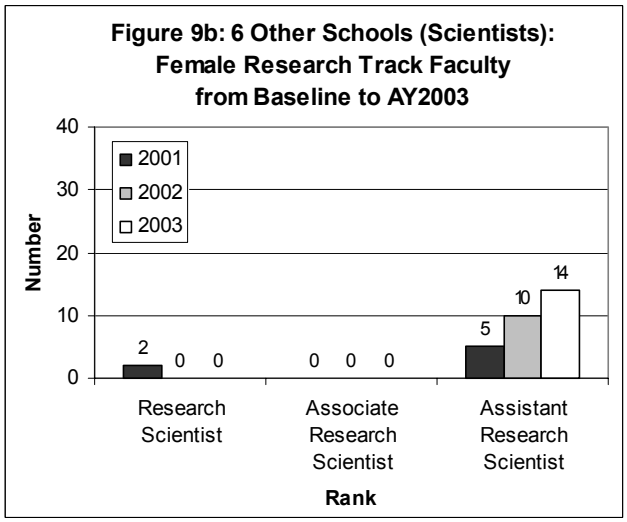


SIX SMALLER SCHOOLS (Scientists*)*

Women research scientists comprised 41% of the research track faculty [38% of FTE] in the six smaller Schools in AY2003 (n=14; see Figure 9b and Table 1). As with the Colleges of Engineering and LS&A (Natural Sciences), all of the female research track faculty held the rank of assistant research scientist. While the majority of male research track faculty also held the rank of assistant research scientist, there were several holding the higher ranks of associate and research scientist (Figure 9a).

In the past two years (i.e., since AY2001) the 6 smaller Schools have experienced a net gain of 6 male and 7 female faculty.





SUMMARY OF RESEARCH TRACK FACULTY

Overall, the proportion of women scientists on the research track in AY2003 did not change much from the baseline year (AY2001) or AY2002. In the colleges of Engineering and LSA (Natural Sciences) women comprised only 6% and 11% of the research faculty respectively, which is even lower than the proportion of women on the tenure track faculty in these colleges (10% and 13% respectively). In the Medical School and 6 smaller Schools, women are better represented, comprising 38% and 41% of the research track respectively, compared to 27% and 24% respectively on the tenure track.

The distribution of faculty across the ranks (for both men and women) remained similar to that observed in previous years—the majority of faculty were at the lowest rank, rather than at the highest rank. This pattern is opposite to that observed for male tenure track faculty. Also in contrast to the tenure track, the number of faculty on the research track has been decreasing over the last few years; there has not been significant hiring as experienced on the tenure track.

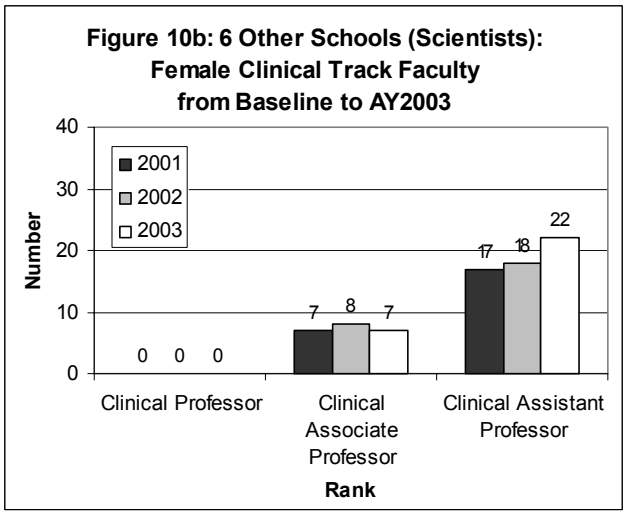
D. Clinical Track Faculty

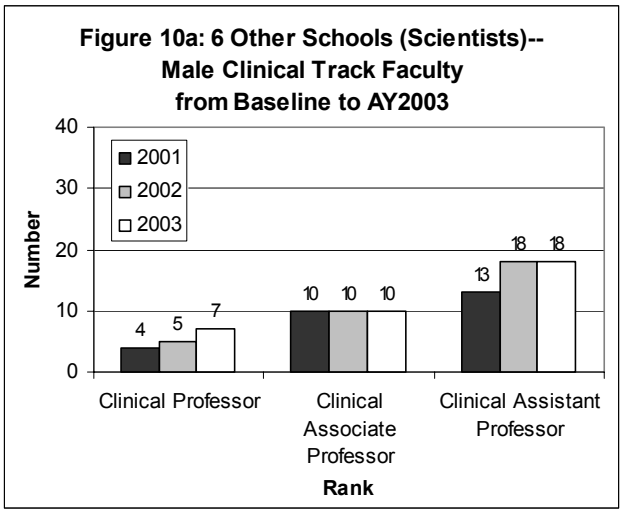
Here we report on the Colleges/Schools that have faculty on the clinical instructional track. In AY2003, the Medical School (Basic Science departments) had one faculty member on this track; only the six smaller Schools had a group of faculty members on this track.

MEDICAL SCHOOL (Basic Science Departments)
In AY2003, the Medical School had only one clinical faculty in a Basic Science department. The single female clinical assistant professor in human genetics was appointed from a Research Investigator position. There had been no clinical faculty in AY2002, and only one female clinical associate professor in AY2001 (see Table 1).

SIX SMALLER SCHOOLS (Scientists)
In AY2003, there were 29 female faculty, representing 45% of the clinical track faculty (see Figures 10a and 10b and Table 1) in the six smaller Schools. Similar to the research track faculty, the clinical track science faculty were concentrated at the lowest rank of clinical assistant professor (63%) and had the smallest proportion of faculty at the highest rank of clinical professor (11%).

Relative to AY2001, the clinical track in these schools experienced overall growth—a net gain of 8 male faculty members, and a net gain of 5 female faculty members.





E. Additional Appointments and Honors (Instructional Track Faculty)

In this section we discuss additional appointments of interest held by instructional track faculty members. These appointments fall under two broad categories: named professorships and administrative service in leadership positions. Under named professorships, we considered the following four categories of honor (see Tables 8a-c): Distinguished University Professor (to recognize exceptional scholarly achievement, national and international reputation, and superior teaching skills; a lifetime award), Collegiate Professor (for outstanding scholarship, teaching and service), Thurnau Professor (for excellence in teaching), and endowed chairs. Since these appointments are generally limited to professors, we only considered faculty at that rank.

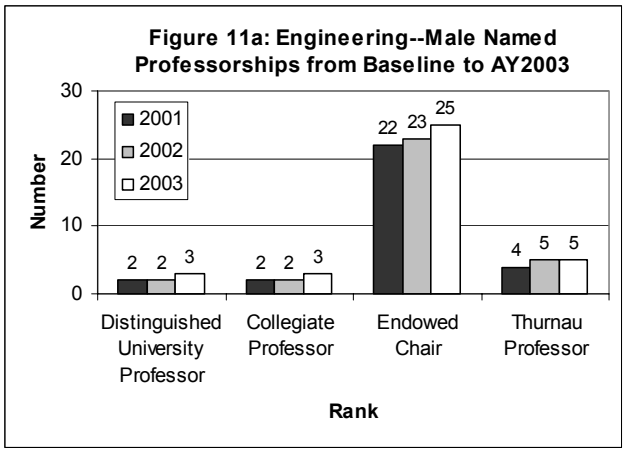
For administrative service, we considered membership on tenure and promotion committees (see Tables 9a-c), as well as administrative appointments (see Tables 10a-c). These appointments were largely held by professors, but also include associate professors so we considered both associate professors and professors who held these positions. We included faculty who served on either college or department level tenure and promotion committees. For administrative positions, we included those who held these positions at the university, college or department level.

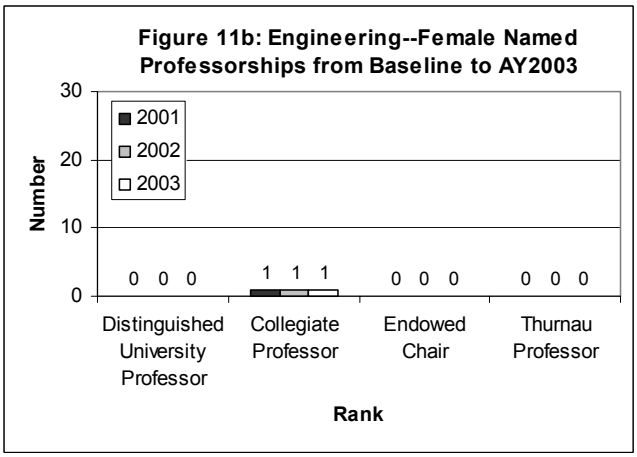
For each type of appointment we addressed the following questions: 1) What was the change in the number of women holding these positions from last year? 2) Was the rate of appointment the same for men and women? For this last question, given the very small numbers (in some cases) of both women professors and additional appointments available, we only consider categories in which the expected rate of appointment for women was equal to or greater than 1 woman.[7]

NAMED PROFESSORSHIPS

College of Engineering.

In AY2003, as in the previous year, all new named professors who were appointed were male: 1 Distinguished University Professor, 1 Collegiate Professor, and 2 Endowed Chairs. The number of female professors holding a named professorship has remained unchanged from AY2002 (and AY2001): 1 Collegiate Professor (see Figures 11a and 11b). In the category in which there is the largest number of positions, Endowed Chairs, the rate of appointment for men was 15% (25 out of 169), but there were no women holding this honor (see Table 8a). If women held these titles at the same rate as men, we would expect to have at least 1 female endowed chair (which would represent 12.5% of female full professors).

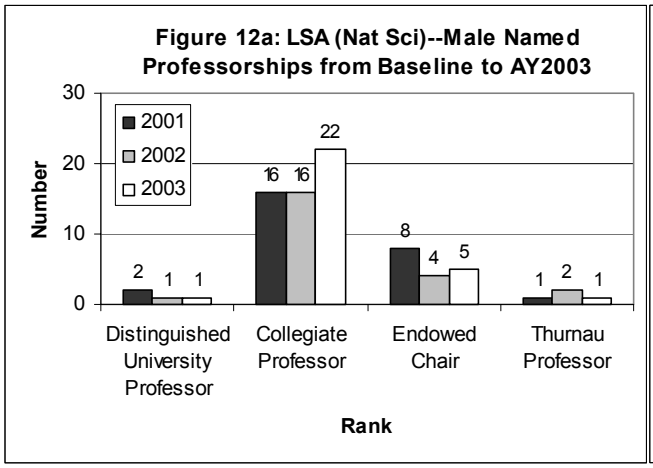


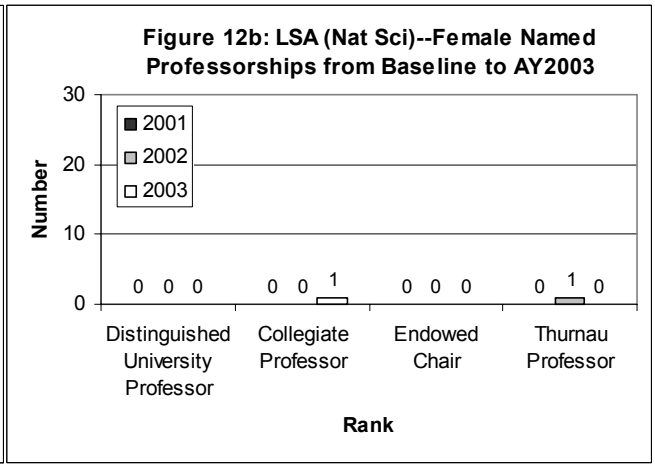


[7] Expected rates can be calculated for each level/category by taking the rates at which male faculty are awarded these positions.

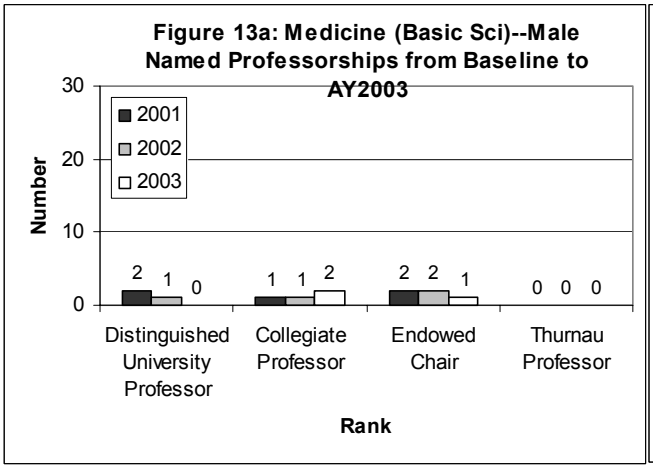
College of LS&A (Natural Sciences Division). LSA (Natural Sciences) appointed 7 new named professors in AY2003: all of these appointments were of male professors (6 Collegiate Professors and 1 Endowed Chair; see Figure 12a). Although one female professor was awarded a Collegiate Professorship in AY2003, this is offset by the loss of the lone female Thurnau Professor from AY2002 (see Figure 12b).

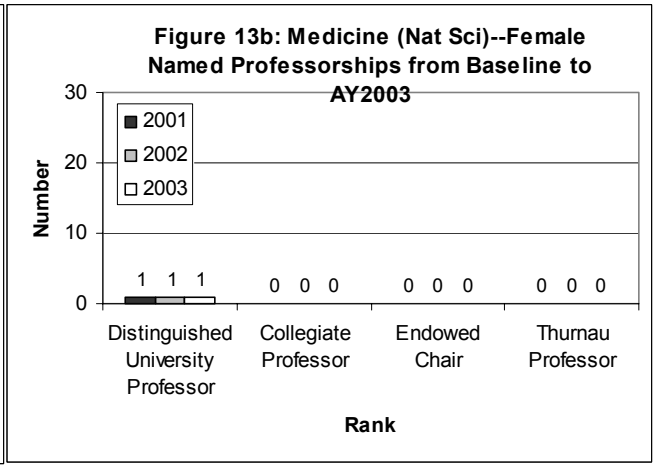
In LSA, the largest number of appointments are to Collegiate Professorships. Approximately 14% of all male professors (22 out of 157) held a Collegiate Professorship. The one female professor who holds this title represents 10% of all female professors. Thus, given the small numbers of female full professors, the rate of awarding Collegiate Professorships is similar for both men and women; see Table 8b.





Medical School (Basic Sciences Departments). Compared to Engineering and LSA (Natural Sciences), the Medical School had a much smaller number of faculty who held named professorships. As a result, we are unable to look at gender differences for any particular category of professorship. Overall, however, the rate of appointment to any of the four named professorships was comparable for men (6% of male full professors) and women (8% of female full professors) (see Table 8c; Figures 13a and 13b).



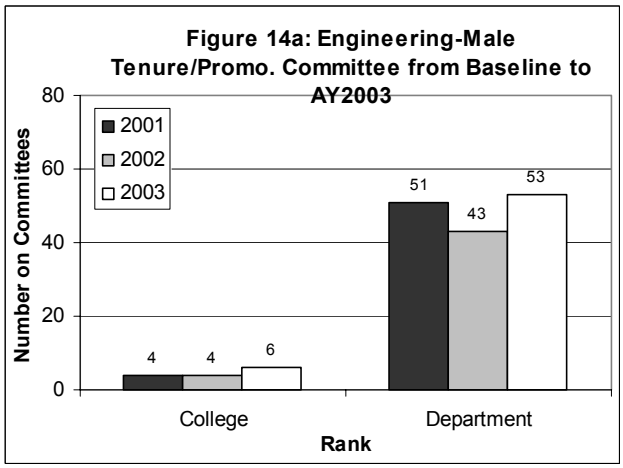


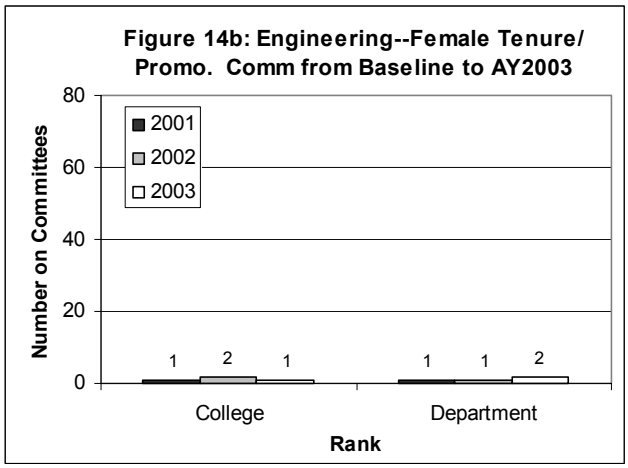
Summary for Named Professorships. None of the three Colleges saw any change in the overall number of female faculty holding named professorships from AY2002 to AY2003. For male faculty, the College of Engineering saw 4 new male named professors, LS&A had 7, and the Medical School lost 1. These differences between new appointments of female and male faculty, while striking, must be considered in the context of the fact that women represent only 5%, 6% and 20% of the full professor population in Engineering, LSA and Medicine, respectively. Thus even looking over 3 years of data, the expected numbers of new female named professorships are so small that it is difficult to determine if women are being appointed at rates similar to that of men.

ADMINISTRATIVE SERVICE: TENURE & PROMOTION COMMITTEES

College of Engineering. The number of men serving on tenure/promotion committees increased by 12 from AY2002 to AY2003 (Figure 14a). There was no change in the number of women serving on these committees combined (Figure 14b).

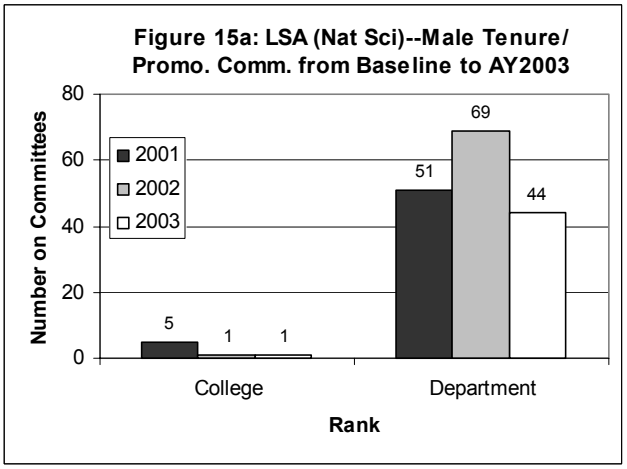
At the department level in AY2003, 23% of male associate and full professors served on a tenure/promotion committee (Table 9a). Thus the expected number of women serving on such committees would be 5. However, only 2 (or 9%) female associate and full professors actually do. At the college level, women fare better, with 5% (1 woman) of associate and full professors serving on these committees; 3% of men serve on college-level committees.

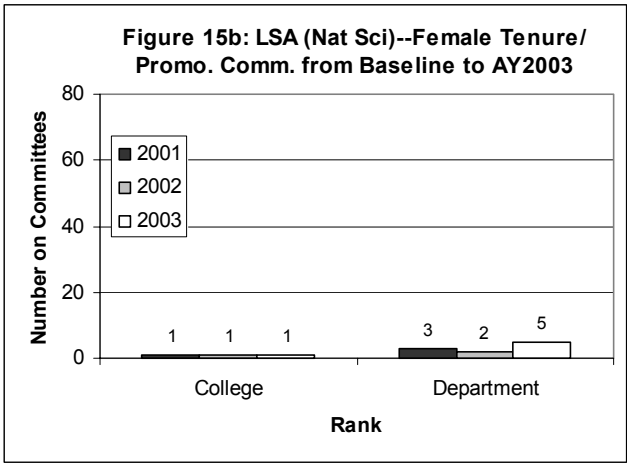




College of LS&A (Natural Sciences Division). The large apparent change in the number of faculty on tenure/promotion committees from AY2002 to AY2003 (particularly for men at the department-level; see Figures 15a and 15b) was mainly due to a change in LSA's reporting procedure. Thus we do not discuss any changes in number for LSA (Natural Sciences) in this report.

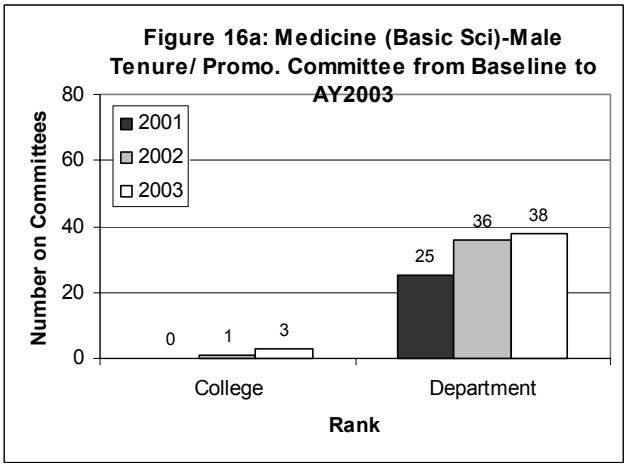
The proportion of women serving on department level tenure/promotion committee in AY2003 was 26% (see Table 9b). This is similar to the 23% of male associate and full professors serving on such committees. At the college level, one man (1% of male associate and full professors) and one woman (5% of female associate and full professors) from the Natural Sciences served on this committee.

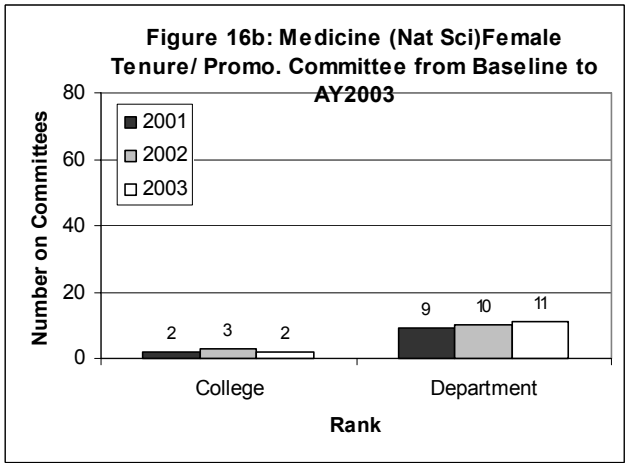




Medical School (Basic Science Departments). In AY2003, there was an increase of 4 male professors serving on tenure/promotion committees (college and department-level combined; Figure 16a) and no net change in the number of female professors serving on such committees (see Figure 16b).

Overall, in AY2003, 58% of male associate and full professors served on department-level tenure/promotion committees. This rate is comparable to the 50% of women associate and full professors who served on these committees. Rates were also comparable at the college level—with 5% of men faculty and 9% of women faculty serving on the committee; see Table 9c.



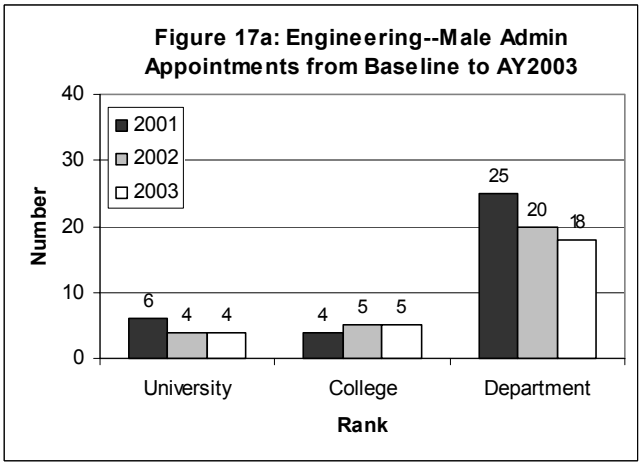


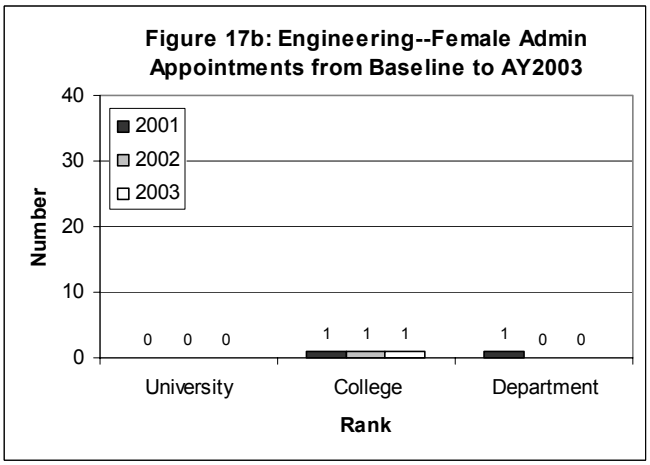
Summary for Tenure and Promotion Committees. Given the small number of faculty on *college* level tenure/promotion committees, women were relatively well represented in all three Colleges. However, in all three colleges, the largest number of positions on tenure and promotion committees was at the *department* level. At this lower level, women held positions at rates similar to that of men in LSA and Medicine, but remained underrepresented in Engineering.

ADMINISTRATIVE SERVICE: ADMINISTRATIVE POSITIONS

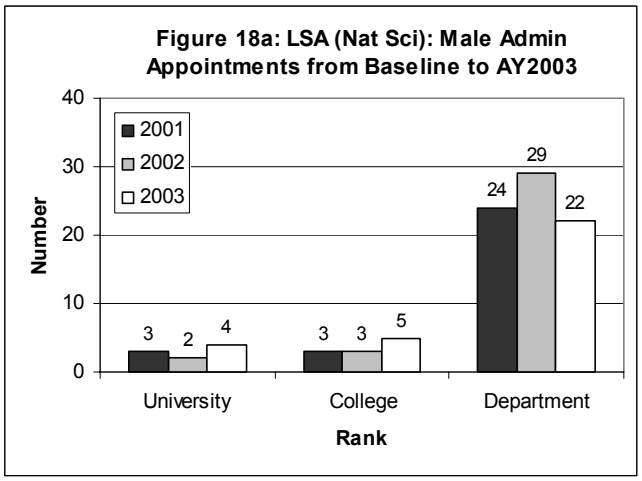
College of Engineering. The total number of faculty with administrative appointments dropped in AY2003, as it did in AY2002: two fewer men held administrative positions in AY2003 than AY2002 (see Figures 17a and 17b).

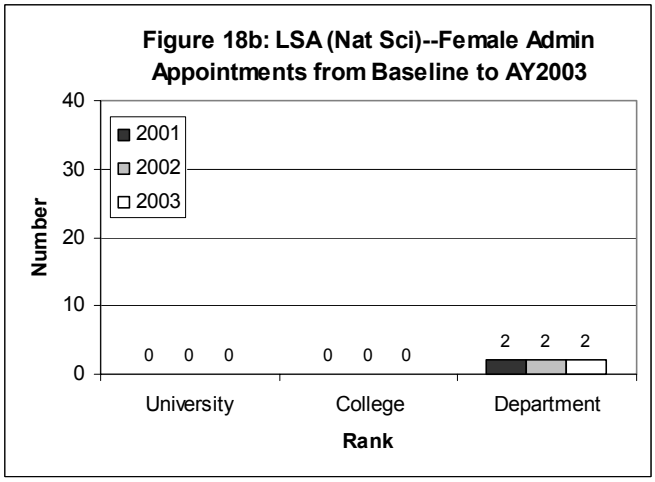
At the department level, while 8% of male associate/professors held administrative appointments, no women held these positions (Table 10a). If women held positions at the same rate as men, it is expected that two women (9% of female associate/professors) would hold department-level administrative appointments.





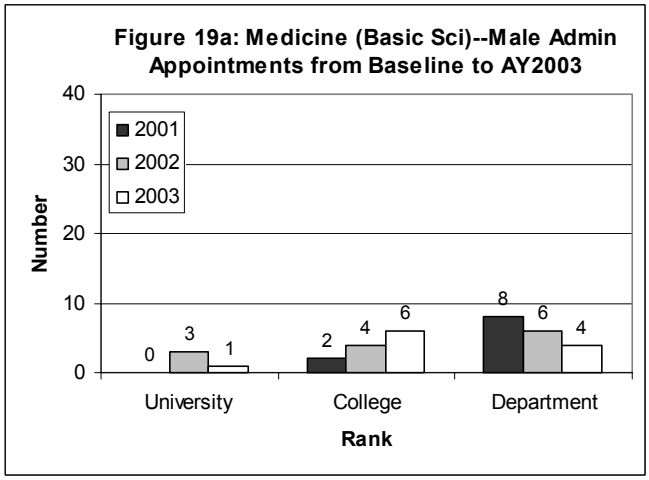
College of LS&A (Natural Sciences Division). In AY2003 there was no change in the number of women holding administrative positions from AY2002 (see Figure 18b). There were 2 men appointed at each of the university and college levels, with a decrease of 7 men holding positions at the department level (see Figure 18a).

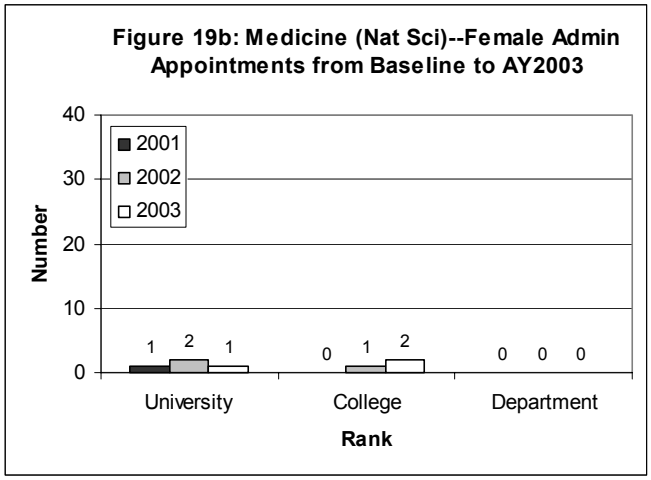




In AY2003, as in AY2002 and AY2001, 2 women held department-level administrative positions (11% of female associate/professors). This is the same rate at which male faculty held department-level administrative positions (22 out of 194 associate/professors; see Table 10b).

Medical School (Basic Science Departments). In AY2003, one new female professor was appointed to a college-level administrative appointment (Figure 19b). Thus at the college level, 9% of both men and women associate/full professors hold administrative appointments (see Table 10c).





Summary for Administrative Positions. The findings here are similar to those observed for membership on tenure and promotion committees: given the small number of faculty appointed to *university* and *college* level administrative positions, it is very difficult to determine if women and men were appointed to these positions at about the same rates. In the case of *department* level administrative positions, women were not represented at the same rates as men in the college of Engineering. That is, women faculty were less likely to hold department-level administrative positions than were men faculty. This is particularly important as the largest numbers of positions in these colleges are at this level. However, in LSA (Natural Sciences), men and women are appointed to these administrative appointments at the same rate. In the Medical School, the number of male faculty holding department-level positions is small (4 positions) and thus it is difficult to make gender comparisons.

SUMMARY FOR NAMED PROFESSORSHIPS & ADMINISTRATIVE SERVICE: ALL SCHOOLS/COLLEGES

The discussion of equitable representation of women in these additional appointments is complicated by the low rates of appointment (for both men and women) to these positions, and further, by the low numbers of female faculty eligible (i.e., associate professors and/or professors) to hold such positions. Though the findings must be considered within this context, it is nonetheless important to discuss any discernable gender disparities.

F. Other Indicators

Here we discuss additional indicators that were collected for AY2003. In the case of three variables: years in rank, years at the University, and salary, we collected data for all three tracks: instructional, research and clinical. For the fourth variable—startup packages—we only collected data for instructional track faculty from the three large Schools/Colleges (Engineering, LS&A, and Medicine).

YEARS IN RANK & YEARS AT INSTITUTION

The raw numbers are reported in Tables 5 and 6 respectively, and have been broken down by School/College, rank and gender. These data are used for salary equity analyses; currently they have not been factored into any descriptive analyses presented in this report.

SALARY

Here we present the raw data in Table 7. While broken down by College/School, track, rank and gender, these data have not incorporated any statistical controls. Thus no conclusions can be drawn from them at this time.

Advance staff continue their efforts to develop an appropriate model for assessing salary equity statistically. Salary analyses initiated in one college last year were replicated and refined using AY2004 data. The report on these analyses is included in Appendix G. Using this set of analyses as a model, preliminary analyses of the two other large schools are currently being conducted.

STARTUP PACKAGES

Startup packages for new incoming instructional track faculty for the three large School/Colleges have been compiled, but for reasons of confidentiality are not included in this report. Data on startup package funding is divided among three categories: 1) base salary; 2) other startup salary and benefits (i.e., benefits, summer salary, and moving costs); 3) research startup funds (i.e., research funds, equipment, and minor renovations [less than $2000]). The total package represents the sum of all 3 categories.

SPACE

In Fall 2001, prior to the start of UM's NSF ADVANCE project, the staff at the Institute for Research on Women and Gender, with funding from UM administration, conducted a exhaustive assessment of space allocation for faculty, by department, across the three large Schools with science and engineering faculty. Preliminary data analyses by Drs. Hansen (Statistics) and Gonzalez (Psychology) have already been conducted and reported to NSF. Both Dr. Hansen and Dr. Gonzalez are continuing their work on different analytic approaches to these data as time permits.

G. Program Evaluation
(To Date and Planned for Remainder of 2004)

EVALUATION OF PROGRAMMING

Events. Recent events hosted by ADVANCE have been evaluated and reports have been completed. Brief summaries of the reports are provided here.

1) **Leadership retreat** (co-hosted by the College of Engineering and College of Literature, Science and Arts for instructional track women faculty; October 2003)
   This two day retreat, to which many prominent women leaders from other universities and companies were invited to speak, was held off-campus for approximately 35 female faculty members. Overall, faculty felt that their expectations for the retreat—hearing about other women's leadership experiences, learning specific leadership skills, and socializing with other scientists/engineers—were met. They found the topics relevant, the speakers interesting, and the sessions enlightening. Attendees appreciated the opportunity to interact both with women leaders from across the country, as well as other Michigan faculty.

2) **Leadership workshop** (for women faculty; February 2004)
   Seventeen women attended this day-long leadership workshop. Overall, women found the historical and social background of women in leadership to be highly interesting and useful. However, many would have liked to see more emphasis placed on development or analysis of individual leadership skills and styles, particularly for an academic setting.

3) **Advanced Negotiation workshop** (for women faculty; March 2004)
   This one day advanced workshop was designed for faculty who had previously attended the introductory negotiation workshop. The seventeen faculty who attended found it useful, particularly the role playing activities and the case studies discussed. All of the respondents would recommend the workshop to others, giving the workshop an overall rating of 4.7 out of 5.

4) **Work Life Balance seminar** (for women faculty and graduate students; March 2004)
   This lunchtime seminar drew 23 women, and had a mix of instructional faculty, research faculty, and graduate students. It was a panel discussion with 2 senior female scientists in the Medical School and the coordinator of the University's Work/Life Resource Center. The participants' average rating of the seminar was quite positive (4.1 out of a 5 point scale); they described the seminar as both useful and relevant. However, it was also clear that the attendees had very diverse needs, and the time allotted did not allow for all concerns to be addressed.

Grants. We are in the process of compiling formal reports of progress on the following grants:

1) Crosby Award winners (20 tenured/tenure-track faculty awardees)
2) DeWitt Award winners (3 research-track faculty awardees)

ADDITIONAL EVALUATION EFFORTS

Attrition Data. We completed a report based on tracking hires and terminations of instructional track faculty in the three large Schools/Colleges, by department, on an annual basis from 1991 to 2001. We coded reasons for attrition:

1) Tenure issues
2) Dissatisfaction with department
3) Personal Reasons
4) Better Opportunity
5) Unknown (not retired or deceased)
6) Retired
7) Deceased

We consulted with faculty from the STRIDE and FASTER committees to help us verify reasons for instructional faculty attrition. The report is attached as Appendix B.

Departmental Transformation Grants. Staff from UM's Center for the Education of Women (CEW) have been engaged in a qualitative evaluation of the three departments that received major departmental transformation grants awards in the first year of the ADVANCE project. Interviews with representative faculty from these departments as well as three comparison departments that did not receive these initial awards have been completed and preliminary reports have been drafted. We expect to have these initial reports finalized by the end of the calendar year.

At the end of 2003, six new small DTG awards were made totaling $197,250. We recently received reports from these departments concerning their activities to date which we summarize here.

Several of the departments are using their funding for recruitment of women faculty. One department used the funding to support travel expenses for 7 women job candidates; 3 of these women were offered positions. Two other departments are currently identifying prospective candidates for upcoming faculty searches; one department plans to send their senior women faculty to the home institutions of potential women candidates to assist in their recruitment.

Funds are also being directed at retention of women faculty already on campus by supporting their research efforts. Travel funds, course release time, and bringing key researchers to campus are all being supported by the DTG funds.

Mentoring of junior women faculty as well as post-docs and graduate students is also being addressed by some departments. These efforts include luncheons, meetings with graduate students and post docs, and a junior faculty forum. Several of these efforts are being made across departments.

Exit Interviews. CEW staff has also initiated exit interviews with all science and engineering tenure track faculty who have left the University (except those who retired) since the ADVANCE project began. CEW has concentrated initially on faculty from those departments being evaluated for the Departmental Transformation Grant awards; with most of those complete they are expanding their efforts to the remaining science and engineering departments. It is hoped that by the end of this calendar year exit interviews will have been completed, when

possible, for those who left the University between 2000 and 2002, and that next year we will complete exit interviews with those who left the University between 2003 and 2004.

Chair Interviews. As we reach the mid-point of the ADVANCE funding period, we are expanding our efforts to assess the impact of the ADVANCE project on the campus beyond the specific initiatives and activities implemented through the program. We have hired a graduate student experienced in qualitative research who will conduct individual interviews with each of the science and engineering chairs and deans in the three large schools and the deans of the six smaller schools with science and engineering faculty over the summer. We hope to learn from these interviews what aspects of the ADVANCE program they have found valuable and what has made them successful. In addition, we will seek their advice about other initiatives or policies that would be useful and how these successful strategies can be institutionalized.

Data collection for December 2004 annual report. We will continue data collection on the indicators in calendar year 2004, standardizing the format and type of data received from individual Colleges and Schools. In December 2004 we will be able to report on activities of the 2004 calendar year (CY2004) in tandem with indicator measures for the 2004 academic year. Note however that activities of the CY2004 will not be reflected in indicators for the AY2004; the impact of such activities should not be evident until AY2005 at the earliest.

Table 1: Tenure, Research and Clinical Track Faculty by Gender 2002-2003

	FULL PROFESSOR						ASSOCIATE PROFESSOR						ASSISTANT PROFESSOR						TOTAL					
	males			females			males			females			males			females			males			females		
	N	FTE	%	N	FTE	%	N	FTE	%	N	FTE	%	N	FTE	%	N	FTE	%	N	FTE	%	N	FTE	%
ENGINEERING	169	147.78	95%	8	7.20	5%	63	58.10	82%	14	12.40	18%	43	43.00	86%	8	7.10	14%	275	248.88	90%	30	26.70	10%
LSA	157	137.58	94%	10	9.50	6%	37	33.45	82%	9	7.50	18%	38	36.50	74%	14	13.00	26%	232	207.53	87%	33	30.00	13%
MEDICINE	54	41.74	79%	13	11.02	21%	12	8.08	47%	9	9.00	53%	13	10.90	64%	7	6.10	36%	79	60.72	70%	29	26.12	30%
6 SMALL SCHOOLS	72	61.62	83%	13	12.90	17%	43	38.45	75%	13	13.00	25%	21	21.00	59%	17	14.83	41%	136	121.07	75%	43	40.73	25%

	RESEARCH SCIENTIST						ASSOC RESEARCH SCIENTIST						ASST RESEARCH SCIENTIST						TOTAL					
	males			females			males			females			males			females			males			females		
	N	FTE	%	N	FTE	%	N	FTE	%	N	FTE	%	N	FTE	%	N	FTE	%	N	FTE	%	N	FTE	%
ENGINEERING	12	9.17	100%	0	0.00	0%	14	12.00	100%	0	0.00	0%	33	30.85	90%	4	3.30	10%	59	52.02	94%	4	3.30	6%
LSA	2	2.00	100%	0	0.00	0%	7	5.77	100%	0	0.00	0%	12	10.25	89%	2	1.25	11%	21	18.02	94%	2	1.25	6%
MEDICINE	1	0.50	33%	1	1.00	67%							9	8.95	68%	5	4.25	32%	10	9.45	64%	6	5.25	36%
6 SMALL SCHOOLS	2	1.17	100%	0	0.00	0%	2	2.00	100%	0	0.00	0%	16	14.10	57%	14	10.45	43%	20	17.27	62%	14	10.45	38%

Table 2: Hires to the Tenure Track (between 3/1/2002 and 3/1/2003)

	FULL PROFESSOR		ASSOC. PROFESSOR		ASST. PROFESSOR		TOTAL	
	male	female	male	female	male	female	male	female
TOTAL ENGINEERING	0	0	4	1	4	1	8	2
Percent of Engineering Hires	--	--	80%	20%	80%	20%	80%	20%
TOTAL LS&A (Natural Sci)	2	0	2	0	12	3	16	3
Percent of LS&A Hires	100%	0%	100%	0%	80%	20%	84%	16%
TOTAL MEDICINE (Basic Sci)	3	0	0	0	2	1	5	1
Percent of Medicine Hires	100%	0%	--	--	67%	33%	83%	17%

Table 3: Retirements and Terminations from the Tenure Track (between 3/1/2002 and 3/1/2003)

	FULL PROFESSOR		ASSOC. PROFESSOR		ASST. PROFESSOR		TOTAL	
	male	female	male	female	male	female	male	female
TOTAL ENGINEERING	-10	-1	-1	0	-5	-1	-16	-2
Percent of Engineering Terminations	91%	9%	100%	0%	83%	17%	89%	11%
TOTAL LS&A (Natural Sci)	-9	0	-3	0	-1	0	-13	0
Percent of LS&A Terminations	100%	0%	100%	0%	100%	0%	100%	0%
TOTAL MEDICINE (Basic Sci)	-3	0	0	0	-1	0	-4	0
Percent of Medicine Terminations	100%	0%	--	--	100%	0%	100%	0%

Table 4: Promotions effective AY2003 (Reviewed in AY2002)

	Asst-->Associate		Associate-->Full	
	M	F	M	F
TOTAL ENGINEERING APPROVED	2	1	5	0
Promotions Denied	3	0	2	0
TOTAL LS&A APPROVED	5	0	2	1
Promotions Denied	1	0	0	0
TOTAL MEDICINE APPROVED	1	1	1	1
Promotions Denied	0	0	0	0

Table 5: Average Time (in Years) in Rank 2002-2003

	PROFESSORS		ASSOC PROFS		ASST PROFS		RESEARCH SCI		ASSOC RES SCI		ASST RES SCI		CLINIC PROF		CLINIC ASSOC P		CLINIC ASST P	
	males	females	males	females	males	females	males	females	males	females	males	females	males	females	males	females	males	females
ENGINEERING Average	11.74	5.58	6.20	3.46	2.72	4.33	6.23		4.16		2.89	4.30						
LS&A Average	14.87	4.10	4.06	6.06	2.23	2.15	8.00		5.39		4.84	2.20						
MEDICINE Average	13.90	9.58	5.19	4.83	3.55	3.93	5.50	5.50			4.99	3.82						0.60
6 SMALL SCHOOLS Average	13.00	7.54	9.28	5.86	2.90	7.37	13.00		4.38		3.35	3.10	2.56		3.30	3.81	3.10	2.77

*include all at FTE > 0%

Table 6: Average Time (in Years) at UM 2002-2003

	PROFESSORS		ASSOC PROFS		ASST PROFS		RESEARCH SCI		ASSOC RES SCI		ASST RES SCI		CLINIC PROF		CLINIC ASSOC P		CLINIC ASST P	
	males	females	males	females	males	females	males	females	males	females	males	females	males	females	males	females	males	females
ENGINEERING Average	19.85	10.35	10.50	7.74	3.07	4.88	16.93		10.44		6.46	9.60						
LS&A Average	23.15	13.05	8.43	11.19	2.42	2.58	24.03		12.47		10.62	4.45						
MEDICINE Average	23.14	20.18	12.45	13.15	4.00	4.93	12.84	27.52			10.21	7.85						5.00
6 SCHOOLS Average	21.56	21.26	14.82	11.32	3.35	8.67	29.23		9.16		8.15	6.09	18.50		11.35	16.67	4.02	7.14

*includes all at FTE > 0%

Table 7: Mean Salary FTE* by Rank and Gender 2002-2003

	PROFESSOR		ASSOC PROF		ASST PROF		RESEARCH SCI		ASSOC RES SCI		ASST RES SCI		CLIN PROF		ASSOC CLIN PROF		ASST CLIN PROF	
	males	females	males	females	males	females	males	females	males	females	males	females	males	females	males	females	males	females
ENGINEERING Average	$ 126,607	$ 122,326	$ 93,278	$ 88,758	$ 77,852	$ 77,445	$ 96,680		$ 70,965		$ 56,654	$ 50,613						
LS&A Average	$ 101,274	$ 92,901	$ 72,838	$ 70,978	$ 62,816	$ 61,970	$ 64,625		$ 45,972		$ 44,183	$ 37,667						
MEDICINE Average	$ 109,549	$ 107,445	$ 80,642	$ 80,360	$ 66,507	$ 65,166	$ 105,680	$ 74,510			$ 49,247	$ 47,787						$ 52,273
6 SCHOOLS Average	$ 115,861	$ 106,349	$ 84,484	$ 78,089	$ 64,047	$ 62,861	$ 42,901		$ 66,938		$ 50,335	$ 52,102	$ 109,001		$ 83,960	$ 76,543	$ 66,619	$ 64,186

*Salary FTE based on 9-month academic year; salaries paid on 12 month year were divided by 11 and multiplied by 9.

Named Professorships AY 2002-2003

Table 8a: Engineering

	Males	% of male Profs*	% of all positions	Females	% of female Profs*	% of all positions
Distinguished University Professor	3	1.8%	100.0%	0	0.0%	0.0%
Collegiate	3	1.8%	75.0%	1	12.5%	25.0%
Endowed	25	14.8%	100.0%	0	0.0%	0.0%
Thurnau (for teaching)	5	3.0%	100.0%	0	0.0%	0.0%

Male Full Prof (Ns)	*169*	*Female Full Prof (Ns)*	*8*
% of all Full Profs	*95%*	*% of all Full Profs*	*5%*

Table 8b: LS&A (Natural Sciences)

	Males	% of male Profs*	% of all positions	Females	% of female Profs*	% of all positions
Distinguished University Professor	1	0.6%	100.0%	0	0.0%	0.0%
Collegiate	22	14.0%	95.7%	1	10.0%	4.3%
Endowed	5	3.2%	100.0%	0	0.0%	0.0%
Thurnau (for teaching)	1	0.6%	100.0%	0	0.0%	0.0%

Male Full Prof (Ns)	*157*	*Female Full Prof (Ns)*	*10*
% of all Full Profs	*94%*	*% of all Full Profs*	*6%*

Table 8c: Medicine (Basic Sciences)

	Males	% of male Profs*	% of all positions	Females	% of female Profs*	% of all positions
Distinguished University Professor	0	0.0%	0.0%	1	7.7%	100.0%
Collegiate	2	3.7%	100.0%	0	0.0%	0.0%
Endowed	1	1.9%	100.0%	0	0.0%	0.0%
Thurnau (for teaching)	0	--	--	0	--	--

Male Full Prof (Ns)	*54*	*Female Full Prof (Ns)*	*13*
% of all Full Profs	*81%*	*% of all Full Profs*	*19%*

*Calculated as a proportion of full professors (with greater that 0 FTE) within gender
Some Professors may hold more than one title, and thus are counted once in each category.

Tenure and Promotion Committees AY 2002-2003

Table 9a: Engineering

	Males	% of male Assoc/Profs*	% of all positions	Females	% of female Assoc/Profs*	% of all positions
College	6	2.6%	85.7%	1	4.5%	14.3%
Department	53	22.8%	96.4%	2	9.1%	3.6%

Male Assoc Prof (Ns)	*63*	*Female Assoc Prof (Ns)*	*14*
Male Full Prof (Ns)	*169*	*Female Full Prof (Ns)*	*8*
Male (Ns)	*232*	*Female (Ns)*	*22*
% of all Assoc/Profs	*91%*	*% of all Assoc/Profs*	*9%*

Table 9b: LS&A (Natural Sciences)

	Males	% of male Assoc/Profs*	% of all positions	Females	% of female Assoc/Profs*	% of all positions
College	1	0.5%	50.0%	1	5.3%	50.0%
Department	44	22.7%	89.8%	5	26.3%	10.2%

Male Assoc Prof (Ns)	*37*	*Female Assoc Prof (Ns)*	*9*
Male Full Prof (Ns)	*157*	*Female Full Prof (Ns)*	*10*
Male (Ns)	*194*	*Female (Ns)*	*19*
% of all Assoc/Profs	*91%*	*% of all Assoc/Profs*	*9%*

Table 9c: Medicine (Basic Sciences)

	Males	% of male Assoc/Profs*	% of all positions	Females	% of female Assoc/Profs*	% of all positions
College	3	4.5%	60.0%	2	9.1%	40.0%
Department	38	57.6%	77.6%	11	50.0%	22.4%

Male Assoc Prof (Ns)	*12*	*Female Assoc Prof (Ns)*	*9*
Male Full Prof (Ns)	*54*	*Female Full Prof (Ns)*	*13*
Male (Ns)	*66*	*Female (Ns)*	*22*
% of all Assoc/Profs	*75%*	*% of all Assoc/Profs*	*25%*

*Calculated as a proportion of full and associate professors (greater than 0 FTE) within gender
Some Assoc/Profs serve on both college and department committees, and thus are counted once in each category.

Administrative Positions AY 2002-2003

Table 10a: Engineering

	Males	% of male Assoc/Profs*	% of all positions	Females	% of female Assoc/Profs*	% of all positions
University	4	1.7%	100.0%	0	0.0%	0.0%
College	5	2.2%	83.3%	1	4.5%	16.7%
Department	18	7.8%	100.0%	0	0.0%	0.0%
TOTAL	27	11.6%	96.4%	1	4.5%	3.6%

Male Assoc Prof (Ns)	*63*	*Female Assoc Prof (Ns)*	*14*
Male Full Prof (Ns)	*169*	*Female Full Prof (Ns)*	*8*
Male (Ns)	*232*	*Female (Ns)*	*22*
% of all Assoc/Profs	*91%*	*% of all Assoc/Profs*	*9%*

Table 10b: LS&A (Natural Sciences)

	Males	% of male Assoc/Profs*	% of all positions	Females	% of female Assoc/Profs*	% of all positions
University	4	2.1%	100.0%	0	0.0%	0.0%
College	5	2.6%	100.0%	0	0.0%	0.0%
Department	22	11.3%	91.7%	2	10.5%	8.3%
TOTAL	31	16.0%	93.9%	2	10.5%	6.1%

Male Assoc Prof (Ns)	*37*	*Female Assoc Prof (Ns)*	*9*
Male Full Prof (Ns)	*157*	*Female Full Prof (Ns)*	*10*
Male (Ns)	*194*	*Female (Ns)*	*19*
% of all Assoc/Profs	*91%*	*% of all Assoc/Profs*	*9%*

Table 10c: Medicine (Basic Sciences)

	Males	% of male Assoc/Profs*	% of all positions	Females	% of female Assoc/Profs*	% of all positions
University	1	1.5%	50.0%	1	4.5%	50.0%
College	6	9.1%	75.0%	2	9.1%	25.0%
Department	4	6.1%	100.0%	0	0.0%	0.0%
TOTAL	11	16.7%	78.6%	3	13.6%	21.4%

Male Assoc Prof (Ns)	*12*	*Female Assoc Prof (Ns)*	*9*
Male Full Prof (Ns)	*54*	*Female Full Prof (Ns)*	*13*
Male (Ns)	*66*	*Female (Ns)*	*22*
% of all Assoc/Profs	*75%*	*% of all Assoc/Profs*	*25%*

*Calculated as a proportion of full and associate professors (greater than 0 FTE) within gender

APPENDIX A

"Assessing the Academic Work Environment for Faculty of Color"

January, 2004
University of Michigan

ASSESSING THE ACADEMIC WORK ENVIRONMENT FOR FACULTY OF COLOR IN SCIENCE AND ENGINEERING

NSF ADVANCE Project
Institute for Research on Women and Gender
1136 Lane Hall, 204 S. State Street
Ann Arbor, MI 48109-1290
Phone: (734) 764-9537
http:www.umich.edu/~advproj

TABLE OF CONTENTS

ACKNOLWEDGEMENTS

This report was prepared by Abigail J Stewart, Janet Malley and Julie Stubbs from the Institute for Research on Women and Gender (IRWG) at the University of Michigan. We were assisted by our distinguished Evaluation Advisory Committee at every stage of our work: planning the survey, conducting appropriate analyses, interpreting and describing the results, and writing the report. In addition, many staff on the ADVANCE team assisted with various aspects of preparation, including Danielle LaVaque-Manty, Laura Reese, and Heather Branton. Finally, many generous colleagues provided outstanding feedback on the report and suggestions for clarification, additions and revisions. We have attempted to incorporate their wise advice, but of course they are in no way responsible for what we have written here. These faculty, as well as the various ADVANCE committee memberships, are listed below.

Thanks to these senior faculty:

Rodney Ewing (Nuclear Engineering)
Oveta Fuller (Microbiology & Immunology)
Trachette Jackson (Mathematics)
Samuel Mukasa (Geological Sciences)
Homer Neal (Physics)
Nair Rodriguez-Hornedo (Pharmaceutical Sciences)

Special thanks to:

Paul C. Courant (Provost, Economics, Public Policy)
Lester Monts (Senior Vice Provost for Academic Affairs, Senior Counselor to the President for the Arts, Diversity & Undergraduate Affairs, Music)

ADVANCE Steering Committee:

Stephen Director (Co-PI, Dean of Engineering)
Allen Lichter (Co-PI, Dean of Medicine)
Terrence McDonald (Co-PI, Dean of Literature, Science and the Arts)
Pamela Raymond (Co-PI, Senior Counselor to the Provost, Cell & Developmental Biology)
Abigail J. Stewart, (PI, Associate Dean of Literature, Science and the Arts, Psychology, Women's Studies)

ADVANCE Evaluation Advisory Committee:

Mark Chesler (Sociology)
Mary Corcoran (Political Science, Public Policy, Social Work, Women's Studies)
Paul Courant (Provost, Economics, Public Policy)
Ann Lin (Public Policy, Political Science)
Richard Gonzalez (Psychology)
Sylvia Hurtado (Higher Education)
Janet Lawrence (Higher Education)
Valerie Lee (Education)
Yu Xie (Sociology)

Assessing the Academic Work Environment for Faculty of Color in Science and Engineering

OVERVIEW

Examining Race-Ethnicity at the University of Michigan

The University of Michigan's commitment to racial-ethnic diversity is clear, as evidenced most publicly by its legal defense of its continuing efforts to maintain a diverse student body. It has also made continued efforts to develop and sustain a diverse faculty. According to an account in the *University Record* from 1995 (Lomax, Moore & Smith, April 17, 1995),

> When James J. Duderstadt became President of the University of Michigan in 1988, he committed himself, his administration and the University to the Michigan Mandate, a blueprint for fundamental change in the ethnic composition of the University community. One major objective of the Mandate was to increase by the year 2000 the representation of persons of color within the professoriate so that the proportion of such individuals would correspond more closely to their proportion in the population of the State of Michigan and the United States of America. At the beginning of the 1989-1990 academic year, Charles Vest, appointed by President Duderstadt to serve as Provost and Vice President for Academic Affairs, asked his faculty advisory committee, the Senate Assembly Academic Affairs Advisory Committee, to devise approaches to address the problem of underrepresentation of persons of color within faculty ranks.

Nearly a decade later, UM President Bollinger declared, "our mission and core expertise is to create the best educational environment we can. We do this in part through a diverse faculty and student body" [UM News Release, 10/14/97]. As recently as June 2003, University President Mary Sue Coleman reminded the campus, "We must look to the future and affirm our institutional commitment to diversity in every aspect of our community: our student body, our faculty, and our staff." Many faculty and administrators have worked long and hard to ensure that the University has a faculty that is excellent in every respect, including in its racial-ethnic diversity.

Despite the commitment to creating a diverse faculty (and student body), faculty of color at the University remain a small minority in most fields. This report examines the specific situation of instructional track faculty of color in the sciences and engineering on the UM campus.

The data analyzed for this report were originally collected to examine the situation of women science and engineering faculty at the University of Michigan. But we deliberately designed the data collection to include enough faculty of color to permit us also to examine race-ethnicity as well as gender. Many studies have shown that while race-ethnicity and gender are different in some ways, they also operate similarly in others (Valian, 2000; Clark & Corcoran, 1986; Menges & Exum, 1983); it is therefore always useful to be mindful of both when making efforts to create and maintain a diverse workforce.

One of the challenges in writing this report was choosing terminology. We recognize that there is no neutral language for describing an individual's race-ethnicity and that different communities and individuals find specific language to be more appropriate than others. Some challenge the use of color or place of origin language as unhelpful or misleading, while others find minority/majority terminology too dependent on context. Because we had to make a choice, and we are reporting on a hetereogeneous group in terms of race-ethnicity, we have adopted the term "of color" to refer to faculty who self-identify as a member of any racial-ethnic minority group. The contrasting (and also heterogeneous) group of faculty who self-identified as European American are referred to as "white."

The Status of Faculty of Color in Academic Science and Engineering

Among full-time doctoral scientists and engineers working in four-year colleges or universities, faculty of color (defined as those of Asian, black and Hispanic background) are less likely than white faculty to be at the rank of full professor, or to be tenured (NSF, 2000). In addition, black and Hispanic science and engineering faculty are paid less than white faculty in the same field, even after controlling for age and experience (NSF, 2000).

Moreover, in academic science and engineering, inequities exist across minority racial/ethnic groups, and between men and women within those groups. For example, Asian and Asian American Ph.D.s are more likely than African American or Hispanic Ph.D.s to be employed in larger research-focused universities (Research I or Doctoral I), while African American Ph.D.s are less likely than other groups to work at research-oriented universities (CAWMSET Report, 2000). In science and engineering professions, African Americans, Hispanics and Native Americans are defined as "underrepresented" minorities, because their numbers in the science and engineering academic workforce are smaller in comparison to their participation in the U.S. workforce at large. In 1991, underrepresented minorities constituted less than 3% of full or part-time faculty employed in science and engineering career fields (Brown, 2000). Those of Asian background, in contrast, were over-represented in science and engineering fields; by 1993 Asian Americans constituted about 4% of the total U.S. population, but held 13.5% of science and engineering doctorates and 11.9% of the overall science and engineering workforce (Cota-Robles, 2000).

Meanwhile, women of color with doctorates, across racial-ethnic groups, have fared worse than their male colleagues. Women of color in academic science and engineering have lower employment rates and salaries at four-year institutions, higher representation at two-year and less prestigious institutions (Brown, 2000), and they are less likely than men of any racial/ethnic group or white women to be at the rank of full professor (NSF, 2000).

The low representation of faculty of color in science and engineering fields is in part a "pipeline" problem (i.e., not enough students of color earning Ph.D.s). Among science and engineering doctorates awarded to U.S. citizens where

Figure 1a: Earned Doctorates in Science, Medicine and Engineering Fields by Race/Ethnicity

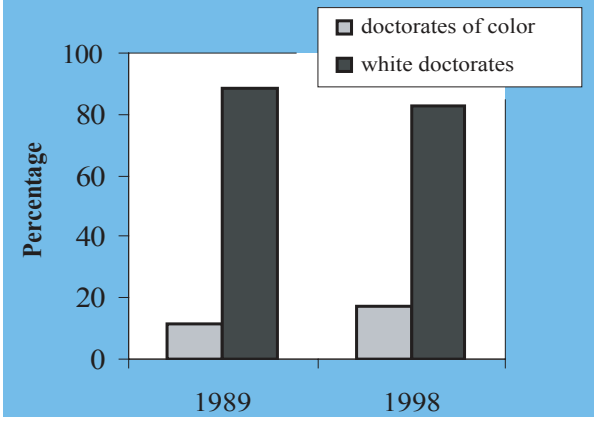
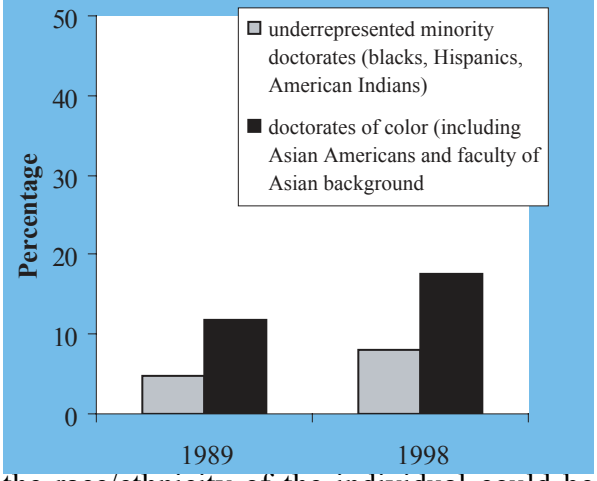
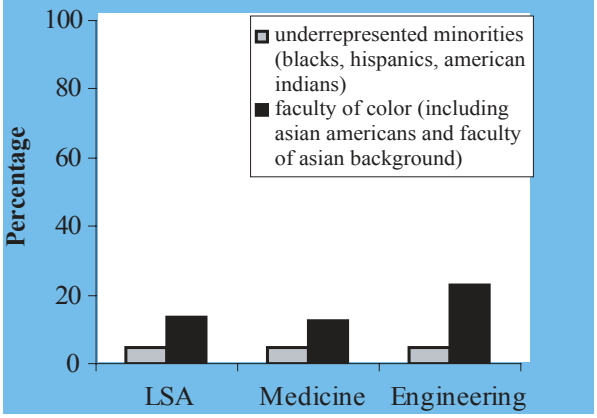


Figure 1b: Doctorates Earned by Faculty of Color in Science, Medicine and Engineering Fields by Race/Ethnicity Group



the race/ethnicity of the individual could be identified, minorities (including Asian-Americans) earned just over 11% in 1989 and 17% in 1998 (Figure 1a); meanwhile, underrepresented minorities earned just under 5% of the science and engineering doctorates in 1989 and 8% in 1998 (Figure 1b). In 2001, at the University of Michigan just over 14% of LS&A science faculty, 23% of Engineering faculty, and 12% of Medical faculty were persons of color (Figure 2). If we limit this analysis to underrepresented minorities in science and engineering fields, the percentages drop to 4% for LS&A science departments, just under 5% for Engineering, and 4% for Medicine (Figure 2).

Figure 2: Science, Medicine and Engineering Faculty of Color at the University of Michigan in 2001



The low representation of faculty of color on U.S. campuses is not limited to the "pipeline," though. Recent studies have shown that minorities who complete a Ph.D. in science or engineering and pursue an academic career often encounter more obstacles than their white counterparts. Among the obstacles reported by faculty of color are: social isolation due to the absence of other underrepresented minority faculty and students (Stein, 1994; Aguirre & Martinez, 1993); insufficient minority membership on faculty search committees; heavy teaching and service demands that are less likely to be rewarded during tenure or promotion review (Banks, 1984; Blackwell, 1996; Nakanishi, 1993, Menges & Exum, 1983; Stein, 1994); and a lack of mentoring (Boice, 1993).

Studies indicate that organizational and environmental factors, such as a hostile working environment, may limit the career attainment and satisfaction of faculty of color in science and engineering fields, as in academe more generally (Brown 2000; CAWMSET Report, 2000). Faculty of color report feeling like outsiders in the world of academic science, citing strained collegial relationships with white faculty, particularly when white faculty mistakenly believe that affirmative action policies have permitted the hiring of less qualified faculty. In response, faculty of color report feeling pressured to continually prove they have earned their positions (Johnsrud & Sadao, 1998; Menges & Exum, 1983; Reyes & Halcon, 1988).

Some faculty of color report that a number of the obstacles that limit their ability to reach professional goals in traditionally white institutions are the result of discrimination and racism (Brown, 2000). [Of course, other kinds of obstacles may limit faculty at historically black institutions.] In a recent national study, more than twice as many faculty of color as white faculty surveyed reported instances of subtle racism (i.e., lack of senstivity to issues of mi-

norities) on their campuses (Astin, 1997).

For purposes of analysis, scholars have found it helpful to distinguish overt from covert racism (Johnsrud & Sadao, 1998; Dube, 1985), and interpersonal from institutional racism (Johnsrud & Sadao, 1998; Haas,1992). Overt racism may include racially based harassment, ethnic slurs, or palpable racial tension on a university campus, while covert racism is subtler and can include tokenism or stereotyping.

Interpersonal racism occurs when a member of the majority group does something to maintain the subordination of another group, such as engaging in ethnic slurs or racial harassment. Institutional racism, in contrast, is structural in nature and often covert or unintended. In this case, as a consequence of organizational structure, university policy or practice, one group is favored and another disadvantaged. With institutional racism the discrimination may be unintentional, but the policies or practices of an institution result in disparate treatment, even if they are believed to be racially/ethnically (or gender) neutral.

It is noteworthy that while there is increasing research on the status of scientists and engineers of color as well as that of women scientists and engineers, the particular position of women faculty of color in academic science and engineering has remained largely unexplored (Hammonds, 1991). Garrison (1987) suggested that women of color are also overlooked in the government's bifurcated efforts to increase participation of minorities and women in scientific degree programs. Understanding their singular position, at the intersection of race and gender, is essential for addressing adequately the unique situation of women of color (Holvino, 2001; Olsen *et al*., 1995).

UM Survey of Academic Climate and Activities—Questionnaire Design

Given the problem nationally, it is important to examine the work situation for science and engineering faculty of color on the UM campus. This report, drawing on a larger study assessing the campus climate for women scientists and engineers, aims to do that. The original study was undertaken to establish a baseline that would enable us to evaluate the impact of NSF ADVANCE-supported efforts at institutional change.[1] In this report we focus on using that dataset to assess the academic work environment for instructional track science and engineering faculty of color at the University of Michigan. First we compare the responses of instructional track faculty of color to those of white faculty. We also explore gender differences among instructional faculty of color, comparing the experiences of female scientists and engineers of color to two key comparison groups: male scientists and engineers of color, and female social scientists of color.

It is important to note that the sample is small, so inferences can only be made with caution. However, given the paucity of systematic data on the experience of faculty of color in science and engineering, we felt it was critical to carry out these analyses and report on the results to the campus community.[2]

The initial data collection included a climate survey, the UM Survey of Academic Climate and Activities, administered by staff from the Institute for Research on Women and Gender during the fall of 2001 (a copy of the survey is

[1] See the full report on the results of this survey in Stewart, Stubbs & Malley (2002).

[2] We are grateful to the Evaluation Advisory Committee as well as a group of senior faculty of color, for advice on this point and the report as a whole.

included in Appendix A). This ten-page survey focused on institutional and unit/department climate, with additional sections on professional employment, teaching, resources, career satisfaction, recognition, productivity, personal life, and demographics (included to help us assess equivalence of faculty experiences). Where possible, we included questions from faculty surveys previously conducted at other universities. Many of the climate questions came from the University of Michigan Faculty Work-Life Study (1996) conducted by researchers from The Center for the Study of Higher and Postsecondary Education (CSHPE) and the Center for the Education of Women (CEW).[3] Other survey topics were suggested by UM women scientists and engineers during interviews conducted by Professor Abigail Stewart in 2000.

Approximately 20 scientists and engineers and social scientists completed a pilot version of the UM Survey of Academic Climate and Activities in August 2001.[4] Details about the construction of scales to assess various aspects of the climate are contained in the full report (Stewart *et al.*, 2002). Five faculty of color from the survey sample were interviewed after the survey data collection.[5] We include a few quotations from these interviews to illustrate points in this report.

Sample

The survey sample was drawn from faculty with paid appointments at the University of Michigan-Ann Arbor as of May 31, 2001. Because the number of faculty of color in science and engineering fields at the University of Michigan is small, the ADVANCE Evaluation Advisory Committee[6] recommended sampling more heavily the science and engineering faculty of color to yield numbers large enough to permit analysis by race/ethnicity, and to protect confidentiality. We therefore sampled nearly all faculty of color, including:

- All women scientists and engineers of color across tracks (N=93; of these 18 were on the instructional track) and women social scientists of color in colleges that also have science faculty (N=52; 12 on the instructional track).

- All men scientists and engineers of color, with the exception of instructional track male scientists and engineers of Asian or Pacific Islander background. We drew a random sample of 50 (of 131) because the number of men in this category far exceeded the number of women of Asian or Pacific Islander background (N=25). This resulted in a

[3] In addition, we incorporated items from a University of Michigan Medical School faculty survey (1994), a Texas A&M University Campus Climate Survey (1998), The University of Arizona Faculty Advancement Survey (2000), and the University of California at Los Angeles Higher Education Research Institute (HERI) Faculty Survey. We adapted questions on gender equity from a Gender Fairness Environment Scale developed by the University of Virginia School of Medicine Committee on Women, and a scale to measure aspects of the working environment for female faculty developed by Riger, Stokes, Raja, and Sullivan (1997). Questions on sexual harassment were modified from items included in the U.S. Merit Systems Protection Board's survey of sexual harassment in the federal workplace (1994).

[4] Many of these individuals were UM faculty members serving on ADVANCE Committees; they were familiar with the faculty experience at UM, but excluded from the survey sample because of involvement with the project.

[5] See Stewart, Stubbs & Malley (2002) for details of the procedure for carrying out these interviews.

[6] Members of that committee included Mark Chesler (Sociology); Mary Corcoran (Political Science, Public Policy, Social Work and Women's Studies); Paul Courant (Economics, Public Policy); Richard Gonzalez (Psychology); Sylvia Hurtado (Education); Janet Lawrence (Education); Valerie Lee (Education); Ann Lin (Public Policy and Political Science); Yu Xie (Sociology).

total of 187 minority men in the sample, across ethnic groups, 24 of whom were on the instructional track.

The sample that responded and the larger survey pool were equivalent in terms of race-ethnicity, rank and college for the instructional track. However, across tracks, faculty of color responded at a lower rate (26%) than white faculty (40%), as is often the case with social science surveys (CSHPE & CEW, 1999). Faculty of color are often more skeptical about the potential use of the data, as well as about assurances that their responses will not be identifiable.

The sample data were statistically weighted to reflect the race and gender demographic characteristics of the UM faculty population surveyed, as well as the response rates by race and gender (weighting is a statistical procedure that adjusts the raw survey data to represent the population from which the sample is drawn). The weighted analyses also included controls to correct for differences among the three core groups compared in the instructional track analyses.

Our primary comparisons were between white instructional track science and engineering faculty (N=185) and instructional track science and engineering faculty of color (N=42). For the purposes of this report, "faculty of color" refers to respondents who self-identified as African-American, Asian American/Asian, Latina/o or Hispanic, Native American/American Indian, or mixed. Unfortunately, there were too few responding faculty of color to allow for analyses of differences among racial/ethnic groups of color. "White" faculty refers to respondents who self-identified as European American.

We did compare faculty of Asian and Asian American backgrounds with all other faculty of color wherever we found differences between faculty of color and white faculty. There were no differences between these two (small) minority groups of faculty, suggesting that while Asian and Asian American faculty may be overrepresented in science and engineering departments, their experiences are similar to those of other faculty of color.

We also explored gender differences among faculty of color with regard to climate and other work experiences. We compared the experiences of instructional track female scientists and engineers of color (N=18) to two comparison groups: male scientists and engineers of color (N=24) and female social scientists of color (N=12). We ran analyses of variance (ANOVA) on scales and items from the survey, comparing the mean scores of these three groups. When the ANOVA indicated an overall significant difference among the groups, we pursued planned comparisons in which female scientists and engineers of color were compared to the two other groups.

Frequency data were evaluated by chi-square tests. We report frequencies, percentages, means and standard deviations, as appropriate. In the results discussed below any references to significant differences or groups differences refer exclusively to differences found to be statistically significant at $p \leq .05$. Tables reporting results of analyses can be found beginning on page 25.

Analyses were attempted comparing faculty of color on the three tracks (instructional, research and clinical). Because these analyses only examined within race/ethnicity differences by track, and the numbers of respondents on the non-instructional tracks were small (9 and 19 for research and clinical respectively), we concluded that these analyses were not particularly helpful in clarifying the experiences of science and engineering faculty of color in comparison with white science and engineering faculty, so we did not include them in this report.

COMPARISONS: INSTRUCTIONAL FACULTY by RACE-ETHNICITY and GENDER

Overview

Like women scientists and engineers, science and engineering faculty of color reported a chilly work environment at UM, against a backdrop of equivalent professional backgrounds. Because there were so few other differences between faculty of color and their white peers, we believe the climate differences are attributable to experiences based on race-ethnicity (and gender). Compared to their white colleagues at the University of Michigan, science and engineering faculty of color reported less satisfaction with the distribution of unit resources and higher levels of what could be termed covert racism. They reported higher levels of tokenism and a higher frequency of racial and religious stereotyping than white faculty, a finding consistent with the marginalization of faculty of color reported in the literature. In addition, 25% of scientists and engineers of color reported having experienced racial discrimination at UM in the last five years.

Among instructional track faculty of color, female scientists and engineers were particularly at risk for experiencing a negative work environment. Compared to men, female scientists and engineers of color reported less career satisfaction, and a serious lack of mentoring. They also reported a more negative departmental climate than their male colleagues. Female scientists and engineers of color reported less felt influence over unit educational decisions, and rated their department chairs as less fair, less able to create a positive environment, and less committed to racial/ethnic diversity.

Results of Analyses

Professional Experience. Comparing science and engineering faculty of color with white scientists and engineers on the instructional track, we found very few significant differences in professional experience. There was no difference in age (average age of instructional track scientists and engineers of color was 47 compared to an average of 49 among white faculty) and there was no significant difference between the two groups in years since Ph.D. (Table 1).

Scientists and engineers of color, however, had been at UM for significantly fewer years, on average, than their white counterparts. This variable, years at UM, was used as a covariate when running analyses. For the group differences reported below, the control variable either had no effect, or the main effect for the group remained even if the years at UM variable produced an effect. Therefore, group differences cannot be explained by differences in length of career at UM.

Comparing female scientists and engineers to male scientists and engineers and to female social scientists among instructional track faculty of color, we found that women social scientists were younger, obtained their highest degree more recently, and had fewer years at UM than women scientists and engineers (Table 2). All women social scientists of color responding to the survey had been hired in the last ten years, compared to only 50% of male and 78% of female scientists and engineers of color.

There were also differences in rank: male scientists and engineers of color (46%) were more likely than their female counterparts (6%) to be at the full professor level. Although women social scientists of color had been at UM significantly fewer years than women scientists and engineers of color, there were no significant differences between these groups in rank. Over 90% of the female faculty of color reported being at the rank of associate or assistant professor. We used the variables age, rank, years experience, and years at UM as covariates when running ANOVAs.

Household Characteristics. There was one significant difference in household characteristics between scientists and engineers of color and white scientists and engineers: faculty of color were more likely to be single parents. More than three quarters of the faculty in both groups had both a partner and children, and about half of those partnered had a partner who works fulltime (Table 3).

There were differences in household composition among the three groups of instructional track faculty of color. Women social scientist faculty of color were more likely to be partnered without children—67% of women social scientists compared to 23% of women scientists and engineers and 10% of men scientists and engineers (Table 4). If partnered, men scientists of color were less likely to have a partner who works fulltime. All women scientists and engineers of color who were partnered, and 92% of women social scientists of color, reported having a partner engaged in fulltime employment, while only 36% of men scientists of color reported this household situation. These differences in household characteristics, while important for understanding the experiences of women scientists and engineers, do not account for the observed group differences reported below. [We used the household characteristics variables as covariates when running ANOVAs on the climate variables.]

Career Experiences and Satisfactions.

- We found no differences between science and engineering faculty of color and white faculty in the areas of productivity, recognition, specific career satisfactions, felt influence over unit educational decisions, and teaching load. There were minor differences in satisfaction with the distribution of unit resources.

- Female scientists and engineers of color reported lower levels of recognition, overall career satisfaction, and felt influence over unit educational decisions than their male peers; they reported receiving fewer items than female social scientists during initial contract negotiations and fewer items than their male colleagues in renegotiations.

Productivity. There were no group differences by race/ethnicity in faculty members' estimations of their own and their departments' views of their productivity. However, women scientists and engineers reported a lower mean perception of their departments' view of their productivity than their male counterparts (Tables 5 and 6).

Recognition. There were no significant differences between the percentages of scientists and engineers of color and white scientists and engineers in the area of recognition, including being nominated for awards in teaching, research, clinical work and service; being nominated for at least one award; or failing to be nominated for an award for which one was qualified. Fifty-five percent of scientists and engineers of color had been nominated for at least one award, compared to 58% of white faculty in the same disciplines (Table 7). In both groups, nearly one in five faculty members reported having been overlooked for an award for which they were qualified.

There were no significant group differences among female and male scientists and engineers of color and female social scientists of color in the percentages of each group who reported nomination for an award in teaching or service. However, a significantly lower percentage of women scientists and engineers than men scientists and engineers or women social scientists of color reported having been nominated for an award for research. While over 38% of male scientists and engineers of color and over 27%

of female social scientists of color reported having been nominated for a research award, none of the female scientists and engineers of color reported having been nominated for an award in this area. Significantly fewer of these women reported being nominated for at least one award (17%) than their male peers (67%; Table 8).

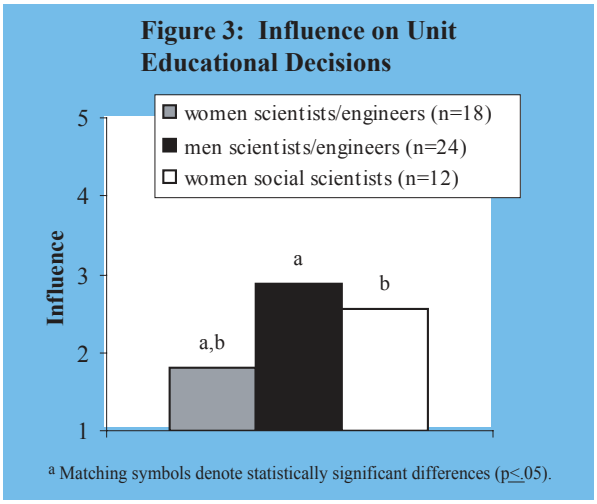
Career Satisfactions. There were no significant differences in satisfaction between scientists and engineers of color and white scientists and engineers based on a series of twelve aspects of career activity (Table 9). The top rated items for both groups were being valued as a mentor by students, being valued as a teacher by students, the opportunity to collaborate with other faculty, and the sense of contributing to the theoretical developments in one's discipline (Table 9).

However, among instructional track faculty of color, women scientists and engineers were significantly less satisfied than men scientists and engineers on a scale averaging ratings for the twelve career satisfactions (Table 10). Looking at the individual items comprising the scale, female scientists and engineers gave lower ratings than their male colleagues on all items except balance between work and family. These differences were statistically significant on two items: "opportunity to collaborate with other faculty" and "current salary in comparison with salaries of UM colleagues" (the mean for women scientists and engineers was also significantly lower than that of women social scientists on this item). Women scientists and engineers of color also reported significantly less satisfaction with the amount of social interaction with members of their unit/department than women social scientists of color.

Felt influence on educational matters and resources. There were no racial/ethnic differences in reported level of influence over educational decisions or unit resources (Table 11).

However, women scientists and engineers of color reported the lowest levels of felt influence over educational decisions, significantly lower than both male scientists and engineers and women social scientists of color (Figure 3, Table 12). Specifically, female scientists and engineers of color felt substantially less influence than both other groups on unit curriculum decisions and selecting new faculty members. Women scientists and engineers also felt less influence than male scientists and engineers of color on selecting graduate students and determining who gets tenure. They also reported a significantly lower mean rating of felt influence over unit resources (all items combined) than the men.

Figure 3: Influence on Unit Educational Decisions



[a] Matching symbols denote statistically significant differences ($p \leq .05$).

Resources—effort and satisfaction. There were no significant differences between instructional track scientists and engineers of color and their white colleagues in the amount of effort necessary to secure resources such as office space, research space, lab equipment, and service from vendors (Table 13). Scientists and engineers of color, however, reported significantly less satisfaction with resources than white faculty overall and specifically with the current allocation of research space and service from vendors.

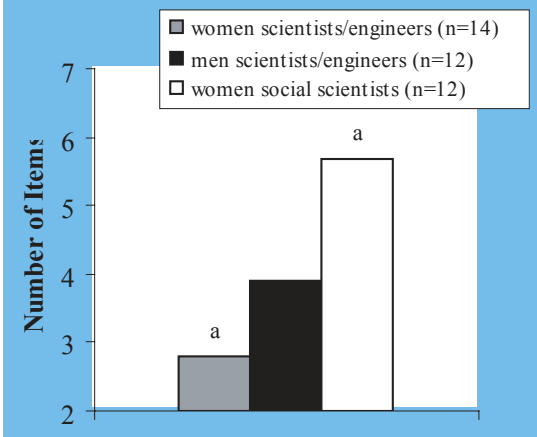
Among instructional track faculty of color, comparing female scientists and engineers to

male scientists and engineers and female social scientists, we found no significant differences in reported effort to secure resources or satisfaction with current allocation of resources.

Initial contract negotiation. All survey respondents who were hired within the past ten years were asked about fifteen key items that might be raised during contract negotiations, such as course release time, lab equipment and lab space, discretionary funds, etc. For this series of fifteen items, survey respondents were asked to indicate whether UM had offered the item during initial contract negotiation, whether they had bargained for the item, whether it was promised in the offer letter, and whether the item was received. There were no significant differences by race/ethnicity in the initial contract negotiation (Table 15).

Among instructional track faculty of color, there were no differences between female and male scientists and engineers in the number of items offered by UM, bargained for, or promised in the offer letter (Table 16). Female social scientists of color, however, reported a significantly higher number of items received during initial contract negotiation than women scientists and engineers of color (Figure 4). They reported receiving an average of three items during initial contract negotiation, compared to an average of nearly six items received by women social scientists of color.

Figure 4: Number of Items Received in Initial Contract Negotiation: Instructional Track Faculty of Color*



[a] Matching symbols denote statistically significant differences ($p \leq .05$).
*Faculty hired in last 10 years.

Contract renegotiation. The question on contract renegotiation asked about the same fifteen items listed under initial contract negotiation, and respondents were asked to indicate the items offered by UM, received through the terms of an award, or bargained for by them during any renegotiation of their original contract. The pattern of results for items received in contract renegotiation is similar to that found with initial contract negotiation. However, in this instance, women scientists and engineers of color reported a significantly lower mean of items received by terms of award in contract renegotiations than their male counterparts, rather than women social scientists (Tables 15 and 16).

Teaching. There were two significant differences between instructional track scientists and engineers of color and white science and engineering faculty in reported teaching load. On average, science and engineering faculty of color reported having developed more courses than their white colleagues and their typical teaching load of graduate courses was, on average, higher (Table 17).

Not surprisingly, among instructional track faculty of color, female social scientists reported a heavier teaching load than female scientists and engineers (Table 18). Comparing the teaching load of female and male scientists and engineers of color, we found that the women served as official advisors to significantly more undergraduate students, and significantly fewer graduate students.

Mentoring. The survey asked several questions regarding the mentoring received by the respondent, including whether the respondent

would benefit from mentoring at this point in his/her career, and how much mentoring the respondent receives. To ensure that individuals were employing similar definitions of mentoring, we asked about eight specific potential activities:

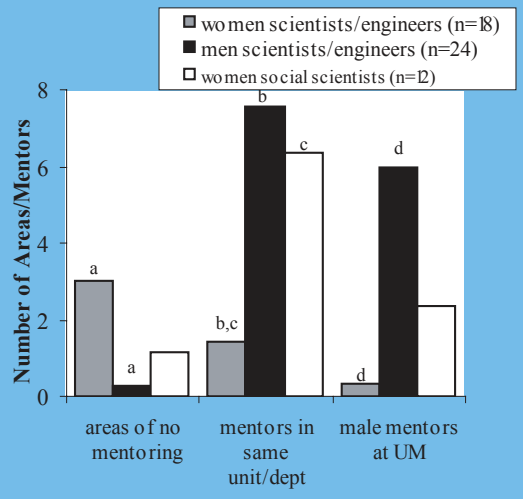
- role modelling
- advocacy
- promoting career through networking
- advising about preparation for advancement
- advising about getting work published
- advising about departmental politics
- advising about obtaining needed resources
- advising about work-family balance

Respondents also were asked to report the total number of male and female mentors they had, (in the same unit at UM, in a different unit at UM, at another institution, or outside academe), and the kind of support each provided.

Analyses of mentoring were limited to assistant professors, since large numbers of senior faculty viewed these questions as not applicable to them. There were no significant differences in received mentoring between white scientists and engineers and scientists and engineers of color (Tables 19a and 19b). Among junior faculty there may be a deficit of mentoring in certain areas regardless of race/ethnicity. Over 30% of white faculty and faculty of color in science and engineering fields at the junior level received no mentoring in the areas of networking, securing resources, advocacy and balancing work and family (Table 19b).

Among instructional track faculty of color, female scientists and engineers receive significantly less mentoring than their male counterparts, or female social scientists. Women scientists and engineers of color reported over three (of eight) areas in which they received no mentoring, compared to less than one area for

Figure 5: Mentoring: Assistant Professors, Instructional Track Faculty of Color



a,b,c,d Matching symbols denote statistically significant differences ($p \leq .05$).

the men (Figure 5, Table 20a). Over two-thirds of female scientists and engineers of color at the assistant professor level reported receiving no mentoring in 6 of 8 areas, including networking, publishing, department politics, resources, advocacy and balancing work and family (Table 20b).

In comparison with male scientists and engineers of color and female social scientists, female scientists and engineers reported significantly fewer mentors in the same department at UM, and fewer male mentors anywhere at UM. Female scientists and engineers of color had between one and two mentors in the same department, on average, while both male scientists and engineers and female social scientists of color had over six mentors in the same department. The average number of male mentors at UM was .23 for female scientists and engineers, six for male scientists and engineers, and between two and three for female social scientists. In an interview, one woman faculty member of color said:

> It would be nice to be actually mentored by a female scientist; a woman on campus who really understands

> what I do and what I'm going through. I….need a longer view on things from somebody who's been there. … [T]he smaller stuff I can talk to my colleagues here, but to get the larger perspective on how they proceeded in terms of career and research paths… it would be nice to get more guidance from this university. Maybe that's what some of the other faculty need as well: mentorship.

Service. On the climate survey, respondents were asked to note their involvement on department, college, and university level committees over the past five years. There were no significant differences in committee service between white science and engineering faculty and faculty of color. On average, both groups served on over three committees per year, chaired fewer than one committee per year, and believed having a college leadership appointment was moderately important (Table 21).

Among the instructional track faculty of color, there were also no significant group differences on these measures.

University Climate. The survey asked several questions regarding climate that were not limited to faculty experiences in their unit(s)/department(s). Questions regarding institutional climate included items assessing the level of gender and racial stereotyping, discrimination, and unwanted and uninvited sexual attention experienced by faculty on the UM campus.

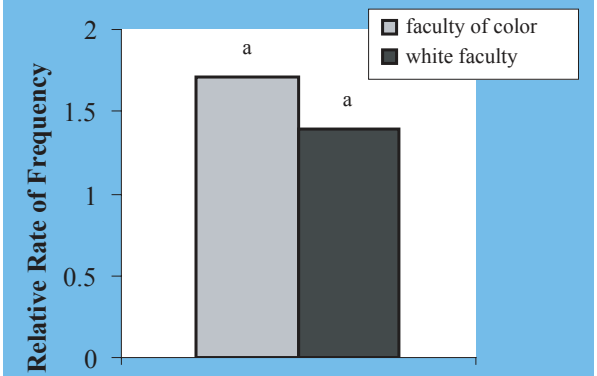
- There were no significant differences between white science and engineering faculty and faculty of color in reported levels of gender stereotyping, gender discrimination, or sexual harassment.

- Scientists and engineers of color reported higher levels of racial and religious stereotyping than white faculty.

- Over 25% of science and engineering faculty of color reported experiencing racial/ethnic discrimination at UM within the last five years. There were no significant differences in the percentage of female and male scientists and engineers of color reporting racial/ethnic discrimination.

Stereotyping. Survey respondents were asked to indicate how often within the last five years they heard faculty or students make insensitive or disparaging comments about women, men, members of racial/ethnic minorities, or members of a particular religious group, as "typical" of that group. These items were combined into two scales: a gender stereotyping scale rating the frequency of disparaging comments about men and women, and a racial/religious stereotyping scale rating insensitive comments about members of a racial/ethnic minority or particular religious group. Instructional track scientists and engineers of color reported a higher level of racial and religious stereotyping than white faculty, but there were no significant differences in the reported levels of gender stereotyping

Figure 6: Ethnic/Religious Stereotyping



[a] Matching symbols denote statistically significant differences ($p \leq .05$).

(Figure 6, Table 23a).

In the interviews, faculty of color described the

kinds of experiences in which they observed faculty members' stereotypes about groups. One said:

> There are little comments every once in a while by people who are sort of well-meaning, but I sometimes worry and get upset that, you know, I'm a minority female faculty …. A couple of people have made comments to me that just were culturally incredibly insensitive…. I kind of worry about what that means when they view me as a colleague or an individual; what do they see? I'm just not sure how to deal with that.

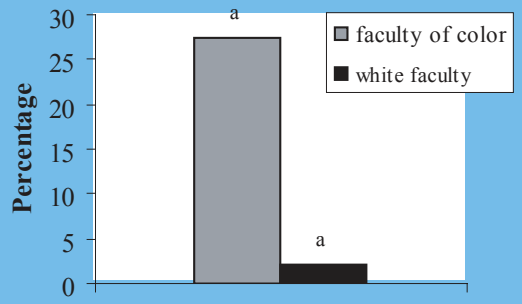
Another faculty member described being in a group of faculty watching a presentation and listening to members of the group snicker and make stereotyping remarks about a minority group represented in the presentation, unconscious of the fact that this person was also a member of that minority group.

> Nobody thought about it…. But that was a completely unconscious reaction on the part of the people [there]. …So that kind of thing is so hard to identify unless it happens to you. In that example…of ethnic or race bias…there is nothing I can do about that. There is no mechanism.

There were no significant group differences among instructional track faculty of color on gender and ethnic/religious stereotyping measures (Table 24a).

Discrimination. Survey respondents were asked to indicate any job-related discrimination they experienced at UM within the last five years, noting the basis for the discrimination (race/ethnicity, gender, sexual orientation, physical disability, religious affiliation), and

Figure 7: Reported Racial/Ethnic Discrimination at UM in Past 5 Years



[a] Matching symbols denote statistically significant differences ($p \leq .05$).

the areas in which the discriminatory behavior affected their career (hiring, promotion, salary, space or other resources, access to administrative staff, graduate student or resident/fellow assignments.) A significantly higher percentage of science and engineering faculty of color (27%) than white faculty (2%) reported experiencing racial discrimination (Figure 7, Table 23a). Others (e.g., Dey, 1994) have found that faculty of color are likely to experience these subtle forms of discrimination as stressful.

Looking at the areas in which faculty felt the racial discrimination had occurred, we found that over 7% of science and engineering faculty of color reported discrimination in how graduate student or resident/fellow assignments are made; over 9% reported experiencing racial discrimination in allocation of resources, and over 17% reported racial discrimination in access to administrative staff (Table 23b).

Similarly, a significantly higher percentage of female science and engineering faculty of color reported gender discrimination in assignments of graduate students or residents/fellows (Table 23c).

In an interview, one faculty member of color described the ways that commitments for space and resources made at the time of hiring were not actually met. The absence of avenues for

redress of these difficulties was noted, as was the fact that filing a lawsuit would likely simply ruin the reputation of the aggrieved faculty member.

Among instructional track faculty of color there were no group differences between female and male scientists and engineers or between female scientists and engineers and female social scientists in experiences of racial discrimination. A significantly higher percentage of women scientists and engineers (33%) reported gender discrimination than did the men scientists and engineers (8%), particularly in the areas of promotion and space/equipment and other resources (Tables 24a and 24b).

Sexual Harassment. The questions about unwanted and uninvited sexual attention,[7] produced no significant differences by race/ethnicity or gender.

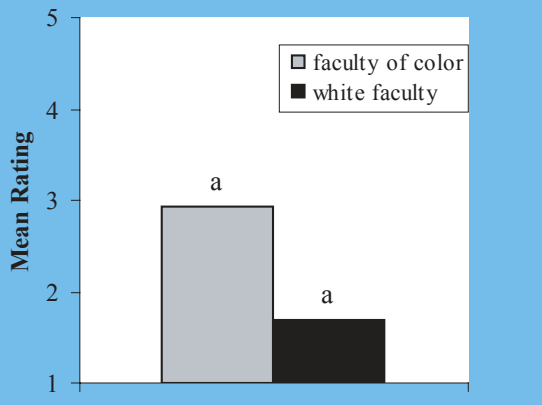
Department Climate.

- Instructional track science and engineering faculty of color reported experiencing higher levels of felt surveillance and tokenism than white faculty.

- Department climate was significantly worse for female scientists and engineers of color than it was for their male counterparts or for female social scientists of color, particularly with respect to the impact of the department chair.

Instructional track science and engineering faculty of color reported a more negative department climate at the University of Michigan, on two of several scales constructed to assess features of *department climate* (positive climate, tolerant climate, egalitarian atmosphere, scholarly isolation, felt surveillance, race/gender tokenism, chair as fair, chair as able to create positive environment, chair as committed to racial/ethnic diversity[8]; Table 25). Although there were no racial/ethnic differences in the combined measure summing all of the climate scales, science and engineering faculty of color did report higher levels of felt surveillance and tokenism, or being expected to represent the point of view of one's gender or race/ethnicity (Figure 8).

Figure 8: Tokenism by Race/Ethnicity



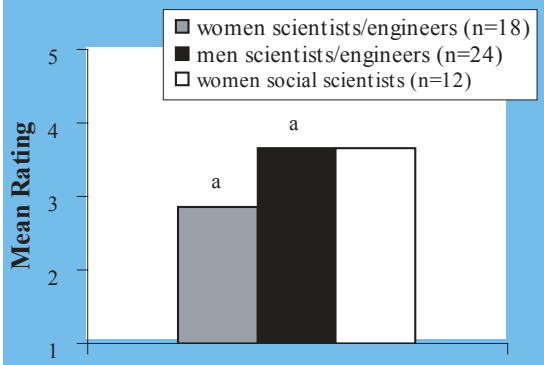
[a] Matching symbols denote statistically significant differences ($p \leq .05$).

In addition, among instructional track faculty of color, female scientists and engineers reported the most negative climate, particularly in terms of the impact of the department chair (Table 26). Compared to male scientists and engineers of color, women rated their departments as having a less positive climate, less gender egalitarianism (Figure 9) and reported more scholarly isolation. They also gave their department chairs significantly lower ratings on fairness, creating a positive environment, and

[7]The survey adapted (using the same wording with different format) the definition of unwanted and uninvited sexual attention used by the Merit Systems Survey of Federal Employees; including unwanted sexual teasing, jokes, remarks or questions; unwanted pressure for dates; unwanted letters, phone calls, email; unwanted touching, leaning over, cornering, pinching; unwanted pressure for sexual favors; stalking; rape or assault.

[8] See Stewart *et al.*, 2002 for a discussion of scale construction.

Figure 9: Gender Egalitarianism: Instructional Track Faculty of Color

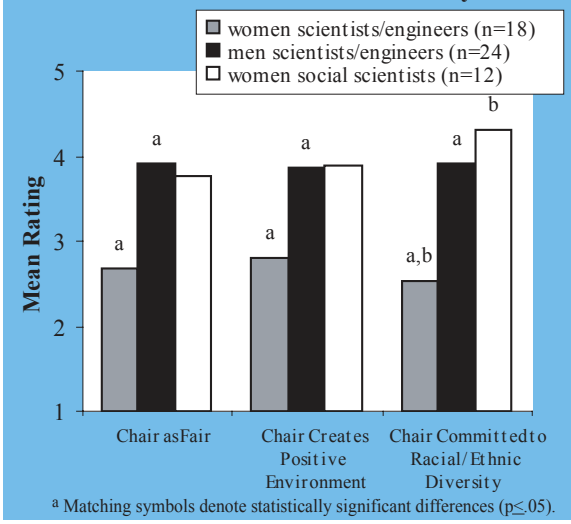


[a] Matching symbols denote statistically significant differences (p≤.05).

commitment to ethnic/racial diversity (Figure 10). On this last item women scientists and engineers gave their chairs lower ratings than both men scientists and engineers and women social scientists.

Looking at the climate scales in the aggregate, we found that women scientists and engineers of color rated their departmental climate as significantly less positive than their male counterparts. On a scale from one (negative) to five (positive), female scientists and engineers of color on the instructional track rated the overall climate as averaging below three, while their male colleagues rated the overall climate on average just below four.

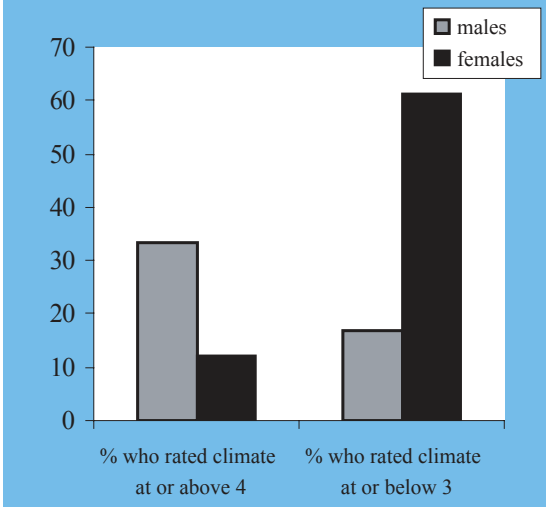
Figure 10: Attitudes Toward Department Chair: Instructional Track Faculty of Color



[a] Matching symbols denote statistically significant differences (p≤.05).

One way to assess the magnitude of this difference is to look at the distribution of scores for men and women. Some women scientists and engineers of color rated the climate at or above four (12%), but almost three times as many men did (33%; Figure 11). Some men scientists and engineers rated the climate at or below three (about 17%), but over 60% of women scientists and engineers of color did.

Figure 11: Distribution of Climate Ratings Among Instructional Track Faculty of Color by Gender



One faculty member of color summed up the climate issue for faculty of color by saying, "their attitude— they try to belittle you all the time, and [give you] no respect. It's already predetermined." In discussing the difficulties of changing the climate, one faculty member of color said that too often departments were motivated only to think about numbers (of faculty or students of color) or financial benefits of diversity (e.g., being able to hire more faculty). This faculty member felt there was too often a focus on increasing numbers, without being concerned about the experience of faculty (or students) of color once they come to the University. This individual commented, "lack of interest in these issues is worse than straightforward racism. Most racists have better manners."

Faculty of color expressed concerns in the inter-

views about processes that were secret or hidden. For example, one faculty member said:

> I think the school needs to have some enforcement, in terms of all the processes. [The] tenure track process has to be public and cannot be secretive, cannot be closed-door ….the process has to be opened up…. It cannot be one person deciding. Everybody must follow the same procedure. Instead, oh, some people our chairman decided, they can pass, that's it. Even the chairman should have to go through the process. This kind of process is very important.

Does Climate Matter?

Do perceptions of climate, other department and academic experiences, or personal and position indicators, affect faculty satisfaction? We ran correlations between these variables and overall satisfaction with current position at UM for both the white science and engineering faculty, the faculty of color, and also women of color alone. We also ran correlations assessing the relationship between other campus experiences, personal and position indicators and overall job satisfaction. We found that the departmental climate ratings were most closely related to satisfaction for each of the three sub-groups of instructional track science and engineering faculty.

Institutional & Departmental Climate Ratings. We found that climate indicators were significantly correlated with overall satisfaction with position at UM (Table 27). For white scientists and engineers, with the exception of ethnic/religious and gender stereotyping, the institutional climate ratings (sexual harassment, gender discrimination) and departmental climate ratings (with the exception of scholarly isolation) were closely related to overall satisfaction with UM position.

The *institutional* climate ratings were not significantly correlated with overall satisfaction for either scientists and engineers of color as a group, or female scientists and engineers of color alone, but the *departmental* climate ratings were closely related to overall job satisfaction for both groups. These findings suggest that climate plays an important role in faculty satisfaction generally, and that the negative departmental climate reported by science and engineering faculty of color has clear consequences for satisfaction. We note, in turn, that satisfaction has been shown to be a key predictor of retention.

Departmental and Other Campus Academic Experiences. The correlations between indicators of departmental and campus academic experiences (career satisfactions, productivity, resources, felt influence, committee service and mentoring), and overall satisfaction with position at UM were also strong, underscoring the importance of a good working environment at the departmental level (Table 28).

For female scientists and engineers of color, science and engineering faculty of color as a whole, and their white colleagues, the following departmental experiences were significantly correlated with overall job satisfaction: career satisfactions; effort to obtain resources; satisfaction with the distribution of resources; and felt influence over unit educational matters and resources.

Personal and Position Indicators and Household Characteristics. In contrast to the climate and campus experiences indicators, virtually no personal and professional experience indicators, or household characteristics, were significantly correlated with overall satisfaction with position at UM (Table 29).

We have seen that university and department climate indicators and other academic expe-

riences relate to faculty satisfaction. This suggests that because scientists and engineers of color, and in particular female scientists and engineers of color, have more negative experiences with regard to university and departmental climate when compared to white science and engineering faculty, they are at a distinct professional disadvantage in terms of retention.

Do Bad Experiences Accumulate?

Findings from the survey data indicate that the scientists and engineers of color at the University of Michigan experience a more negative climate than do their white colleagues. To examine whether reports of gender discrimination or racial/ethnic discrimination—questions rated for "the past five years" on the survey—"predict" current satisfaction and climate ratings, we ran independent sample t-tests (Tables 30 and 31).[9] Among all instructional track scientists and engineers, scientists and engineers of color, and female scientists and engineers of color, those who had experienced gender discrimination or racial discrimination reported a more negative climate. This evidence suggests that bad experiences may accumulate. Thus, it would be in the best interest of faculty and the University to work to prevent the occurrence of negative incidents, and minimize their impact on faculty through implementation of clear policies and procedures to address rapidly the difficulties scientists and engineers of color experience.

[9] In the longer report focusing on gender, we also tested sexual harassment as a "predictor" of current job satisfaction. Because only 2 of 42 instructional track faculty of color reported experiencing sexual harassment at UM in the past five years, we dropped this variable from the race/ethnicity analyses.

CONCLUSIONS

Instructional Track Faculty of Color

Science and engineering faculty of color and white faculty at the University of Michigan reported few differences in professional experience, household characteristics, and career experiences and satisfactions. They reported important differences, however, in perceptions of the work environment. Findings from our survey indicate that scientists and engineers of color experience a significantly less positive climate than their white colleagues. One in four instructional track science and engineering faculty of color reported experiencing racial discrimination at UM within the past five years. These findings are consistent with other studies that find faculty of color face an unwelcoming environment (Allen et al., 2000; Laden & Hagedorn, 2000).

Furthermore, compared to white science and engineering faculty, scientists and engineers of color reported higher levels of tokenism, and a higher frequency of racial and religious stereotyping. Both tokenism and stereotyping are referred to as covert racism in the literature, and are linked to feelings of marginalization reported by faculty of color on university campuses (Johnsrud & Sadao, 1998). These results are consistent with other research that finds minority faculty are cut-off from full participation in their academic institutions, institutions that were initially established to serve an all white male faculty (Aguirre, 2000).

Women Instructional Track Faculty of Color

There is evidence that among faculty of color at UM, female scientists and engineers on the instructional track fared worse than male scientists and engineers or female social scientists. The findings discussed here largely parallel those observed among UM science and engineering faculty as a whole (Stewart

et al., 2002).

Compared to their male counterparts, women scientists and engineers of color reported: lower rates of recognition, less felt influence on unit educational decisions, less access to graduate students and lower career satisfaction. Compared to women social scientists, the start-up packages of women scientists and engineers were described as including fewer elements and their contract renegotiations contained fewer items than those of their male peers. Moreover, in comparison with both male scientists and engineers and women social scientists, female scientists and engineers of color faced a serious lack of mentoring: over two-thirds of the women reported receiving no mentoring in six of the eight targeted areas.

Women scientists and engineers of color also reported a significantly more negative department climate than either their male counterparts, or women social scientists of color. Our findings are consistent with others who report that women faculty of color experience more discrimination in the workplace than male faculty of color (Bronstein & Farnsworth 1998) and that their opportunities for advancement are more seriously hampered than their white female counterparts (Aguirre, 2000).

Compared to male scientists and engineers of color, women rated their departments as less gender egalitarian, and gave their department chairs significantly lower ratings on fairness and creating a positive environment. On commitment to racial/ethnic diversity women scientists and engineers gave their chairs lower ratings than both male peers and women social scientists. In addition, over one-third of the women also reported experiences of gender discrimination within the previous five years. These findings are especially important given other research (e.g., Rosch & Reich, 1996) that department climate and role of the chair are critical elements in integrating faculty into the institution.

Uses of the Findings

The findings discussed here highlight the importance of climate to overall job satisfaction (Tables 26 and 27) and also indicate that previous bad experiences, such as racial discrimination, can "predict" current climate ratings (Table 31). Our data support other findings that institutional support and department climate, as well as a sense of control over one's own career, are predictive of job satisfaction in faculty of color (Laden & Hagedorn, 2000; Olsen *et al*., 1995). Therefore, preventing or minimizing early experiences of disadvantage could provide long-term benefits to faculty morale.

We hope that the findings in this report will inspire further research on the particular challenges that face male and female faculty of color at the University of Michigan. In addition, we hope that, along with the findings from *Assessing the Academic Work Environment for Women Scientists and Engineers*, the findings reported here will be used to make policy recommendations and identify practices that might improve the work environment for faculty of color, and for all faculty, at the University of Michigan.

Inadequate institutional policies and practices, including lack of mentoring (Corcoran & Clark, 1984), unclear promotion policies (Austin & Rice, 1998), and discrimination (Menges & Exum, 1983), contribute to an inhospitable environment for faculty of color. Given the small number of faculty of color, and their experiences of the climate, the single most important remedy suggested by our findings is increasing the "critical mass" of science and engineering faculty of color by recruiting and retaining more racially/ethnically diverse scientists and engineers (Branch, 2001). The following remedies are also suggested by our findings:

Climate:

- chairs and senior faculty leaders play crucial roles in defining the climate for faculty; therefore it is important to provide them with adequate support and resources to provide excellent mentoring, problem-solving and conflict-resolution, and establish and maintain fair and judicious procedures and practices;
- encourage departments to make use of centrally provided resources and professional external evaluators to engage in systematic assessment of their own climates, that might lead to active steps to address their negative features;
- ensure that departments and colleges have clear and transparent policies and procedures in hiring, tenure, and other decision-making processes that minimize negative experiences.

Mentoring:

- increase commitment to and understanding of mentoring among chair and senior faculty leaders, as well as younger faculty;
- support on- and off-campus mentoring;
- create formal and informal mentoring programs for tenure track faculty.

Contracts and Resources:

- ensure that equitable offers, counter-offers, and contract agreements are made and monitored;
- ensure clear and transparent policies for allocation of resources.

REFERENCES

Aguirre, A., Jr. (2000). Women and minority faculty in the academic workplace: Recruitment, retention, and academic culture. *Higher Education Reports, 27*(6), 1-110.

Aguirre, A., Jr., & Martinez, R. O. (1993). *Chicanos in higher education: Issues and dilemmas for the 21st century.* ASHE-ERIC Higher Education Report No. 3. Washington DC: George Washington University, School of Education and Human Development.

Austin, A., & Rice, E.R. (1998). Making tenure viable. *American Behavioral Scientist, 41*(5), 736-754.

Allen, W., Eepps, E., Guillory, E., Suh, S., & Bonous-Hammarth, M. (2000). The black academic: Faculty status among African Americans in higher education. *The Journal of Negro Education, 69*, 1/2)

Astin, H. (1997). *Race and ethnicity in the American professorate, 1995-1996.* Los Angeles: University of California, Los Angeles (UCLA), Higher Education Research Institute.

Banks, W. M. (1984). Afro-American scholars in the university: Roles and conflicts. *American Behavioral Scientist, 27,* 325-339.

Blackwell, J. E. (1996). Faculty issues: The impact on minorities. In C. Turner, M. Garcia, A. Nora, & L. I. Rendon (Eds.), *Racial and ethnic diversity in higher education.* Needham Heights, MA: Simon & Schuster Custom Publishing, 315-326.

Boice, R. (1993). New faculty involvement for women and minorities. *Research in Higher Education. 34*(3), 291-341.

Branch, A.J. (2001). How to retain African American faculty during times of challenge for higher education. In L. Jones (Ed.) *Retaining African Americans in higher education.* Sterling, Virginia: Stylus.

Bronstein, P., & Farnsworth, L. (1998). Gender differences in faculty experiences of interpersonal climate and processes for advancement. *Research in Higher Education, 39*(5), 557-585.

Brown, S.V. (2000). The preparation of minorities for academic careers in science and engineering: How well are we doing? In G. Campbell, R. Denes, & C. Morrison, (Eds.) *Access denied: Race, ethnicity, and the scientific enterprise*. New York: Oxford University Press, 239-269.

Clark, S. & Corcoran, M. (1986). Perspectives on professional socialization of women faculty: A case of accumulative disadvantage? *Journal of Higher Education, 57* (1), 20-43.

Corcoran, M., & Clark, S. (1984). Professional socialization and contemporary career attitudes of three faculty generations. *Research in Higher Education, 20(*2), 131-153.

Cota-Robles, E. (2000). Introduction. In G. Campbell, R. Denes, & C. Morrison, (Eds.) *Access denied, Race, ethnicity, and the scientific enterprise*. New York: Oxford University Press, 3-4.

CSHPE & CEW (1999). *University of Michigan Faculty Work-Lie Study Report.* Center for the Study of Post-secondary Education and the Center for the Education of Women. November.

Dey, E. (1994). Dimensions of stress: A recent survey. *The Review of Higher Education,*

17(3).

Dube, E. (1985). The relationship between racism and education in South Africa. *Harvard Educational Review*, *55*, 86-100.

Garrison, H. (1987). Undergraduate science and engineering education for Blacks and Native Americans. In G. Dix., (Ed.) *Minorities: Their underrepresentation and career differenials in science and engineering*. Washington DC: National Academy Press.

Hammonds, E.M. (1991). Underrepresentations. *Science*, 253, p. 919.

Hass, M. (1992). *Institutional racism: The case of Hawaii*. Westport, CT: Praeger.

Holvino, E. (2001). *Complicating gender: The simultaneity of race, gender, and class in organization change(ing). Center for Gender in Reorganizations*. Working Paper, no. 14.

Johnsrud, L.K., & Sadao, K.C. (1998). The common experience of "Otherness": Ethnic and racial minority faculty. *Review of Higher Education, 21*(4), 315-342.

Laden, B.V., & Hagedorn, L.S. (2000). Job satisfaction among faculty of color in academe: Individual survivors or institutional transformers? *New Directions for Institutional Research, 105*, 57-66.

Menges, R. J., & Exum, W. H. (1983). Barriers to the progress of women and minority faculty. *Journal of Higher Education, 54(2),* 123-143.

Nakanishi, D. T. (1993). Asian Pacific Americans in higher education: Faculty and administrative representation and tenure. In J. Gainen and R. Boice (Eds.), *Building a diverse faculty*. San Francisco: Jossey-Bass, 51-59.

National Science Foundation. *Women, Minorities, and Persons with Disabilities in Science and Engineering, 2000.* Arlington, VA, 2000. (NSF 00-327).

Olivas, M. A. (1988). Latino faculty at the border: Increasing numbers key to more Hispanic access. *Change,* May/June, 6-9.

Olsen, D., Maple, S., & Stage, R. (1995). Women and minority faculty job satisfactoin: Professional role interests, professional satisfactions, and institutional fit. *Journal of Higher Education, 66*(3), 267-293.

Report of the Congressional Commission of the Advancement of Women and Minorities in Science, Engineering, and Technology Development (CAWMSET). (2000). *Land of the plenty: Diversity as America's competitive edge in science, engineering and technology.* Retrieved Spring 2002, http://www.nsf.gov/od/cawmset.

Reyes, M. de la Luz, & Halcon, J. J. (1988). Racism in academia: The old wolf revisited. *Harvard Educational Review, 58,* 299-314.

Rosch, T.A., & Reich, J.N. (1996). The enculturation of new faculty in higher eduation: A comparative investigation of three academic departments. *Research in Higher Education, 37*(1).

Stein, W. (1994). The survival of American Indian faculty. *Thought and Action: The National Education Association Higher Education Journal, 10,* 101-114.

Stewart, A.J., Stubbs, J., & Malley, J. (2002).

Assessing the academic work environment for women scientists and engineers. http://www.umich.edu/~advproj/climatereport.pdf.

Valian, V. (2000). *Why so slow? The advancement of women.* Cambridge, MA: MIT Press.

TABLES

Table 1: Professional Experience by Race/Ethnicity

	Faculty of Color (N=42)		White Faculty (N=185)	
	mean	sd	mean	sd
	46.80	10.09	49.39	10.79
Time since highest degree*	3.70	2.04	4.25	2.16
Time since first UM appointment*	3.34 [a]	1.45	3.30 [a]	2.13
	percentages		percentages	
Hired in last ten years	57		42	
Joint appointment	14		19	
Small college	31		15	
Full professor	36		55	
Associate professor	27		19	
Assistant professor	37		26	

*1=1995-2001; 2=1990-1994, 3=1985-1989; 4=1980-1984; 5=1975-1979; 6=1970-1974; 7=1965-1969; 8=1960-1964.

[a]*Matching symbols denote statistically significant differences at the level of p≤.05*

Table 2: Professional History: Instructional Track Faculty of Color

	women scientists/engineers (N=18)		men scientists/engineers (N=24)		women social scientists (N=12)	
	mean	sd	mean	sd	mean	sd
	43.56 [a]	7.76	47.87	10.67	36.58 [a]	7.35
Time since highest degree*	3.00 [a]	1.50	3.92	2.17	1.67 [a]	1.23
Time since first UM appointment*	2.06 [a]	1.43	2.43	1.56	1.08 [a]	.29
	percentage		percentage		percentage	
Hired in last ten years	78		50		100	
Joint appointment	17		13		42	
Small college	35		29		8	
Full professor rank	6 [a]		46 [a]		8	
Associate professor rank	44		21		25	
Assistant professor rank	50		33		67	

*1=1995-2001; 2=1990-1994, 3=1985-1989; 4=1980-1984; 5=1975-1979; 6=1970-1974; 7=1965-1969; 8=1960-1964.

[a]*Matching symbols denote statistically significant differences at the level of p≤.05*

Table 3: Household and Partner Employment Characteristics by Race/Ethnicity (Percentages)

	Faculty of Color	White Faculty
Household Composition:	(N=42)	(N=185)
Single (no partner nor children)	4	5
Children, no partner	6[a]	1[a]
Partner and children	78	83
Partner, no children	13	11
Partner Employment:	(N=38)	(N=158)
Partner works fulltime	51	48
Partner employed at UM	39	31
If partner employed at UM, employed as faculty	41	56
Considered leaving UM to improve partner's career	44	33

[a]*Matching symbols denote statistically significant differences at the level of p≤.05*

Table 4: Household and Partner Employment Characteristics (Percentages): Instructional Track Faculty of Color

	women scientists/ engineers	men scientists/ engineers	women social scientists
Household Composition:	(N=18)	(N=24)	(N=12)
Single (no partner nor children)	0	5	0
Children, no partner	8	5	0
Partner and children	69	80	33
Partner, no children	23[a]	10	67[a]
Partner Employment:	(N=16)	(N=22)	(N=12)
Partner works fulltime	100[a]	36[a]	92
If partner employed at UM (N=33), employed as faculty	63	33	50
Considered leaving UM to improve partner's career	47	43	64

[a]*Matching symbols denote statistically significant differences at the level of p≤.05*

Table 5: Productivity by Race/Ethnicity

	Faculty of Color (N=42)		White Faculty (N=185)	
	mean	sd	mean	sd
Perception of own productivity	7.42	1.73	7.09	1.71
Perception of department's view of own productivity	5.96	2.11	6.46	1.87

*Scores on all items ranged from 1 to10 (1=much less productive; 10=much more productive).
Controlling for years at UM

Table 6: Productivity: Instructional Track Faculty of Color

by Gender/Field Groups:	women scientists/ engineers (N=18)		male scientists/ engineers (N=24)		women social scientists (N=12)	
	mean	sd	mean	sd	mean	sd
Perception of Own Productivity	7.36	1.55	7.44	1.83	6.68	1.79
Perception of Department's View of Own Productivity	4.94 [a]	2.49	6.39 [a]	1.96	5.68	1.93
by Rank:	assistant professor (N=26)		associate professor (N=16)		full professor (N=13)	
	mean	sd	mean	sd	mean	sd
Perception of Own Productivity	7.25	1.59	7.32	1.91	7.34	1.93
Perception of Department's View of Own Productivity	6.15	2.25	6.11	2.10	5.73	2.07

*Scores on all items ranged from 1 to10 (1=much less productive; 10=much more productive).
Controlling for age, rank, years experience and years at UM

[a]*Matching symbols denote statistically significant differences at the level of $p \leq .05$*

Table 7: Recognition by Race/Ethnicity (Percentages)

	Faculty of Color (N=42)	White Faculty (N=185)
Nominated for teaching award	25	38
Nominated for research award	28	31
Nominated for clinical award	4	3
Nominated for service award	24	11
Nominated for at least one award	55	58
Failed to be nominated for award for which one is qualified	18	19

Controlling for years at UM

Table 8: Recognition: Instructional Track Faculty of Color

by Gender/Field Groups:	women scientists/ engineers (N=18)	male scientists/ engineers (N=24)	women social scientists (N=12)
	percentage	percentage	percentage
Nominated for teaching award	0	33	20
Nominated for research award	0 [ab]	38 [a]	27 [b]
Nominated for service award	17	26	27
Nominated for clinical award	0	0	0
Nominated for at least one award	17 [a]	67 [a]	42
Dept failed to nominate for appropriate award	18	17	0

Controlling for age, rank, years experience and years at UM.

[a,b]*Matching symbols denote statistically significant differences at the level of p≤.05*

Table 9: Mean Scores of Career Satisfaction Item Ratings by Race/Ethnicity

	Faculty of Color (N=42)		White Faculty (N=185)	
	mean	sd	mean	sd
Scale:				
Satisfaction with unit/department	3.62	.96	3.70	.79
Individual items:*				
Sense of being valued as a mentor or advisor by students	4.27	1.06	4.40	.97
Sense of being valued as a teacher by students	4.01	1.19	4.13	1.09
Sense of contributing to theoretical developments in my discipline	3.76	1.09	3.97	1.08
Opportunity to collaborate with other faculty	4.01	1.31	3.89	1.28
Ability to attract students to work with	3.56	1.25	3.46	1.38
Level of funding for research or creative efforts	3.59	1.31	3.75	1.20
Sense of being valued for my teaching by members of unit/dept	3.66	1.51	3.48	1.29
Level of intellectual stimulation in day-to-day contacts with faculty colleagues	3.54	1.34	3.61	1.27
Amount of social interaction with members of unit/department	3.50	1.52	3.62	1.34
Sense of being valued for research, scholarship, or creativity by members of unit/department	3.27	1.53	3.57	1.32
Current salary in comparison with the salaries of UM colleagues	3.42	1.43	3.16	1.23
Balance between professional and personal life	3.19	1.42	3.20	1.24

*Scores on all items ranged from 1 to 5 (1=very dissatisfied; 5=very satisfied).
Controlling for years at UM.

Table 10: Career Satisfactions Scale and Item Ratings by Instructional Track Group: Faculty of Color

	women scientists/ engineers (N=18)		men scientists/ engineers (N=24)		women social scientists (N=12)	
	mean	sd	mean	sd	mean	sd
Career satisfactions (total scale)	3.32[a]	.85	3.81[a]	.89	3.84	.60
Individual items:						
Sense of being valued as a mentor or advisor by students	4.19	1.28	4.38	.92	4.08	.90
Sense of being valued as a teacher by students	3.81	1.33	4.19	.98	3.92	1.08
Sense of contributing to theoretical developments in my discipline	3.50	1.27	3.86	1.08	4.08	.67
Opportunity to collaborate with other faculty	3.75[a]	1.53	4.23[a]	1.19	4.08	1.17
Ability to attract students to work with	3.47	1.46	3.76	1.09	4.08	1.00
Level of funding for research or creative efforts	3.50	1.37	3.82	1.18	3.73	1.10
Sense of being valued for my teaching by members of unit/dept	3.06	1.56	3.96	1.36	3.67	.98
Level of intellectual stimulation in day-to-day contacts with faculty colleagues	3.29	1.76	3.64	1.26	3.73	1.62
Amount of social interaction with members of unit/department	3.00[a]	1.59	3.73	1.42	4.08[a]	1.24
Sense of being valued for research, scholarship, or creativity by members of unit/department	2.71	1.72	3.50	1.37	3.83	1.19
Current salary in comparison with the salaries of UM colleagues	2.94[ab]	.93	3.68[a]	1.49	3.67[b]	1.16
Balance between professional and personal life	3.53	1.38	3.23	1.41	3.64	1.21

*Scores on all items ranged from 1 to 5 (1=very dissatisfied; 5=very satisfied).
Controlling for age, rank, years experience, and years at UM.

[a,b]*Matching symbols denote statistically significant differences at the level of p≤.05*

Table 11: Influence over Educational Decisions and Unit Resources by Race/Ethnicity

	Faculty of Color (N=42)		White Faculty (N=185)	
	mean	sd	mean	sd
Scales:				
Unit educational decisions	2.59	.90	2.67	.95
Unit resources (salary, money for travel, facilities/equipment)	2.31	.92	2.37	.95
Individual items:*				
Unit curriculum decisions	2.83	1.24	2.71	1.25
Size of salary increases I receive	1.85	.99	1.79	.93
Obtaining money for travel to professional meetings	2.56	1.50	2.53	1.30
Securing the facilities or equipment I need for my research	2.82	1.16	3.01	1.14
Selecting new graduate students or residents/fellows	3.40	1.35	3.34	1.30
Selecting new faculty members to be hired	2.80	1.24	2.92	1.21
Determining who gets tenure	1.90	1.17	2.28	1.34
Selecting the next unit head	1.75	.99	2.12	1.12
Affecting the overall unit climate/culture	2.75	1.26	2.92	1.10

*Scores for all items range from 1 to 5 (1=no influence; 5=tremendous influence).
Controlling for years at UM.

Table 12: Influence over Educational Matters & Resources: Instructional Track Faculty of Color

	women scientists/ engineers (N=18)		men scientists/ engineers (N=24)		women social scientists (N=12)	
	mean	sd	mean	sd	mean	sd
Unit educational decisions (total scale)	1.81 [ab]	.79	2.88 [a]	.76	2.56 [b]	.72
Individual items:						
Unit curriculum decisions	1.64[ab]	.84	3.23 [a]	1.07	2.82 [b]	1.08
Selecting new graduate students or residents/fellows	2.53[a]	1.46	3.72[a]	1.23	3.42	1.17
Selecting new faculty members to be hired	1.81[ab]	.98	3.18[a]	1.10	2.92[b]	.67
Determining who gets tenure	1.15 [a]	.38	2.14 [a]	1.24	1.83	1.40
Selecting the next unit head	1.60	.99	1.84	1.02	1.82	.98
Affecting the overall unit climate/culture	2.18	1.09	2.39	.88	2.44	.66
Unit resources (total scale)	2.20 [a]	1.27	3.00 [a]	1.18	2.42	1.08
Individual items:						
Size of salary increases I receive	1.60	.99	1.91	1.02	1.64	.92
Obtaining money for travel to professional meetings	2.27	1.56	2.72	1.49	2.46	1.04
Securing the facilities or equipment I need for my research	2.47	1.41	3.00	1.06	3.17	.58

*Scores for all items range from 1 to 5 (1=no influence; 5=tremendous influence).
Controlling for age, rank, years experience, and years at UM.
[a,b]*Matching symbols denote statistically significant differences at the level of $p \leq .05$*

Table 13: Effort and Satisfaction with Resources by Race/Ethnicity

	Faculty of Color (N=42)		White Faculty (N=185)	
	mean	sd	mean	sd
Scales				
Mean effort	2.84	1.00	2.75	1.00
Mean satisfaction	3.09[a]	1.08	3.72[a]	1.02
Effort to secure the following resources*:				
office space	2.11	1.24	2.45	1.52
research space	3.59	1.46	3.32	1.42
computer equipment	2.51	1.35	2.46	1.12
lab equipment	3.38	1.39	3.38	1.22
service from vendors (repairs, supplies, upgrades)	3.21	1.21	2.73	1.03
Satisfaction with the following resources:**				
office space	3.56	1.50	3.86	1.39
research space	2.48[a]	1.30	3.48[a]	1.47
computer equipment	3.57	1.31	3.80	1.24
lab equipment	3.46	1.20	3.77	1.23
service from vendors (repairs, supplies, upgrades)	2.82[a]	1.08	3.43[a]	1.06

* Scores on all items range from 1 to5 (1=no effort; 5=tremendous effort).
** Scores on all items range from 1 to 5 (1=very dissatisfied; 5=very satisfied).
Controlling for years at UM.

[a]*Matching symbols denote statistically significant differences at the level of p≤.05*

Table 14: Effort and Satisfaction with Resources: Instructional Track Faculty of Color

	women scientists/ engineers (N=18)		men scientists/ engineers (N=24)		women social scientists (N=12)	
	mean	sd	mean	sd	mean	sd
Efforts to secure the following resources*:	2.55	1.06	2.87	.97	2.48	.47
office space	1.93	1.33	2.30	1.26	1.45	.69
research space	3.20	1.52	3.60	1.55	3.10	1.10
computer equipment	2.50	1.34	2.53	1.31	2.91	.70
equipment	2.75	1.28	3.36	1.43	2.63	.74
service from vendors (repairs, supplies, upgrades)	2.80	1.32	3.32	1.17	2.75	.71
Satisfaction with the following resources:**	3.23	1.42	307	1.02	4.04	.50
office space	3.77	1.48	3.35	1.57	4.70	.67
research space	3.00	1.60	2.33	1.18	3.40	1.35
computer equipment	3.62	1.76	3.61	1.20	4.00	.94
lab equipment	3.38	1.41	3.50	1.24	4.00	.93
service from vendors (repairs, supplies, upgrades)	3.10	1.52	2.78	1.06	3.43	1.13

* Scores on all items range from 1 to5 (1=no effort; 5=tremendous effort).
** Scores on all items range from 1 to 5 (1=very dissatisfied; 5=very satisfied).

Controlling for age, rank, years experience, and years at UM.

Table 15: Number of Items in Contract Negotiation by Race/Ethnicity

	Faculty of Color (N=26)		White Faculty (N=86)	
	mean	sd	mean	sd
Initial Contract Negotiation (if hired in last 10 yrs)				
Number of items offered by UM	2.34	2.44	2.87	2.40
Number of items bargained for	2.32	2.14	2.70	2.89
Number of items promised in offer letter	2.20	2.38	2.97	2.80
Total n umber of items received	3.77	2.40	4.17	2.67
Contract Renegotiation	(N=37)		(N=161)	
Number of items offered by UM	1.43	2.02	1.68	2.00
Number of items bargained for	1.54	1.55	1.86	2.06
Number of items received by terms of award	1.14	1.77	.98	1.51
Total number of items received	4.10	4.01	4.52	3.84

Controlling for years at UM

Table 16: Number of Items in Contract Negotiation: Instructional Track Faculty of Color

	women scientists/ engineers (N=14)		men scientists/ engineers (N=12)		women social scientists (N=12)	
	mean	sd	mean	sd	mean	sd
Initial Contract Negotiation (for those hired in last 10						
Number of items offered by UM	1.86	2.07	2.55	2.77	3.50	1.68
Number of items bargained for	2.29	2.02	2.09	2.21	2.75	2.38
Number of items promised in offer letter	1.43	1.45	2.18	2.44	2.92	2.02
Total number of items received	2.79[a]	2.64	3.91	1.92	5.67[a]	1.72
Contract Renegotiation	(N=16)		(N=21)		(N=11)	
Number of items offered by UM	1.13	1.59	1.68	2.21	3.18	2.60
Number of items bargained for	1.44	1.67	1.53	1.58	2.00	1.48
Number of items received by terms of award	.38 [a]	.62	1.53 [a]	2.01	.82	1.54
Total number of items received	2.94	3.02	4.74	4.41	6.00	4.67

Controlling for age, rank, years experience, and years at UM.

[a]Matching symbols denote statistically significant differences at the level of p≤.05

Table 17: Teaching by Race/Ethnicity

	Faculty of Color (N=42)		White Faculty (N=185)	
	mean	sd	mean	sd
Typical yearly teach load in department				
Number of undergraduate courses	1.27	1.07	1.24	1.14
Number of graduate courses	1.74 [a]	1.15	1.25 [a]	.96
Number new courses developed in past 5 years	2.81[a]	3.23	1.36[a]	1.68
Number of courses released from teaching in past 5 yrs	1.90	3.13	1.48	2.32
Teaching load winter and fall Semesters 2001				
Number of undergraduate courses	1.02	1.74	.87	1.35
Number of graduate courses	1.15	1.44	.87	1.17
Number of non-lab courses	1.82	1.59	1.48	1.56
Number of lab courses	.34	.91	.25	.74
Number of undergraduate students	41.90	62.21	63.71	105.04
Number of graduate students	55.80	104.68	34.81	66.18
Official advising				
Number of undergraduates	.82	1.87	1.76	4.82
Number of graduate students (masters, PhD, medical)	4.91	5.15	3.00	3.52
Number of postdocs or residents/fellows	.96	1.18	1.50	2.74
Number of junior faculty	.21	.54	.22	.73

Controlling for years at UM

[a]*Matching symbols denote statistically significant differences at the level of $p \leq .05$*

Table 18: Teaching: Instructional Track Faculty of Color

	women scientists/ engineers (N=18)		men scientists/ engineers (N=24)		women social scientists (N=12)	
	mean	sd	mean	sd	mean	sd
Typical yearly teaching load in department						
Number of undergraduate courses	1.41	1.20	1.25	1.08	1.92	.51
Number of graduate courses	1.50	1.03	1.89	1.22	1.33	.49
Number new courses developed in past 5 years	1.73 [a]	1.95	3.00	3.52	3.92 [a]	1.56
Number of courses released from teaching in past five years	.50	.76	2.25	3.47	1.90	1.20
Teaching load winter and fall semesters 2001						
Number of undergraduate courses	1.08 [a]	1.32	1.10	1.92	2.75 [a]	1.96
Number of graduate courses	.85	.99	1.35	1.57	.63	.93
Number of non-lab courses	1.85	1.68	2.00	1.56	2.13	1.88
Number of lab courses	.08 [a]	.28	.45	1.05	1.25 [a]	2.14
Number of undergraduate students	67.54	68.73	39.05	61.61	81.33	118.40
Number of graduate students	56.46	140.60	59.20	99.70	7.50	8.75
Official advising						
Number of undergraduates	2.85 [a]	3.18	.32 [a]	.75	1.82	1.89
Number of graduate students (masters, PhD, medical)	2.39 [a]	2.40	5.32 [a]	5.10	2.46	1.44
Number of postdocs or residents/fellows	1.19 [a]	1.60	.82	1.07	.00 [a]	.00
Number of junior faculty	.15	.55	.25	.58	.09	.30

Controlling for age, rank, years experience, and years at UM.

[a]*Matching symbols denote statistically significant differences at the level of $p \leq .05$*

Table 19a: Mentoring of Junior Faculty by Race/Ethnicity

	Faculty of Color (N=17)		White Faculty (N=51)	
	mean	sd	mean	sd
Number of areas of no mentoring by anyone anywhere	1.31	1.83	2.19	2.23
Number of mentors in same UM unit/department	5.80	3.83	4.00	3.76
Number of male mentors at UM	4.26	3.18	2.70	2.86

Controlling for years at UM

Table 19b: Percent With No Mentoring in Each Area Junior Faculty by Race/Ethnicity

	Faculty of Color (N=17)	White Faculty (N=151)
% receiving no mentoring in each area:		
role model	14.3	23.5
networking	33.5	30.7
advancement	19.2	27.8
publishing	38.4	24.7
department politics	25.1	47.3
resources	30.0	43.0
advocacy	30.0	38.7
balancing work/family	54.1	71.6

Table 20a: Mentoring: Assistant Professors, Instructional Track Faculty of Color

	women scientists/engineers (N=9)		men scientists/engineers (N=8)		women social scientists (N=8)	
	mean	sd	mean	sd	mean	sd
Number of areas of no mentoring from anyone	3.00[a]	2.12	.29[a]	.76	1.13	.99
Number of mentors in same UM unit/department	1.44[ab]	2.13	7.57[a]	2.44	6.38[b]	4.17
Number of male mentors at UM	.33[a]	.50	6.00[a]	2.00	2.37	2.22

* Controlling for age, rank, years experience, and years at UM.

[a,b]*Matching symbols denote statistically significant differences at the level of p≤.05*

Table 20b: Percentage of Faculty of Color With No Mentoring in Each Area, for Assistant Professors on Instructional Track Only

Percent who received no mentoring from anyone in- or outside UM in each of the following areas:	women scientists/ engineers	men scientists/ engineers	women social scientists
Assistant Professors only	(N=9)	(N=8)	(N=8)
role model	44.4[a]	0.0[a]	25.0
networking	77.8[a]	12.5[a]	50.0
advancement	33.3	12.5	25.0
publishing	66.7	25.0	25.0
department politics	77.8[a]	0.0[a]	37.5
resources	66.7[a]	12.5[a]	37.5
advocacy	66.7[a]	12.5[a]	25.0
balancing work/family	88.9[a]	37.5[a]	62.5

[a]*Matching symbols denote statistically significant differences at the level of p≤.05*

Table 21: Service by Race/Ethnicity

	Faculty of Color (N=42)		White Faculty (N=185)	
	mean	sd	mean	sd
Average number of committees served on per year	3.05	1.88	3.23	2.63
Average number of committees chaired per year	.73	.88	.73	.86
Importance of having dept/college leadership position*	3.00	1.40	2.86	.140

*Rated on a scale from 1 to 5 (1=not important; 5=very important).
Controlling for years at UM.

Table 22: Service: Instructional Track Faculty of Color

	women scientists/engineers (N=18)		men scientists/engineers (N=24)		women social scientists (N=12)	
	mean	sd	mean	sd	mean	sd
Average number of committees served on per year	3.00	2.09	3.21	1.80	2.73	1.49
Average number of committees chaired per year	.69	1.01	.83	.86	.30	.48
Importance of having dept/college leadership position *	3.00	1.73	3.00	1.38	3.00	1.21

*Rated on a scale from 1 to 5 (1=not important; 5=very important).
Controlling for age, rank, years experience, and years at UM.

Table 23a: Stereotyping, Discrimination and Sexual Harassment Indicators by Race/Ethnicity

	Faculty of Color (N=42)		White Faculty (N=185)	
Stereotyping*	mean	sd	mean	sd
Gender stereotyping	1.74	.69	1.55	.69
Ethnic/religious stereotyping	1.71[a]	.89	1.30[a]	.53
Discrimination at UM in past 5 years	percentage		percentage	
Race/ethnicity	27.5[a]		2.2[a]	
Gender	14.4		9.0	
Sexual orientation	1.3		.3	
Physical disability	.0		.0	
Religious affiliation	.0		.0	
Sexual harassment at UM in past 5 years	percentage		percentage	
Individuals reporting sexual harassment	4.7		8.0	
Individuals reporting others reported sexual harassment	28.0		20.9	

*Scores range from 1(low) to 5 (high) on all variables.
Controlling for years at UM.

[a]*Matching symbols denote statistically significant differences at the level of p≤.05*

Table 23b: Racial/Ethnic Discrimination by Race/Ethnicity (Percentages)

	Faculty of Color (N=42)	White Faculty (N=185)
Experienced racial discrimination with past 5 years at UM in:		
Hiring	8.1	1.3
Promotion	6.8	1.3
Salary	11.5	2.7
Space/equipment, other resources	9.2[a]	1.3[a]
Access to administrative staff	17.2[a]	2.6[a]
Graduate student or resident/fellow assignments	7.5[a]	1.1[a]

[a]*Matching symbols denote statistically significant differences at the level of p≤.05*

Table 23c: Gender Discrimination by Race/Ethnicity (Percentages)

	Faculty of Color (N=42)	White Faculty (N=185)
Experienced gender discrimination at UM within past 5 years in:		
Hiring	2.6	2.2
Promotion	3.4	2.9
Salary	9.2	6.7
Space/equipment, other resources	3.4	4.6
Access to administrative staff	1.7	2.0
Graduate student or resident/fellow assignments	5.8 [a]	1.1 [a]

[a]*Matching symbols denote statistically significant differences at the level of p≤.05*

Table 24a: Stereotyping, Discrimination and Sexual Harassment Indicators

	women scientists/ engineers (N=18)		men scientists/ engineers (N=24)		women social scientists (N=12)	
Stereotyping*	mean	sd	mean	sd	mean	sd
Gender stereotyping	1.78	.67	1.73	.73	1.86	.82
Ethnic/religious stereotyping	1.71	.74	1.72	.96	1.48	.47
Discrimination at UM in past 5 years	percentage		percentage		percentage	
Gender	33.3 [a]		8.3 [a]		33.3	
Race/ethnicity	22.2		29.2		33.3	
Sexual orientation	5.6		0.0		0.0	
Physical disability	0.0		0.0		0.0	
Religious affiliation	0.0		0.0		0.0	
Sexual harassment at UM in past 5 years	percentage		percentage		percentage	
Individuals reporting sexual harassment	5.6		4.3		25.0	
Individuals reporting others reported sexual harassment	21.4		30.0		18.2	

*Scores range from 1(low) to 5 (high) on all variables.
Controlling for age, rank, years experience, and years at UM.
[a]*Matching symbols denote statistically significant differences at the level of p≤.05*

Table 24b: Gender Discrimination (Percentages)

	women scientists/ engineers (N=18)	men scientists/ engineers (N=24)	women social scientists (N=12)
Experienced gender discrimination at UM within past 5 years in:			
Hiring	0.0	0.0	0.0
Promotion	12.5 [a]	0.0 [a]	11.1
Salary	18.8	5.6	22.2
Space/equipment, other resources	12.5 [a]	0.0 [a]	11.1
Access to administrative staff	6.3	0.0	11.1
Graduate student or resident/fellow assignments	6.3	5.6	0.0

[a]*Matching symbols denote statistically significant differences at the level of p≤.05*

Table 25: Department Climate Scales* by Race/Ethnicity

	Faculty of Color (N=42)		White Faculty (N=185)	
	mean	sd	mean	sd
Positive environment	3.32	.97	3.44	.90
Tolerant environment	3.57	1.02	3.83	.72
Scholarly isolation	2.78	.49	2.65	.50
Felt surveillance	2.92 [a]	.96	2.40 [a]	.98
Egalitarian Atmosphere	3.48	1.04	3.81	.78
Tokenism	2.93 [a]	1.38	1.68 [a]	1.05
Chair as fair	3.53	1.17	3.58	.97
Chair as able to create a positive environment	3.49	1.20	3.42	1.03
Chair as committed to ethnic/racial diversity	3.62	1.29	3.78	1.00

*Scores range from 1(low) to 5 (high) on all items that make up the scales.
Controlling for years at UM.

[a]*Matching symbols denote statistically significant differences at the level of p≤.05*

Table 26: Departmental Climate Scales—Instructional Track Faculty of Color*

	women scientists/ engineers (N=18)		men scientists/ engineers (N=24)		women social scientists (N=12)	
	mean	sd	mean	sd	mean	sd
Positive climate	2.92 [a]	1.19	3.55 [a]	.78	3.50	1.11
Tolerant climate	3.03	1.05	3.79	.91	3.60	1.26
Gender egalitarian atmosphere	2.86 [a]	.95	3.65 [a]	.96	3.67	1.00
Scholarly isolation	2.97 [a]	.47	2.77 [a]	.46	2.99	.53
Felt surveillance	3.29	1.15	2.71	.85	2.53	.94
Tokenism	3.40	1.34	2.76	1.37	3.00	1.17
Department chair as fair	2.67 [a]	1.10	3.92 [a]	1.05	3.77	1.14
Department chair creates positive environment	2.80 [a]	1.26	3.86 [a]	1.02	3.90	1.08
Dept chair committed to ethnic/racial diversity	2.53 [ab]	1.30	3.91 [a]	1.13	4.30 [b]	1.49

*Scores range from 1(low) to 5 (high) on all items that make up the scales.
Controlling for age, rank, years experience, years at UM.
[a,b]*Matching symbols denote statistically significant differences at the level of p≤.05*

Table 27: Institutional and Departmental Climate Ratings—Correlations with Overall Satisfaction with Position and Productivity by Race and Gender

	Overall Satisfaction with UM Position		
	women scientists/ engineers of color (N=18)	scientists/engineers of color (N=42)	white scientists/ engineers (N=185)
Institutional Factors:			
Gender stereotyping	-.30	-.03	-.11
Ethnic/religious stereotyping	-.14	-.05	-.06
Gender discrimination	-.23	-.24	-.22 **
Unwanted sexual attention	-.42	-.07	-.25 ***
Departmental Factors:			
Positive climate	.58 *	.78 ***	.47 ***
Tolerant climate	.55 *	.37 *	.23 **
Gender egalitarian atmosphere	.76 ***	.44 **	.18 *
Scholarly isolation	.05	-.02	-.11
Felt surveillance	-.53 *	-.63 ***	-.25 ***
Race/gender tokenism	-.14	-.39 *	-.43 ***
Rating of dept. chair as fair	.62 **	.70 ***	.33 ***
Rating of depart. chair as able to create positive environment	.45	.69 ***	.36 ***

*p<.05, **p<.01, ***p<.001

Table 28: Departmental Experiences Indicators— Correlations with Overall Satisfaction with Position and Productivity by Race and Gender

	Overall Satisfaction with UM Position		
	women scientists/ engineers of color (N=18)	scientists/engineers of color (N=42)	white scientists/ engineers (N=185)
Career satisfactions	.77 ***	.85 ***	.61 ***
Influence over educational decisions	.34	.44 **	.29 ***
Influence over unit resources	.62 **	.37 *	.24 **
Effort to obtain resources	-.83 ***	-.42 *	-.24 **
Satisfaction with resources	.57 *	.44 **	.29 ***
N areas of non-mentoring	-.20	-.37 *	-.12
N mentors in same department	.27	.22	.03
N male mentors in same dept	.14	.24	-.03
Committee service	-.24	-.06	.14
Committee chair	.20	.13	.14
Failure to nominate for award	-.40	-.49 **	-.09
Productivity—self view	-.21	-.09	.18 *
Productivity—department view	.29	.47 **	.48 ***

*p<.05, **p<.01, ***p<.001

Table 29: Personal and Position Indicators and Household Characteristics— Correlations with Overall Satisfaction with Position and Productivity by Race & Gender

	Overall Satisfaction with UM Position		
	women scientists/ engineers of color (N=18)	scientists/engineers of color (N=42)	white scientists/ engineers (N=185)
	-.21	-.05	.14
Years at UM	-.03	.16	-.03
Years since Ph.D.	-.07	.06	.18 *
Joint appointment	-.02	-.09	.11
	.04	.07	.07
Small college	-.39	.03	-.09
Single, no children	na	.08	-.03
Partner and children	-.10	-.16	.03

*p<.05, **p<.01, ***p<.001

Table 30: Gender Discrimination by Gender and Race/Ethnicity– Relationship with Satisfaction and Climate Ratings

	women scientists/engineers of color (N=18)			scientists/ engineers of color (N=42)			white scientists/engineers (N=185)		
	experienced discrimination (N=6)	experienced no discrimination (N=12)		experienced discrimination (N=8)	experienced no discrimination (N=34)		experienced discrimination (N=47)	experienced no discrimination (N=138)	
	mean (sd)	mean (sd)	sig.	mean (sd)	mean (sd)	sig.	mean (sd)	mean (sd)	sig.
Satisfaction with	2.67 (1.21)	3.25 (1.22)	ns	2.81 (1.15)	3.64 (1.21)	ns	3.09 (1.14)	3.81 (.92)	**
Climate Scales									
Gender stereotyping	1.49 (.62)	1.95 (.67)	ns	1.66 (.51)	1.76 (.72)	ns	2.14 (.83)	1.50 (.65)	**
Racial stereotyping	1.50 (.77)	1.81 (.74)	ns	1.67 (.61)	1.72 (.93)	ns	1.44 (.55)	1.29 (.53)	ns
Positive climate	2.96 (1.10)	2.89 (1.27)	ns	2.98 (1.07)	3.38 (.95)	ns	3.10 (.93)	3.48 (.89)	*
Tolerant climate	2.64 (.68)	3.23 (1.17)	ns	3.35 (.94)	3.61 (1.03)	ns	3.49 (.73)	3.86 (.72)	*
Gender egalitarian atmosphere	2.23 (.71)	3.21 (.90)	**	2.64 (.77)	3.62 (1.02)	**	3.13 (1.11)	3.88 (.71)	*
Scholarly isolation	2.64 (.39)	3.14 (.43)	**	2.58 (.38)	2.82 (.50)	ns	2.76 (.50)	2.64 (.51)	ns
Felt surveillance	3.46 (1.14)	3.20 (1.19)	ns	3.09 (1.04)	2.89 (.96)	ns	3.43 (1.07)	2.29 (.91)	***
Tokenism	3.08 (1.63)	3.61 (1.17)	ns	2.72 (1.55)	2.97 (1.36)	ns	3.01 (1.18)	1.53 (.92)	***
Dept chair as fair	2.89 (1.68)	2.55 (1.10)	ns	2.64 (.90)	3.68 (1.15)	**	3.51 (1.20)	3.58 (.95)	ns
Dept chair creates positive environment	3.17 (1.26)	2.61 (1.27)	ns	3.02 (.94)	3.58 (1.23)	ns	3.37 (1.19)	3.43 (1.02)	ns

*p<.05, **p<.01, ***p<.001

Table 31: Racial/Ethnic Discrimination by Gender and Race/Ethnicity– Relationship with Satisfaction and Climate Ratings

	women scientists/engineers of color (N=18)			scientists/engineers of color (N=42)			white scientists/engineers (N=185)		
	experienced discrimination (N=4)	experienced no discrimination (N=14)		experienced discrimination (N=11)	experienced no discrimination (N=31)		experienced discrimination (N=2)	experienced no discrimination (N=183)	
	mean (sd)	mean (sd)	sig.	mean (sd)	mean (sd)	sig.	mean (sd)	mean (sd)	sig.
Satisfaction with	2.25 (1.26)	3.29 (1.14)	ns	3.08 (1.28)	3.68 (1.18)	ns	3.50 (.71)	3.75 (.97)	ns
Climate Scales									
Gender stereotyping	1.92 (.80)	1.74 (.66)	ns	1.93 (.85)	1.67 (.62)	ns	1.38 (.18)	1.56 (.70)	ns
Racial stereotyping	2.13 (1.09)	1.59 (.62)	ns	2.02 (1.29)	1.59 (.67)	ns	1.25 (.00)	1.30 (.54)	ns
Positive climate	1.68 (.48)	3.27 (1.06)	***	2.88 (.90)	3.49 (.96)	*	2.75 (1.30)	3.46 (.89)	ns
Tolerant climate	2.19 (.43)	3.27 (1.06)	***	2.66 (.79)	3.92 (.88)	***	3.38 (.53)	3.84 (.73)	ns
Gender egalitarian atmosphere	2.19 (1.19)	3.01 (.87)	ns	2.81 (1.15)	3.71 (.90)	*	4.40 (.22)	3.80 (.78)	***
Scholarly isolation	3.18 (.62)	2.92 (.43)	ns	3.03 (.49)	2.69 (.46)	*	2.18 (.02)	2.66 (.51)	***
Felt surveillance	4.56 (.59)	2.89 (.98)	***	3.36 (.80)	2.75 (.98)	*	2.50 (2.12	2.39 (.96)	ns
Tokenism	3.63 (1.80)	3.32 (1.23)	ns	3.41 (1.53)	2.72 (1.28)	ns	2.50 (1.41)	1.66 (1.04)	ns
Dept chair as fair	1.67 (.82)	2.97 (1.00)	**	2.82 (1.36)	3.69 (1.10)	ns	3.33 (1.41)	3.58 (.97)	ns
Dept chair creates positive environment	2.08 (1.26)	3.03 (1.22)	ns	3.13 (1.30)	3.64 (1.15)	ns	2.83 (1.18)	3.43 (1.03)	ns

*p<.05, **p<.01, ***p<.001

Appendix A: UM Survey of Academic Climate and Activities

University of Michigan **Fall, 2001**

SURVEY OF ACADEMIC CLIMATE AND ACTIVITIES

Procedures for Completing the Survey

Thank you very much for taking the time to complete this survey. We know how busy you are and have tried to make the process as simple and efficient as possible. However, if you feel that there is any additional information about your experiences at the University of Michigan that was not asked in the survey, but that you think we should know, please feel free to add your written comments on an additional sheet of paper and return it with the survey. There are three options available to you for completing the survey: by hand; on the computer using a downloaded PDF file; or in an interview. In order to fully protect respondents' anonymity, we have decided against offering as alternatives either submission of the PDF version via the web, or a web survey.

1. **Completing the survey by hand**
   You can simply fill out the enclosed copy of the survey by hand and return it to us in the enclosed addressed and stamped envelope.

2. **Completing the survey on your computer**
   A PDF download is available on the Institute for Research on Women and Gender's website at http://www.umich.edu/~irwg/climatesurvey/ to permit you to complete the survey on a computer. Once you have completed the survey, please print it out and return it to us in the enclosed self-addressed stamped envelope. (Because of concerns about maintaining privacy, submission of the file via the web is not possible.) If you have trouble locating or downloading the PDF file, please contact Julie Stubbs (764-9537/ jstubbs@umich.edu).

3. **Completing the survey in an interview**
   If it would be easier for you to respond in an interview format, we will arrange for a project staff member to do the survey with you, either over the phone or face-to-face, and record your responses on a survey. If you prefer this option, please contact Julie Stubbs (764-9537/jstubbs@umich.edu).

To facilitate analyses and future planning, we hope to receive completed surveys no later than ***November 5, 2001****.*

Please note that the university's Behavioral Sciences Human Subjects Review Committee has approved this study. If you have any questions, please contact Kate M. Keever, Administrator, Human Subjects Protection Office (734/936-0933, IRB-Behavsci-Health@umich.edu).

University of Michigan Survey of Academic Climate and Activities

Throughout this survey, "faculty" refers to all tenured and tenure-track, primary research, and clinical track faculty.

PROFESSIONAL EMPLOYMENT

In the chart below, please check the appropriate boxes to indicate when you obtained your highest academic degree, your first UM appointment and started on a tenure track at UM (if applicable).

	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-01
year of highest degree									
year of 1st UM appointment									
year began tenure track at UM									

How would you classify the primary field of your UM appointment? *(check only one)* ____Social Science
____Science or Engineering
(basic, natural, clinical & applied science)

Please indicate in the following chart your budgeted appointment *for July 2000-June 2001* at UM, including the School or College in which you held the appointment, as well as the rank and fraction of time associated with that appointment. If you had multiple budgeted appointments, please list information for second, third and fourth budgeted appointments, where applicable, as well; *fraction amounts should not equal more than 100%.* To list your rank, please use the following codes. *Note that all ranks include adjunct appointments.*

Instructional Track:
1 lecturer
2 instructor
3 asst. professor
4 assoc. professor
5 professor

Primary Research Track:
6 research investigator
7 asst. research scientist
8 assoc. research scientist
9 senior assoc. research scientist
10 research scientist
11 senior research scientist

Clinical Track:
12 instructor
13 asst. professor
14 assoc. professor
15 professor

Administrative:
16 any administrative appointment

	school/ college	rank code	appointment fraction (e.g., 100%, 50%)
1st (only) budgeted appointment			
2nd budgeted appointment			
3rd budgeted appointment			
4th budgeted appointment			

Including up through this academic year (2001-02), how many years (including 0) have you held each of the following ranks at UM and at other academic institutions (please distinguish between part-time and full-time employment)?

	U of M		other academic institution	
	part time	full time	part time	full time
post-doctoral fellow				
lecturer				
instructor				
assistant professor/assistant research scientist				
associate professor/associate research scientist				
senior associate research scientist				
professor/research scientist				
senior research scientist				

How many years (including 0) were you *only* employed as a researcher in a non-academic setting? _____
Since receiving your final degree, for how many years (including 0) were you *not* employed at all? _____

Do you *currently* have one or more dry (unfunded) appointments? Yes No

Have you changed your fractional appointment *within the last five years*? Yes No
If yes, why and how did it change? _____
_____
_____

University of Michigan Survey of Academic Climate and Activities

Throughout this survey, "faculty" refers to all tenured and tenure-track, primary research, and clinical track faculty.

Were you hired at UM within the last 10 years? Yes No

If yes, please check which, if any, of the following were part of any aspect of your *initial contract negotiation*, and in what ways, according to the four categories listed below.

Please check all that apply.	offered by university	asked/bargained for by me	promised (in my offer letter)	received		offered by university	asked/bargained for by me	promised (in my offer letter)	received
course release time					signing bonus				
lab equipment					summer salary				
lab space					special timing of tenure clock				
renovation of lab space					moving expenses				
research assistant					housing subsidy				
clerical/admin. support					child care				
discretionary funds					partner/spouse position				
travel funding					other:				

TEACHING. If *not* teaching, please indicate N/A by checking here ; and then go to section labeled **SERVICE** (p. 3).

What is the *typical teaching load* each year in your primary unit? Number of undergraduate courses? _____
Number of graduate courses? _____

Number of student contact hours? _____
(Not covered by formal courses)

In the past 5 years, how many *new* courses (courses that you have not taught previously--do not include even major revisions of courses you have taught before) have you prepared for your primary unit? _____
Of these, how many did *you* propose? _____
How many were you *asked or required* to develop? _____

In the past 5 years, how many courses have you been released from teaching for the following reasons:
(Indicate how many next to each category.) _____with your own grant or fellowship funds?
_____by your department? for? *(check all that apply)*:
_____course development
_____administrative work
_____modified duties
_____routine leave (e.g., "nurturance leave"/leave after certain duties)
_____sabbatical
_____other: _____

For how many of each of the following types of individuals (including 0) do you currently serve as *official* advisor?

_____undergraduates _____medical students _____residents/fellows
_____MA students _____post-docs _____junior faculty
_____PhD students

On average, how many hours per month do you spend on *informal* mentoring activities
(e.g. advising, counseling, advocating for students or junior faculty who are not your advisees)? _____

University of Michigan Survey of Academic Climate and Activities

Throughout this survey, "faculty" refers to all tenured and tenure-track, primary research, and clinical track faculty.

Please answer the following questions about your teaching load, which may not include formal courses for medical faculty, for the *winter 2001*and *fall 2001* terms (calendar year 2001). If on sabbatical or leave either term, please indicate by checking on the appropriate line under the relevant term(s).

	winter 2001		fall 2001	
on sabbatical/leave of absence				
	undergrad	graduate	undergrad	graduate
non-lab courses*/number (N) and total credit hours (hrs)	N= hrs=	N= hrs=	N= hrs=	N= hrs=
lab courses*/number (N) and total credit hours (hrs)	N= hrs=	N= hrs=	N= hrs=	N= hrs=
total number of students taught/teaching				
total number of GSIs/graders across courses				
average number of contact hours/week with medical students				
average number of contact hours/week with residents/fellows				
average number of office hours/week				
average number of hours supervising student research/week				

*If appropriate, put in parentheses the number of these courses designated for non-majors.

SERVICE. We're interested in knowing your level of involvement in committee work at UM over the *past 5 years.* For *each* of the following levels, please choose 3-5 of the committees you consider important, *whether or not you have served on them* by checking the box to the left of the committee name. Then specify your level of participation on those selected by checking the appropriate boxes. (Please note: important committees are those which *you feel* address significant/ substantive issues and on which *you feel* you have/could play a meaningful role.)

	Please check all that apply for each committee you list.	no participation	volunteered	asked to serve	served	chaired
	Department level committees:					
	curriculum					
	department executive					
	faculty search					
	fellowship					
	graduate admissions					
	space					
	other (please list):					
	School/college level committees					
	college curriculum					
	college executive					
	department/unit head search					
	other (please list):					
	University level committees					
	Please list:					
	Please list:					
	Please list:					

In a typical year, how many committees do you serve on? _____ *In a typical year*, how many do you chair?_____

Please list any other committees you have served on *in the past 5 years.* _____ _____

Have you *ever* been asked to serve and/or served as department chair, department section/area/program chair or center/ lab/ institute/program director or administrator? asked to serve: Yes No
served: Yes No

How important to you is having a department or college leadership position? *Please circle the appropriate number.*
Not at all important 1 2 3 4 5 Very important

How willing are you to take on time-consuming service tasks (e.g., chairing an important committee)? *Please circle the appropriate number.* Not at all willing 1 2 3 4 5 Very willing

University of Michigan Survey of Academic Climate and Activities

Throughout this survey, "faculty" refers to all tenured and tenure-track, primary research, and clinical track faculty.

RESOURCES. In the chart below, please indicate how much effort (e.g., memos, meetings, phone calls, etc.) it takes for you to secure the following items, and your level of satisfaction with current allocations of these items. *Please indicate by checking one box for each item under "effort" and one box for each item under "satisfaction."*

	effort						**satisfaction**					
	no effort	some effort	moderate effort	substantial effort	tremendous effort	not applicable	very dissatisfied	somewhat dissatisfied	neutral	somewhat satisfied	very satisfied	not applicable
office space												
research space												
computer equipment												
lab equipment												
service from vendors-repairs, supplies, upgrades												

If helpful, please elaborate on any resource allocation issues that concern you: _____

_____

_____

Have you received any of the following resources as a result of your own negotiations, the terms of an award, or offer by the university, since your initial contract at UM? *If so,* please check all that apply. *If not applicable*, please check here:

	asked/ bargained for by me	terms of an award	offered by university		asked/ bargained for by me	terms of an award	offered by university
course release time				special bonus			
lab equipment				summer salary			
lab space				special timing of tenure clock			
renovation of lab space				moving expenses			
research assistant				housing subsidy			
clerical/admin. support				child care			
discretionary funds				partner/spouse position			
travel funding				other :			

Have you *ever* had an outside offer while at UM? Yes No

If yes, has an outside offer ever resulted in a salary increase? Yes No

If no, why not _____

Many of the questions on the following pages ask you to rate conditions in your unit(s) or department(s). If you have multiple appointments, we would like to give you the opportunity to rate two units. Normally this would be the two units in which you spend the most time (regardless of percentage of budgeted appointment). However, we are most interested in learning about instructional units, so if one of these is a unit in which you have an administrative position, and you have an additional instructional appointment in another unit, please select the instructional unit. Please identify the unit(s) you will be rating in terms of the school/college in which each is located as well as your appointment in each by checking the appropriate boxes in the rows labeled Unit 1 and Unit 2, if applicable.

	School/College					**Appointment**		
	Engin.	Med.	LSA/Sci.	LSA/Soc. Sci.	Other	Instructional	Research	Clinical
Unit 1								
Unit 2								

University of Michigan Survey of Academic Climate and Activities

Throughout this survey, "faculty" refers to all tenured and tenure-track, primary research, and clinical track faculty.

CAREER SATISFACTION. How satisfied are you with the following dimensions of your professional development?

Unit 1							Unit 2					
very dissatisfied	somewhat dissatisfied	neutral	somewhat satisfied	very satisfied	not applicable	*Check the box that best expresses your level of satisfaction.*	very dissatisfied	somewhat dissatisfied	neutral	somewhat satisfied	very satisfied	not applicable
						opportunity to collaborate with other faculty						
						amount of social interaction with members of my unit/department						
						level of funding for my research or creative efforts						
						current salary in comparison to the salaries of my UM colleagues						
						ability to attract students to work with me						
						sense of being valued as a teacher by my students						
						sense of being valued as a mentor or advisor by my students						
						sense of being valued for my teaching by members of my unit/department						
						sense of being valued for my research, scholarship, or creativity by members of my unit/department						
						level of intellectual stimulation in my day-to-day contacts with faculty colleagues						
						sense of contributing to theoretical developments in my discipline						
						balance between professional and personal life						
						other, please specify:						

All things considered, how satisfied are you with your current position at UM? *Please circle the number on the scale that is closest to how you feel.* Very dissatisfied 1 2 3 4 5 Very satisfied

RECOGNITION

Has your department ever nominated you for an award in the following areas?

teaching	Yes	No
research	Yes	No
clinical	Yes	No
service	Yes	No

Has your department failed to nominate you for an award for which you were qualified? Yes No I don't know

If yes, please elaborate: _____

_____

PRODUCTIVITY

What are the most reliable and informative indicators of productivity in your area of research? *Please check up to five items.*

- ❑ number of external grant proposals (PI or co-PI)
- ❑ total dollar amount of external grants (PI or co-PI)
- ❑ number of external fellowships
- ❑ number of articles published in refereed academic or professional journals
- ❑ number of monographs written
- ❑ number of books edited
- ❑ number of book chapters
- ❑ number of dissertations chaired
- ❑ number of presentations at national/international conferences
- ❑ number of patents
- ❑ other *(please specify):* _____

_____

Using the criteria you checked above, how would you rate your overall level productivity compared to researchers in your area and at your rank nationwide? *Please circle the number that best corresponds to your rating.*

Much less productive 1 2 3 4 5 6 7 8 9 10 Much more productive

Using the same criteria, how do you think your department views your productivity, compared to the departmental average? *Please circle the number that best corresponds to your rating.*

Much less productive 1 2 3 4 5 6 7 8 9 10 Much more productive

University of Michigan Survey of Academic Climate and Activities

Throughout this survey, "faculty" refers to all tenured and tenure-track, primary research, and clinical track faculty.

INSTITUTIONAL AND UNIT/DEPARTMENT CLIMATE

In the chart below, please indicate the areas in which you would benefit from mentoring at this stage of your career by checking the relevant boxes in the column on the left. *Please check all that apply.* In the columns on the right, please indicate the level of mentoring you currently receive in each area listed, regardless of whether or not it is beneficial.

	My mentor(s)…	none	some	a lot	too much
	serves as a role model				
	promotes my career through networking				
	advises about preparation for advancement (e.g., promotion, leadership positions)				
	advises about getting my work published				
	advises about department politics				
	advises about obtaining the resources I need				
	advocates for me				
	advises about balancing work and family				
	other *(please specify):*				

Is there anyone whom you currently regard as a mentor—someone who gives advice and counsel on career issues and/or sponsors or advocates for you? Yes No

In the chart below please indicate in the space provided *how many* male and female mentors you have and the *kinds of support/advice they provide,* according to their institutional affiliation category. *Please answer separately for male and female mentors, as appropriate, and check all that apply*. If you feel this is not applicable to you, please leave blank and check here:

My mentor(s)…	male mentors (N=)				female mentors (N=)			
	UM same unit (1 or more)	UM different unit (1 or more)	at other institution (1 or more)	outside academe (1 or more)	UM same unit (1 or more)	UM different unit (1 or more)	at other institution (1 or more)	outside academe (1 or more)
serves as a role model								
promotes my career through networking								
advises about preparation for advancement (e.g. promotion/tenure, leadership positions)								
advises about getting my work published								
advises about department politics								
advises about obtaining the resources I need								
advocates for me								
advises about balancing work and family								
other:								

Please rate the climate of your unit(s)/department(s) on the following continuum by *circling/underlining the appropriate number*.

Unit 1

Friendly	1	2	3	4	5	Hostile
Racist	1	2	3	4	5	Non-racist
Homogeneous	1	2	3	4	5	Diverse
Disrespectful	1	2	3	4	5	Respectful
Collegial	1	2	3	4	5	Contentious
Non-sexist	1	2	3	4	5	Sexist
Collaborative	1	2	3	4	5	Individualistic
Cooperative	1	2	3	4	5	Competitive
Homophobic	1	2	3	4	5	Non-homophobic
Not supportive	1	2	3	4	5	Supportive

Unit 2

Friendly	1	2	3	4	5	Hostile
Racist	1	2	3	4	5	Non-racist
Homogeneous	1	2	3	4	5	Diverse
Disrespectful	1	2	3	4	5	Respectful
Collegial	1	2	3	4	5	Contentious
Non-sexist	1	2	3	4	5	Sexist
Collaborative	1	2	3	4	5	Individualistic
Cooperative	1	2	3	4	5	Competitive
Homophobic	1	2	3	4	5	Non-homophobic
Not supportive	1	2	3	4	5	Supportive

University of Michigan Survey of Academic Climate and Activities

Throughout this survey, "faculty" refers to all tenured and tenure-track, primary research, and clinical track faculty.

Please indicate your level of agreement with each of the following statements concerning conditions in your unit(s)/ department(s), and your relationships with your unit/department colleagues by *checking the appropriate box*.

Unit 1							Unit 2					
strongly disagree	tend to disagree	neutral	tend to agree	strongly agree	not applicable		strongly disagree	tend to disagree	neutral	tend to agree	strongly agree	not applicable
						My research interests are valued by my colleagues.						
						I feel pressured to change my research agenda in order to fit in.						
						I feel/felt pressured to change my research agenda to make tenure/be promoted .						
						I am comfortable asking questions about performance expectations.						
						I am/was reluctant to bring up issues that concern me for fear that it will/would affect my promotion/tenure.						
						My colleagues expect me to represent "the point of view" of my gender.						
						My colleagues expect me to represent "the point of view" of my race/ethnicity.						
						My colleagues solicit my opinions about their research ideas and problems.						
						My colleagues have lower expectations of me than of other faculty.						
						I constantly feel under scrutiny by my colleagues.						
						I have/had to work harder than I believe my colleagues do, in order to be/have been perceived as a legitimate scholar.						
						There are many unwritten rules concerning how one is expected to interact with unit colleagues.						
						Others seem to find it easier than I to "fit in."						

How would you rate your unit(s)/department(s)'s executive leader (chair or director) in each of the following areas*? Check the appropriate box for each item.*

Unit 1						**Unit 2**					
poor	below average	average	above average	superior	The chair/director of my unit/department…	poor	below average	average	above average	superior
					maintains high academic standards					
					is open to constructive criticism					
					is an effective administrator					
					shows interest in faculty					
					encourages and empowers faculty					
					treats faculty in an even-handed way					
					helps me obtain resources I need					
					gives me useful feedback about my performance					
					articulates a clear vision					
					articulates clear criteria for promotion/tenure					
					honors agreements					
					handles disputes/problems effectively					
					communicates consistently with faculty					
					creates a cooperative and supportive environment					
					shows commitment to racial-ethnic diversity					

University of Michigan Survey of Academic Climate and Activities

Throughout this survey, "faculty" refers to all tenured and tenure-track, primary research, and clinical track faculty.

For each item, please *check the box* that best corresponds to how much influence you feel you have over the following matters in your unit(s)/department(s):

Unit 1							Unit 2					
really no influence	minor influence	some influence	substantial influence	tremendous influence	not applicable		really no influence	minor influence	some influence	substantial influence	tremendous influence	not applicable
						unit curriculum decisions						
						size of salary increases I receive						
						obtaining money for travel to professional meetings						
						securing the facilities or equipment I need for my research						
						selecting new graduate students or residents/fellows						
						selecting new faculty members to be hired						
						determining who gets tenure						
						selecting the next unit head						
						affecting the overall unit climate/culture						

Please indicate in the chart below any job-related discrimination you have experienced *at UM within the last five years*, noting the basis for the discrimination (race/ethnicity, gender, sexual orientation, etc.) and the areas in which the discriminatory behavior has affected your career at UM. *Please check all that apply.*

	not applicable	race/ ethnicity	gender	sexual orientation	physical disability	religious affiliation	other:
hiring							
promotion							
salary							
space/equipment, other resources							
access to administrative staff							
graduate student or resident/fellow assignments							
other *(please specify)*:							

Please indicate your level of agreement with each of the following statements concerning the atmosphere in your unit(s)/department(s) by *checking the appropriate box*:

Unit 1						Unit 2					
strongly disagree	disagree	neutral	agree	strongly agree		strongly disagree	disagree	neutral	agree	strongly agree
					Some faculty have a condescending attitude toward women.					
					Sexist remarks are heard in the classroom.					
					There is equal access for both men and women to lab/research space.					
					The environment promotes adequate collegial opportunities for women.					
					Men receive preferential treatment in the areas of recruitment and promotions.					
					Men are more likely than women to receive helpful career advice from colleagues.					
					In meetings, people pay just as much attention when women speak as when men do.					
					Women are appropriately represented in senior positions.					
					Sex discrimination is a big problem in my department.					

University of Michigan Survey of Academic Climate and Activities

Throughout this survey, "faculty" refers to all tenured and tenure-track, primary research, and clinical track faculty.

How often within the last five years at UM have you overheard insensitive or disparaging comments about the following types of people in general, or about particular people as a member of that group, made by faculty or students? [*This does not refer to comments about an individual as an individual.] Please check once for each row. Check "never" if not applicable.*

		never	once or twice/ year	couple of times/ term	more than once/ month	weekly
about women in general, or about particular women as "typical" of women	faculty					
	students					
about men in general, or about particular men as "typical" of men	faculty					
	students					
about racial/ethnic minorities, or about particular persons of color as "typical" of a racial/ethnic group	faculty					
	students					
about a religious group or about particular persons as "typical" of a religious group	faculty					
	students					

Within the past 5 years, have you experienced any unwanted and uninvited sexual attention (defined as including unwanted sexual teasing, jokes, remarks or questions; unwanted pressure for dates; unwanted letters, phone calls, email; unwanted touching, leaning over, cornering, pinching; unwanted pressure for sexual favors; stalking; rape or assault)?

Yes No

If yes, did you make an official report of it to anyone? Yes No

Why/why not? _____

_____

_____

If applicable, please indicate which of the following actions you took in response to the unwanted sexual attention by indicating the effect that this action had. *Please check all that apply. If you did not take the action please check N/A.*

	I felt better	I felt worse	behavior decreased	behavior increased	made no difference	N/A
ignored behavior						
avoided the person(s)						
curtailed time in that unit						
asked/told the person(s) to stop						
reported behavior to unit/department head						
reported behavior to other UM official						
made a joke of the behavior						
went along with the behavior						
other; please explain:						

In your unit(s)/department(s), how prevalent are instances of unwanted and uninvited sexual attention? *Please circle the appropriate number for each applicable unit.*

Unit 1: Not at all prevalent 1 2 3 4 5 Very prevalent

Unit 2: Not at all prevalent 1 2 3 4 5 Very prevalent

Within the past five years, how many individuals from UM have come to you concerned about behavior they experienced that either *you or they* would define as uninvited and unwanted sexual attention? _____

Are you now, or *in the past five years* have you ever been, the officially designated person to whom people report incidences of unwanted sexual attention? Yes No

University of Michigan Survey of Academic Climate and Activities

Throughout this survey, "faculty" refers to all tenured and tenure-track, primary research, and clinical track faculty.

PERSONAL LIFE

Do you have a spouse or partner? Yes No
(*If no,* please go to the section labeled **DEMOGRAPHICS**, below)

What, if any, is your spouse's/partner's employment or career field? _____

What is your spouse's/partner's employment status? Full time Part time Not employed

What is your spouse's/partner's *preferred* employment status at this time? Full time Part time Not employed

If your partner is employed at UM, what type of appointment does he or she have? *Check all that apply.*

faculty member	administrative/professional staff	office or support staff
primary research appointment	technical	health field
post-doctoral or fellowship	librarian/curator	other, specify_____

Have you ever sought help from UM in attempting to find appropriate employment for your spouse or partner? Yes No

If yes, how satisfied were you with UM's help in locating appropriate opportunities for your spouse or partner? *Please circle the appropriate number.*

Very dissatisfied 1 2 3 4 5 Very satisfied

Have you ever considered leaving UM to improve career opportunities for your spouse/partner? Yes No

DEMOGRAPHICS

Age: _____ (years) Sex: Male Female US citizen?: Yes No

Racial/Ethnic Identification *(Check one):*
___African American
___Asian American
___Euro American
___Latina/o or Hispanic American
___Native American/American Indian
___Mixed (pleased describe):_____
___Other (please describe): _____

Number of children for whom you do, or have, provide(d) care: _____
Age of youngest: _____
Age of oldest: _____

If you are a tenured or tenure-track faculty member:
Is it possible to stop or extend the tenure clock in your unit(s)/department(s)? Yes No I don't know

If yes, and if you were ever an assistant professor at UM, did you stop or extend the tenure clock for any of the following reasons? *Check all that apply.*

Yes, as part of my start-up package.
Yes, because of a professional opportunity.
Yes, because of childbirth/other dependent care duties.
Yes, for health/medical reasons.
Yes, for other reasons; please specify _____

Did you choose *not* to stop the tenure clock even though you were entitled to? Yes No
If yes, why? _____

If you have chosen to stop the tenure clock for any reason, how supportive was/were your unit(s)/department(s) in facilitating this choice? *Please circle the appropriate number for each applicable unit.*

Unit 1:	Not at all supportive	1	2	3	4	5	Very supportive
Unit 2:	Not at all supportive	1	2	3	4	5	Very supportive

SURVEY FOLLOWUP

Because the survey responses are anonymous, we have no way of knowing who completed them. Therefore, we ask you to please fill out and return, under separate cover, the enclosed stamped and addressed postcard. The postcard asks you to provide the following information:

1. that you have completed and returned (or decline to complete) the survey. This information will be used to re-contact non-respondents in an effort to increase response rate. *If you return the postcard you will not be re-contacted about the survey;*

2. whether or not you would like a copy of the report of the findings;

3. whether or not you would be interested in participating in a follow-up interview. Sometimes respondents are willing to be interviewed in order to discuss further issues raised briefly in a survey. If you think you might be interested in an interview, please indicate this by checking the appropriate box on the reply postcard. Information provided in an interview, while not anonymous, will be confidential. Regrettably, we may not be able to interview all those who express interest.

Thank you very much for taking the time to complete and return the survey.

APPENDIX B

Memo on Faculty Attrition Analyses

MEMORANDUM

TO: ABIGAIL STEWART

FROM: CHING-YUNE C. SYLVESTER (PROGRAM EVALUATION MANAGER, *ADVANCE*)

SUBJECT: UM SCIENCE & ENGINEERING INSTRUCTIONAL TRACK FACULTY ATTRITION: ANALYSES BY GENDER

DATE: 6/28/2004

As part of our reporting requirements to the NSF, ADVANCE has been attempting to compile data on reasons why science and engineering (S&E) faculty have left instructional track (i.e., tenured and tenure-track) positions in the three schools with the largest S&E populations: College of Engineering, College of LS&A (Natural Science Division), and Medical School (Basic Science departments). We have focused our efforts on documenting the 10 year period prior to the start of the ADVANCE project (1992-2001). We will continue to collect these data for S&E faculty in the schools of interest throughout the course of the project. The primary reason to conduct these analyses is the desire to assess whether men and women leave faculty positions in science and engineering at the University of Michigan for different reasons.

Although many audiences (deans, chairs, faculty groups) request information on this issue, the University has very limited data on attrition. Though all faculty who separate from the University are accounted for in the University HR system, the reasons for separation are indicated by a variety of codes which appear to be applied quite inconsistently. Thus, for example, an individual who was in fact denied tenure may be listed in the system as having had his or her "appointment terminated," or as having taken "another position elsewhere," among other possibilities. As a result, we have had to attempt to recode the data for purposes of this analysis.

In this memo, we provide data and analyses from the academic years 1991-1992 through 2000-2001. The data were taken from the University's HR (MPathways) system; all instructional track faculty members who held budgeted appointments in the departments of interest during this time were tracked. If, during this 10 year period, faculty stopped holding an instructional track position in a department, they were coded as having left that department. Note, however, faculty were *not* considered to have left the department if their budgeted appointment changed to a non-budgeted (i.e., dry) appointment.[1]

In order to verify the data obtained from the MPathways system, the STRIDE committee and FASTER members, as well as other senior faculty members recommended by STRIDE, were sent the data for their department. These faculty members were asked to look over the data, and they returned them to us with corrections and additional information about reasons why the faculty member(s) left. The data were finally coded according to the seven categories listed and explained in the accompanying codebook. In brief, they are:

1) Tenure issues
    a. Tenure/renewal denied

[1] The one exception to this rule occurs in the Cell and Developmental Biology (CDB) department in the Medical School. Five faculty members who took full-time positions as Medical School administrators, were not considered to have left the department even though they did not hold budgeted or non-budgeted positions in CDB.

    b. Tenure-related departure (before review, tenure unlikely)
2) Dissatisfaction with department
3) Personal Reasons
4) Left for a Better Opportunity
5) Unknown Reasons (not retired or deceased)
6) Retirement
    a. Retired
    b. Retired and took another position (non-UM)
7) Deceased

Please note that in many cases several factors play a role in a faculty member's decision to leave the University. We have attempted to categorize every departure into the single category that best captures the decisive reason, based on the best information we could obtain. Our decision rules are outlined in the attached codebook, but there is no doubt that although these rules enable us to categorize each faculty departure, they oversimplify many of those decisions.

In the figure below, we show the distribution of faculty attrition reasons for the scientists and engineers for all three colleges. Over the 10 year period of interest, there were a total of 319 faculty members (28F, 291M) who left tenured/tenure-track positions in their respective departments at the University of Michigan. The most frequent reason is clearly retirement, and the least frequent reason is "dissatisfaction with department." Deaths and retirements seemed to us to be likely to relate to gender for reasons that were not important to the ADVANCE project, mainly because few women have been faculty long enough to retire or die in tenure-track positions. For that reason, we have removed these attrition reasons for subsequent analyses.

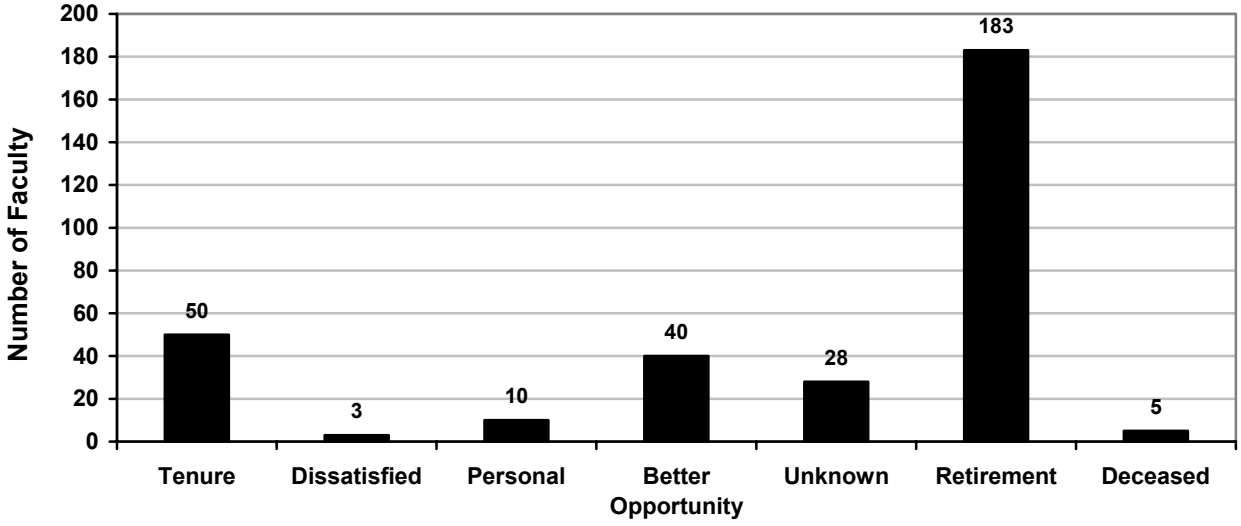


Figure 1: Attrition Reasons for all S&E faculty, 1992-2001

In the remaining analyses, we consider only faculty who have left the university/departments for the first 5 main categories (22F, 109M): Tenure Issues (including both denial of tenure, tenure-related departures), Dissatisfaction with Department, Personal Reasons, Left for Better Opportunity, and

Unknown. Additionally, in the category of tenure issues, we consider only faculty at the Assistant Professor rank[2]; for all other categories we consider faculty at all ranks.

Analyses

In order to maximize the number of cases in the analyses, chi-squares were first conducted for the faculty of all three colleges combined, and then separately by college. For the analyses by college, the small numbers of faculty in certain categories precluded statistical analyses in some cases. At the same time, due to the opposing patterns of distribution observed across different colleges (as is reported below), the combined analysis ended up providing a misleading picture of the patterns of attrition. For this reason, despite the limitation of small numbers of faculty in each college, only findings from the individual colleges are reported in this memo.

It should be pointed out that even in cases where there were sufficient cases to calculate chi-squares, none of the analyses indicated statistically significant gender differences. Given the small numbers involved in these analyses, and the importance of the issue to the institution, we report the patterns descriptively, and we will continue to gather and monitor the data. Clearly, apparent differences or lack of differences across gender should be interpreted with care.

Engineering

From 1992 through 2001, 62 faculty members (9F, 53M) left their respective departments in Engineering for one of the 5 reasons: Tenure Issues (including both denial of tenure, tenure-related departures), Dissatisfaction with Department, Personal Reasons, Left for Better Opportunity, and Unknown.

Considering assistant professors[3] who left because of tenure issues, more women left for reasons *other* than those that were tenure related (43% [3 out of 7] left for tenure-related issues); men more often left for tenure-related reasons than other reasons (69% [25 out of 36]).

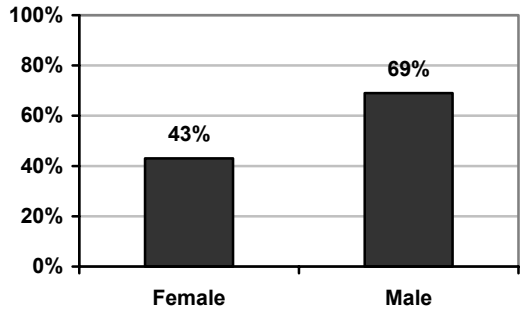


Figure 2: Proportion of Engineering Assistant Professors who because of Tenure Issues

With respect to those leaving for better opportunities, a larger proportion of women left for better opportunities than did men (33% of women [3 out of 9] vs. 17% of men [9 out of 53]).

[2] With the exception of 2 male Associate Professors and 1 male Full Professor in Engineering who were denied tenure; they were included in the number of faculty who left for tenure-related reasons.

[3] Note that 3 male non-Assistant Professors who were denied tenure were included in this count.

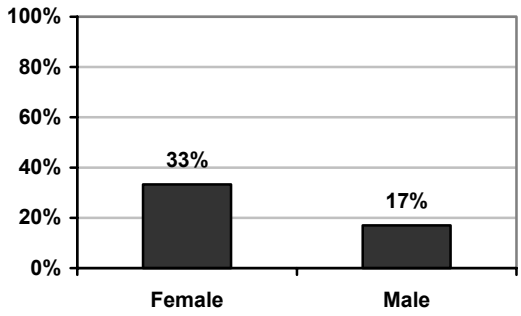


Figure 3: Proportion of Engineering faculty who left for Better Opportunities

There were very few faculty whose primary reason for leaving was either dissatisfaction with the department or personal. However, it should be noted that 11% of women faculty (1 out of 9) left because they were dissatisfied with the department, but 0% of men faculty (out of 53) left for this reason. A similar pattern was observed for faculty who left for personal reasons—11% of women (1 out of 9) women left for personal reasons, and only 2% of men (1 out of 53) left for personal reasons.

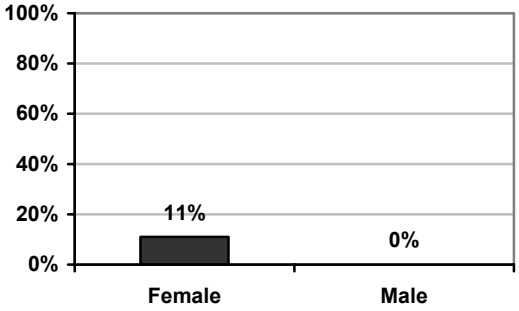


Figure 4: Proportion of Engineering faculty who left because of Dissatisfaction

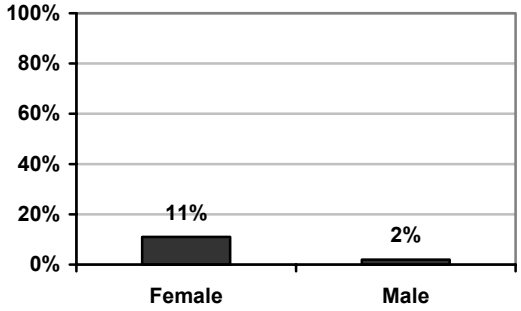


Figure 5: Proportion of Engineering faculty who left for Personal Reasons

LS&A (Natural Science Division)

During the same period, 47 faculty members (9F, 38M) left their respective natural science departments in LS&A for one of the following 5 reasons: Tenure Issues (including both denial of tenure, tenure-related departures), Dissatisfaction with Department, Personal Reasons, Left for Better Opportunity, and Unknown.

For both men and women, the majority of assistant professors left because of tenure issues (88% of women [7 out of 8] and 55% of men [11 out of 20] did so). However, there is a trend for women to be more likely to leave for tenure related reasons than men. This trend is in contrast with the pattern observed for Engineering faculty, where men appeared to be more likely to leave due to tenure issues than women.

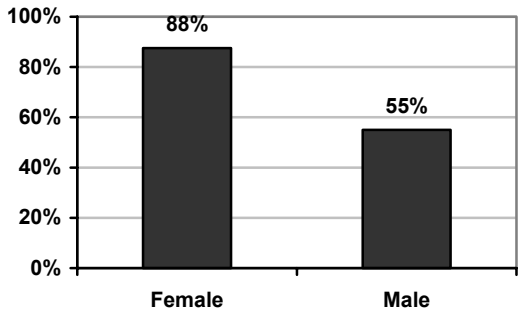


Figure 6: Proportion of LS&A science Assistant Professors who left because of Tenure Issues

Women were more likely than men to leave for reasons *other* than for better opportunities (only 11% of women [1 out of 9] left for better opportunities), whereas 40% of men (15 out of 38) left for better opportunities. Again, this trend is in contrast with the trend observed for Engineering faculty where women were more like to leave for better opportunities than men.

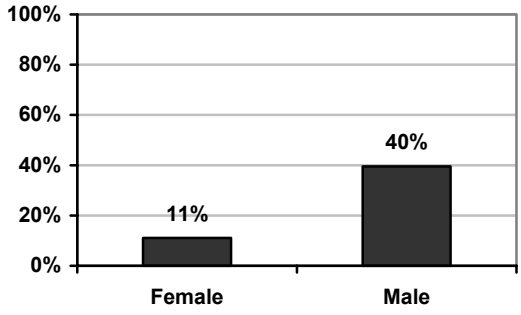


Figure 7: Proportion of LS&A science faculty who left for Better Opportunities

Again the numbers of faculty leaving dissatisfied with the department or for personal reasons were very small. Looking at the general pattern of faculty who left due to dissatisfaction with their department, 11% of women (1 out of 9) and 5% of men (2 out of 38) left for this reason. This pattern is similar to that observed for Engineering. For personal reasons, 0% of women (out of 9) and 16% of men (6 out of 38) left their departments, which is in contrast to that the pattern observed for Engineering.

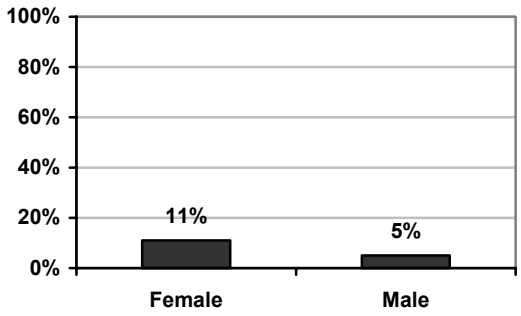


Figure 8: Proportion of LS&A science faculty who left because of Dissatisfaction

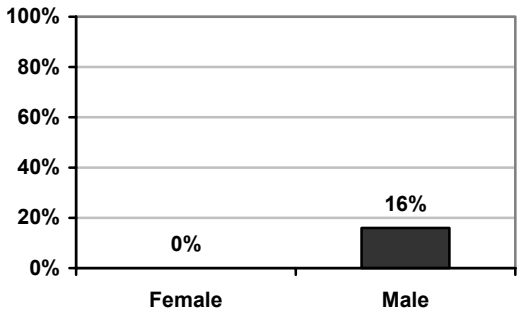


Figure 9: Proportion of LS&A science faculty who left for Personal Reasons

Medicine (Basic Science departments)

During the 10 years of interest, 22 faculty members (4F, 18M) left their respective basic science departments in Medicine for one of the following 5 reasons: Tenure Issues (including both denial of tenure, tenure-related departures), Dissatisfaction with Department, Personal Reasons, Left for Better Opportunity, and Unknown. It should be pointed out that the number of faculty examined for Medicine is much smaller than for Engineering or LS&A, and the issue of small numbers is particularly relevant for this college.

With regard to faculty who left for tenure-related issues, only a relatively small proportion of assistant professors left the departments for this reason (compared to LS&A in particular): 25% of women (1 out of 4) and 43% of men (3 out of 7). However, as in Engineering, it does appear that men assistant professors are more likely to leave for tenure-related reasons than are women assistant professors.

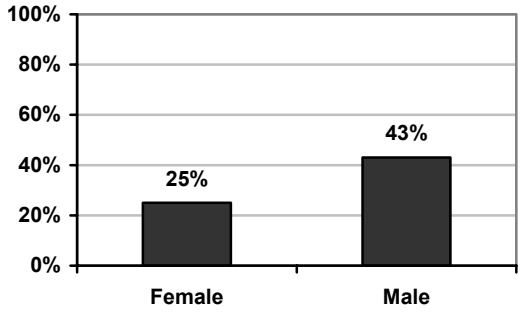


Figure 10: Proportion of Medicine science Assistant Professors who left because of Tenure Issues

In the category of leaving for better opportunities, only a small proportion of women left for better opportunities (25% [1 out of 4]), while a large proportion of men (61% [11 out of 18]) did. This pattern is consistent with that observed in LS&A (and not with Engineering).

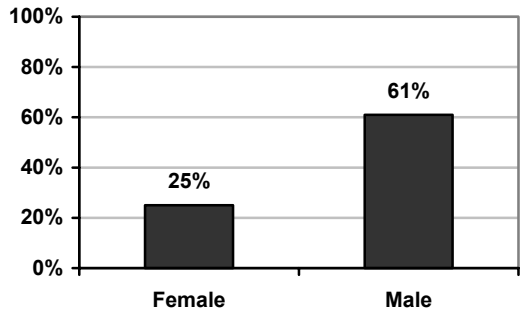


Figure 11: Proportion of Medicine science faculty who left for Better Opportunities

As with Engineering and LS&A, very few faculty left because they were dissatisfied with the department: 25% of women (1 out of 4) left for this reason, and 0% of men (out of 18) did. This pattern, while based on few faculty, is similar to the patterns observed both for Engineering and LS&A. There were no men or women who left for personal reasons.

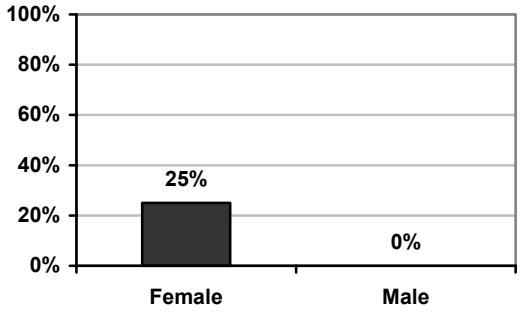


Figure 12: Proportion of Medicine science faculty who left because of Dissatisfaction

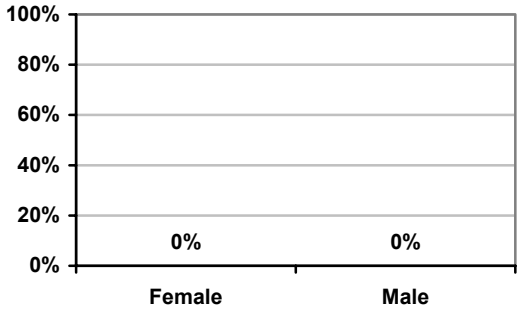


Figure 13: Proportion of Medicine science faculty who left for Personal Reasons

Summary

Overall, despite the 10 year period time-frame that we examined, once the data were broken down by college, the numbers of faculty leaving for any one reason became quite small. Thus the data here must be interpreted with care. It is interesting that patterns by gender were different in the three colleges, but it is possible that these differences simply reflect random variation. Alternatively, they may result from different circumstances in the three environments. These data alone are insufficient to draw conclusions, but they are certainly suggestive, and point to the need for more adequate data on attrition.

In particular, in the colleges of LS&A and Medicine, men were believed to have left for better opportunities more than women were. However, in Engineering, this pattern was reversed and women appeared more likely to leave for better opportunities than men.[4] Also, in LS&A and Medicine, women were more likely to leave for tenure-related issues than men, a pattern that was also reversed in Engineering.

[4] Note that Engineering also had a high number of male faculty (18) who were categorized as leaving for "unknown reasons" who may have actually left for better opportunities. Medicine and LS&A had only 4 each.

One trend that was consistent across the colleges, although with very few faculty falling into this category, was that female faculty were more likely to leave because they were dissatisfied with their department (3 out of 22 in all three colleges; 14%) than were men (2 out of 109 in all three colleges; 2%).

It is possible that both the nature of the data collection (judgments by informants rather than self-reports by the individual) and the decision rules (particularly the rule requiring a single reason to be identified as primary) played a large role in keeping some categories (such as "dissatisfaction with department") low in frequency. It is clear that we need more adequate data on the reasons faculty leave the institution, and that it would be helpful to collect data both on the primary reason and on "other factors." Such data would best be collected at the time a faculty member departs from the institution, in the context of a required "exit interview" with an individual clearly quite independent of the department and college being left. This would enable much more adequate analyses than those attempted in this report.

Codebook for Categorizing Attrition Reasons

In situations where more than one reason may have applied, we have prioritized the reasons in the following order:

1) If an individual officially retired from the university, this reason takes precedence over, and thus they are not coded as:

Dissatisfied with department
Leaving for better opportunity [although this is captured in the category R(A)]

2) If an individual is denied tenure, or leaves because they are not likely to receive tenure, these reasons take precedence over, and thus they are not coded as:

Leaving for a better opportunity
Dissatisfied with department

3) If an individual is dissatisfied with their department, this reason takes precedence over, and thus they are not coded as:

Personal Reasons (e.g., spousal or family concerns)
Leaving for a better opportunity

Code Description

TD Tenure/renewal denied

Reasons are coded here if it is known that the individual went through the renewal or tenure review, but were denied renewal/tenure. These individuals may still be at UM, in non-tenure track positions.

Denied tenure
Denied tenure (with clock stoppage of 1 year)
Appointment not renewed after 3 (or 4) years

TR **T**enure-**R**elated departure

Reasons are coded here if the individual left the position before coming up for tenure review, where the outcome would most likely have been negative. These individuals may still be at UM, in non-tenure track positions.

Left because tenure seemed unlikely
Tenure pressure

Dis **D**issatisfaction with department

Reasons are coded here if it is known that at the time the individual left, one of the following issues was a key motive for leaving the department. This may include faculty who leave one department of the University for another department in the University (if they cease holding any funded or dry appointments in the first department).

Dissatisfied with departmental support
Issues with Department
Mpathways classification "Dissatisfied with Salary"
Unhappy and left academia

P **P**ersonal Reasons

Reasons are coded here if it is known that at the time the individual left, one of the following issues was a key motive for leaving the department.

- Lateral move
- Move for geographical reasons
- Returned to home country
- Spouse wanted to return to home country
- Spouse was unhappy in Ann Arbor
- Too hard to juggle family and career
- Dual career issues
- Unable to find job for spouse
- Move for personal reasons
  - To be closer to significant other
  - For better education for children with special needs
  - Post divorce
- Medical problems

B Left for a **B**etter Opportunity

Reasons are coded here if it is known that the individual left for a different position (academic or otherwise) and the offer included a feature that was attractive to him or her. However, these may or may not have been the decisive factor in their decision to leave.

- Higher rank or endowed chair (even if at less prestigious university)
- More money (even if at less prestigious university)
- More prestigious university
- Stronger in particular research area (even if at less prestigious university), e.g., more people in research area
- Better offers in academia or industry
- Resigned to take another position
- Took positions they believed were better jobs
- Left for a better dual career opportunity

U **U**nknown (not retired or deceased)

Reasons are coded here if the individual is classified in MPathways as having terminated their position at the UM, but we were unable to garner any additional information (from the faculty members whom we asked) regarding the reasons for the departure. Also included are several reasons which did not fit into other categories; they are listed below.

- Mpathways classifications:
- "Relocation"
- "Other Reasons"
- "Another Educ Inst Pos"
- "Another Pos Elsewhere"
- "Another Educ—Relocation"
- "Future Plans Unknown"
- "No return from LOA"
- Quit
- Did not like working with students

R **R**etired

Reasons are coded here if an individual officially retired from their UM position, and were not known to take on additional employment after leaving UM.

R(A): Retired and took another position (outside of UM, after official retirement)

Reasons are coded here if the individual officially retired from their UM position, but were known to take another position elsewhere (academic or otherwise) afterward. Here we do not distinguish between individuals who were happy with the department, and those who were dissatisfied with the department, when they left.

Formally retired but took a position elsewhere afterwards
Formally retired but started a company afterwards
Formally retired but did consulting work afterwards

D Deceased

Reason is coded here if it is known that the individual died while holding a position at UM.

APPENDIX C

Executive Summary of the GSE Subcommittee Recommendations

UNIVERSITY OF MICHIGAN
COMMITTEE ON
GENDER IN SCIENCE AND ENGINEERING

Executive Summaries of Recommendations
From Reports of the Subcommittees On:

Recruitment, Retention and Leadership

Faculty Evaluation and Development

Family-Friendly Policies and Faculty Tracks

MARCH 2004

Executive Summary of the Report from the Subcommittee on Recruitment, Retention and Leadership

The Subcommittee on Recruitment, Retention and Leadership found substantial variation in the amount of documentation that supports policies and procedures at the institutional and unit (school/college) level. In addition the Subcommittee determined that the areas of retention and leadership were sufficiently intertwined that they would be better considered under the broader rubric of "Career Development".

One of the key findings of the Subcommittee was the importance of a proactive and vigorous program for assistance in dual career situations as a critical component of any policy recommendation designed to improve diversity in the science and engineering faculty. In fact by appropriately handing dual career situations the University has the opportunity to recruit two outstanding individuals. To increase our success in attracting and retaining dual career couples, it is especially important to maintain constant support from central administration both in the development of institutional and unit-level policies and procedures and in identifying mechanisms to provide financial resources and incentives. The Subcommittee also felt that emphasizing interdisciplinarity as one of the distinctive hallmarks of the University's academic scene could be an important tool to increase the diversity and excellence of the faculty, particularly in science and engineering.

In addition to developing a mechanism to share best practices, the principle recommendations of the Subcommittee, in abbreviated form are listed below by topic.

Hiring

- Searches should be defined as broadly as possible to allow more diversity in the hiring pool.
- Adopt aggressive recruiting policies whereby search committees pro-actively identify candidates, especially from under-represented groups.
- Provide candidates with recruitment packets that contain institutional information on such issues as dual careers, gender initiatives, family friendly policies, as well as departmental information.
- Require a permanent data collection system. Specifically, require departments to submit demographic information about their search process (interviews, offers and hires) to the Provost's office to be eligible for PFIP (Provosts Faculty Initiative Program) funding.

Provosts Faculty Initiative Program (PFIP)

- Maintain PFIP funding.
- Employ the same hiring processes and standards for all candidates rather then having two separate hiring mechanisms: one for regular hires and one to promote diversity.

Dual Careers

- Enhance staff support for dual career partners, e.g. Director of Academic Dual Career Services, shared by LSA, Engineering and Medicine, is one potential model.
- Enhance financial support for dual career partners.

- Maintain a centralized database of dual career partners and their career track within the university, and make the information available through regular reporting mechanisms.
- Ensure department chairs and program directors, and their search committees are knowledgeable about the dual career process and sensitive to the policies, procedures and best practices and approaches.
- Actively seek dual career couples.
- Sensitize candidates to University opportunities for dual couples by creating a brochure highlighting existing dual career cases with their profiles and testimonials of their experience to be used as a handout for potential faculty recruits.

Mentoring

- Implement structural mechanisms to inform faculty and chairs of updates in policies and university resources related to mentoring. Information should be available on websites, and faculty should be made aware of these resources.
- Provide multiple avenues of support to faculty for career development at each stage of the academic ladder. Encourage the leadership of academic units to facilitate group and specific mentoring programs at the unit, department and program level.
- Evaluate mentoring at the department level regularly and include this activity as part of chair performance evaluations.

Leadership

- Develop specific processes to identify a diverse pool of mid-career faculty with the potential for leadership, and offer them formal mentoring/training opportunities early in their career to prepare them for future leadership positions, and then appoint them to such positions.
- Develop specific procedures that increase the diversity of faculty who are awarded collegiate and endowed professorships in the academic units and named University professorships, such as the Thurnau Professorships and Distinguished University Professorships.

Retention

- Establish endowed funding mechanisms for preemptive offers and counter offers that include salary increases, research supplements and incentives.
- Establish an ongoing process to provide guidance for an equitable salary structure among faculty perhaps using a model based on multiple regression analysis.
- Consider creating time limited named/endowed professorships for faculty at intermediate stages in their careers, for example, at the transition from Assistant to Associate Professor.
- Increase the number of daycare facilities on or near campus.
- Provide tuition relief for children of faculty and staff who are attending the University of Michigan

Executive Summary of the Report from the Subcommittee on Faculty Evaluation and Development

The Subcommittee on Faculty Evaluation and Development of the Gender in Science and Engineering Committee for the University of Michigan was chaired by Terrence J. McDonald, Dean of the College of Literature, Science, and the Arts. It included faculty members from LSA, Engineering, Medicine, Pharmacy, and the LSI.

The Subcommittee was charged to "Examine and evaluate institutional policies and practices for that might differentially impact the progress of women faculty in science and engineering fields," with a particular focus on "promotion and tenure, focusing on the schools/colleges with substantial numbers of faculty in science and engineering disciplines."

In response to this charge, the subcommittee developed a series of recommendations aimed at maximizing transparency, equity, and collegiality. Though stimulated by consideration of the needs of women faculty in the sciences and engineering, these recommendations will improve the academic environment for all faculty. We have organized these seven recommendations in terms of the career course of a faculty member.

Mentoring

- Each academic department at the University should have in place a formal mentoring program available to all untenured faculty or assistant professors. The committee details specific features of desirable programs.

Faculty Annual Reviews

- Annual review information should be collected from all faculty in a standardized manner within all departments and colleges. The committee has reviewed a number of different forms and has distilled what we found as best practices into a template form, which provides for explicit prompting of many categories.

Third Year Reviews

- Third year reviews are mandated on campus; however, current implementation varies widely. We recommend some standardization of best practices.

Flexible Tenure Probationary Period

- The University should adopt a more flexible tenure probationary period for untenured faculty on the tenure track, while maintaining a uniform standard of performance. Specifically, we recommend that the criteria for accomplishments in the area of scholarship, teaching, and service should be set based on the assumption of a tenure review in the sixth year. However, in consideration of unusual professional or personal circumstances, the tenure review may be conducted at any time between the sixth and ninth years, using those criteria and that standard.

Faculty Member Training

- Faculty members who sit on committees given the responsibility for deciding whether an untenured faculty member will be granted tenure, or whether individuals are to be promoted to full professor, should be required to attend training designed to educate them on all aspects of the decision-making process including gender and other biases that affect evaluation

processes reflected in the materials they review (teaching evaluations, recommendations, etc.), and in their own deliberations.

Associate Professor Development

- All schools and colleges at the University should establish guidelines that will assist tenured professors at the associate level in preparing for promotion to full professor. All faculty members promoted to associate professor with tenure should receive a review in their third year in rank, which will result in a formal promotion plan.

Senior Faculty Development

- All faculty members promoted to full professor should receive a review after seven years in rank, followed by additional reviews after each seven-year interval. This recommendation is intended partly to counter the trend toward a "counter-offer culture."

Executive Summary of the Report from the Subcommittee on Family-Friendly Policies and Faculty Tracks

As competition to recruit and retain the most highly qualified faculty becomes increasingly intense, it is essential that the University of Michigan remain in the first rank in all of the things it offers to its faculty. Currently, we offer the many benefits of a world-class research university, a community with an excellent quality of life, cultural opportunities that greatly exceed those found in other cities the size of Ann Arbor, excellent benefits, and competitive faculty salaries.

However, when compared to some of our peer institutions, UM is increasingly non-competitive in its policies related to the family needs of many faculty. These needs are not limited to junior faculty, or to women, but addressing these needs plays an especially important role in recruiting and retaining outstanding women faculty.

Many current University policies are dated and, in the present environment, are beginning to undermine our competitiveness in a variety of ways. The University lags seriously behind a number of institutions in particular policies, including the University of California, Princeton, Harvard, the University of Wisconsin, MIT, the University of Iowa, and MSU. Within the University, LSA and Engineering have adopted policies that are more generous than University policy. We recommend that University policies be brought into alignment with these more generous policies.

Birth or Adoption of a Child
(or care of a spouse/family member)

- A faculty member who becomes a parent, through birth or adoption is entitled, upon request, to a period of modified duties, without a reduction in salary.
- An untenured tenure-track faculty member may request a delay in the tenure review in recognition of the demands of caring for his/her newly born or adopted child or because of the critical illness of the faculty member or of his/her partner, child, or parent.
- A tenured or tenure-track faculty member may request a reduction of his or her appointment in recognition of the demands of caring for a newly born or adopted child, or for a child, partner or parent requiring time-consuming care.

Military Leave

- The University of Michigan will provide supplemental pay and benefits to make up the difference between the reservist's military pay and benefits and the salary and benefits they were receiving from Michigan.

Faculty Tracks

- The "clinical" and "research" adjectives be utilized in formal personnel paperwork within the University, but for routine communications a Clinical Assistant, Associate or full Professor and a Research Assistant, Associate, or full Professor be known by rank and not track.
- Clinical and Research track faculty should have full representation on appropriate School/College and University committees.
- Clinical and Research track faculty should have full access to internal University grants and programs
- Clinical and Research track faculty should be entitled to the Emeritus title.
- Clinical and Research track faculty at the full Professor level should be eligible for tenure if scholarly work, teaching, clinical efforts, and organizational service justify this award.

Track Switches

- Requests for faculty to change tracks will continue to be handled on a case-by-case basis.

Day Care

- Additional on-campus daycare centers be provided, whether in existing buildings or through new construction. Any new campus facilities would have preferential admissions for University of Michigan faculty, staff, and students while not excluding the community if space permits.
- When any new University facilities are being considered, provision of daycare facilities should be taken into consideration and incorporated into the design and construction of the building.

Residency Policy

- The committee recommends that when new faculty and staff are recruited to the University from out of state that they be immediately granted residency status for the purposes of assessing tuition for their family members.

Gender in Science and Engineering Committee
Mary Sue Coleman, President
Paul Courant, Provost and Executive Vice President for Academic Affairs
Robert Kelch, Executive Vice President for Medical Affairs
Janet Weiss, Associate Provost for Academic Affairs

Meigan Aronson, LSA (Physics)
Stephen Director, Dean of the College of Engineering
Peter Polverini, Dean of the School of Dentistry
Allen Lichter, Dean of the School of Medicine
Terrence McDonald, Dean of the College of Literature, Science and the Arts
Tresa Pollock, Engineering (Materials Sciences & Engineering)
Pamela Raymond, Medicine (Cell and Developmental Biology)
Abigail Stewart, LSA (Psychology, Women's Studies)
Alan Saltiel, Medicine and Life Sciences Institute

Subcommittee on Recruitment, Retention and Leadership
Stephen Director, Engineering, Chair (also GSE)
Meigan Aronson, LSA (also GSE)
Frank Ascione, Pharmacy
Dick Canary, LSA
Marci Lesperance, Medicine
Matt O'Donnell, Engineering
Pamela Raymond, Medicine (also GSE)

Subcommittee on Faculty Evaluation and Development
Terrence McDonald, LSA, Chair (also GSE)
Katherine Freese, LSA
Margaret Gyetko, Medicine
Tresa Pollock, Engineering (also GSE)
Nair Rodriguez-Hornedo, Pharmacy
William Roush, LSA
Alan Saltiel, Medicine, LSI (also GSE)

Subcommittee on Faculty Career Tracks and Work-Family Integration
Allen Lichter, Medicine, Chair (also GSE)
Peter Polverini, Dentistry, Acting Chair (also GSE)
James Bean, Engineering
Michael Boehnke, Public Health
Christin Carter-Su, Medicine
Abigail Stewart, LSA (also GSE)
Lars Stixrude, LSA

APPENDIX D

Crosby Award Booklet

Elizabeth Caroline Crosby Research Fund Grant Winners 2002 and 2003

World-renowned Neuroanatomist Elizabeth Caroline Crosby (1888-1983) began her long and distinguished career at the University of Michigan in 1920. Starting as an Anatomy instructor, she rose through the ranks to become the first woman full professor of the medical school. A dedicated researcher and teacher, Dr. Crosby published extensively in comparative anatomy, and received several prestigious awards. She was the first woman to be awarded the Henry Russel Lectureship at the University of Michigan (1946); she earned the Henry Gray Award in Neuroanatomy in 1972, and the National Medal of Science in 1979. After her retirement in 1958, at age sixty-nine, Dr. Crosby served as a clinical consultant at both the University of Michigan and University of Alabama, where a former student held a faculty position. Although she never married, she adopted an 11-year-old girl in 1940 and another girl in 1944. She remained active in scientific work until the end of her life in 1983, at the age of ninety-four.

Elizabeth Caroline Crosby Research Awards are available to help meet career-relevant needs of individual tenured and tenure-track faculty, if meeting those needs will help increase the retention or promotion of women science and engineering faculty. The fund, initially seeded by an NSF ADVANCE grant, supports a range of activities necessary for scholarly work in science and engineering fields. Competition for funds ($100,000 annually) takes place once each year. Applications may be for up to $20,000. Support may be requested for, but is not limited to, the following: extended travel to research sites or collaborators' laboratories; lab space and equipment; research assistance; training of doctoral and postdoctoral students; teaching release time; summer salary; work-related travel; long stays at field sites or long and late hours at labs; expenses for specialized child care to permit research activities. For complete application guidelines, please visit our website: http://www.umich.edu/~advproj/crosbyguide.html

Applications must be received no later than February 16, 2004. Awards will be announced by June 15, 2004.

Program

ADVANCE Welcome

Abigail J. Stewart, Director, ADVANCE Project

Agnes Inglis Collegiate Professor of Psychology

and Women's Studies

Associate Dean for Academic Affairs, LS&A

Remarks

Sarah Winans Newman, Professor Emerita, Anatomy & Cell Biology

January 13, 2004

Michigan Room, Michigan League

Rebecca Bernstein

Assistant Professor of Astronomy
"Galaxy Formation and Intracluster Light"

Two of the long-standing goals of observational cosmology are to understand the physical mechanisms which influence the evolution of galaxies, and to identify the fraction of mass in the universe which is baryonic matter (like hydrogen gas). Gravitationally bound clusters of galaxies are convenient testing sites to address both questions.

Sensitive observations show that as much as 20% to 50% of the total starlight in any rich cluster of galaxies comes from stars which are not bound to any individual galaxy but are trapped in the gravitational potential well of the cluster. In other words, the light (and mass) in the intracluster stars is comparable to that in the galaxies themselves, but we do not explicitly understand their origin. By carefully quantifying the characteristics of the ICL --- its color, flux, profile, and substructure --- we can constrain the mechanisms driving galaxy evolution and also obtain a complete census of the baryonic content of clusters. Over the last four years, I have obtained a unique data set with which to quantify the ICL in clusters at a range of evolutionary states. Funding from a Crosby Research Award has provided the computer and salary support for graduate student Jessica Krick, with whom I have worked in the last 9 months to obtain our first results in this work.

2003 Elizabeth Crosby Awardees

Katarina T. Borer

Professor of Kinesiology

"Using Exercise and Diet for Appetite Suppression in Postmenopausal Women"

The project examines the feasibility of manipulating exercise and meal-taking in ways that could contribute to body fat loss. The information is important and urgent because of the global epidemic of obesity, and dismal, third-from-last national ranking of the state of Michigan in body fatness.

As of December 2003, the first of the two planned studies is nearly complete. It produced provocative findings that exercise on an empty stomach produces hypoglycemia and increased plasma free fatty acids as well as secretion of recently-discovered gut hormone ghrelin, all physiological markers of energy need, but no increase in the sensation of hunger. The search for the cause of this exercise-induced suppression of hunger in the face of energy need will take the doctoral candidate Elizabeth Wuorinen on a dissertation research quest.

The cost of the hormone and metabolite assays and subject fees for this study could not have been borne without the Elizabeth Crosby award. The pilot data have allowed me to apply for an NIH grant (currently under review), provided a phenomenon for dissertation research for Elizabeth, and motivation for a M.S. student from Taiwan, Po-Ju Lin, to take on the challenge of applying to the Kinesiology doctoral program (to carry out the second of the two planned studies.)

2003 Elizabeth Crosby Awardees

Robyn Burnham

Associate Professor of Ecology and Evolutionary Biology and of Geological Sciences
Associate Curator for the Museum of Paleontology and the Biology Department
"Population Structure of a Dominant Tropical Plant: Implications for Forest Dynamics and Conservation Status"

The Crosby Award I received is devoted to expeditions to the Amazon Basin (Ecuador, Peru, Bolivia) to collect a dominant climbing plant, *Machaerium cuspidatum,* over its geographic range. The funds also will be used to continue molecular lab work on the samples collected to determine the degree of genetic difference between populations of the plants throughout its range. *Machaerium cuspidatum* is widespread and common in the intensely diverse area of Ecuador known as the Yasuní National Park and Huaorani Ethnic Reserve. Preliminary sampling suggested that either the plant was extremely variable from place to place (heterogeneous), or that it was indifferent to distance, and was genetically homogenous throughout the area. The difference between these two alternatives matters very much to conservation of high diversity forests. If heterogeneous, then every population matters for conservation of genetic diversity. If homogenous, we might propose that some diminution of its numbers will not affect the larger forest in a significant way. The Crosby funds already applied to this problem indicated that genetic variation is not related to distance between individuals, at least within the National Park, an area representing up to 100 km between samples. Remaining questions to be addressed in the coming year are: 1) at what distance does genetic differentiation appear within this species? 2) are individuals in the National Park genetically identical to one another at a local scale? 3) do individuals show more than one genetic signature, thus indicating error inherent in the methods used?

2003 Elizabeth Crosby Awardees

Amy Cohn

Assistant Professor of Industrial and Operations Engineering

"Large-Scale Optimization Techniques for Network Design Problems with Non-Linear Cost Functions"

Network problems, in which we want to flow commodities over a system of nodes and arcs, appear in a wide array of application areas - telecommunications, supply chain logistics, transportation, and manufacturing, just to name a few. In many cases, the cost associated with this flow is a linear function of the amount on each arc. In more challenging cases, the cost may be a non-linear function of the flow on each arc - such problems are significantly more difficult to solve. In our research, we consider an even more difficult question, which has not previously appeared in the literature: how do we solve network design problems in which the cost associated with an arc depends not only on the flow across that arc, but also depends on the flow across other arcs as well?

The Crosby funds have been extremely valuable in helping to begin addressing this problem. Our research team includes two women graduate students, Lisa Schkade and Melinda Davey, as well as two women undergraduates, Caris Wong and Amanda Siegel, who were supported through the Sarah Marion Parker Scholars program. We were able to present preliminary results at a major conference in October, and it was quite satisfying to present a talk with 4 female co-authors! The Crosby funds helped in supporting the graduate students and made the conference travel possible. The Crosby funds have also enabled me to participate activities to help mentor undergraduate women, which included a panel discussion by women alumnae from the College of Engineering and a pre-exam study break with members of Phi Sigma Rho, the undergraduate engineering sorority.

2003 Elizabeth Crosby Awardees

Rachel Goldman

Associate Professor of Materials Science and Engineering

"The Effects of Hydrogen on the Properties of Narrow Gap Nitride Semiconductor Alloys"

The funds from the Elizabeth Caroline Crosby Research Fund have provided financial assistance which has benefited the scholarship and creative activities of my research group in a highly productive way. These funds enabled me to hire a total of ten undergraduate students, including four women, during Spring/Summer 2003. The contributions of several of these students have already been included in twenty contributed and invited presentations by my group at National and International Conferences during Fall Term 2003. The visibility of this work has been beneficial, as it has led to more than five additional invitations to speak at International Conferences and top-ranked Universities. Furthermore, two of the undergraduate students have been selected as Finalists for the Intel Student Research Contest for Undergraduate Students, scheduled to take place in March 2004.

The remainder of the funds from the Elizabeth Caroline Crosby Research Fund have been used to purchase several components and instruments associated with a new plasma chamber for our molecular beam epitaxy chamber. This new plasma chamber will enable us to control the incorporation of nitrogen and hydrogen during the epitaxial growth of dilute nitride semiconductor alloys. This new capability will enable us to reveal the effect of hydrogen on the properties of dilute nitride semiconductor alloys that are promising for a wide range of optoelectronic applications.

2003 Elizabeth Crosby Awardees

Ingrid Hendy

Assistant Professor of Geological Sciences
"Eastern Tropical Pacific Intermediate Ocean History"

I proposed examining low oxygen sediments in a series of deep ocean sediment cores from the Gulf of Tehuantepec, Mexico. Research completed during the my tenure as a Postdoctoral Fellow at the University of British Columbia, Canada has established the first record of low oxygen sediments in the Eastern Tropical Pacific. I began as an assistant professor at the University of Michigan in September 2002 and am now attempting to secure funds from federal sources to establish a research program. The funds requested from the Crobsy Award will be used to bridge to future research and fund raising efforts.

2003 Elizabeth Crosby Awardees

Trachette Jackson

Assistant Professor of Mathematics
"Multiphase Mechanics of Tumor Encapsulation"

The mechanisms by which a tumor becomes encapsulated as a continuum of cells or as several lobes of different sizes, separated by connective tissue, is an interesting, important, and unsolved phenomenon in tumor biology. Despite the importance of capsule formation, little is known about the process by which they arise. In order to compare two leading theories which attempt to explain how tumor capsules form, I have developed a mathematical modeling framework to describe tumor growth, encapsulation, multiple lobe formation, and transcapsular spread based on the physical (mechanical) forces and cellular interactions involved.

During the first year of my tenure-track appointment, I applied for an NSF grant to fund this research project. Although my proposal was funded, the program director cited the early stage of my academic career (at the time I was only two years post-Ph.D.) as reason not to fund graduate students, postdoctoral associates, and teaching reductions as part of the grant. The Elizabeth Caroline Crosby Research Award award allowed me to support two graduate students for three months over the summer. Each focused on a separate and specific aspect of my research. I feel strongly that being granted this award in the semester following my third-year review proved invaluable to my tenure case by allowing me to devote more of my professional time to the advancement and advertisement of my research.

2003 Elizabeth Crosby Awardees

Smadar Karni

Associate Professor of Mathematics
"Women in Applied Mathematics"

My award is being used to run a special Speaker Series celebrating the achievements of women in applied mathematics. The aim of the series is to promote the visibility of women applied mathematics, to bring to the limelight the breadth and excellence of their scientific contributions, and to be inspired by their accomplishments. Ultimately, it is hoped that it will lead to an increase in the share of women applied mathematicians among the department's permanent faculty.

As part of the visit, the speakers are invited to have lunch with the women graduate students, postdocs and faculty, to have a chance to meet and chat informally about career related issues. The lunches were attended by some 15-20 people each, and provide an opportunity to hear words of wisdom from the speaker, but equally importantly provide a chance for us to meet with each other. The series was inaugurated by Prof. Cathleen Morawetz, a former President of the American Mathematical Society, and was toasted to a wonderful start by Provost Paul Courant. The series will continue to run in the winter term and during next year.

2003 Elizabeth Crosby Awardees

Elizaveta Levina

Assistant Professor of Statistics

"Classification of High-Dimensional Data with Applications to Texture"

The research supported by the Crosby Award is on pattern recognition for high-dimensional data, with applications to imaging. Massive amounts of data collected in the modern world have created a number of new challenges for statisticians, and new theoretical and practical tools need to be developed to deal with high-dimensional data, and particularly with the situation when the number of variables is large relative to the number of observations. This problem occurs in many applications (gene expression data, medical imaging, remote sensing, financial data, and chemometrics, to name a few). While a few, mostly heuristic, algorithms exist for dealing with such data, the amount of research into the issue to date is limited.

The Crosby Award supported my research on this subject by providing teaching release for Fall 2003, summer salary, and travel support. It allowed me to do several things that would have likely not been accomplished otherwise, or would have taken much longer: (a) to branch out into a somewhat different research direction; (b) to find collaborators at the University of Michigan (in Mechanical Engineering) and start working with them on applications of my research to a practical problem in quality control from image data; (c) give several invited seminars, and participate in a special program on high-dimensional data. It has been extremely helpful to have the extra funds and time, particularly at this early stage of my tenure track.

2003 Elizabeth Crosby Awardees

Mingyan Liu

Assistant Professor, Electrical Engineering and Computer Science

"Fundamental Stochastic Problems in Wireless Sensor Networks"

The goal of this research project is to formulate certain stochastic problems arising from data search and retrieval in large-scale wireless sensor networks. The award helped me to conduct research with a graduate student during the summer of 2003 in this direction. It will also likely fund the travel of the student to attend a conference and present a paper as a direct result of this research. Specifically, we investigated the problem of searching/locating a piece of data/file/object in a large network. We formulate this as a stochastic control problem, which allows us to derive search strategies that achieve this goal in a most efficient and least costly way. So far our work has focused on the class of flooding search strategies, where a query is progressively flooded to the network (with increasing range of flooding) till the target data/object is found. We have found optimal search strategies for given probability distribution of the target data. Currently we are in the process of developing search strategies that aim at optimizing the worst-case performance when the distribution of target data/object is not known a priori. We believe this work promises significant impact on efficient data search not only in wireless sensor networks, but also in the more generic wired networks, e.g., the Internet, especially within the context of peer-to-peer networking. Our next step would be to conduct similar studies for the class of linear search or random walk based search strategies.

2003 Elizabeth Crosby Awardees

Laura Olsen

Arthur F. Thurnau Professor, Associate Professor and Associate Chair of Research and Facilities
Department of Molecular, Cellular, and Developmental Biology
"Molecular and Ultrastructural Analysis of Autophagy in Plants"

Autophagy is a dynamic process in which cytoplasm and organelles are sequestered in lysosomes or vacuoles for degradation and recycling. Very little is known about this process in plants. The long-term goal of the project is to characterize the molecular and ultrastructural events associated with the onset of autophagy in response to nutrient starvation or stress conditions in plants. This project is the beginning of a new research direction for my lab. The Crosby Award provided summer support for students at three levels of their education – an advanced graduate student, who helped train the other students and acted as a role model for the others; an incoming graduate student who had begun working on autophagy as an undergraduate with my collaborator at Eastern Michigan University; and a new undergraduate Honors student. As an "inter-generational" team, we all worked together to generate preliminary data needed to apply for more extensive extramural funding. Without the Crosby Award to provide this summer support I would have been unable to make such a positive and concrete start on the project. We made good progress on each of our objectives. I am now able to begin planning a full-scale grant proposal, along with my collaborators within my department and at Eastern Michigan University and Central Michigan University, to be submitted to the National Science Foundation. Thus, the Crosby Award provided seed money for a new and exciting research program that I hope to direct for many years to come.

2003 Elizabeth Crosby Awardees

Rosemary Rochford

Assistant Professor of Epidemiology
"Burkitt's lymphoma in Kenya"

My main interest lies in the pathogenesis of Epstein-Barr virus associated malignancies. My research on EBV has focused primarily on the EBV-associated immunoblastic lymphomas and lymphoproliferative disorders that arise in individuals with AIDS or in transplant patients undergoing immunosuppressive therapy. More recently, we have also initiated studies on endemic Burkitt's lymphoma as well as studies on viral pathogenesis following infection of mice with MHV-68.

Dr. Rochford left the University of Michigan in Fall, 2003 and is now at SUNY Upstate Medical University.

2003 Elizabeth Crosby Awardees

Michele Swanson

Associate Professor of Microbiology and Immunology

Given the dearth of women scientists, it is imperative that each maximizes her impact. To do so, one must not only secure colleagues' respect through scientific achievement, but also become an informed advocate for the minority. With support from the Elizabeth C. Crosby Research Award, I have devoted my sabbatical to gaining expertise in both the biology of bacterial biofilm communities and the challenge of gender equity. As an Invited Professor at the Pasteur Institute, I am affiliated with the laboratory of Jean-Marc Ghigo, who applies genetic methods to analyze biofilm development. My residence in Paris has also promoted interaction with the European community, including invited seminars at Oxford University in England; the Université de Poitiers, Universite Mediterranee de Marseille-Luminy, and Pasteur Institute in France; the Max Planck Institute, University of Ulm, and University of Tubingen in Germany; and conferences in Switzerland, Germany, and Spain. Already four of these meetings have led to new collaborations between my laboratory and European scientists with complementary expertise. Freedom from most teaching and service has allowed me to devote time to literature relevant to gender equity. By reading books from the practical manual *At the Helm, a Laboratory Navigator* by Kathy Barker to the inspirational memoir *Madame Secretary* by Madeleine Albright, and from my numerous personal conversations with women scientists in England, Germany, and France, I am better prepared to advocate for equality in academic science. Finally, I am especially grateful for the opportunity to share the adventures of a year abroad with my teenage daughter and son and with my husband.

2003 Elizabeth Crosby Awardees

Maria Clara Castro

Assistant Professor of Geological Sciences

The Elizabeth Caroline Crosby Research Fund has supported a post-doctoral fellow, Delphine Patriarche, who is undertaking research with me on regional groundwater flow and transport modeling. The goal of this study is to investigate the use of three-dimensional models for providing additional constraints necessary to reduce the non-uniqueness problems associated with 2D models. Such models provide higher resolution of the heterogeneities present in the groundwater systems and thus, allow discrimination of which parameters play a major role in influencing the movement of groundwater at a regional scale.

To this end, we have constructed a three-dimensional finite element model, the most complex groundwater 3D model ever built, representing four formations in southwest Texas. This 3D model, which covers a surface of ~7000 km^2 and comprises more than 5 million elements, has allowed simulation of coupled fluid flow and 4He transport in steady-state conditions. Our results show that both depth and changes in lithological facies play a major role in groundwater flow movement as they are directly related to variations in hydraulic conductivity. This work is significant because it increases our general understanding of regional groundwater flow movement, which will positively impact a diversity of fields including management of groundwater resources, contaminated aquifer remediation and reconstruction of paleoclimates. The first results of this research were presented to the scientific community at the AGU Fall Meeting 2003 (December 8-12th) and a research paper will be submitted for publication to Water Resources Research in early 2004.

2002 Elizabeth Crosby Awardees

Aline Cotel

Assistant Professor of Civil and Environmental Engineering

The research project started as an all-women collaboration between an undergraduate, graduate student and assistant professor and represented the first phase in a larger scale endeavor related to river restoration. The students performed laboratory experiments related to flow around structures commonly encountered in streams. This was continued with field work at the University of Michigan Biological Station this past summer and partially funded another female undergraduate student (Lisa Rayle).

Funding provided by the Crosby award has allowed me to broaden my research interests and initiate collaboration with Prof. Paul Webb in the School of Natural Resources and the Environment. To date, this has proven to be the most productive collaboration I have been able to establish since my arrival at the University of Michigan. Combining biology and fluid mechanics as well as laboratory and field experiments is opening new avenues in the study of fish dynamics and habitat restoration in general. Proposals have been submitted to the National Science Foundation and local organizations. This area of research is quickly becoming my primary focus, all thanks to the Crosby award.

Kimberlee Kearfott

Professor of Nuclear Engineering and of Biomedical Engineering

This award was used to obtain equipment for a laboratory to enable the identification and measurement of small amounts of unknown radioisotopes. This capability is useful for radioactivity expected to be encountered in environmental samples as a result of natural variation in background, radiation fallout, normal industrial operations, accidents, and potential terrorist events. The funds provided by the Crosby Award were supplemented by the Department of Nuclear Engineering, the College of Engineering Associate Dean for Academic Affairs, the College of Engineering Associate Dean for Research, and the Office of the Vice President for Research. As a result, it was possible to obtain an alpha spectroscopy system, a specialized support system for making field measurements, air sampling equipment, thermoluminescent materials, and radon gas measurement systems. In addition, funds enabled the repair of repair several gamma ray spectroscopy and modular nuclear instrumentation systems which were obtained by donation to the laboratory. The newly equipped laboratory will enable research in applied radiation measurements methods. During Fall 2003, four graduate and 12 undergraduate students performed research of various types in the laboratory.

2002 Elizabeth Crosby Awardees

Joanna Mirecki Millunchick

Assistant Professor of Materials Science and Engineering

The aim of this project was to raise the visibility of women in the field of Materials Science. This was done primarily by bringing scientists to the University of Michigan to participate in the Women in Materials Science Speaker Series, which showcased the accomplishments of woman scientists, and fostered mentoring and networking opportunities. The scientists who were featured ranged in rank and experience from the most junior, such as Kalina Hristova, an assistant professor at Johns Hopkins, to the most senior, such as Professor Kathy Faber who was the current chair of the Materials Science and Engineering Department at Northwestern University. We also brought Professor Millie Dresselhaus as our Van Vlack Lecturer. This is the highest honor bestowed by the Department of Materials Science and Engineering, and is given to the individual that is not only a renowned Materials Scientist, but also an exemplary educator. Professor Dresselhaus is without question beyond reproach in both categories. This funding was also used by a female assistant professor and several female graduate and undergraduate students to travel to conferences and universities to publicize their research.

2002 Elizabeth Crosby Awardees

Kristen Moore

Assistant Professor of Mathematics

There is considerable societal need and student demand for research and educational programs in Actuarial and Financial Mathematics (AFM) that keep pace with the increasing complexity of the financial environment and the mathematical tools available for its analysis. The Crosby Award helped me to integrate my background from my first career in insurance with my Ph.D. training in Partial Differential Equations in order to investigate important open questions and enhance our department's curriculum in the burgeoning field of AFM.

In the case of financial markets, the celebrated Black-Scholes pricing theory provides a dynamic strategy for pricing and hedging against the risk of derivative securities such as options. Fundamental to the Black-Scholes model is the assumption of a complete market; however, insurance markets are incomplete. To date, there is no universal theory that addresses dynamic pricing of risk in incomplete markets. With teaching release time from the Crosby Award, Dr. Virginia Young and I built on her earlier work using equivalent utility methods to price dynamic risks in an incomplete market. The results of this study are detailed in our paper that appeared recently in the journal *Insurance: Mathematics and Economics*. In addition, we are using techniques from stochastic optimal control to study optimal strategies for an investor who seeks to achieve an objective such as minimizing the probability of financial ruin during her lifetime. These investigations are timely in light of the increased longevity of our aging population, recent pension fund failures, and the continuing trend toward defined contribution retirement plans under which individuals assume all investment risk.

2002 Elizabeth Crosby Awardees

Geneva Omann

Associate Professor of Surgery and Biological Chemistry

Her Crosby Award will support research to develop high throughput assays for measuring G-protein coupled receptor binding and processing.

Strategies to determine receptor binding and processing kinetics will be utilized to begin to understand the role these kinetic play in drug action. Three faculty women will participate in this project, and their careers will be advanced in the following ways: 1) The completion of the work will advance the standing of the faculty members in the field of receptor biology and contributions here will strengthen their portfolios. 2) The completed work may lead to new strategies for drug design and enhance the faculty members' abilities to compete for additional funding from pharmaceutical companies, private foundations and government agencies.

2002 Elizabeth Crosby Awardees

Ana I. Sirviente

Naval Architecture and Marine Engineering Department

The Elizabeth Caroline Crosby Research Award allowed me to partially fund the work of an outstanding female doctoral student on her work in two different research areas. One was to complete an ongoing experimental study on free surface turbulent flows. Such study produced a very detailed experimental data set that is allowing the development of a modified more effective turbulence closure to give a more accurate representation of the turbulence field near a deformable free surface. The second study was conducted on the area of polymer drag reduction in a re-circulating channel flow with polymer injected at the test section entrance. The aim of the study was to gain a better understanding of the physical processes that take place in polymer-turbulence interaction. It was found that the mixing taking place in a shear flow can induce macro-molecular polymer structures. Such polymer structures are much better drag reduction agents than single polymer molecules.

2002 Elizabeth Crosby Awardees

ADVANCE Staff:
Janet Malley, Evaluation
Laura Reese, Evaluation and Implementation
Robin Stephenson, Implementation
Abigail Stewart, PI, Implementation
Ching-Yune Sylvester, Evaluation

Elizabeth Caroline Crosby Selection Committee
Selection committee membership varies year by year, but has included these individuals at some time in the past three years:
Cinda-Sue Davis, Program Director, Women in Science & Engineering
Deborah Goldberg, Professor and Chair, Ecology and Evolutionary Biology
Sarah Winans Newman, Professor Emerita, Anatomy & Cell Biology
Susan Nolen-Hoeksema, Director, Institute for Research on Women and Gender
Pamela Raymond, Co-PI ADVANCE, Senior Counselor to the Provost, Cell and Developmental Biology
Lisa Tedesco, Professor of Dentistry, Vice President and Secretary of the University

Steering Committee
Stephen Director (Co-PI, Dean of Engineering)
Allen Lichter (Co-PI, Dean of Medicine)
Terrence McDonald (Co-PI, Dean of Literature, Science & Arts)
Pamela Raymond (Co-PI, Senior Counselor to the Provost, Cell and Developmental Biology)
Abigail Stewart (PI, Psychology, Women's Studies)

NSF ADVANCE
Institute for Research on Women and Gender
University of Michigan
1136 Lane Hall
Ann Arbor, MI 48109-1290
734-764-9533 * advanceproject@umich.edu
www.umich.edu/~advproj

APPENDIX E

Crosby/DeWitt Press Release

UNIVERSITY OF MICHIGAN NEWS SERVICE

THE UNIVERSITY RECORD ONLINE

SEARCH Updated 11:00 AM April 19, 2004

12 will receive research awards

By Robin Stephenson
NSF ADVANCE Project

The National Science Foundation (NSF)-funded ADVANCE program, in cooperation with the offices of the president and provost, has made 10 Elizabeth Caroline Crosby Research Awards and two Lydia Adams DeWitt Research Awards to advance the careers of women in science and engineering at U-M.

The awards totaling $232,975 were announced by Abigail Stewart, principal investigator on the NSF ADVANCE grant and associate dean in LSA.

"In the three years since its inception, the Crosby Fund has provided direct support to the careers of at least 57 U-M women and many men, including post-docs and graduate students who are collaborating with the faculty in their research," Stewart says. "Indirectly, if these women thrive at Michigan it will positively affect many more."

The DeWitt awards extend the same opportunities to women faculty on the primary research scientist track.

Both current and former award recipients collaborate on research, prepare papers, and present at national and international conferences. They develop pilot research evidence to support applications for external funding. They develop not only their own careers and recognition for them, but mentor and introduce students—including women students—to scientific and engineering fields of study.

In this way, the Crosby fund provides crucial support to women science and engineering faculty who in turn inspire young women and men students to seek academic and other research positions in science and engineering, Stewart says. Also, the Crosby grants support some of the family life demands that affect women more than men and can interfere with research-related activities, Stewart says. These include pregnancy and childcare as well as other kinds of caregiving.

Crosby proposals increased significantly this year, making the field extremely competitive. Proposals were judged on two criteria: the quality and significance of the scholarly activity and, equally important, its value in enhancing women's participation and advancement in science and engineering at the University. A panel of senior U-M scientists and engineers selected the winners.

2004 Crosby award winners

Kate Barald, Cell and Developmental Biology, "Cadherin Molecules and Morphogenesis of the Developing Vertebrate Inner Ear."

Susan H. Brown, Kinesiology, "Sensorimotor Contributions to Age-related Declines in

Limb-Posture Coordination."

Laura Beretta, Microbiology and Immunology, "The Human Proteome Organization."

Lacey Knowles, Ecology and Evolutionary Biology and Zoology Museum, "Tests of the Role of Sexual Selection in the Rapid Diversification of Montane Grasshoppers."

Carolina Lithgow-Bertelloni, Geological Sciences, "Structure and Evolution of the Earth."

Mathilde Peters, School of Dentistry, "Minimally Invasive Techniques for Caries Management."

Elizabeth Petty, Medicine and Human Genetics, "Molecular Mechanisms Underlying Breast Cancer."

Jing Sun, Naval Architecture and Marine Engineering, "Dynamic Reconfiguration and Adaptation of Integrated Power Systems for All-electric Ships."

Mimi Takami, Internal Medicine, "Neuroendocrine modulation of gastrointestinal physiology and pathophysiology."

Margaret Wooldridge, Mechanical Engineering, "The Chemistry of Particle Nucleation."

2004 DeWitt winners

Julie Kaflfikadis, Atmospheric, Oceanic, and Space Sciences, "Variability of Atomic Oxygen in the Upper Mesosphere," and "Dynamical Effects in Stratospheric Aerosols."

Margaret Liu, Ecology and Evolutionary Biology, "Tinman Activity in Heart Development."

The awards are funded by a five-year, $3.7 million grant from NSF, which was given to U-M to develop strategies that will improve opportunities for tenure-track women faculty in scientific and engineering fields. Additional funding was provided by the president's and provost's offices.

The Crosby Research Awards are named for world-renowned neuroanatomist Elizabeth Caroline Crosby (1888-1983), who was the first woman full professor of the U-M Medical School and the first woman to be awarded the Henry Russel Lectureship. She received the Henry Gray Award in Neuroanatomy in 1972 and the National Medal of Science in 1979. Although she retired in 1958, she served as a clinical consultant at U-M and the University of Alabama, and she remained active in scientific work until the end of her life.

The DeWitt Research Awards commemorate Lydia Adams DeWitt (1859-1928), a pathologist and research scientist known for her pioneering work in the chemotherapy of tuberculosis. She earned doctor of medicine and bachelor of science degrees from U-M, and she taught and did research here for some 11 years following graduation. When she was rejected by U-M's all-male Faculty Research Club, she organized the Women's Research Club, serving for a time as its president.

For more information, visit http://www.umich.edu/~advproj/grants.html.

More Stories

- U-M prescription drug plan saves money, slows premium increases

- $8M gift to fund new wing at Kelsey Museum
- Depression Center receives $10M gift, will name building after Rachel Upjohn
- Purchasing task force recommends vendor code of conduct
- Senate Assembly to vote on evaluation committee
- Coleman feted
- Faculty perspective: University raising health care costs for most families and retirees
- A fish tale: Research looks at gobies' effect on ecosystem
- Baseball standout catches award named after two professors
- Periodic Health Appraisal Unit to close doors
- Ulaby accepts Purdue post
- 12 will receive research awards
- With their Will, they made their way
- Spotlight: Roadside hero
- Instruments from Stearns Collection on display at Hill
- Proving their medal
- World's oldest mouse reaches milestone birthday
- Moon named interim dean at U-M-Flint
- Companies benefit by accepting blame for poor performance
- Student research may help astronauts burn fuel on Mars
- Burn Center launches anti-scald campaign
- Archer: 'One person can make a difference'
- Expanded banking services can benefit low-income households
- Childcare subsidies aid the transition from welfare to work
- Singapore summit
- 2004 University Spring Commencement activities
- Don't Miss

Front Page | Accolades | News Briefs | Events | U-M Jobs | Advertise
Archives | Obituaries | Police Beat | Regents Round-up | Research Reporter | Letters | Contact Webmaster

APPENDIX F

List of degrees considered science degrees

Appendix F

List of Degrees of Faculty Included/Excluded as Scientists for the 6 Smaller Schools.

The following tables list all fields of degrees of instructional (tenure), research and clinical track faculty with budgeted appointments in these schools. Faculty holding degrees listed in the "Include" column were deemed scientists; those holding degrees in the "exclude" column were deemed non-scientists for our purposes (and not included in any tables or figures). Those holding degrees in the "individualized" column were looked at on an individual level: their current field of research, as reflected by recent publications and website descriptions, determined their status as scientists or non-scientists.

School of Dentistry:

Include	**Exclude**	**Individualized**
Anatomy Biochemistry Bioengrg & Biomedical Engrg Biology Biometrics And Biostatistics Chemical Engineering Dental Hygiene Dental Specialties Dentistry Dds Or Dmd Degree Genetics Materials Engineering Medicine Md Degree Microbiology Neurosciences Pathology Physical Sciences Physiology	Anthropology Education Medical Record Librarianship Psychology	Public Health

School of Information:

Include	**Exclude**	**Individualized**
Computer & Information Science Computer And Data Processing Elect & Communication Engrg	Economics History Library Science Philosophy Political Science & Government Psychology Social Sciences	Information Sciences & Systems

Division of Kinesiology:

Include	**Exclude**	**Individualized**
Bioengrg & Biomedical Engrg Engineering Neurosciences Physiology Stats, Math & Theory	Business Administration Education Experimental Psychology Marketing And Purchasing	Physical Education

School of Natural Resources:

Include	**Exclude**	**Individualized**
Agriculture & Natural Resource Biology Biometrics And Biostatistics Chemical Engineering Ecology Environmental Science Forestry Marine Biology Natural Resources Plant Physiology Zoology	Agricultural Economics City, Community & Reg Planning Educational Psychology Fine Arts Fish, Game & Wildlife Mgmnt Geography Landscape Architecture Law Political Science & Government Sociology	

College of Pharmacy:

Include	**Exclude**	**Individualized**
Biochemistry Biophysics Cell Biology Chemistry Pharmaceutical Chemistry Pharmacy Physical Chemistry Physical Therapy	Education	Health Serv & Paramedical Tech

Appendix F

School of Public Health:

Include	**Exclude**	**Individualized**
Analytical Chemistry	Anthropology	Environmental Health
Atmospheric Sci & Meteorology	Business Administration	Health Professions
Biochemistry	Clinical Psychology	Public Health
Biological Sciences	Developmental Psychology	
Biometrics And Biostatistics	Economics	
Cell Biology	Educational Psychology	
Chemistry	Geography	
Civil & Construction Engrg	Health Education	
Dentistry Dds Or Dmd Degree	Hospital & Health Care Admin	
Ecology	Law	
Foods, Nutrition And Dietetics	Political Science & Government	
Genetics	Psychology	
Geochemistry	Social Psychology	
Medical Specialties	Sociology	
Medicine Md Degree	Urban Studies	
Microbiology		
Molecular Biology		
Nutrition		
Physics		
Physiology		
Stats, Math & Theory		
Toxicology		

APPENDIX G

Report of 2003-04 Salary Study of One School

Report of 2003-04 Salary Study of One School
University of Michigan
June, 2004

This report is a summary of the findings of a statistical analysis of 2003-04 salaries of instructional faculty from one school at the University of Michigan. The analyses largely followed the methodology of a University-wide salary study, released in 2001, and subsequent analyses by the ADVANCE project in 2002 and 2003.

The following analyses were conducted under the direction of Abigail Stewart in May and June 2004. The study was requested by the school's Dean to assist him in evaluating salary equity in tenure and tenure track faculty salaries for the 2004-05 academic year. Given the findings from previous studies that indicated 1-3% and 3-5% salary discrepancies for women tenure track faculty in the sciences and engineering, the Dean was particularly interested in identifying whether there were continuing and/or new instances of serious salary inequities among women faculty in the sciences and engineering.

In addition to identifying salary inequities, we strive to refine a method of analysis so that administrators may easily monitor the situation for faculty on an on-going basis. This is not an easy task as there are many factors (some more and some less tangible and easily measured) that affect an individual's salary level. Nevertheless, we believe the goal is achievable, and having such a tool would be invaluable to the University.

We took as a starting point the model developed for UM's 2001 report, which used the following factors to predict salary: gender, race and ethnicity, highest degree, year received highest degree, years at UM, school/college, departmental unit affiliation, market ratio, administrative appointments, current rank, years in rank, and the interaction of rank by years in rank (the specific variables are listed in Table 2). However, because of concerns raised in that report that controlling for rank and years in rank might mask gender differences in rates of promotion as well as potential problems associated with redundancy in time measures (e.g., years at UM and years in rank)[1], the ADVANCE project staff created a revised model that included the following variables to predict salary: gender, race, years since degree, years from degree at hire, years in rank, rank, and department (see Table 3 for a listing of the variables). With these two studies as models, and recommendations from *Paychecks* and an expert in the field of salary equity studies (Toutkoushian, 2004), we felt it would be helpful to explore ways to refine and, hopefully, improve the model for use by the ADVANCE project and individual schools.

Please note that this model, like most that can be conducted on administrative data across many units, cannot include any direct estimate of recent productivity (rank, and other variables estimate longterm productivity crudely). This is equally true for all faculty in the equations. To the extent that productivity is equally distributed across all of the other variables represented (race, gender, rank, experience, etc.), its absence does not affect the other coefficients. However, if productivity is more accurately reflected in salary for some groups than others, on a cumulative basis, then the absence of a direct measure of productivity will produce data that are differentially valid for different groups.

It is also important to note that to the extent that gender or race correlate with other predictor variables in the model, the model likely underestimates the impact of gender and race. This problem—of overcorrection for variables correlated with variables of interest—is endemic to assessments of salary equity. That, along with problems of very unequal Ns (of men vs. women and of white faculty vs. faculty

[1] See for example, Haignere, L. (2002). *Paychecks: A guide to conducting salary-equity studies for higher education faculty*, second edition. Washington, DC: American Association of University Professors.

of color), makes it inappropriate to rely too heavily on estimates of statistical significance, or on specific dollar values.

Revised Model for 2003-04 Study

We ultimately developed a regression model that diverges somewhat from that used in the 2001 UM and 2003-03 ADVANCE salary studies. Following is an explanation of those differences.

Salary: Actual salary (in dollar amounts) rather than the natural log of salary was used. Log of salary can be particularly helpful when the range of salaries is large (i.e., if the proportion between the highest and lowest salary is >10), as it produces a more normal distribution (Haignere, 2002). However, the range of salaries in this study did not warrant the use of the natural log and using actual dollar amount makes results easier to interpret. Most faculty salaries are paid over a 9 month period reflecting the academic calendar; salaries for those faculty paid over 12 months were converted to the 9 month base.

Highest Degree: All but three faculty members in this school had achieved the highest degree in their field. The variance of this variable would not be large, so this variable was not included.

Time Variables: The UM model includes two variables assessing time at UM (number of years at UM and number of years in rank (at UM)). Haignere (2002) points out that including both introduces an element of redundancy that should be avoided. In addition, number of years in rank only measures the time an individual has been in their current rank at UM. Thus, if a faculty member is hired as a professor and has been in that rank for 5 years prior to coming to UM, the time variable in the UM database does not include those additional 5 years in the rank of professor. Therefore, we did not include the number of years in rank at UM.

Potential total work experience was assessed with a variable that calculated number of years from year of highest degree to current year; potential work experience prior to UM was assessed with a variable that calculated number of years from highest degree at time of hire; and seniority or longevity at UM was measured by a variable that calculated years at UM prior to current rank. Because these time variables often have a curvilinear relationship to salary, a quadratic term for each of these time variables was included in the initial regression analysis.

Market Ratio: Market ratio was not included as a variable as that information was not readily available. Moreover, Haiegnere (2002) recommends against this strategy because using average market salaries ignores the relative prestige of a given department. Because these analyses were limited to faculty in one school, individual departments were included as individual dummy variables (excluding one) to address salary differences by discipline.

Other Differences: Other variables that were part of the initial salary study but were not included here were sometimes entirely irrelevant (School/College) and sometimes difficult to assess meaningfully: Number of appointments; Medical appointment; and Rank by years in rank interactions. For example, the variable measuring Administrative Appointment was excluded because it should be based on all administrative appointments (past and current) held by each faculty member; our database only contains current appointments. Equally, variables assessing the number of appointments and medical appointments did not successfully capture accurate information about faculty in the college. Finally, since years in rank was excluded, an interaction term including it was irrelevant.

Application of the New Model

All of the variables used in the regression model are listed in Table 4. These measures were used in a regression analysis with data on all tenure track faculty in the one college to assess overall salary equity. The adjusted R^2 for this regression was .698 suggesting that these variables account for 70% of the variance in salary for faculty in this school. Haignere reports that most regression analyses of faculty salary have adjusted R^2 values greater than .50 and above .70 is not unusual (p. 6). Thus, these models in general do a good job predicting salary. Equally, our new model appears to fit our data well.

While not statistically significant, the coefficient for gender in the analysis with this new model was -1220. Because actual salary is the dependent variable in this analysis, that figure is interpreted as the average salary difference between the men and women, with all other variables held constant. These results, then, indicate that tenured and tenure track women in this school, in general, continue to be at a disadvantage relative to their male colleagues in annual compensation and receive, on average, $1,220 less in annual salary compensation than male peers. Given these findings, we decided to try to identify potential individual cases of inequity.

Assessing Individual Inequity

Following Haignere, we applied an approach she calls the "white-male-population salary analysis." This method is recommended to identify what the salary of a person would be if she (or he) were a white man with the same attributes and experiences (see Haignere, p. 42 for a fuller explanation of this analysis). To apply this method we calculated the same regression equation on the white male faculty subsample, with one important exception—this analysis was conducted within particular disciplinary divisions, so that individuals would be compared with white males in their division. We combined the Associate Professor (1-6 years) with the Associate Professor (7+ years) to ensure that a sufficient number of men (at least five) fell into each category (ranks within divisions); otherwise an uncharacteristic male in an individual category could invalidate the results. The race and gender variables were also dropped because they were irrelevant in a model estimating coefficients for white men only. Blocked hierarchical regression analysis was performed for each of the three divisions. Following Haignere, we dropped the quadratic term for "longevity" at UM, because it was not significant in any of the divisional models and excluding it did not significantly change the final results.

Results from these regressions were used to predict salaries for individual faculty members within divisions by multiplying the regression coefficient for each variable by the actual value of that variable for the individual faculty member. These values plus the intercept term were added to produce a predicted salary. Table 1 provides an example of the results for three faculty members in one division, by rank.

Please note that data provided for women and faculty of color offer information about the salary that a person with that individual's characteristics would have if s/he were a white male; it is on that basis that it is considered an estimate of (potential) inequity. We note, though, that other factors besides inequity could lead to differences in these salaries. These include differences in particular fields' average salaries, and cumulative differences in productivity. It is also true that since white men's salaries were the source of the regression coefficients, calculations of individual white men's predicted vs. actual salaries can inform us about the degree to which an actual salary for an individual departs from the regression. Thus, it is also possible to acquire an estimate of individual deviation from the regression within the group of white men, but it is not so clearly an estimate of potential inequity.

Table 1. Predicted Salaries of Individual Faculty Members in One Division Based on the White Male Population Model

	Unstandard-ized coefficients for white male faculty	female assistant professor		female associate professor		male of color professor	
Intercept	58559	1	58559	1	58559	1	58559
Yrs from degree (potential total experience)	1852.24	9	16670	15	27784	20	37045
Yrs from degree (quadratic)	-32.04	81	-2596	225	-7210	400	-12818
Yrs since degree at hire (potential prior experience)	-1524.34	4	-6097	2	-3049	5	-7622
Yrs since degree at hire (quadratic)	62.16	16	995	4	249	25	1554
Yrs at UM prior to rank (longevity)	-2520.48	0	0	6.01	-15137	10.01	-25219
Associate prof (yes/no)	11643	0	0	1	11643	0	0
Professor (yes/no)	44922	0	0	0	0	1	44922
predicted u-yr salary (in dollars)			67531		72838		96422
actual u-yr salary (in dollars)			60781		76793		78643
actual – predicted (in dollars)			-6750		3955		-17779

Of the 37 tenured and tenure track women in this division, 16 (43%) had salaries below what was predicted from these analyses. The monetary differences ranged from $1,942 to over $13,000. Over half (10) of these women earned salaries lower than that predicted for white men with the same attributes by over $5,000; the average difference was $7,138. The 16 whose salaries were lower than predicted were represented in all ranks. Six (6) were at the full professor level; 4 were associate professors; and 6 were assistant professors. Further, the 16 women were from 6 of the 8 departments, with 4 of the departments having most (14) of the women with lower than predicted salaries.

Table 2
Variables used in Regression
2001 UM Gender Salary Study

Ln Salary	Natural logarithm of salary (adjusted to 9 months)averaged across appointments
Gender	Female=1
Race	Asian, Pacific Islander=1 Under-represented Minority=1
Degree Date	Date of highest degree
Years at UM	1999-instructional entry date
Highest Degree	Holds doctorate or other appropriate terminal degree=1
Departmental Units	Dummy variables were constructed for 29 departmental unit affiliation categories
Market Ratio	Natural logarithm of average market ratio across appointments. Market ratio was calculated as average salary at peer institutions for given field and rank divided by average peer salary of all fields for given rank.
Number of Appointments	Two appointments=1 Three or more appointments=1
Medical Appointment	=1
Administrative Appointment	=1
Rank	Professor=1 Associate Professor 1-6 years=1 Associate Professor 7+ years=1
Years in Rank	based on highest rank
Rank by Years in Rank Interaction	Professor by Years in Rank Associate Professor 1-6 years by Years in Rank Associate Professor 7+ years by Years in Rank
School/College	Medical school not included

Table 3
Variables in Regression
2002-03 Study of Faculty Salaries in One College
ADVANCE Project

Salary	salary (adjusted to 9 months)
Gender	Female=1
Race	Asian, Pacific Islander=1 Under-represented Minority=1
Years since Degree	2003-year of final degree; this variable was centered and the quadratic term was also included
Years from Degree at Hire	Number of years since degree at time of hire; this variable was centered and the quadratic term was also included
Years in Rank	Number of years in current appointment; this variable was centered and the quadratic term was also included
Rank	Professor=1 Associate Professor 1-6 years=1 Associate Professor 7+ years=1
Department	Dummy variables were constructed for 24 of the 25 departments; program was also included for those faculty who did not have a departmental appointment. One department was the excluded category.

Table 4
Variables in Regression
2003-04 Study of Faculty Salaries in One College
ADVANCE Project

Salary	salary (adjusted to 9 months)
Gender	Female=1
Race	Asian, Pacific Islander=1 Under-represented Minority=1
Years from Highest Degree	Measures potential total work experience Current year (2004) minus year highest degree earned; this variable and its quadratic term were included
Years since Highest Degree at Time of Hire	Measures potential work experience prior to UM Year hired at UM minus year highest degree earned; this variable and its quadratic term were included
Years at UM prior to Current Rank	Measures longevity or seniority at UM Date of entry into current rank minus date of hire (divided by 365 to convert days into years); this variable was included in the final model but not its quadratic term
Rank	Professor=1 All Associate Professors=1
Department	The departments were included as dummy variables in the overall school regression analysis but not in the separate division analyses.
Division	The data were analyzed separately by division for the "white male population" models.