

Women in Academia: Are We Asking the Right Questions?

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The recent study *A National Analysis of Diversity in Science and Engineering Faculties at Research Universities* by Donna J. Nelson and Diana C. Rogers [2] has been widely cited by the National Organization for Women (NOW) and in Congressional testimony [3], [4]. From fifty departments in each of fourteen fields of science and engineering, including mathematics, the authors obtained demographic data (gender, race/ethnicity) of the tenured and tenure-track faculty at each rank. As the first unified study of such demographic data for all fourteen fields, the study draws attention to the significant underrepresentation of women and minorities (Blacks, Hispanics, and Native Americans). In mathematics the percentage of women in the rank of full professor, associate professor, and assistant professor in the departments surveyed was 4.6%, 13.2%, and 19.6% respectively. The comparison of assistant professors (19.6% female in 2002) with recent Ph.D. recipients (27.2% female over the period 1993–2002) reveals a pattern of attrition which persists across many of the disciplines surveyed. The survey points out that when minority status is also taken into account, the picture is even more dismal: minority women are practically invisible in all ranks of the faculty at the institutions surveyed.

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Some comments are in order on the selection of departments to be surveyed. In each field the authors chose the fifty departments whose institutions received the largest research expenditures from the National Science Foundation. One can see good reasons for this criterion: it can be applied across fields, the information on NSF expenditures is readily available, and NSF expenditures would be expected to correlate highly with research strength. The resulting list of “top fifty” departments in each field is a good sample of active research departments, although not necessarily the top departments as perceived within the field. We compared the list of mathematics departments surveyed with the rankings of mathematics departments used in the Annual Survey of the Mathematical Sciences (see [7]). The latter divides the Ph.D.-granting institutions into three groups: Group I, comprising the forty-eight highest-ranked departments; Group II, consisting of the next ranked fifty-six departments; and Group III, which includes all remaining Ph.D.-granting departments. Of the “top fifty” mathematics departments in the Nelson-Rogers study, forty-seven are Ph.D.-granting departments. Among these, twenty-nine appear in Group I, fourteen in Group II, and four in Group III.

The demographic data for mathematics obtained in the Nelson-Rogers survey are similar to those in the Annual Survey of the Mathematical Sciences if one combines Groups I–III and Va in the Annual Survey. (These groups comprise all the doctorate-granting departments in pure and applied mathematics.) Unfortunately, the Annual Survey data for the Group I departments paint an even more

discouraging picture. Indeed, the 2002 survey (Table 3 in the Third Report [5]) shows that the percentage of females among untenured tenure-track faculty in Group I is only 11% and the percentage of women among the tenured faculty is roughly 7%. Consistent with the Nelson-Rogers study, the Annual Survey figures for the percentage of women among new Ph.D.'s in 2002 was 31% from all doctorate-granting institutions and 24% from the Group I institutions. Thus, in the Group I institutions we see an even higher rate of attrition from Ph.D. to tenure-track than the already discouraging rate reported in the Nelson-Rogers study.

It is surprising that the Nelson-Rogers study makes no mention of postdoctoral positions, an important first step in establishing a research career in almost all the fields surveyed. The Annual Survey of the Mathematical Sciences shows that the percentage of women among new Ph.D.'s and the percentage among postdoctoral fellows are pretty comparable, whether one restricts attention only to Group I departments or considers all doctorate-granting departments (Table 5E, [6]). The conspicuous drop in the percentage of women occurs only when one considers the tenure track. Another factor not considered in the survey but surely operative in most disciplines is that hiring in all fields takes place on the international stage these days, while the reported rates of Ph.D. attainment are for U.S. institutions only.

Why Is Attrition So High?

The study asserts that “new and totally different approaches will be needed” to right the imbalance. The study cannot and does not attempt to answer the question of whether hiring and work practices at the top universities actively discriminate against women and minorities. The authors remark that there is general agreement that women are not applying for tenure-track positions at research institutions at a rate consistent with their attainment of degrees, although there is no consensus on an explanation.

The problem is clearly complex and many-faceted. A recent survey of members of the Association for Women in Mathematics suggests one (of possibly many) factors that may discourage women from entering the tenure track: over 40% of the respondents identified flexibility in the tenure clock to allow for a better balance between career and childcare responsibilities as the issue that they would most like the AWM to address. (The question was *not* multiple choice!) This inflexibility in the tenure probationary period is a problem for women across academia. The American Association of University Professors makes the following recommendation [8]:

The AAUP now recommends that, upon request, a faculty member be entitled to

stop the clock or extend the probationary period, with or without taking a full or partial leave of absence, if the faculty member (whether male or female) is a primary or coequal caregiver of newborn or newly adopted children. Thus, faculty members would be entitled to stop the tenure clock while continuing to perform faculty duties at full salary....Institutions should also take care to see that faculty members are not penalized in any way for requesting and receiving extensions of the probationary period.

Even with an extended pretenure period, a faculty member caring for young children will succeed only if (s)he is strongly dedicated to her/his career and is very effective at time management—qualities that give promise of a highly productive career. The period of caring for small children occupies only a small part of one's career span. If one looks around most departments, including the best, one sees that even in judging male faculty at the time of tenure, promotion committees have not invariably made decisions that were in the department's best interest. A careful reexamination of the methods by which we make the most important decisions in hiring and granting tenure and of the support given to untenured faculty will benefit the quality of research, scholarship, teaching, and mentoring in academic institutions.

Conclusions of the Nelson-Rogers Study

The authors assert that disparities in hiring and retention between male and female scientists impact women at all levels, from undergraduate to full professor: undergraduate science majors are discouraged from pursuing academic careers both by lack of role models and by observing female faculty in their own discipline “marginalized, treated poorly, or not promoted.”

The article concludes: “In order to diversify successfully and open wide the doors for women, universities have to examine culture, attitudes, and policies they have long followed assuredly. This is a long-overdue and realistic response to a changing world. As Princeton chemist George McLendon observed, ‘Academic institutions are intrinsically monastic institutions that were created in the 13th century. They might need a little fine-tuning.’”

A comparison, not mentioned in the analysis, gives a strong warning of what may befall our profession if universities do not change their culture. The same thirty years following Title IX (Education Act Amendments, 1972) that opened up universities to women entering science and engineering fields also opened up the fields of law, medicine, and business to women in unprecedented numbers. While faculties in these fields may not have changed

either, the composition of those professions has changed dramatically in the thirty-year period. Apparently the marketplace in the professions has been friendlier to women than has the professoriate. In the competition for talent [1], universities have generally been losing ground to better-paying careers. It would be doubly unfortunate if universities, faced with a shrinking pool, are making that pool even smaller through poor recruitment or retention practices.

The conclusions of the Nelson-Rogers study are consistent with the experience of many academic mathematicians. We encourage our colleagues to examine the academic climate at their institutions. The Academic Climate website [9], developed by the Association for Women in Science, is an excellent resource. The site includes tools to initiate and provide a framework for institutional assessment of gender equality in science departments, model programs and policies, and many other resources. We invite members of the mathematics community to seek solutions within their own institutions.

References

- [1] DEREK BOK, *The Cost of Talent: How Executives and Professionals Are Paid and How It Affects America*, The Free Press, Macmillan, New York, 1993.
- [2] DONNA J. NELSON and DIANA C. ROGERS, *A National Analysis of Diversity in Science and Engineering Faculties at Research Universities*, Final Report, http://www.now.org/issues/diverse/diversity_report.pdf.
- [3] NOW staff, *Study Shows Top Colleges Have Few Women Profs in Hard Sciences*, National Organization for Women, <http://www.now.org/issues/diverse/011504study.html>.
- [4] KIM GANDY, *Universities Must Change Faculty Atmosphere for Women and People of Color*, press conference, <http://www.now.org/issues/diverse/011504report.html>.
- [5] ELLEN E. KIRKMAN, JAMES W. MAXWELL, and KINDA REMICK PRIESTLEY, 2002 Annual Survey of the Mathematical Sciences (Third Report), *Notices Amer. Math. Soc.* **50** (September 2003), 925-935.
- [6] ELLEN E. KIRKMAN, JAMES W. MAXWELL, and COLLEEN ROSE, 2003 Annual Survey of the Mathematical Sciences (First Report), *Notices Amer. Math. Soc.* **51** (February 2004), 218-233.
- [7] http://www.ams.org/employment/groups_des.html.
- [8] American Association of University Professors, <http://www.aaup.org/statements/REPORTS/re01fam.htm>.
- [9] Association for Women in Science, <http://www.academicclimate.org/>.