ADVANCEMENT OF WOMEN THROUGH THE ACADEMIC RANKS OF THE COLUMBIA UNIVERSITY GRADUATE SCHOOL OF ARTS AND SCIENCES: WHERE ARE THE LEAKS IN THE PIPELINE?

The Commission on the Status of Women

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EXECUTIVE SUMMARY

Over the last decade, there has been progress toward gender equity within the Arts and Sciences at Columbia University. In 1990, women represented 30.8% of the tenure-eligible faculty; by 2000, this had risen to 33.3%. Over the same time period, representation of women among the tenured faculty rose from 13.2% to 19.9%. Some specific departments where women were underrepresented at the start of the study period have moved toward equity at rates far faster than these averages.

Although there has been progress, it has been slow and unevenly distributed, especially over a time that saw a nationwide increase in women completing Ph.D.s in many disciplines. This pipeline study attempts to identify the choke points in the system, the points where women do not seem to be making the same gains as do men in progressing through the academic system, attaining Ph.D.'s, attaining entry-level jobs, and attaining tenure.

We note the following areas of concern:

- Among Ph.D. students, we see a higher level of attrition among women than men in all divisions of Arts & Sciences. Female-rich attrition occurs both early and late in the graduate student career, among both funded and unfunded students. This problem does not appear to be improving over time.
- For the tenure-eligible faculty ranks, we see a leak in the pipeline at the entrance to the applicant pool. Compared to national availability data, or to Columbia's own Ph.D. production rate, Columbia is attracting substantially less than its share of female applicants for junior faculty jobs. Once within the applicant pool, women are hired at an equitable rate.
- For entry into the tenured ranks, we find that the promotion process has contributed toward improving the gender balance of the tenured faculty, but the process of hiring from outside directly into tenure has not. External hires into tenured positions in Social Sciences and Natural Sciences are only half as likely to be female as are candidates promoted from within the University. This is important, because fully half of all new appointments to tenure come from outside Columbia. The imbalance is particularly bad for "targets of opportunity" (applicant pool of one) within the Natural Sciences; eleven male and zero female scientists were hired through this mechanism over the decade studied.

We also note that management decisions taken without consideration of gender balance may have unintended gender consequences. Over the decade of our study period, progress toward gender equity seems closely linked to expanding faculty size in a given unit. Departments, divisions, and ranks that are growing in overall number of faculty have had the most success in moving toward gender equity, while areas that have diminished in size have in some cases actually decreased their percentage of women. Consequently, as the demographics of the faculty shift, from division to division, department to department, untenured to tenured, special care must be taken to ensure that such shifts do not inadvertently retard progress toward gender equity.

This study concludes with recommendations for action and for further study. In brief, we recommend that the University:

- extend the pipeline study to other parts of the University, and to possible causative factors, such as inequity in workload and non-salary support;
- identify and rectify the causes of Ph.D. student attrition, through exit interviews with departing students, a stronger support system for first-year students, and examination of longitudinal data to identify pressure points;
- proactively recruit qualified women to apply for entry-level faculty jobs at Columbia, and examine factors that may be discouraging women from applying for Columbia jobs;
- bring the gender ratio among external hires into the tenured ranks into line with the gender ratio of promotions from within the University.

1. INTRODUCTION

In the spring of 1998, the Commission on the Status of Women, working with the Office of Institutional Research, began to collect data on women's progress through the academic pipeline at Columbia. Loosely modeled on the University of Michigan study of 1996, this effort represents an attempt to chart the relative success of men and women progressing through the academic ranks: earning degrees, attaining faculty posts, advancing to tenure, receiving benefits and support from the institution, and maintaining a manageable workload.

Invaluable staff support has been provided to the Commission by Lucy Drotning of the Office of Institutional Planning and Research.

Scope of the present report

Addressing all relevant pipeline issues for women in all divisions of the University was a task that the Commission and one research staff member could not accomplish in one or two years. We therefore constrained the initial scope of the study to two areas. On the matter of earning degrees, we looked at attrition rate of students enrolled in Ph.D. degree programs and within the Arts & Sciences. With respect to recruitment to and advancement through the faculty ranks, we looked at faculty in the Arts & Sciences (exclusive of the School of the Arts).

Additional crucial pipeline issues remain to be studied. These include: male versus female attrition among undergraduates, masters candidates, and professional school students; recruitment to and advancement through the faculty ranks of the professional schools; male versus female likelihood of success at tenure review; gender equity in distribution of workload; and gender equity in receipt of benefits and support from the University.

Organization of the report and definitions

This report begins with an examination of the current demographics of the Arts & Sciences student body and faculty and the demographic trends over the last decade (1990–2000). We then work upward through the academic ranks looking for leaks in the pipeline, beginning with graduate student attrition, continuing with hiring into tenure-eligible positions, followed by promotion/recruitment into the tenured ranks. Following this vertical slice through the data, we take

a horizontal slice, emphasizing the importance of microclimates in individual departments or divisions. The report concludes with recommendations for both further work and changes to procedures and policies.

Some data is reported according by "division." Exhibit 1 defines which departments make up each division. In the discussion of faculty, "tenure-eligible faculty" includes instructors, assistant professors, and associate professors without tenure. "Tenured faculty" includes associate professors with tenure and full professors. Adjunct or visiting faculty and professors without tenure are not included in the study.

2. DEMOGRAPHICS

Student body

The undergraduate and graduate student bodies are both close to 50:50 men:women, integrating across the Arts & Sciences, and not counting Barnard or SEAS. Following the admission of women to Columbia College in 1983–1984, the percentage of women in the college expanded rapidly until approximately 1990. Since 1990, the percentage of women in Columbia College and among the Arts & Sciences graduate students has risen slowly, approximately half a percent per year.

Not surprisingly, given the national trends, the gender makeup of the student body varies from division to division (Exhibits 2, 3, and 4). Of the divisions, Humanities has the largest percentage female graduate students and female majors/concentrators (both approximately 60%). Social Sciences (approximately 47%) and Natural Sciences (50% undergrad majors/concentrators and 33% grad) have lower percentages.

The trend lines for female representation tend upward in all of the divisions, for both graduate students and undergraduate majors/concentrators (Exhibits 2, 3 and 4). The increases are slow but steady, in the range of 1–10 % change over the interval from 1990 to 2000.

In Humanities and Social Sciences, the trend lines for undergraduate and graduate female percentages (Exhibits 2 and 3) track within a few percentage points of each other. But in Natural Sciences (Exhibit 4), there is a persistent gap of 17–22 percentage points between graduate and undergraduate female representation (1990: 50% women among undergrad majors/concentrators versus 30% women among grad students; 2000: 50% women undergrad majors/concentrators versus 33% women grad students). Is this part of a national trend, or is it possible that Columbia's Natural Sciences departments are underrecruiting women for their graduate programs?

Faculty

Exhibit 5 gives a snapshot of the women's position on the Arts & Sciences faculty in academic year 2000. The higher the rank, the lower the number of women in that rank: 17% of tenured full professors were female; 33% of associate professors; 35% of assistant professors; as contrasted with 62% of lecturers and associates. In the non-tenure-eligible ranks of lecturer and associate, women outnumber men. In the tenure-eligible and tenured ranks, men outnumber women. Note that there are approximately as many full professors (N=292) as all of the other full-time instructional ranks combined (N=304), so that the male-rich gender ratio at the top of the hierarchy weights the entire faculty toward a more disproportionate gender ratio.

In keeping with the national trends, women are best represented among the Humanities faculty, less abundant in the Social Sciences, and least represented in the Natural Sciences (Exhibits 2, 3, and 4). This hierarchy of Humanities>Social Sciences>Natural Sciences is found at both the tenure-eligible and tenured ranks, and has persisted over the decade covered by this study.

Looking back over the last decade, the percentage of women among the tenure-eligible faculty in all of the Arts & Sciences stagnated at around 30% female between 1990 and 1997, and then rose slightly to 33% (58/174) by 2000 (Exhibit 6). This rate of increase seems very slow given the influx of young women into the Ph.D.-bearing ranks across the country during this decade. In the Humanities (Exhibit 7), tenure-eligible faculty dropped very slightly from 44% to 43% women, as the total number of tenure-eligible professors shrink from 91 to 54. In the Social Sciences (Exhibit 8), the junior faculty went from 19 women (32%) in 1990 to 20 women (36%) in 2000. Almost all of the gain in tenure-eligible women was achieved in Natural Sciences (Exhibit 9), which started at a low baseline of 5 women (9%) in 1990, and rose to 15 women (23%) by 2000.

Among the tenured faculty across all of the Arts & Sciences, both the percentage and number of tenured women increased slowly but surely between 1990 and 2000, from 13% (39/296) to 20% (68/341). This occurred in the context of an expanding tenured faculty (Exhibit 6). In the Humanities (Exhibit 7), the number of tenured women grew from 19 to 31, resulting in a tenured faculty that was 25% female by 2000. In the Social Sciences (Exhibit 8), the number of senior women grew from 12 to 24, while the senior faculty as a whole went from 91 to 101, resulting in a tenured faculty that was 23% women by 2000. In the Natural Sciences (Exhibit 9), the number of tenured women was 8 in 1990, dropped to 6 in 1994, got out of single digits in 1998, and reached 13 (11%) in 2000.

Relationship between gender balance and growth rate

Over the 1990–2000 study interval, those components of the faculty that experienced overall growth in number of individuals have generally made substantial progress toward gender balance:

- total A&S tenured faculty (296 → 341 individuals; 13% → 20% women)
- Humanities tenured faculty (109 → 122 individuals; 17% → 25% women)
- Social Sciences tenured faculty (91 → 103 individuals; 13% → 23% women)
- Natural Sciences tenure-eligible faculty (57 → 64 individuals; 9% → 23% women)
- Natural Sciences tenured faculty (96 → 116 individuals; 8% → 11% women)

On the contrary, those elements of the faculty where the total number of individuals has decreased have generally[*] been less successful in moving toward gender balance:

- total A&S tenure-eligible faculty (208 → 174 individuals; 31% → 33% women)
- Humanities tenure-eligible faculty (91 → 54 individuals; 44% → 42% women)

[*] Social Sciences tenure-eligible faculty presents a mixed trend. From 1990 to 1997, the pattern held: 60 → 58 individuals; 32% → 24% women. But from 1997 to 2000, the trend reversed: 58 → 56 individuals; 24% → 36% women)

This association between faculty growth rate and progress toward gender balance reflects the reality that the easiest way to change a gender balance is through new hires, and new hires happen more frequently in growing departments and divisions. This reality needs to be taken into account when allocating new faculty lines.

The other way to change a gender balance is through disproportionate gender balance in faculty departures. The current study did not examine the gender ratio of faculty leaving Columbia; this should be done.

Relationship among gender, rank, and disciplinary balance

Columbia's progress in advancing the percentage of women in the graduate student and faculty ranks over the 1990–2000 interval must be considered in the context of the changing disciplinary and rank balance of the Arts & Sciences over this time interval.

Between 1990 and 2000, both the Ph.D. student body and the faculty became less Humanities-heavy. In 1990, the Ph.D. student body was 44% Humanities (1212/2761), 38% Social Sciences (1033/2741), and only 18% Natural Sciences (516/2761). By 2000, Humanists were down to 41% of the graduate student body (949/2292), Social Scientists down to 36% (834/2292), and Natural Scientists had increased to 22% (509/2292). A shift of comparable magnitude out of Humanities occurred in the faculty. In 1990, the total tenured + tenure-eligible Arts & Sciences faculty was 40% Humanities (200/503), 30% Social Sciences (150/503), and 30% Natural Sciences (153/503). By 2000, Humanists were down to 34% (176/515), while Natural Scientists were up to 35% (180/515); Social Scientists held nearly steady at 31% (159/515). To the extent that women have a stronger presence in Humanities than in the Social or Natural Sciences, this shift in disciplinary balance has made it harder to achieve a substantial increase in the overall number or percentage of women.

Over this same interval, the tenured:tenure-eligible ratio among the faculty shifted toward the tenured. In 1990, 59% of the tenured + tenure-eligible faculty had tenure (296/504). By 2000, the percentage had risen to 66% (341/515). Because of the relatively recent entry of substantial numbers of women into some A&S disciplines, the available pool of qualified women in some fields remains small at the tenured level. Thus the shift toward a more heavily tenured faculty has probably worked against the effort to increase the overall number and percentage of women in the faculty.

Comparison of student versus faculty gender ratios

In considering gender balance among the faculty, one tough question is, What should the goal be; what would be a fair or desirable ratio of women to men on the faculty?

One possible way to answer this question is to say that the gender ratio among the faculty in any division should approximate the gender ratio among the graduate students in the same disciplines. At a school like Columbia, which trains Ph.D. students for careers in academia, the percentage of women among the graduate students is an indicator of how many women aspire to, and are appropriately trained for, careers as professors. Furthermore, a faculty gender ratio approximating the student gender ratio facilitates mentoring relationships among that subset of students who prefer a mentor of their own gender.

Progress toward this goal would be represented by convergence between the faculty lines and the Ph.D. student lines in Exhibits 2, 3, and 4. By this measure, Columbia has a long way to go (Exhibit 10). The gap between female representation in the graduate student body and that in the tenured faculty is 28 percentage points, ranging from 22% in Natural Sciences to 33% in Humanities. This situation is not improving very quickly: back in 1990, the gap was 32%. For tenure-eligible faculty, the gap is smaller but still substantial (15%). In Social Sciences and Humanities, the gap between female representation among tenure-eligible faculty versus graduate students has actually increased between 1990 and 2000.

One bright point in the picture is the rapid convergence between the percentage of women among Natural Sciences tenure-eligible faculty and graduate students, shrinking a 21% gap down to a 10% gap between 1990 and 2000 (Exhibits 4 and 10). In light of the comments above about growth rate, it may be significant that the Natural Sciences is the only division where the number of tenure-eligible faculty did not shrink over the study period.

Summary of demographics and trends

Columbia's Graduate School of Arts & Sciences has made some progress over the last decade in increasing the participation of women in the undergraduate and graduate student body, and in the tenure-eligible and tenured faculty. The student body now approximates a 50:50 male:female ratio, which is probably a healthy and desirable situation. Among the faculty, women are less represented at higher ranks than in lower ranks, and less represented in the Natural Sciences than in the Humanities or Social Sciences, reflecting the national trends. The representation of women in the faculty still lags far behind that which would be expected or desired, given the influx of women into Ph.D. programs and professions across America in the last quarter century. In general the trend lines for representation of women among the faculty are not close to converging with the trend lines for representation of women among the Ph.D. students in similar disciplines. Progress in advancing the number and percentage of women in the tenure-eligible non-tenured ranks has been especially slow, even more so than for the tenured ranks.

RECOMMENDATIONS ARISING FROM EXAMINATION OF DEMOGRAPHICS

- As a target for monitoring progress toward achieving gender balance among the faculty, Columbia should aim for a convergence between the trend lines for percentage of women among the Ph.D. students and percentage of women among the faculty in similar disciplines. This metric self-corrects for the differing representation of women from discipline to discipline.
- It must be recognized that in a population where women are unevenly distributed, decisions that appear to be gender-neutral may in fact have gender-balance consequences. For example, it seems likely that the shift toward a more fully tenured and less Humanities-rich faculty has slowed Columbia's efforts to achieve a more gender-balanced faculty overall. In the future, the potential gender-balance consequences of any such policy changes should considered in advance rather than discovered retrospectively.
- Examine possible causes for the persistent 20% gap between the percentage of women among Natural Science undergraduate major/concentrators and the percentage of women among graduate students in the same disciplines. Is this part of a national

pattern, or might it be possible that the Natural Sciences are underrecruiting women for their graduate programs?

3. ATTRITION OF GRADUATE STUDENTS

We examined attrition rate of male versus female Ph.D. students at two points in the pipeline, one year into their graduate studies, and seven years after matriculation.

First year attrition is interesting from both the perspective of cause and potential cure. Students who leave in the first year are probably doing so of their own volition; few departments have an up or out hurdle this early in the graduate student career. Thus first year attrition numbers can be considered a measure of student unhappiness, rather than a measure of student performance. Departments, divisions and GSAS have (or could potentially have) quite a bit of influence over the first year graduate experience, when students tend to follow a somewhat prescribed pathway through orientation activities and coursework. The later part of the graduate experience, after students have dispersed to their individual scholarly endeavors, is much less amenable to any sort of intervention that might be attempted at the department, division, or school level.

Exhibit 11 shows the attrition of doctoral students one year into their graduate studies, as of the fall of 2000. In all divisions, women left the Ph.D. program at rates two or three times larger than their male classmates. Nineteen percent of female Humanities students left the program within one year, 13% of Social Sciences women, and 15% of Natural Sciences women. The comparable figures for men were 7%, 5% and 4%. Across all divisions, the cohort began with a male: female ratio of 192: 145, or approximately 4:3. After only one year, 23 women (and 10 men) had left the program and the ratio had deteriorated to 182:122, or approximately 3:2.

By seven years post-matriculation, a student making good progress should have graduated. Thus we took the percentage of students who had matriculated in 1993, but had neither graduated nor registered for further study in the fall of 2000, as an indicator of "ultimate attrition" of Ph.D. students. The class which entered in 1993 was the oldest cohort for which data were available, and the way in which the data were compiled did not allow us to identify whether there might be students who were on formal leave-of-absence, who might complete their Ph.D. eventually. In any case, the available numbers show students who had failed to achieve their original objective of obtaining a Ph.D. in a reasonable length of time (7 years).

Within these caveats, Exhibit 12 indicates the attrition of doctoral students seven years post-matriculation, as of the fall of 2000. Once again, we see a consistent pattern: attrition for women in all divisions was apparently higher than for their male classmates. Forty-six percent of female Humanities students had neither graduated nor re-registered seven years after matriculation, 44% of Social Sciences women, and 33% of Natural Sciences women. The comparable numbers for men were 35%, 39%, and 28%. Across all divisions, the cohort began with a male: female ratio of 207:202, or nearly 1:1. After seven years, 71 men and 86 women had not achieved their objective of obtaining a Ph.D..

We note that the imbalance between male and female attrition rates pertains across all three divisions. Although Natural Sciences, with its smaller percentage of women students and women faculty, has a reputation for being inhospitable to women, the male versus female attrition rates for Natural Science students are not notably worse than for Humanities or Social Sciences.

We considered whether funding status might influence a student's likelihood of dropping out. Exhibit 13 shows the interaction between funding status and attrition rate for the cohort that entered in 1993. In the 1993 Humanities cohort, women were much more likely to be unfunded than men (52% men funded versus 39% women funded), and not surprisingly, unfunded students were much more likely to drop out than funded students. But even when comparing just those Humanities students who did have funding, attrition among female students was much higher than among male students (32% attrition among funded woman versus 19% attrition among funded men). In the 1993 Social Sciences cohort, a higher percentage of women than men were funded. The attrition rate among funded men and women was comparable; the attrition rate among unfunded Social Sciences women was higher than for unfunded Social Sciences men (57% versus 46%). In Natural Sciences nearly all Ph.D. students are funded.

We wished to examine whether women's attrition rates have improved through time, in parallel with women's general advancement throughout society. Unfortunately, the data we had available covered only one snapshot in time, the fall of 2000. From the data in hand, we can say that M/F attrition rates to date in the cohort that entered in the fall of 1999 (Exhibit 11) are even more lopsided than the cohort that entered in 1993 (Exhibit 12). This observation is alarming, but inconclusive, given the differing pressures on first-year versus end-game graduate students, and the changing demographics of the GSAS student body. A far preferable data analysis would be to follow individual cohorts of students longitudinally, graphing and tabulating the number of students remaining registered, graduated, and attrited versus year since matriculation. This approach would allow identification of when pressure point in the pipeline occur, which would be a more informative starting point for a discussion of potential interventions. In addition, this approach would help us understand whether we are making progress as an institution: is there evidence that female students in recently matriculated cohorts are faring better than cohorts from 5 or 10 years ago?

RECOMMENDATIONS CONCERNING GRADUATE STUDENTS

- Extend the study of student attrition to undergraduates, masters students, and professional school students
- Institute exit interviews or questionnaire for students leaving the Ph.D. program. A standard set of questions should be asked, and the data should be tabulated in a way that can be compared across divisions and across cohorts.
- Examine and strengthen the support structure for first-year Ph.D. students, including orientation activities, first year course of study, and the mechanism for matching student with advisor.
- Recompile the data on graduate student attrition into a form that will allow individual entering cohorts to be tracked longitudinally.

- Examine longitudinal data for pressure points: are there points in the student trajectory where attrition of female students preferentially occurs, cohort after cohort?
- Compare longitudinal data across cohorts for evidence of change over time: is there evidence that female students in more recent cohorts are faring better than the cohorts from 5 or 10 years ago?

4. HIRING INTO THE TENURE-ELIGIBLE RANKS

We examine two aspects of hiring into the tenure-eligible ranks: (1) is the influx of new hires into the tenure-eligible ranks working toward better gender balance? And (2) does the selection of new hires favor or disfavor women?

Gender balance of new hires versus existing faculty

Exhibit 14 compares the gender balance of new hires against the gender balance of existing tenure-eligible faculty, by time slice and by division. For any given segment of the university and time slice, if the percentage of women among the new hires is larger than the percentage of women in the existing tenure-eligible faculty, then the new-hire process is, on net, working toward improving the gender balance of the faculty. Integrating across all of Arts & Sciences, the influx of new hires has been very slightly (1–4%) more female-rich than the standing stock since 1993. This average masks a substantial variation from division to division: since 1993, Humanities has consistently brought in a substantially (2–19%) more female-rich group than their standing stock; whereas Natural Sciences has brought in a group of new hires which is less female-rich (by 1–7%) than their standing stock.

It is not obvious at first glance how to reconcile the data in Exhibit 14 with the observation that the percentage of tenure-eligible women has increased substantially in Natural Sciences (Exhibit 9) and hardly budged in Humanities (Exhibit 7). How can Humanities consistently bring in a more female-rich group of new hires than their existing tenure-eligible faculty, and yet not succeed in raising the percentage of women among their tenure-eligible faculty? And how can Natural Sciences consistently bring in a less female-rich group of new hires than their standing stock, and yet achieve a dramatic (Exhibit 9) increase in percentage of women in the tenure-eligible ranks? As illustrated graphically in Exhibit 15, the answer may lie in the fluxes out of the tenure-eligible ranks, by promotion to tenure and by departures from the University. That a male-rich outflux from the tenure-eligible ranks in Natural Sciences could have occurred is supported by the observation (Exhibit 9) that the number of tenure-eligible men in that division decreased from 52 to 49 between 1990 and 2000. That a relatively female-rich outflux from Humanities could have occurred is supported by the observation (Exhibit 7) that the tenure-eligible women in that division decreased by 43% (17 lost out of 40 initially), while the tenure-eligible men decreased by only 39% (20 lost out of 51 initially). Departures from the faculty ranks were not examined in the current study, but must be a priority for the next phase of the project.

Gender balance of new hires versus applicant pool and availability pool

Exhibits 16 and 17 compare the percentage of women among the group of new hires with that of the applicant pool from which they were selected. Looking first at the 1999–2000 time slice

(Exhibit 16 top; Exhibit 17), we see that female applicants have done well in the competition for Columbia tenure-eligible positions. Integrating across Arts & Sciences, a new-hire group comprising 34% women was selected from an applicant pool that was only 23% female. Both Social Sciences and Natural Sciences selected a group of new hires that was more female-rich than the applicant pool.

However, when we compare the percentage of women in the applicant pool with the percentage in the national availability pool (Survey of Earned Doctorates, NSF, 1975–1998), we find that Columbia is attracting less than our share of female applicants. In Natural Sciences, for example, Columbia's applicant pool in 1999–2000 was less than half as female-rich as the national availability pool (14% versus 39%). In Humanities and Social Sciences the discrepancy was in the same direction, although not as extreme.

This pattern has been amazingly robust over time (Exhibit 16, bottom). In every time slice since 1990, women applicants have been hired into Columbia's tenure-eligible ranks at rates higher than their representation in the applicant pool. But, at the same time, women have been substantially underrepresented in the applicant pools, relative to the national availability pools.

We considered the possibility that the national availability pool data might not be the appropriate basis for comparison. For example, it was suggested that the highest-quality Ph.D. programs, from which Columbia likes to select its junior faculty, might be less female-rich than the national availability pool. As a proxy for the Ph.D. production rate at Columbia-caliber universities, we considered Columbia's own Ph.D. production rates (Exhibit 16, table, far right column). The percentage of women among Columbia's own Ph.D. recipients in the preceding years differs slightly from the national availability pool, but is still substantially higher than in the applicant pools.

There could be many reasons why women are underrepresented in Columbia's applicant pools. Something about Columbia's history, location, or reputation could be off-putting to potential applicants. The observation that women are overselected from among the applicant pool could mean that self-selection and/or different recruiting practices have prefiltered out a smaller but higher-caliber group of female applicants than male applicants. Columbia's true availability pool could differ from the national availability pool, for example, by being more international or more geographically mobile. Developing and testing hypotheses about the apparent discrepancy between the availability pool and the applicant pool should be a priority for the next phase of the pipeline study. Fruitful lines of inquiry would be to compare Columbia's statistics with those for other elite, international Universities, to compare Columbia's statistics against those for other New York City universities, to record and examine the point of initial contact for applicants (advertisement, professional society meeting, personal contact through a faculty member at student's university, etc.), and to dig deeper into the meaning of the "national availability pools."

5. ENTRY INTO THE TENURED RANKS

With respect to entry into the tenured ranks, we consider three pathways of entry: internal promotion through the tenure review process, external hire through competitive selection, and "target of opportunity" hiring. "Targets of Opportunity" are identified as external hires for which the applicant pool, as reported to the Affirmative Action Office, comprises one person.

Concerning internal promotions, we would like to be able to ask: are male and female candidates equally likely to be successful in the promotion-to-tenure process? A subcommittee of the Provost's Salary Equity Committee was charged with tackling this complex question, and therefore it was excluded from the scope of this CSW Pipeline Study. We urge that the promotion study be updated with accepted and transparent methodology, and that the methodology, results, and supporting data be disseminated to the University community.

The data available to us do permit us to ask a simpler question: is the promotion-to-tenure process, on net, serving to bring the gender ratio of the tenured faculty more nearly into balance? Exhibits 18 and 19 show that the answer is yes. For all of the Arts & Sciences, and for each division considered individually, the flux of new blood entering the tenured ranks via internal promotion is more female-rich than that of the standing stock of existing tenured faculty.

A similar comparison can be made for external hires (Exhibits 18 and 19). Here the picture is mixed. In the Humanities, external hires and promotees have both been 40% female, much higher than the ratio within the existing tenured faculty. But in Social Sciences and Natural Sciences, the percentage of females among the external hires is substantially lower than among the promotees, and the external hires have not helped the gender balance. This is an important point, because fully half of the new appointments in Columbia's tenured ranks arrive through external hire rather than through promotion (88 promotees versus 87 external hires between 1990 and 2000 across all of the Arts & Sciences). A particularly egregious data point concerns "target of opportunity" hires in Natural Sciences (Exhibit 18, lower right): eleven natural scientists were hired into the tenured ranks without competitive searches, and not a single one of them was female.

A complete picture of the fluxes and populations of male and female faculty should include fluxes out as well as in (Exhibit 19, bottom), i.e., retirements and departures from the University. Given the relatively recent entry of substantial numbers of women into many academic disciplines, the outflux due to retirement is probably more male-rich than the tenured population as a whole. The outflux through departures to other universities at the tenured level could also plausibly be more male-rich; this hasn't yet been studied. Male-rich outfluxes from a male-rich population will tend to drive the population toward a more even gender ratio, and this process could explain some fraction of the progress toward an increasing percentage of women in the tenured faculty (Exhibit 6).

RECOMMENDATIONS CONCERNING THE FACULTY PIPELINE

- Extend the faculty pipeline study to the professional schools
- Develop and test hypotheses concerning low representation of women in Columbia's tenure-eligible applicant pools: comparison with other elite universities, other NYC universities, etc.
- Recruit women proactively for tenure-eligible positions. Scrutinize the makeup of each applicant pool, as well as consider whether women *in* the applicant pool were fairly considered.
- Update the study of the success rate of male and female candidates for promotion to tenure, with accepted methodology, and disseminate the methodology, results, and supporting data to the University community.
- Scrutinize every external hire into a tenured position, especially in the Social Sciences and Natural Sciences, seeking to improve upon the record of the last decade in which external hires had a gender balance only half as female-rich as internal promotions in these divisions.
- Investigate the gender balance of fluxes out of the faculty: by retirement, death, and for other jobs, at tenured and tenure-eligible levels.

6. THE IMPORTANCE OF MICROCLIMATES

School-wide trends, or even trends by division, mask significant department-to-department variation. It is within individual departments that hiring decisions originate, and where women and men have the majority of their day-to-day interactions. Some microclimates are more or less chilly for females, both students and faculty.

Exhibit 20 is an example of a large department that has made negative progress toward achieving gender balance over the last decade. In this department, the number of tenured women, the number of tenure-eligible women, the percentage of tenured women, and the percentage of tenure-eligible women, all dropped between 1990 and 2000. What would a reasonable percentage of women in this department be? Is it possible that this department already had achieved a good gender balance back in 1990 and is now fluctuating about an appropriate plateau? No. Exhibit 21 demonstrates that both the graduate student body and undergraduate major/concentrators have been maintaining at approximately 60% female in this department for a decade or longer, while the percentage of women in the tenured faculty of this department has remained stuck at less than half that.

Exhibits 22 and 23, in contrast, portray an example of a department of similar size that has made positive net progress over the last decade, increasing both number and percentage of women among both the tenure-eligible and tenured faculty. The gap between percentage of women in the tenure-eligible faculty and percentage of women in the student body has collapsed over the last few years.

In light of our earlier finding on the relationship between gender balance and growth rate, it may not be coincidence that the department in the first example decreased in size over the study period,

while the department in the second example achieved its improvements in the representation of women during 1996–2000, a period of growth in departmental size.

Exhibit 24 lists departments that made substantial progress on improving the representation of women in their tenured and tenure-eligible ranks between 1990 and 2000—and departments that did not. The majority of Arts & Sciences departments are somewhere in the middle, with either little change or a mixed message. This could mean a department that has had no hiring opportunities—or a department which has failed to take advantage of the growing availability of women in its field. Graphs and tables such as Exhibits 20–23 for all of the A&S departments are forthcoming on the World Wide Web at www.columbia.edu/cu/senate.

RECOMMENDATIONS CONCERNING MICROCLIMATES

- Disseminate the department-by-department data on faculty and student gender balance over time, 1990–2000, to allow individual departments to evaluate their own standing and progress.
- In allocating new faculty lines, the administration and the favored departments/divisions must realize that the opportunity to achieve gender balance for the entire University lies preferentially with departments that are growing. These opportunities cannot be allowed to be squandered.
- Conversely, when it is considered necessary to reduce the faculty size in a given department or division, precautions should be taken to ensure that this shrinkage does not occur by differential elimination of females.

7. SUMMARY OF RECOMMENDATIONS

We conclude by summarizing all of the recommendations coming forward from our study, both for actions and policies and for further study.

RECOMMENDATIONS FOR ACTIONS AND POLICIES

- As a target for monitoring progress toward achieving gender balance among the faculty, Columbia should aim for a convergence between the trend lines for percentage of women among the Ph.D. students and percentage of women among the faculty in similar disciplines. This metric self-corrects for the differing representation of women from discipline to discipline.
- Recognize that in a population where women are unevenly distributed, decisions that appear to be gender-neutral may in fact have gender-balance consequences. In the future, the potential gender-balance consequences of any such policy changes should considered in advance rather than discovered in retrospect.
- Institute exit interviews or questionnaire for students leaving the Ph.D. program. A standard set of questions should be asked, and the data should be tabulated in a way that can be compared across divisions and across cohorts.

- Examine and strengthen the support structure for first-year Ph.D. students, including orientation activities, first year course of study, and the mechanism for matching student with advisor.
- Recruit women proactively for tenure-eligible positions. Scrutinize the makeup of each applicant pool, as well as consider whether women *in* the applicant pool were fairly considered.
- Scrutinize every external hire into a tenured position, especially in the Social Sciences and Natural Sciences, seeking to improve upon the record of the last decade, in which external hires had a gender balance only half as female-rich as did internal promotions in these divisions.
- Disseminate the department-by-department data on faculty and student gender balance over time, 1990–2000, to allow individual departments to evaluate their own standing and progress.
- In allocating new faculty lines, the administration and the favored departments/divisions must realize that the opportunity to achieve gender balance for the entire University lies preferentially with departments that are growing. These opportunities cannot be allowed to be squandered.
- Conversely, when it is considered necessary to reduce the faculty size in a given department or division, precautions should be taken to ensure that this shrinkage does not occur by differential elimination of females.

RECOMMENDATIONS FOR CONTINUED STUDY

- Examine possible causes for the persistent 20% gap between the percentage of women among Natural Science undergraduate major/concentrators and the percentage of women among graduate students in the same disciplines. Is this part of a national pattern, or might it be possible that Columbia's Natural Sciences are underrecruiting women for their graduate programs?
- Extend the study of student attrition to undergraduates, masters students, and professional school students.
- Recompile the data on graduate student attrition into a form that will allow individual entering cohorts to be tracked longitudinally. Examine longitudinal data for pressure points: are there points in the student trajectory where attrition of female students preferentially occurs, cohort after cohort? Compare longitudinal data across cohorts for evidence of change over time: is there evidence that female students in more recent cohorts are faring better than the cohorts from 5 or 10 years ago?
- Extend the faculty pipeline study to the professional schools.
- Develop and test hypotheses concerning low representation of women in Columbia's tenure-eligible applicant pools: comparison with other elite universities, other NYC universities, etc.
- Update the study of the success rate of male and female candidates for promotion to tenure (previously performed by the Committee on Salary Equity), and disseminate the methodology, results, and supporting data to the University community.

- Investigate the gender balance of fluxes out of the faculty: by retirement, death, and for other jobs, at tenured and tenure-eligible levels.

ADDITIONAL AREAS RECOMMENDED FOR STUDY

- Examine gender equity in non-salary benefits and supports provided by the University and its subsidiary parts.
- Examine gender equity in allocation of faculty workload.

i

Exhibit 1: Definitions of GSAS Divisions

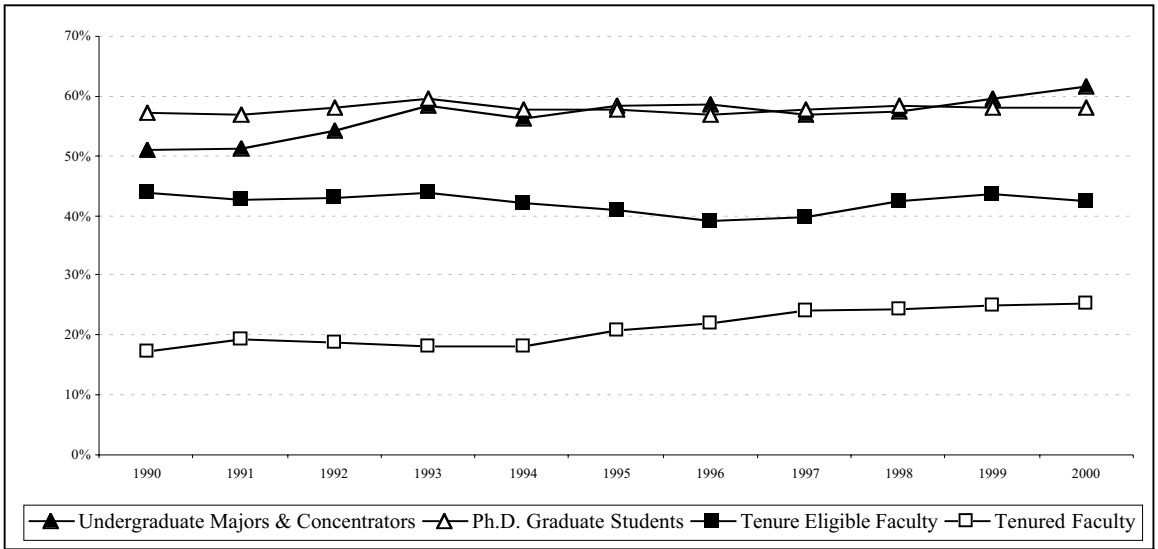
Humanities	Social Sciences	Natural Sciences
• Art History & Archaeology • Classics • East Asian Languages & Cultures • English & Comparative Literature • French & Romance Philology • Germanic Languages • Italian • Middle East & Asian Languages & Cultures • Music • Philosophy • Religion • Slavic Languages • Spanish & Portuguese	• Anthropology • Economics • History • International & Public Affairs • Political Science • Sociology	• Astronomy • Biology • Chemistry • Earth & Environmental Sciences • Mathematics • Physics • Psychology • Statistics

Exhibit 2

Humanities, 1990-2000

COMPARISON OF THE PERCENTAGE OF WOMEN STUDENT MAJORS
AND FULL-TIME INSTRUCTIONAL WOMEN FACULTY

Undergraduate Majors & Concentrators and Ph.D. Graduate Students; Tenured and Tenure-Eligible Faculty



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Undergraduate Majors & Concentrators											
Women	372	366	318	327	384	414	430	412	450	462	478
Men	356	346	267	232	297	294	302	312	333	314	296
Total N	728	712	585	559	681	708	732	724	783	776	774
% Women	51.1%	51.4%	54.4%	58.5%	56.4%	58.5%	58.7%	56.9%	57.5%	59.5%	61.8%
Ph.D. Graduate Students											
Women	693	668	679	675	641	626	608	605	604	567	551
Men	519	504	486	459	466	456	456	439	427	407	398
Total N	1212	1172	1165	1134	1107	1082	1064	1044	1031	974	949
% Women	57.2%	57.0%	58.3%	59.5%	57.9%	57.9%	57.1%	58.0%	58.6%	58.2%	58.1%
Tenure-Eligible Faculty											
Women	40	35	35	33	30	27	24	24	23	24	23
Men	51	47	46	42	41	39	37	36	31	31	31
Total N	91	82	81	75	71	66	61	60	54	55	54
% Women	44.0%	42.7%	43.2%	44.0%	42.3%	40.9%	39.3%	40.0%	42.6%	43.6%	42.6%
Tenured Faculty											
Women	19	21	20	21	20	24	27	28	30	31	31
Men	90	87	86	93	90	90	95	88	92	92	91
Total N	109	108	106	114	110	114	122	116	122	123	122
% Women	17.4%	19.4%	18.9%	18.4%	18.2%	21.1%	22.1%	24.1%	24.6%	25.2%	25.4%

Notes: Undergraduates included are those students who have declared a major or concentration, usually juniors and seniors. Graduate Students includes students in registered in non-terminal M.A./M.S. and in Ph.D. programs. Tenure Eligible Faculty include Instructors, Assistant Professors, and Associate Professors without Tenure. Tenured Faculty include Associate Professors with Tenure and Full Professors. Adjunct or Visiting Faculty and Professors without Tenure are not included.

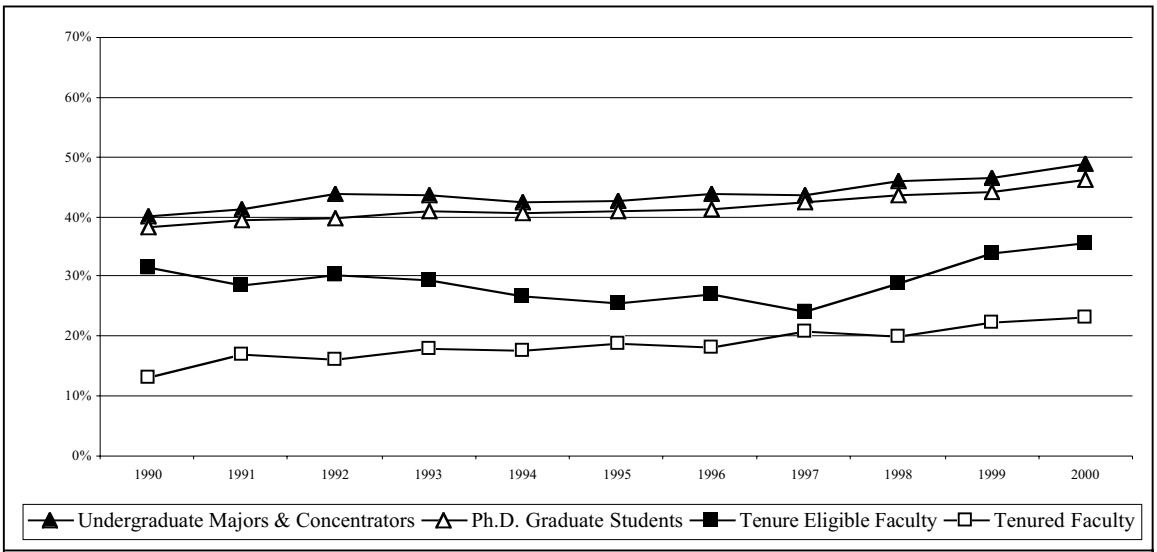
Sources: Student data are from the Student Information System (SIS). Faculty data are from the Office of the Vice Provost for Academic Administration.

Exhibit 3

Social Sciences, 1990-2000

COMPARISON OF THE PERCENTAGE OF WOMEN STUDENT MAJORS
AND FULL-TIME INSTRUCTIONAL WOMEN FACULTY

Undergraduate Majors & Concentrators and Ph.D. Graduate Students; Tenured and Tenure-Eligible Faculty



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Undergraduate Majors & Concentrators											
Women	335	369	375	360	369	412	447	413	448	521	547
Men	501	523	476	462	496	550	567	530	525	593	571
Total N	836	892	851	822	865	962	1014	943	973	1114	1118
% Women	40.1%	41.4%	44.1%	43.8%	42.7%	42.8%	44.1%	43.8%	46.0%	46.8%	48.9%
Ph.D. Graduate Students											
Women	396	403	409	407	403	405	389	396	404	394	386
Men	637	615	613	585	584	578	554	532	518	498	448
Total N	1033	1018	1022	992	987	983	943	928	922	892	834
% Women	38.3%	39.6%	40.0%	41.0%	40.8%	41.2%	41.3%	42.7%	43.8%	44.2%	46.3%
Tenure-Eligible Faculty											
Women	19	16	17	20	18	16	18	14	17	19	20
Men	41	40	39	48	49	46	48	44	42	37	36
Total N	60	56	56	68	67	62	66	58	59	56	56
% Women	31.7%	28.6%	30.4%	29.4%	26.9%	25.8%	27.3%	24.1%	28.8%	33.9%	35.7%
Tenured Faculty											
Women	12	15	14	16	16	17	16	18	19	23	24
Men	78	73	72	73	74	73	72	68	76	80	79
Total N	90	88	86	89	90	90	88	86	95	103	103
% Women	13.3%	17.0%	16.3%	18.0%	17.8%	18.9%	18.2%	20.9%	20.0%	22.3%	23.3%

Notes: Undergraduates included are those students who have declared a major or concentration, usually juniors and seniors. Graduate Students includes students in registered in non-terminal M.A./M.S. and in Ph.D. programs. Tenure Eligible Faculty include Instructors, Assistant Professors, and Associate Professors without Tenure. Tenured Faculty include Associate Professors with Tenure and Full Professors. Adjunct or Visiting Faculty and Professors without Tenure are not included.

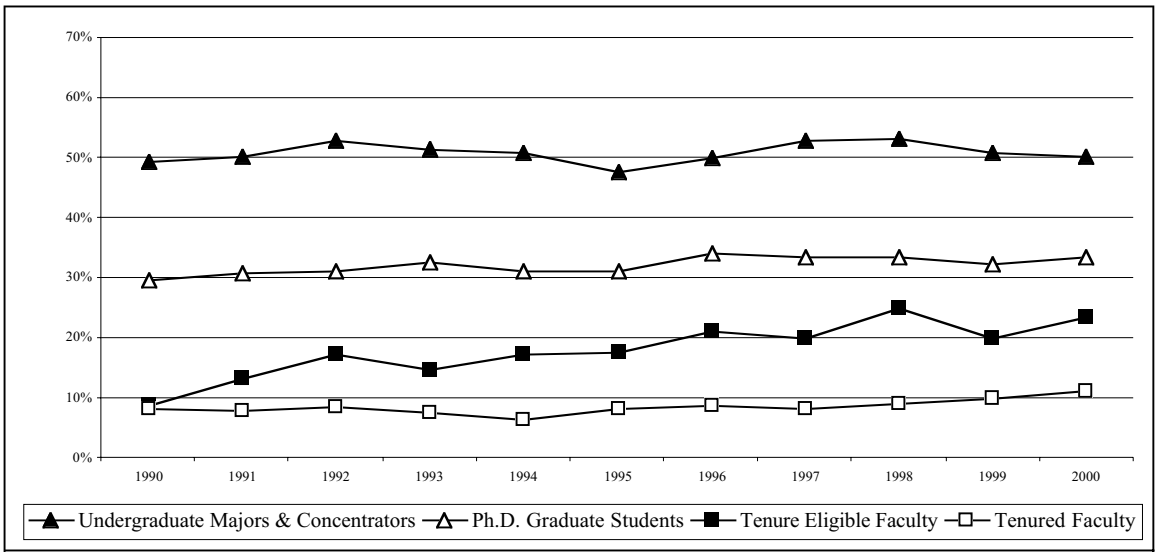
Sources: Student data are from the Student Information System (SIS). Faculty data are from the Office of the Vice Provost for Academic Administration.

Exhibit 4

Natural Sciences, 1990-2000

COMPARISON OF THE PERCENTAGE OF WOMEN STUDENT MAJORS
AND FULL-TIME INSTRUCTIONAL WOMEN FACULTY

Undergraduate Majors & Concentrators and Ph.D. Graduate Students; Tenured and Tenure-Eligible Faculty



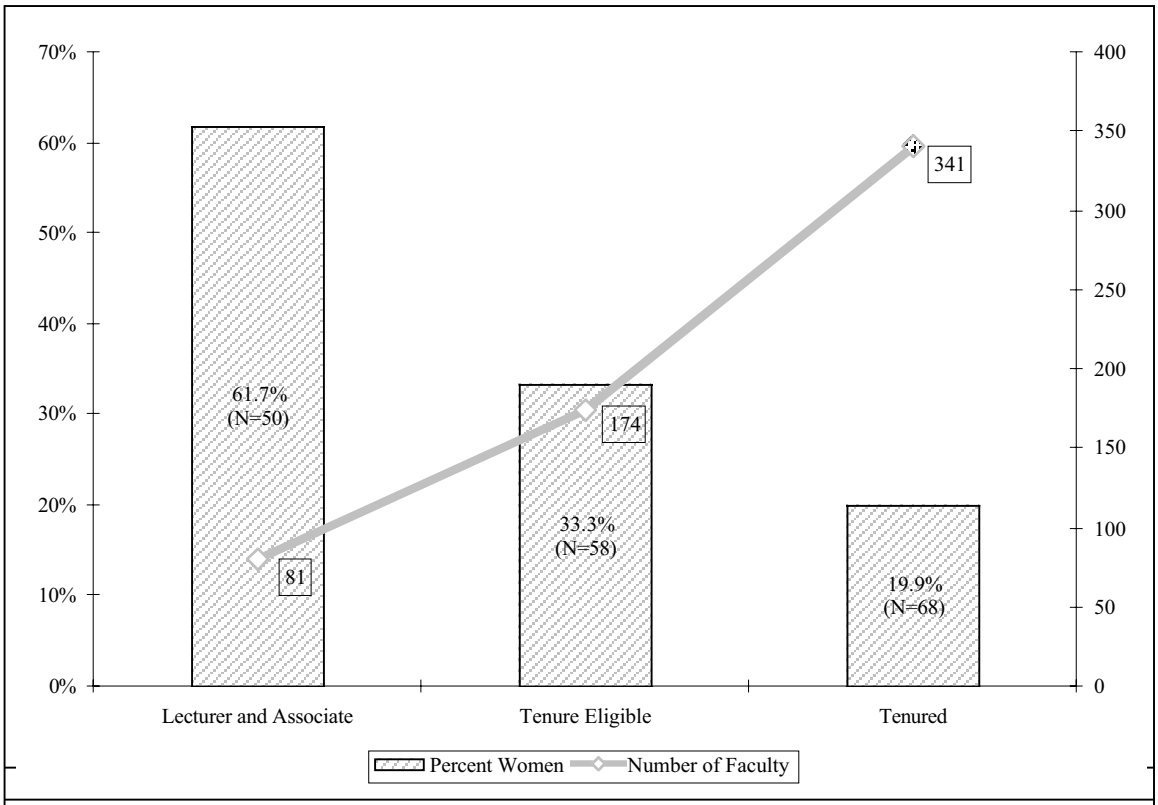
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Undergraduate Majors & Concentrators											
Women	135	147	155	156	189	196	217	248	265	261	258
Men	138	146	138	147	183	216	218	220	234	251	255
Total N	273	293	293	303	372	412	435	468	499	512	513
% Women	49.5%	50.2%	52.9%	51.5%	50.8%	47.6%	49.9%	53.0%	53.1%	51.0%	50.3%
Ph.D. Graduate Students											
Women	153	156	157	171	164	153	160	154	155	155	170
Men	363	349	346	352	364	339	307	307	309	326	339
Total N	516	505	503	523	528	492	467	461	464	481	509
% Women	29.7%	30.9%	31.2%	32.7%	31.1%	31.1%	34.3%	33.4%	33.4%	32.2%	33.4%
Tenure-Eligible Faculty											
Women	5	7	9	8	9	8	11	11	13	11	15
Men	52	46	43	46	43	37	41	44	39	44	49
Total N	57	53	52	54	52	45	52	55	52	55	64
% Women	8.8%	13.2%	17.3%	14.8%	17.3%	17.8%	21.2%	20.0%	25.0%	20.0%	23.4%
Tenured Faculty											
Women	8	8	8	7	6	8	9	9	10	11	13
Men	88	92	87	85	85	89	94	99	101	99	103
Total N	96	100	95	92	91	97	103	108	111	110	116
% Women	8.3%	8.0%	8.4%	7.6%	6.6%	8.2%	8.7%	8.3%	9.0%	10.0%	11.2%

Notes: Undergraduates included are those students who have declared a major or concentration, usually juniors and seniors. Graduate Students includes students in registered in non-terminal M.A./M.S. and in Ph.D. programs. Tenure Eligible Faculty include Instructors, Assistant Professors, and Associate Professors without Tenure. Tenured Faculty include Associate Professors with Tenure and Full Professors. Adjunct or Visiting Faculty and Professors without Tenure are not included.

Sources: Student data are from the Decision Support System (DSS). Faculty data are from the Office of the Vice Provost for Academic Administration.

Exhibit 5

Arts & Sciences
PERCENTAGE OF WOMEN FACULTY BY TENURE STATUS
Regular Fulltime Instructional Faculty
2000

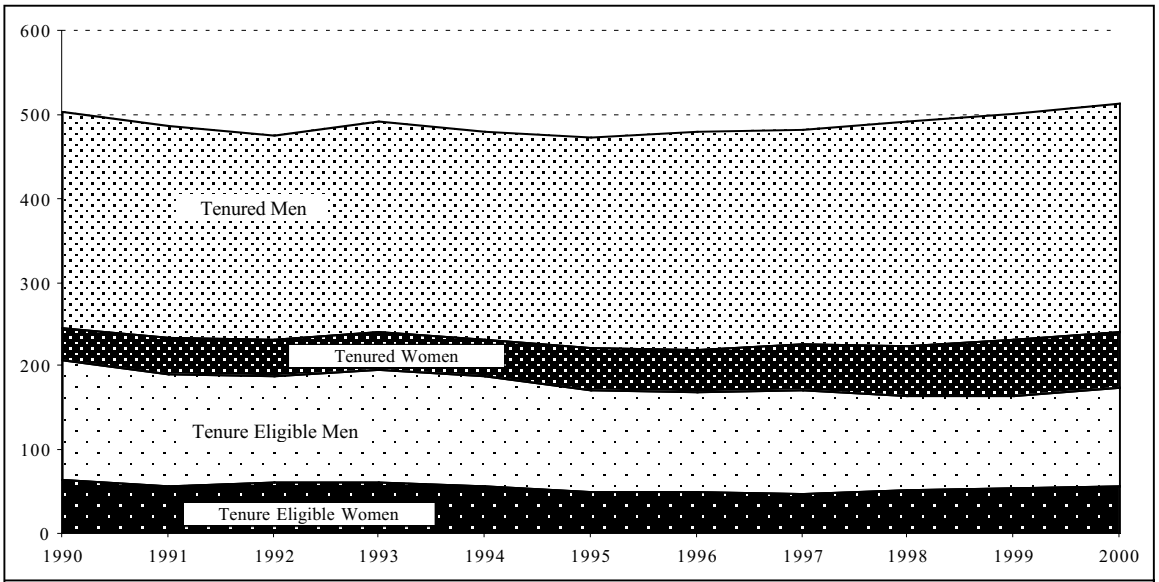


	Women	Men	Total	% Women
Lecturer and Associate	50	31	81	61.7%
Instructor & Assistant Professor	48	89	137	35.0%
Associate Professor w/o Tenure	10	27	37	27.0%
Associate Professor with Tenure	18	31	49	36.7%
Professor	50	242	292	17.1%
Tenure Eligible	58	116	174	33.3%
Tenured	68	273	341	19.9%
Total Number of Faculty	176	420	596	29.5%

Notes: Lecturer and Associate includes Associate, Associate in Language, Associate in Music, Lecturer, Lecturer in Language, Lecturer 2, Senior Lecturer, Senior Lecturer in Language.
Source: Office of the Vice Provost for Academic Administration.

Exhibit 6

Arts & Sciences
DISTRIBUTION OF REGULAR FULL-TIME INSTRUCTIONAL FACULTY
BY GENDER AND TENURE STATUS
1990-2000



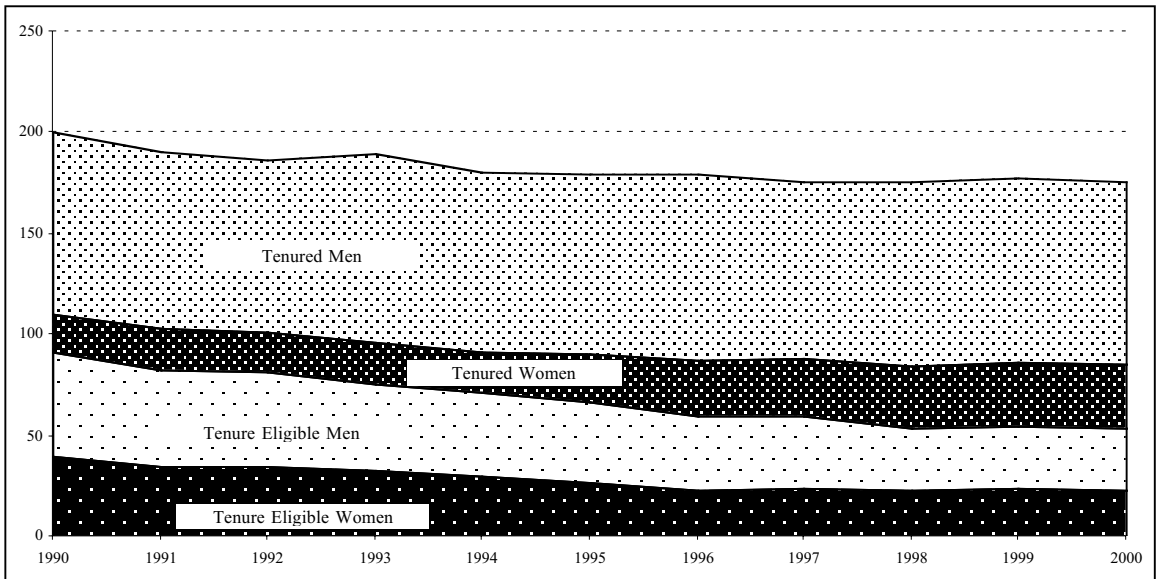
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Tenure Eligible Faculty											
Women	64	58	61	61	57	51	50	49	53	54	58
Men	144	133	128	136	133	122	119	124	112	112	116
Total N	208	191	189	197	190	173	169	173	165	166	174
% Women	30.8%	30.4%	32.3%	31.0%	30.0%	29.5%	29.6%	28.3%	32.1%	32.5%	33.3%
Tenured Faculty											
Women	39	44	42	44	42	49	52	55	59	65	68
Men	257	252	245	251	249	252	259	255	269	271	273
Total N	296	296	287	295	291	301	311	310	328	336	341
% Women	13.2%	14.9%	14.6%	14.9%	14.4%	16.3%	16.7%	17.7%	18.0%	19.3%	19.9%

Notes: Tenure Eligible Faculty include Instructors, Assistant Professors, and Associate Professors without Tenure. Tenured Faculty include Associate Professors with Tenure and Full Professors. Adjunct or Visiting Faculty and Professors without Tenure are not included.

Source: Office of the Vice Provost for Academic Administration.

Exhibit 7

Humanities
DISTRIBUTION OF REGULAR FULL-TIME INSTRUCTIONAL FACULTY
BY GENDER AND TENURE STATUS
1990-2000



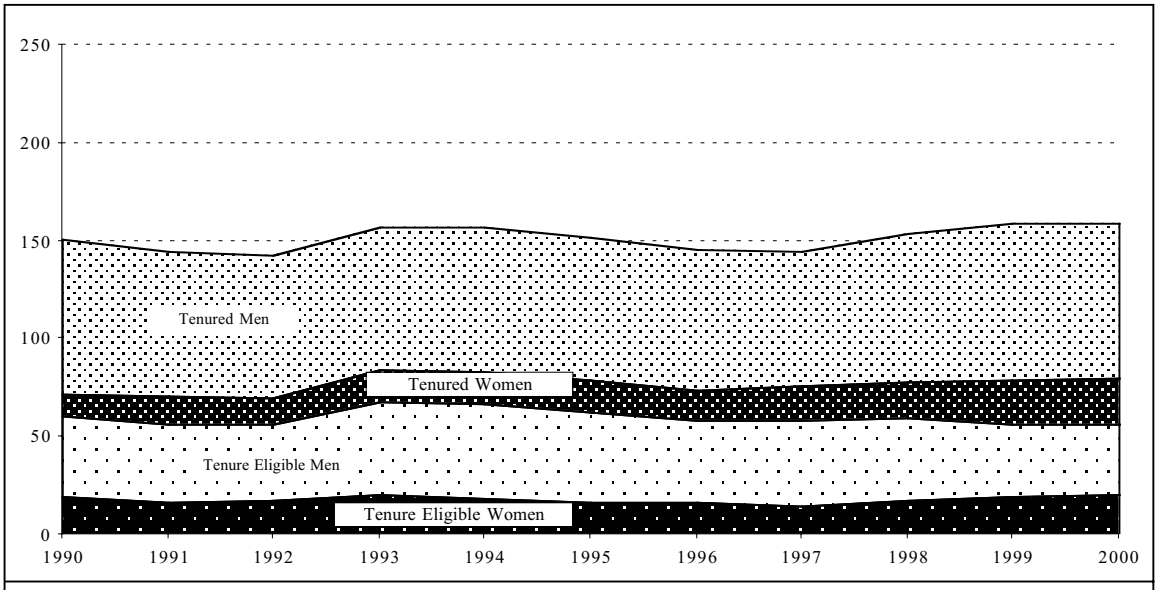
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Tenure Eligible Faculty											
Women	40	35	35	33	30	27	23	24	23	24	23
Men	51	47	46	42	41	39	37	36	31	31	31
Total N	91	82	81	75	71	66	60	60	54	55	54
% Women	44.0%	42.7%	43.2%	44.0%	42.3%	40.9%	38.3%	40.0%	42.6%	43.6%	42.6%
Tenured Faculty											
Women	19	21	20	21	20	24	27	28	30	31	31
Men	90	87	86	93	90	90	93	88	92	92	91
Total N	109	108	106	114	110	114	120	116	122	123	122
% Women	17.4%	19.4%	18.9%	18.4%	18.2%	21.1%	22.5%	24.1%	24.6%	25.2%	25.4%

Notes: Tenure Eligible Faculty include Instructors, Assistant Professors, and Associate Professors without Tenure.
Tenured Faculty include Associate Professors with Tenure and Full Professors. Adjunct or Visiting Faculty and Professors without Tenure are not included.

Source: Office of the Vice Provost for Academic Administration.

Exhibit 8

Social Sciences
DISTRIBUTION OF REGULAR FULL-TIME INSTRUCTIONAL FACULTY
BY GENDER AND TENURE STATUS
1990-2000



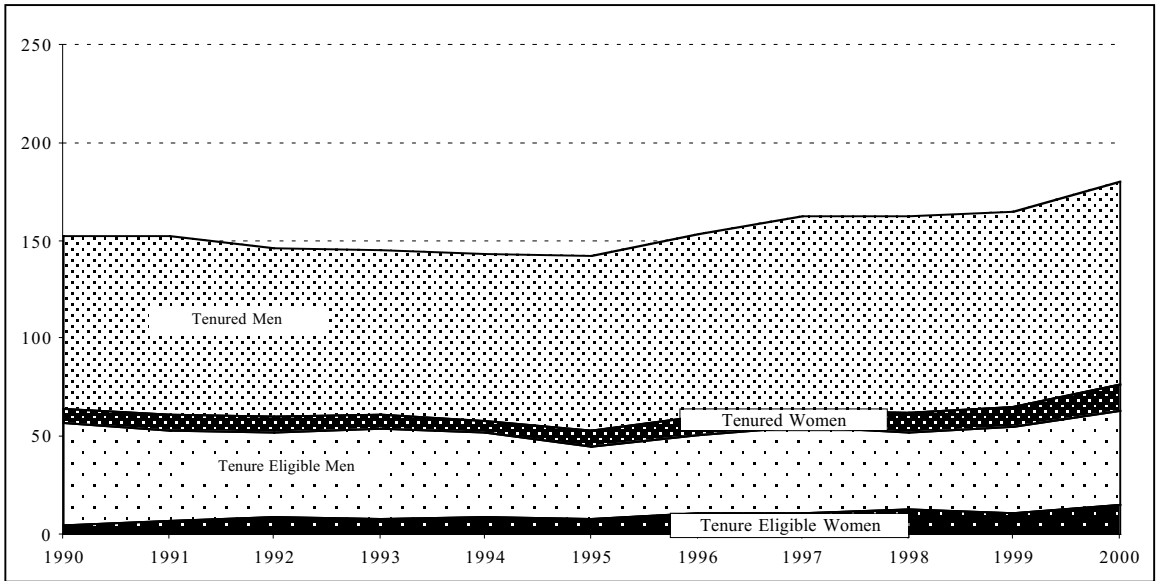
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Tenure Eligible Faculty											
Women	19	16	17	20	18	16	16	14	17	19	20
Men	41	40	39	48	49	46	42	44	42	37	36
Total N	60	56	56	68	67	62	58	58	59	56	56
% Women	31.7%	28.6%	30.4%	29.4%	26.9%	25.8%	27.6%	24.1%	28.8%	33.9%	35.7%
Tenured Faculty											
Women	12	15	14	16	16	17	16	18	19	23	24
Men	79	73	72	73	74	73	72	68	76	80	79
Total N	91	88	86	89	90	90	88	86	95	103	103
% Women	13.2%	17.0%	16.3%	18.0%	17.8%	18.9%	18.2%	20.9%	20.0%	22.3%	23.3%

Notes: Tenure Eligible Faculty include Instructors, Assistant Professors, and Associate Professors without Tenure.
Tenured Faculty include Associate Professors with Tenure and Full Professors. Adjunct or Visiting Faculty and Professors without Tenure are not included.

Source: Office of the Vice Provost for Academic Administration.

Exhibit 9

Natural Sciences
DISTRIBUTION OF REGULAR FULL-TIME INSTRUCTIONAL FACULTY
BY GENDER AND TENURE STATUS
1990-2000



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Tenure Eligible Faculty											
Women	5	7	9	8	9	8	11	11	13	11	15
Men	52	46	43	46	43	37	40	44	39	44	49
Total N	57	53	52	54	52	45	51	55	52	55	64
% Women	8.8%	13.2%	17.3%	14.8%	17.3%	17.8%	21.6%	20.0%	25.0%	20.0%	23.4%
Tenured Faculty											
Women	8	8	8	7	6	8	9	9	10	11	13
Men	88	92	87	85	85	89	94	99	101	99	103
Total N	96	100	95	92	91	97	103	108	111	110	116
% Women	8.3%	8.0%	8.4%	7.6%	6.6%	8.2%	8.7%	8.3%	9.0%	10.0%	11.2%

Notes: Tenure Eligible Faculty include Instructors, Assistant Professors, and Associate Professors without Tenure. Tenured Faculty include Associate Professors with Tenure and Full Professors. Adjunct or Visiting Faculty and Professors without Tenure are not included.

Source: Office of the Vice Provost for Academic Administration.

Exhibit 10

Gap between Percentage of Women in PhD Student Body and
Percentage of Women in Faculty

	Tenure-Eligible		Tenured	
	1990	2000	1990	2000
Total Arts & Sciences	14% (45% v 31%)	15% (48% v 33%)	32% (45% v 13%)	28% (48% v 20%)
Humanities	13% (57% v 44%)	15% (58% v 43%)	40% (57% v 17%)	33% (58% v 25%)
Social Sciences	6% (38% v 32%)	10% (46% v 36%)	25% (38% v 13%)	23% (46% v 23%)
Natural Sciences	21% (30% v 9%)	10% (33% v 23%)	22% (30% v 8%)	22% (33% v 11%)

Exhibit 11
First Year Attrition of Doctoral Students
(Students who entered fall of 1999; Status as of fall 2000)

Humanities

	Women	Men
# entered	59	54
# attrition	11	4
% attrition	19%	7%

Social Sciences

	Women	Men
# entered	52	59
# attrition	7	3
% attrition	13%	5%

Natural Sciences

	Women	Men
# entered	34	79
# attrition	5	3
% attrition	15%	4%

All Divisions

	Women	Men
# entered	145	192
# attrition	23	10
% attrition	16%	5%

Exhibit 12
Ultimate Attrition of Doctoral Students
(Students who entered fall of 1993; Status as of fall 2000)

Humanities

	Women	Men
# entered	96	60
# attrition*	44	21
% attrition	46%	35%

Social Sciences

	Women	Men
# entered	66	82
# attrition*	29	32
% attrition	44%	39%

Natural Sciences

	Women	Men
# entered	40	65
# attrition*	13	18
% attrition	33%	28%

All Divisions

	Women	Men
# entered	202	207
# attrition*	86	71
% attrition	43%	34%

* students neither graduated nor registered, seven years post-matriculation

Exhibit 13
Influence of Funding Status on Attrition
(Students who entered fall of 1993; Status as of fall 2000)

Humanities

	Women	Men
# entered	96	60
# funded	37	31
% funded	39%	52%
% attrition* among funded students	32%	19%
% attrition* among unfunded students	54%	52%

Social Sciences

	Women	Men
# entered	66	82
# funded	29	28
% funded	44%	34%
% attrition* among funded students	28%	25%
% attrition* among unfunded students	57%	46%

* students neither graduated nor registered, seven years post-matriculation

(Natural Sciences not shown because almost all students are funded.)

Exhibit 14
Percent Women among New Hires for Tenure-eligible Ranks

For any given segment of the University, during any given timeslice, if the percentage of women among the new hires exceeds the percentage of women among the existing faculty (the "standing stock"), then this will tend, all else being equal, to drive the gender balance among the faculty towards a more female-rich mixture. Italicized numbers show when this situation has occurred.

	1999-2000		1996-1998	
	Existing Tenure-Eligible Faculty*	New Hires	Existing Tenure-Eligible Faculty*	New Hires
Total Arts & Sciences	33%	*34%*	28%	*32%*
Humanities	43%	*45%*	40%	*46%*
Social Sciences	36%	*48%*	24%	*32%*
Natural Sciences	23%	16%	20%	19%

	1993-1995		1990-1992	
	Existing Tenure-Eligible Faculty*	New Hires	Existing Tenure-Eligible Faculty*	New Hires
Total Arts & Sciences	30%	*31%*	30%	29%
Humanities	42%	*63%*	43%	37%
Social Sciences	27%	25%	29%	*31%*
Natural Sciences	17%	11%	13%	*16%*

* "Existing" tenure-eligible faculty was taken as 2000 for the 1999-2000 time slice, as 1997 for the 1996-1998 time slice, as 1994 for the 1993-1995 time slice, and as 1991 for the 1990-1992 timeslice.

Exhibit 15

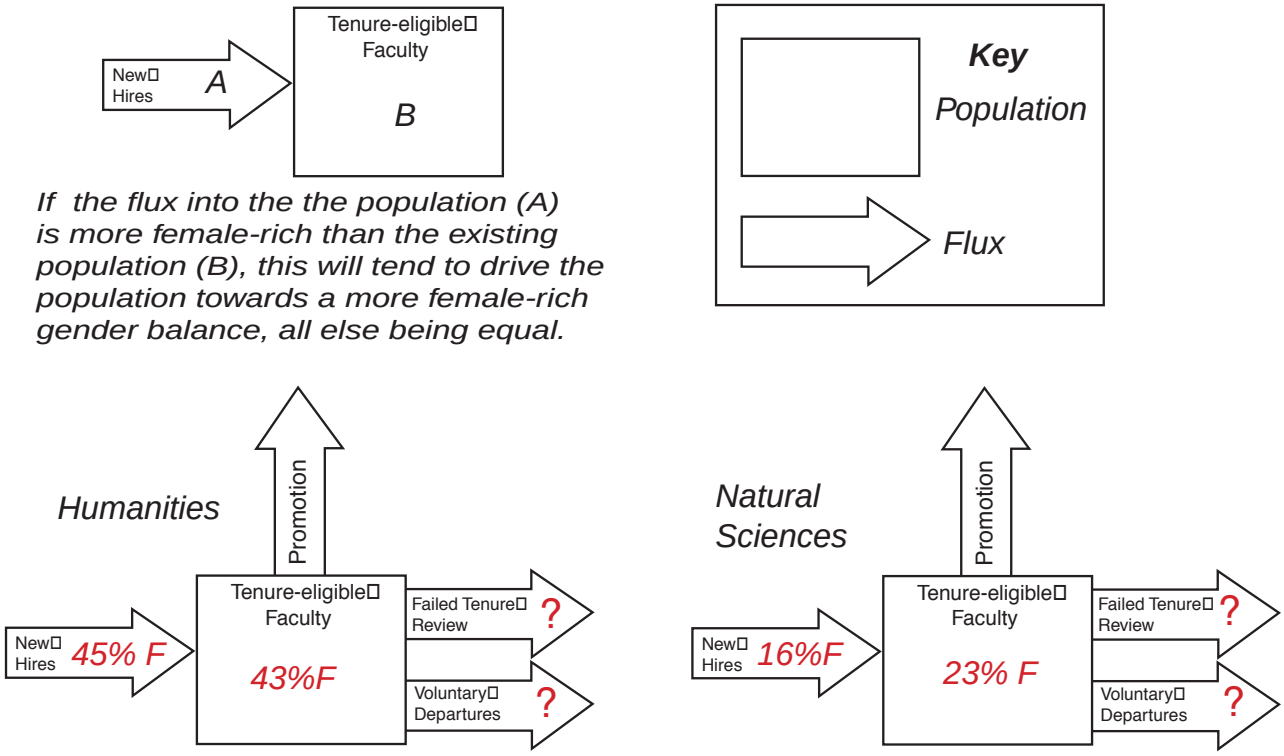


Exhibit 15: (upper right) In this and the following flowchart diagrams, a rectangle represents a "stock" or population of people, and an arrow represents a flux of people into or out of the population. (upper left) If the flux of people into the stock has a higher percentage of women than the existing population, that will tend to drive the population towards a more female-rich gender balance. (bottom) Paradoxically, the flux of new hires into the Humanities tenure-eligible faculty has been more female-rich than the existing population, but the population has not become more female-rich. The flux of new hires into the Natural Sciences tenure-eligible faculty has been less female-rich than the existing population, but the percentage of tenure-eligible women has increased in that division. Numbers shown are for 1999-2000, but a similar paradox has existed since 1993 (compare Exhibit 14). We hypothesize that the paradox may be resolvable through examination of the fluxes out of the populations, by promotion and departures from the University.

Exhibit 16

New Hires versus Applicant & Availability Pools
for Tenure-eligible Ranks
(1999-2000)

	% Women among						
	Current Ten-El. Faculty	New Hires		Applicant Pool		National Availability Pool	Columbia PhD's granted ('97-'00)
Total Arts & Sciences	33%	34%	>	23%	<	43%	42%
Humanities	43%	45%	<	48%	<	51%	56%
Social Sciences	36%	48%	>	31%	<	42%	38%
Natural Sciences	23%	16%	>	14%	<	39%	32%

For the last decade, Columbia has consistently hired women into the tenure-eligible ranks at a rate higher then their proportion in the applicant pool. However, compared to the national availability pools, women have been consistently underrepresented in the applicant pools.

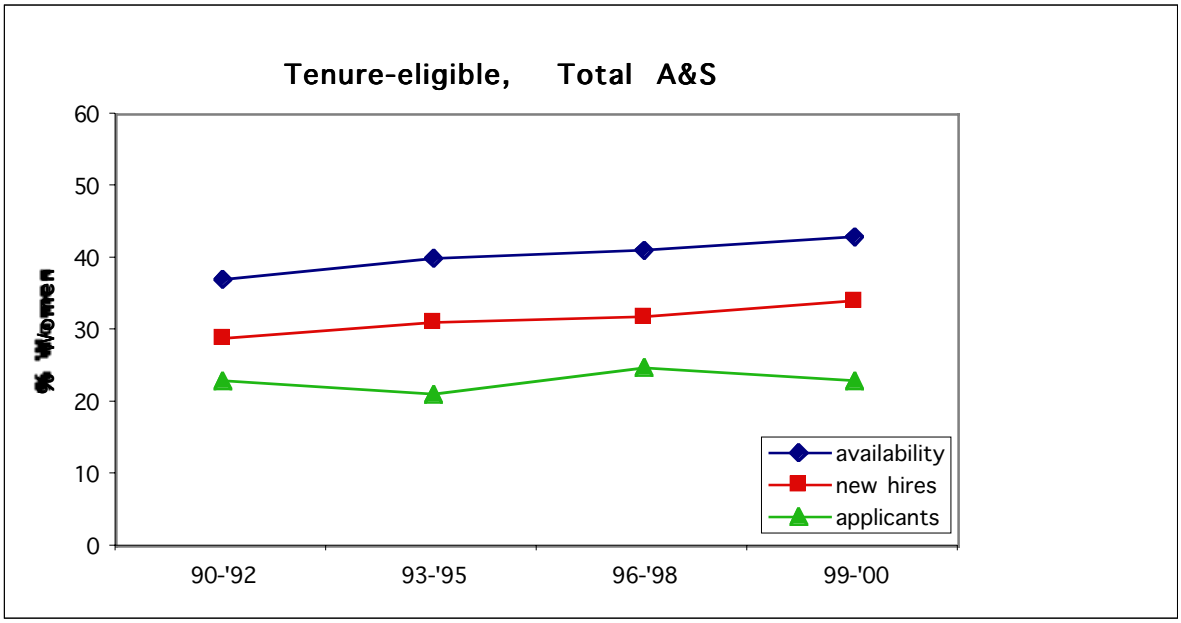
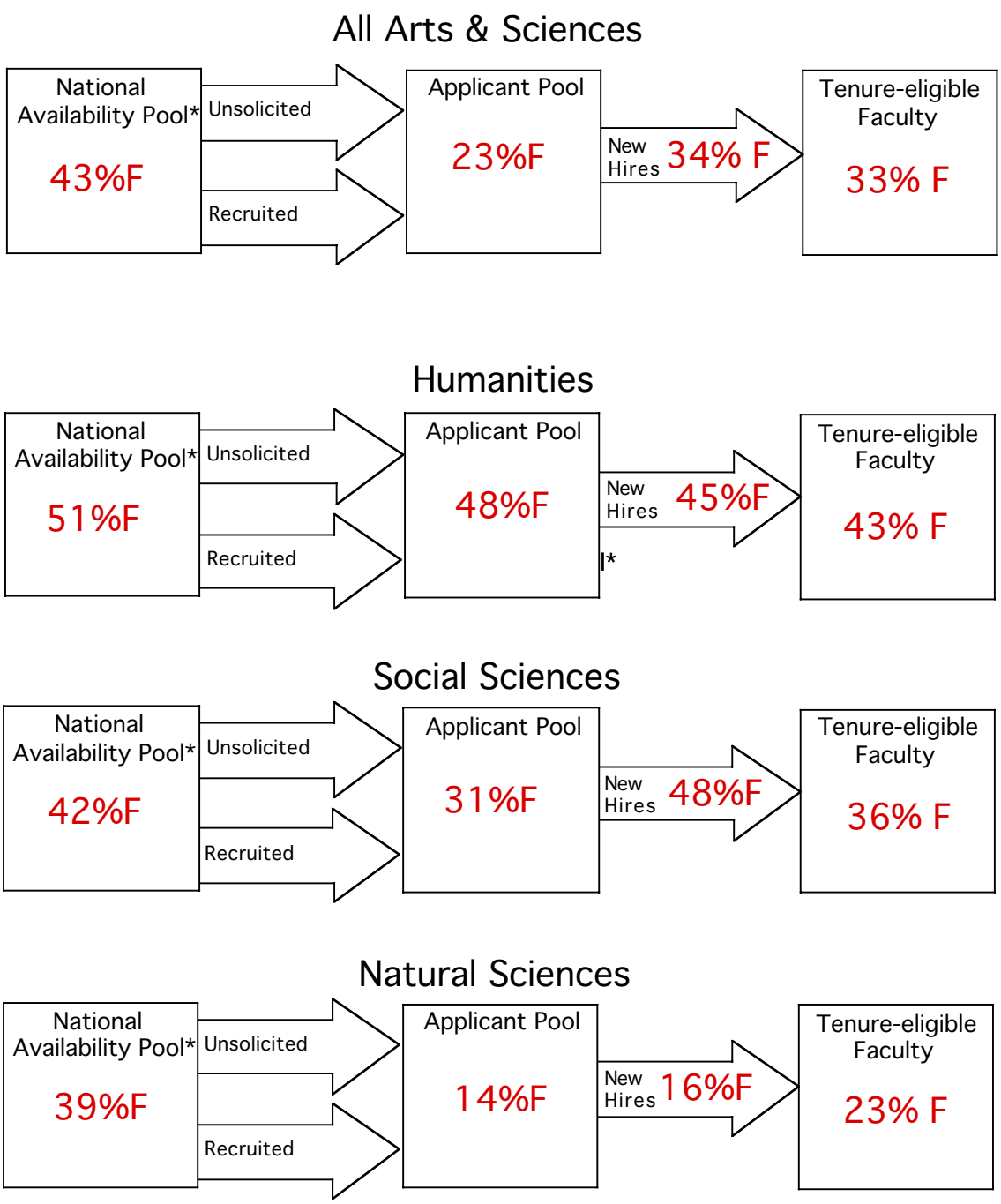


Exhibit 17

Flux of Women into the Tenure-eligible Ranks (1999-2000)



* Received PhD one to three years earlier

Exhibit 18

Entry to the Tenured Ranks
1990 – 2000

	Women/Total			
	Existing Tenured Faculty	Internal Promotions (1990-2000)	External Hires (1990-2000)	Targets* of Opportunity (1990-2000)
Total Arts & Sciences	1990: 13% 2000: 20%	33% (29/88)	22% (19/87)	27% (8/30)
Humanities	1990: 17% 2000: 25%	40% (15/38)	40% (10/25)	50% (5/10)
Social Sciences	1990: 13% 2000: 23%	40% (10/25)	19% (7/36)	33% (3/9)
Natural Sciences	1990: 8% 2000: 11%	16% (4/25)	8% (2/26)	0% (0/11)

* Applicant pool of one person, in Affirmative Action records

Exhibit 19

Entry into Tenured Ranks

(1990 - 2000)

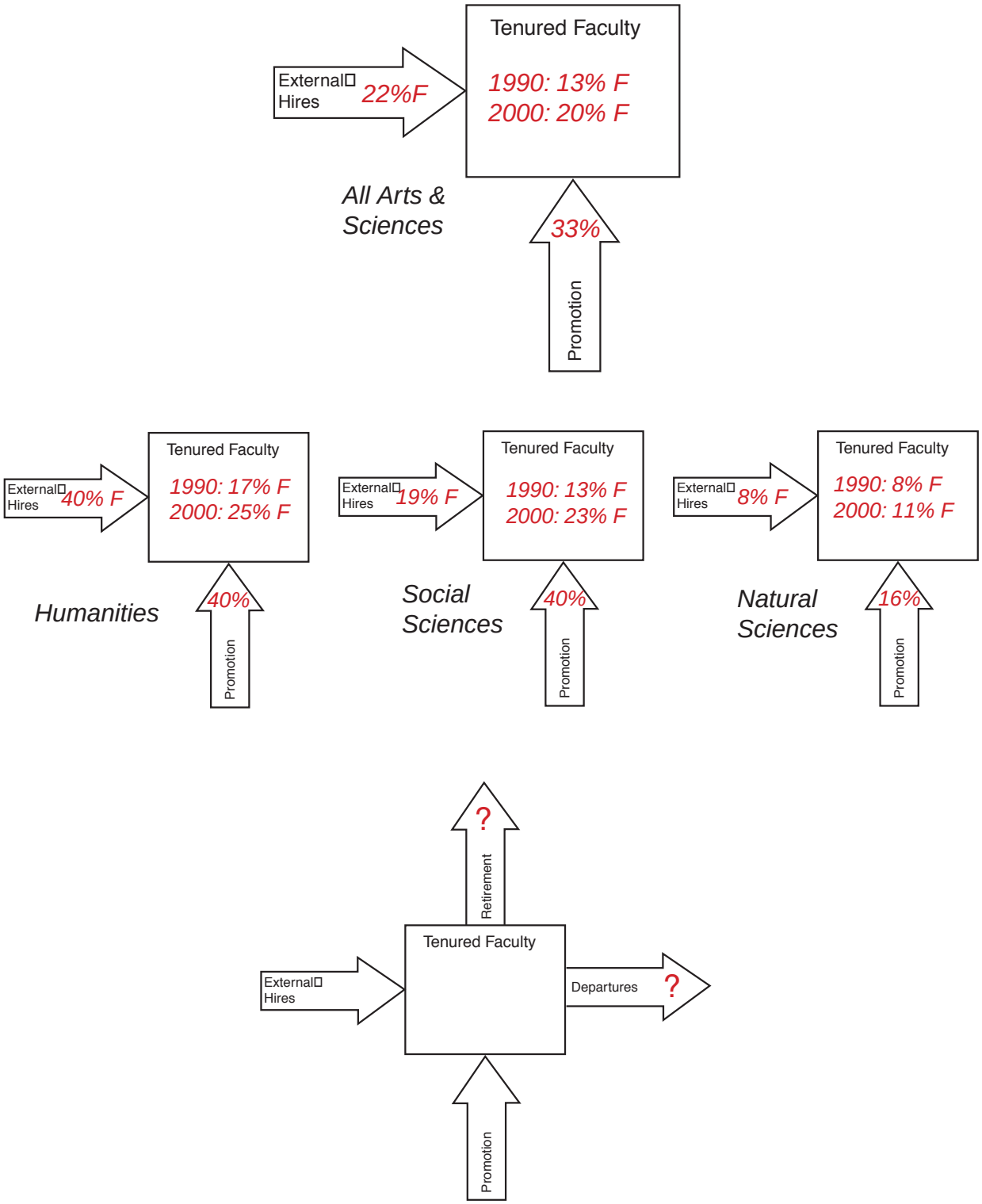
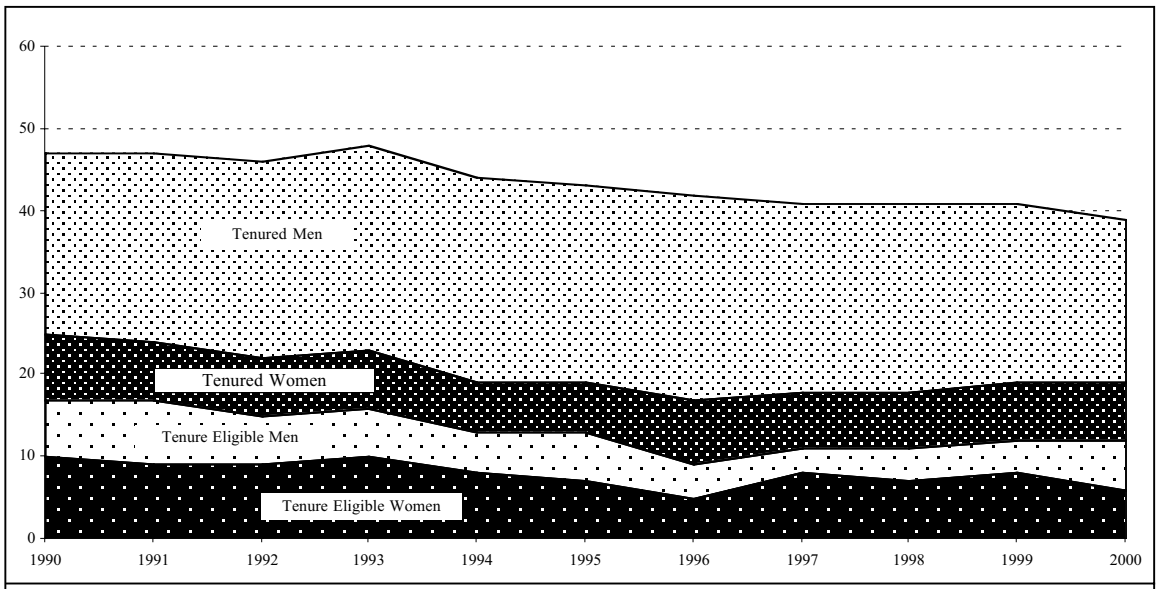


Exhibit 20

Example of a Department that has made negative progress
DISTRIBUTION OF REGULAR FULL-TIME INSTRUCTIONAL FACULTY
BY GENDER AND TENURE STATUS
1990-2000



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Tenure Eligible Faculty											
Women	10	9	9	10	8	7	5	8	7	8	6
Men	7	8	6	6	5	6	4	3	4	4	6
Total N	17	17	15	16	13	13	9	11	11	12	12
% Women	58.8%	52.9%	60.0%	62.5%	61.5%	53.8%	55.6%	72.7%	63.6%	66.7%	50.0%
Tenured Faculty											
Women	8	7	7	7	6	6	8	7	7	7	7
Men	22	23	24	25	25	24	25	23	23	22	20
Total N	30	30	31	32	31	30	33	30	30	29	27
% Women	26.7%	23.3%	22.6%	21.9%	19.4%	20.0%	24.2%	23.3%	23.3%	24.1%	25.9%

Notes: Tenure Eligible Faculty include Instructors, Assistant Professors, and Associate Professors without Tenure.
Tenured Faculty include Associate Professors with Tenure and Full Professors. Adjunct or Visiting Faculty and Professors without Tenure are not included.

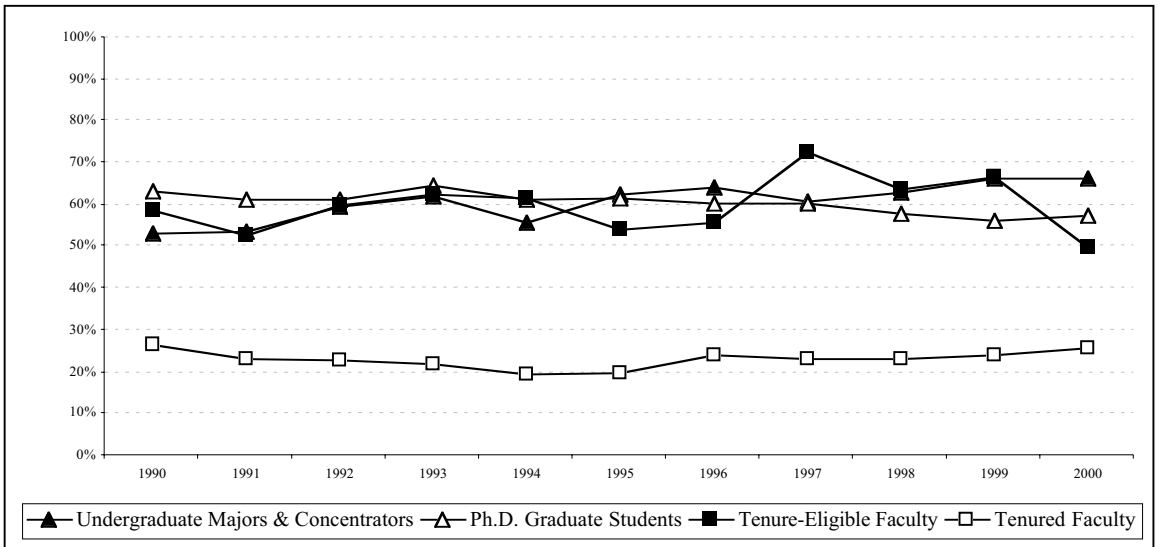
Source: Office of the Vice Provost for Academic Administration.

Exhibit 21

Same Department as previous exhibit

COMPARISON OF THE PERCENTAGE OF WOMEN STUDENT MAJORS
AND FULL-TIME INSTRUCTIONAL WOMEN FACULTY

Undergraduate Majors & Concentrators and Ph.D. Graduate Students; Tenured and Tenure-Eligible Faculty



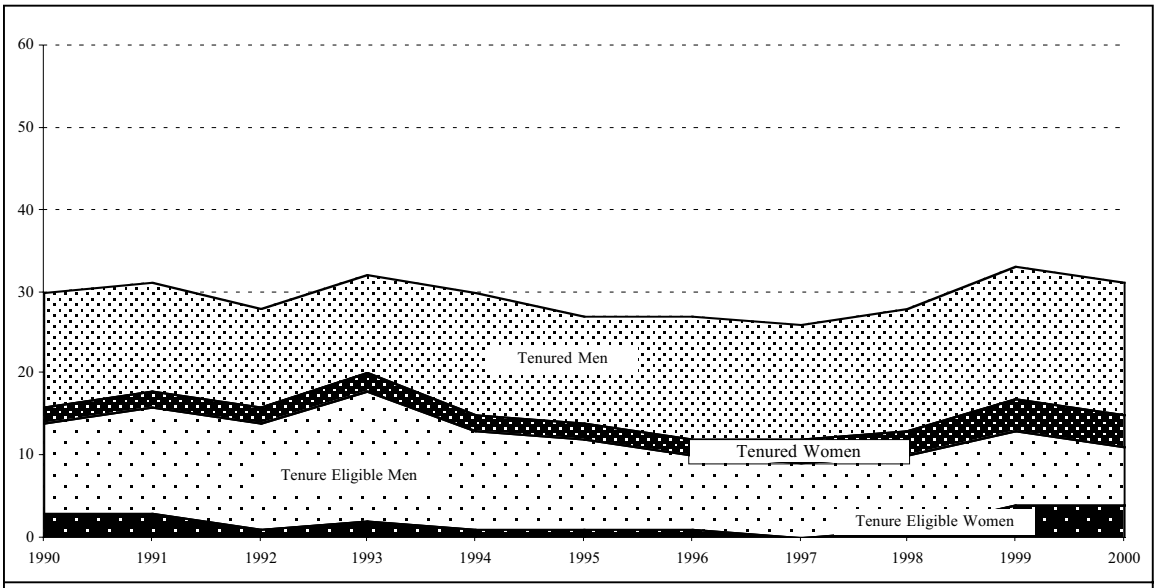
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Undergraduate Majors & Concentrators											
Women	177	170	153	160	168	184	194	168	182	197	196
Men	155	146	104	98	134	111	109	108	107	101	99
Total N	332	316	257	258	302	295	303	276	289	298	295
% Women	53.3%	53.8%	59.5%	62.0%	55.6%	62.4%	64.0%	60.9%	63.0%	66.1%	66.4%
Ph.D. Graduate Students											
Women	205	186	187	192	171	165	154	152	134	118	118
Men	119	119	119	105	109	103	102	100	97	93	87
Total N	324	305	306	297	280	268	256	252	231	211	205
% Women	63.3%	61.0%	61.1%	64.6%	61.1%	61.6%	60.2%	60.3%	58.0%	55.9%	57.6%
Tenure-Eligible Faculty											
Women	10	9	9	10	8	7	5	8	7	8	6
Men	7	8	6	6	5	6	4	3	4	4	6
Total N	17	17	15	16	13	13	9	11	11	12	12
% Women	58.8%	52.9%	60.0%	62.5%	61.5%	53.8%	55.6%	72.7%	63.6%	66.7%	50.0%
Tenured Faculty											
Women	8	7	7	7	6	6	8	7	7	7	7
Men	22	23	24	25	25	24	25	23	23	22	20
Total N	30	30	31	32	31	30	33	30	30	29	27
% Women	26.7%	23.3%	22.6%	21.9%	19.4%	20.0%	24.2%	23.3%	23.3%	24.1%	25.9%

Notes: Undergraduates included are those students who have declared a major or concentration, usually juniors and seniors. Graduate Students includes students in registered in non-terminal M.A./M.S. and in Ph.D. programs. Tenure Eligible Faculty include Instructors, Assistant Professors, and Associate Professors without Tenure. Tenured Faculty include Associate Professors with Tenure and Full Professors. Adjunct or Visiting Faculty and Professors without Tenure are not included.

Sources: Student data are from the Decision Support System (DSS). Faculty data are from the Office of the Vice Provost for Academic Administration.

Exhibit 22

Example of a department that has increased representation of women
DISTRIBUTION OF REGULAR FULL-TIME INSTRUCTIONAL FACULTY
BY GENDER AND TENURE STATUS
1990-2000



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Tenure Eligible Faculty											
Women	3	3	1	2	1	1	1	0	1	4	4
Men	11	13	13	16	12	11	9	9	9	9	7
Total N	14	16	14	18	13	12	10	9	10	13	11
% Women	21.4%	18.8%	7.1%	11.1%	7.7%	8.3%	10.0%	0.0%	10.0%	30.8%	36.4%
Tenured Faculty											
Women	2	2	2	2	2	2	2	3	3	4	4
Men	14	13	12	12	15	13	15	14	15	16	16
Total N	16	15	14	14	17	15	17	17	18	20	20
% Women	12.5%	13.3%	14.3%	14.3%	11.8%	13.3%	11.8%	17.6%	16.7%	20.0%	20.0%

Notes: Tenure Eligible Faculty include Instructors, Assistant Professors, and Associate Professors without Tenure.
Tenured Faculty include Associate Professors with Tenure and Full Professors. Adjunct or Visiting Faculty and Professors without Tenure are not included.

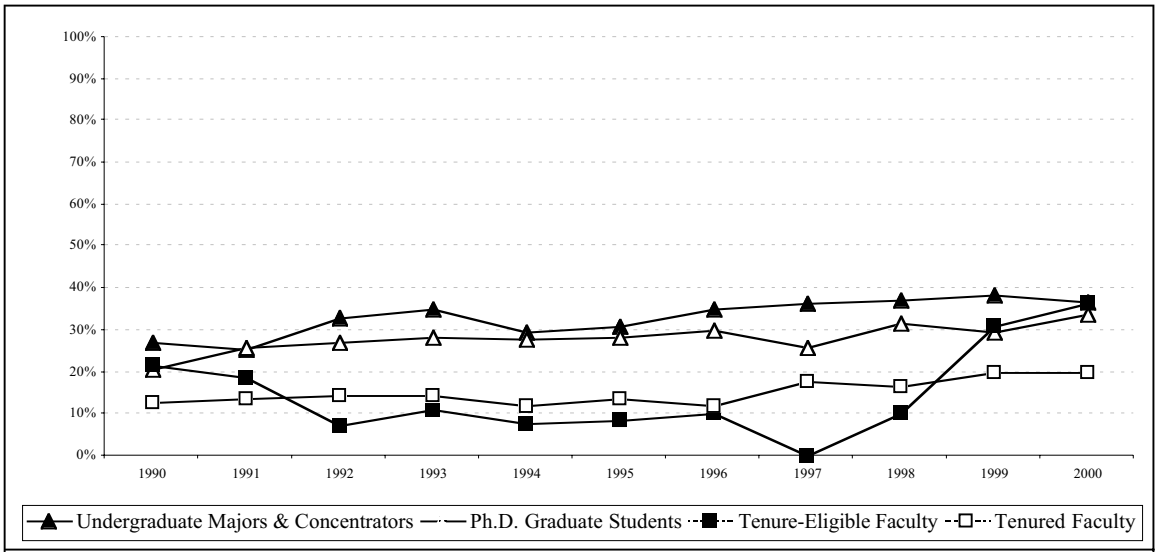
Source: Office of the Vice Provost for Academic Administration.

Exhibit 23

Same Department as previous exhibit

COMPARISON OF THE PERCENTAGE OF WOMEN STUDENT MAJORS
AND FULL-TIME INSTRUCTIONAL WOMEN FACULTY

Undergraduate Majors & Concentrators and Ph.D. Graduate Students; Tenured and Tenure-Eligible Faculty



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Undergraduate Majors & Concentrators											
Women	50	50	60	62	66	103	136	134	142	153	139
Men	136	148	122	116	156	231	252	235	242	247	239
Total N	186	198	182	178	222	334	388	369	384	400	378
% Women	26.9%	25.3%	33.0%	34.8%	29.7%	30.8%	35.1%	36.3%	37.0%	38.3%	36.8%
Ph.D. Graduate Students											
Women	25	35	38	39	38	40	41	33	43	42	44
Men	95	102	103	98	98	102	95	96	92	100	87
Total N	120	137	141	137	136	142	136	129	135	142	131
% Women	20.8%	25.5%	27.0%	28.5%	27.9%	28.2%	30.1%	25.6%	31.9%	29.6%	33.6%
Tenure-Eligible Faculty											
Women	3	3	1	2	1	1	1	0	1	4	4
Men	11	13	13	16	12	11	9	9	9	9	7
Total N	14	16	14	18	13	12	10	9	10	13	11
% Women	21.4%	18.8%	7.1%	11.1%	7.7%	8.3%	10.0%	0.0%	10.0%	30.8%	36.4%
Tenured Faculty											
Women	2	2	2	2	2	2	2	3	3	4	4
Men	14	13	12	12	15	13	15	14	15	16	16
Total N	16	15	14	14	17	15	17	17	18	20	20
% Women	12.5%	13.3%	14.3%	14.3%	11.8%	13.3%	11.8%	17.6%	16.7%	20.0%	20.0%

Notes: Undergraduates included are those students who have declared a major or concentration, usually juniors and seniors. Graduate Students includes students in registered in non-terminal M.A./M.S. and in Ph.D. programs. Tenure Eligible Faculty include Instructors, Assistant Professors, and Associate Professors without Tenure. Tenured Faculty include Associate Professors with Tenure and Full Professors. Adjunct or Visiting Faculty and Professors without Tenure are not included.

Sources: Student data are from the Decision Support System (DSS). Faculty data are from the Office of the Vice Provost for Academic Administration.

Exhibit 24

Change in Representation of Women on Faculty (1990 – 2000)

Improved substantially:

Anthropology
Classics
Economics
Italian
Philosophy
Psychology
Sociology

Least Improved:

English & Comparative Literature
Germanic Languages
Middle East & Asian Languages & Culture