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Righting the Balance: Gender Diversity in the Geosciences

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Righting the Balance: Gender Diversity in the Geosciences

The blatant barriers are down. Women are now welcomed as equals, but the role of women remains a continuing concern. Women are under-represented in the Earth, ocean, and atmospheric sciences. Let's do the numbers: As of 1997, women received 41 Ph.D.s in physics and engineering, but only 25% of the doctors in the Earth, atmospheric, and oceanographic sciences (NSF, 1999b). Women were 23% of employed Ph.D.s across all fields of science, but increased to 28% in the geosciences. Women's salaries also lag the median salary for all Ph.D. geoscientists ($60,000) for women, the figure is $47,000 (NSF, 1999b). The growing number of women students is a clear right direction, but a stop.

What must be done to attain gender parity? While many studies have addressed the institutional influences on the careers of women scientists [e.g., Cole and Zuckerman, 1997; MIT, 1996], the picture is not complete. Women's careers are played out in specific disciplines. Solving the problem of gender imbalance and the critical issues requires an understanding of the particular obstacles women face in our field, as to be in science, a problem to be solved is both a challenge and an opportunity to progress.

The underrepresentation of women offers Earth science departments, universities and academic centers, and professional organizations like AGU opportunities for constructive action.

Opportunities for Departments: Balance Demographics

A Call for Nominations on the Status of Women at Columbia University, New York, examined women's progress through the academic pipeline (Applegate et al., 2001). From 1990 to 2000, the representation of women in the natural sciences ranges from 8% to 11%, while the percentage of women in the graduate student population grew from 27% to 35%. The picture at Columbia mirrors national trends in the physical sciences (Long, 2001), but because of a complete and detailed inventory, highlighting the points where women are not progressing through the academic pipeline at the same rate as men, and because of the specific nature of the problem, women are underrepresented in the same disciplines. Women are significantly less likely to be candidates promoted from within the university. The imbalance is particularly noticeable when departments hire what administrators call "tiers of opportunity." Over the decade studied, 11 men and no female scientists were hired as "stars" in the natural sciences at Columbia.

This analysis indicates two points in the pipeline to be fixed. As producers of Ph.D.s and post-docs, departments should seize the opportunity to encourage university students to pursue the academic Ph.D. As consumers of young Ph.D.s, departments have the opportunity to actively recruit the good young women scientists, to convince them that applying for a Ph.D. in academic jobs will be a positively stimulating waste of time, but an opening to great opportunities. The most compelling argument would be to make it the truth. At the second point, departments should make aggressive efforts to recruit female "tiers of opportunity." To aid these women, employers should strongly encourage to visit institutions for solicitation of women in science, the connections made during such visits often lead to recruiting efforts at all levels.

Opportunities for Universities and Research Facilities: Security and Open Distribution of Funds

To win the games, you have to know the rules—the real rules. Women are often not included in the informal network in which information about promotion possibilities and job openings is exchanged (Rhine and Zacharias, 1989). Consequently, well documented, widely disseminated information on promotion and advancement has been identified as an important element in creating a positive climate for women in academic science; the transparency of promotion and review procedures is essential to universities and science centers. Recent experience at Lamont-Doherty indicates that implementing and communicating well-defined criteria for promotion requires a significant investment of time and effort. Promotion criteria must be defined, all scientists must be informed of these criteria, and promotion must be made for regular written and oral feedback to junior scientists.

The MIT [1995] report indicated that science departments with undergraduate course requirements had the most successful advancement procedures also tended to give women department members equitable access to institutional resources. Clearcut handicaps women in their research and creates an additional impediment to advancement. Access to matching funds for proposals, institutionally supported fellowships and research assistants, funding for new instrumentation, startup packages, and seed funding for new projects has been identified as one of the major sources of gender inequality by both the Zuckerman et al. [1991] study and the MIT report. An open, peer-reviewed process for distributing internal discretionary funds for new project development will reduce this discrepancy.

Opportunities for Funding Agencies: Ensuring the Financial Burdens of Fieldwork

Across the sciences, the academic workplace is now a more congenial environment for women and men with families to work productively. Many institutions such as Lamont-Doherty have developed clear family leave policies and invested in childcare facilities. But the geosciences often require extended fieldwork in remote locations, which raise unique issues for parents. In oceanography, polar sciences, and marine geosciences, data collection and experimentation require that scientists spend weeks to months on research vessels. Fieldwork, a major attraction to graduate students, becomes increasingly difficult for early and midcareer scientists, particularly women and men with children. This critical component in the career of a young scientist immediately increases the tension between career and family.

Providing financial support for parents conducting extensive fieldwork, "family field pay" would go far more toward the pay the tension in the marine sciences, the cost of sea pay (US$400/day) is routinely budgeted to cover the hardships of the researc ing experience. The funding agencies have an opportunity to help scientists balance the demands of fieldwork and family by accepting family field pay as an allowable expense on field program budgets. Examples of potentially useful expenditures for family field pay include temporary babysitting services, extended hours of child care, transportation costs to bring a family member back for home visits, or even support for taking a babysitter into the field.

Opportunities for Professional Organizations

AGU annually documents the employment patterns and demographic characteristics of recent Ph.D.s in Earth and environmental sciences. Many studies have been conducted on the status of women in science at all levels. While knowledge of the status of women in necessary, it is not sufficient. Just as we cannot understand climate change by merely measuring the temperature over a decade, we cannot understand how to increase the contribution of women to this knowledge without understanding the biases and control points in the system. Professional organizations such as AGU and the Geophysical Society of America should develop projects to monitor the career patterns of scientists, both men and women, beyond graduate school and the first job. A study could involve longitudinal tracking cohorts of geoscientists through graduate school to 20 years and beyond. This project would provide fundamental data for design successful programs to enhance diversity in science.

The Future

The scientific challenges facing the geosciences and the realization that research budgets will never grow as quickly as research opportunity make it imperative that the Earth and environmental sciences use all of the resources available to them, including the growing number of women scientists. These scientists have training, background, and will to advance important research in our fields. Ensuring that they will have the opportunity to do so is the responsibility of us all.

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References

Yong, E., "From Scarcity to Opportunity: Gender Differences in the Careers of Scientists and Engineers." National Research Council, 2000.