May 2003 ISSUE

THE BACK PAGE SPS NEWS

Can Title IX Do for Women In Science and Engineering What It Has Done for Women In Sports?

By Debra R. Rolison

What does Title IX have to do with women in science? Many Americans singularly associate the Education Amendments of 1972, commonly called Title IX, with the spectacular increase in opportunities for female athletes in schools and colleges, but the law as originally written never mentioned sports.

It stated, "No person in the United States shall, on the basis of sex, be... denied the benefits of... any education program or activity receiving Federal financial assistance."

I would argue that being a professor of science in a federally funded university is an educational activity and therefore subject to Title IX considerations.

Title IX is a mechanism that can be used to stimulate change. In analogy with the legal strategy that extended Title IX to school sports and led to women comprising 42% of today's collegiate athletes, I argued in 2000 that it was time to apply Title IX as a strategy on behalf of women faculty in chemistry departments. Twenty percent of the PhDs in chemistry went to women in 1985 and that fraction has only increased, reaching 33% in 1999. Yet the fraction of women on the faculty of the top 50 research departments in chemistry in 2000 was only 10%, rising to 12% in 2002.

Should the American taxpayer support institutions that continue to hire white men preferentially? If universities cannot incorporate onto their faculty a representative fraction of the talented women awarded PhDs in science, then it is reasonable to withhold Federal funding from the departments seemingly satisfied with a gender status quo that would not be out of place in the 1950s.

As a further incentive, the research funds so freed could be directed to those universities who do attract to their science faculty the diversity of talent in the PhD pool.

Why propose such a drastic course of action? Because science, technology, engineering, and mathematics (STEM) departments need more women as faculty—and not only to show their undergraduate students (the majority of whom in some disciplines are now women) that a career in academia is a viable path.

The breathtaking inability of too many of our research universities to diversify their faculty is a national disgrace; these universities have recognized the importance of a diversified student body, but have not yet reflected that pool of talent onto their faculty.

Similar difficulties are apparent among the scientific staff of National and Federal laboratories. It matters who teaches and self-reform is not getting it done. The slow pace is especially frustrating in light of the historic opportunity to change the faculty demographics as scientists and engineers hired in the boom years of the 1960s retire.

The "pipeline" has increasingly allowed women with PhDs in STEM to flow into a well-populated candidate pool for faculty openings-albeit enriched in some disciplines, less so for others such as physics. Women earn more than 40% of the PhDs in the life sciences, more than 30% of the PhDs in chemistry, more than 20% of the PhDs in mathematics. Yet applications from women for advertised faculty positions in PhD-granting STEM departments rarely match the numbers of women who graduate from these departments with PhDs.

Science and our society can no longer tolerate the tired contention that "the statistics of small populations" is the operative reason for the slow advancement of women in science. Such language too often deflects action that

would transform the academic culture to one that adapts to women.

If the observable is the absence of women from the applicant pool for science faculty, what is the mechanism?

In Cathy Trower's paraphrase of a 1990's political slogan: "It's the culture, stupid." Academic science still echoes the standards of David Noble's description of Western science: "a world without



women," one in which round-the-clock scholarship by men was historically sustained by an infrastructure first provided by monasteries and then by wives.

Most women in science do not have wives, and many men in science no longer have the traditional infrastructure either. The university, which should be the most flexible and advanced of workplaces, is unpleasantly out-of-phase with the modern world.

In the three years since I provocatively suggested applying Title IX to departments in the chemical sciences, I have heard from women and men across all the STEM disciplines saying that they, too, have the same problems we face in chemistry. It may be nice to have some company, but enough is enough. With nearly ten centuries of higher education, it is past time to diversify our university system beyond the operative one where the *de facto* hiring quota in science is 80–90% white men. Isn't a millennium of affirmative action for white men sufficient?

More to the point: Should scientists accept the maledominant status quo of the modern university and laboratory? We have got to get out of our lily-white male universe if we want to stay at the forefront of science.

A leader, as opposed to a (minding-the-store) manager, would not stand still for less. Men, because they have been and predominantly still are the stewards and beneficiaries of the current system, have a moral responsibility to decide how to transform the institution and its culture.

But if sweet reason, historical perspective, and moral suasion were sufficient to alter the culture of science to

one that fully incorporates the talent we train, I wouldn't be writing this article.

So, historically, how does one reform institutions that institutionalize injustice?

First option: complete demolition (see the French Revolution).

Second option: redirect the reward structure—do so and people change their behavior. The nominal demands for faculty success in STEM disciplines today require someone who must cover the CEO, COO, CFO, CTO, CIO, and human resources functions of a small company.

Our universities can never pay faculty commensurate with all those activities: it is past time to stop demanding so much of STEM faculty and return them to—and reward them for—the primary reason they are in academics: educating independent thinkers and critical scholars in pursuit of new knowledge.

Third option: coercion. The possible loss of Federal R&D dollars as a consequence of Title IX assessments focuses the attention of the powers-that-be: administrators and those faculty most rewarded by the current system.

The environment in STEM departments is a multivariate problem; improving the environment will require more than one solution, even though Title IX is probably the biggest hammer we can take to it. But in the face of possible Title IX action, a wide range of transformational strategies immediately becomes more appealing.

If the case can be made that STEM departments merit application of Title IX, where does the fault lie? Not with the women, who did what was asked of them and stayed in the pipeline. Pumping more women with PhDs into the STEM professions was long thought to be the solution, but even a well-filled pipeline is only a necessary, not a sufficient condition for thriving careers.

Because physics trails even mathematics with respect to the fraction of women achieving PhDs, we need to recognize that the problem lies with an environment and culture that do not appeal to women otherwise interested in science- and math-intensive studies, including how scientific arrogance and other solipsistic behaviors are over-rewarded by the existing culture.

The US Congress has noted with concern the increasing need for the US to import its scientific talent to satisfy the technological needs of our country and has tied that need to the inability of our educational system to attract the diverse American populace, including women, into scientific studies and careers.

The pre-9/11 findings of Phase III of the Hart-Rudman report on National Security/21st Century, which noted that it is a national imperative to maintain a high level of American expertise in science and technology, only amplified Congressional concerns on these matters after the 9/11 attacks.

In the October 2002 US Senate hearing on "Title IX and Science", Senator Ron Wyden (D-OR), then-chair of the Subcommittee on Science, Technology, and Space commented for the record: "It's time Congress quantified and qualified the realities facing women in the sciences. Only then can we find fully effective solutions." An outcome of this hearing was the addition of amendments to the bill authorizing appropriations for the National Science Foundation, which required the NSF to charge the National Academy of Sciences with examining gender differences on issues such as faculty hiring, promotion, tenure, and allocation of resources including laboratory space.

Such a study echoes the 1999 MIT report, which showed a pattern of gender discrimination among the faculty of the College of Science at MIT, and will provide the data to determine if comparable imbalances exist in our STEM departments—and Title IX permits the consideration of statistical evidence tending to show that imbalances exist. As a further outcome of this bill, the Academy will also examine gender differences in major Federal external grant programs.

In the meanwhile, activism that starts with the individual up to mechanisms to expand Title-IX-like actions (*e.g.*, withholding non-federally derived resources from poorly diversified departments) might rouse the stewards of the current STEM structures from their passivity.

As individuals, we can certainly start upending the myth of objectivity in evaluating merit. If women have to be more productive than men to be deemed comparably qualified, often at the expense of a far-greater expenditure of time and energy on family/home than a "comparable" man, all hiring, promotion, and award committees should reassess their standard perceptions of credentials/productivity in order to level the psychological playing field skewed by our gender schemas (culturally embedded unconscious biases and beliefs).

Let's "out" the toxic departments: create a guerilla web site that provides the statistics for the top tier of STEM graduate departments in order to get quantitative and qualitative information into the hands of the "consumer" the undergraduate seniors and the faculty (primarily at four-year colleges) who advise them.

Undergraduates can then be encouraged to give diversified institutions their first attention when looking at graduate school.

Other practical goals to transform the culture and improve the environment for men and women include aggressively recruiting excellent female and under-represented minority candidates for faculty and staff openings, fairer evaluation of the contributions and productivity of candidates and faculty who are not white men, ensuring on-campus day care, career-long mentoring, and really rewarding the good teacher–scholars because of how they guide and challenge their students.

It is now time that women thrive, not just survive in their STEM career homes—especially in academia, our gateway to the future.

Debra R. Rolison is head of the Advanced Electrochemical Materials section at the Naval Research Laboratory in Washington, DC, and is also adjunct Professor of Chemistry at the University of Utah. The views herein are those of the author and do not represent official positions of the US Naval Research Laboratory or the US Department of Defense.

The author gave a talk on this topic at the APS March Meeting in a session sponsored by the Committee on the Status of Woman in Physics.

©1995 - 2003, AMERICAN PHYSICAL SOCIETY APS encourages the redistribution of the materials included in this newspaper provided that attribution to the source is noted and the materials are not truncated or changed.