

## Title IX as a change strategy for women in science and engineering . . . and what comes next<sup>†</sup>

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What does Title IX have to do with women in science?<sup>‡</sup> Title IX is a mechanism that—when wielded—successfully affects change for women. Americans rightly attribute 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 athletics. 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.”

In analogy with the creative legal strategy that extended Title IX to school sports and led (with time and effort) 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.<sup>(1)</sup> While that suggestion was met with near-universal horror,<sup>(2)</sup> look at the facts. Twenty percent of the Ph.D.s in chemistry went to women in 1985, increasing to 33% by 1999. Yet the fraction of women on the tenure-track faculty of the top 50 research departments in chemistry in 2000 was only 10%, rising to 12% in 2002 and stagnating at that level in 2003 and 2004.<sup>(3)</sup>

Chemistry is not the only discipline with solid Ph.D. numbers: women earn more than 40% of the Ph.D.s in the life sciences, more than 20% of the Ph.D.s in chemical engineering, more than 20% of the Ph.D.s in mathematics. Yet applications from women for advertised faculty positions in Ph.D.-granting STEM departments rarely match the numbers of women who graduate from these departments with Ph.D.s. The now-false and tired contention that “the statistics of small populations” is the operative reason for the slow advancement of women in science, especially to positions of power and impact, has too often been used to deflect action that would transform the academic culture to one that adapts to women.<sup>(4,5)</sup> § As Trower and Chait remind us, self-reform is

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† The author’s arguments with respect to the application of Title IX on behalf of women on science faculty are presented in more extended form in Chapter 6 in *Women in the Chemical Workforce* [National Academy Press, Washington, DC, 2000, pp. 74–88], available at <<http://www.nap.edu/books/030907293X/html>> and in updated form as the Back Page feature of *APS News*, 2003, 12 (May) available at <<http://www.aps.org/apsnews/0503/050312.cfm>>.

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‡ The term “science” will be used as shorthand throughout this discussion for the STEM disciplines of Science, Technology, Engineering, and Mathematics.

§ If the observable is not only the absence of women from the tenure-track STEM faculty in research universities, but their absence from the applicant pool for faculty openings, 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,”<sup>(5)</sup> one in which round-the-clock

not getting it done,<sup>(4)</sup> and the slow pace is especially frustrating in light of the current (and historic) opportunity to change the faculty demographics as scientists and engineers hired in the boom years of the 1960s retire.

After suggesting that departments in the chemical sciences should be “Title Nined,” I then heard from women and men across all the STEM disciplines saying that they, too, experience the same problems we face in chemistry. Can one take any comfort in that universality? Hardly. Enough is enough. Nearly ten centuries of higher education should have provided ample time to diversify our university system (and so, too, our national and federal laboratories) beyond the operative one where the de facto hiring quota in science has been 80% to 90% white men. Isn’t a millennium of affirmative action for white men sufficient?

But why propose such a drastic course of action as Title IX? Because it’s the LAW—as made clear by the release of the July 2004 General Accountability Office (GAO) report entitled *Gender Issues: Women’s Participation in the Sciences Has Increased, but Agencies Need to Do More to Ensure Compliance with Title IX.*<sup>(6)</sup> And because it works. The threat that Title IX compliance reviews could affect federal funding to universities is what has led to change, not an actual loss of funds.

Now that the GAO has reminded the Federal funding agencies that Title IX compliance audits must also be done with respect to science (and should have been ongoing for the past 30 years), it is time to contemplate what the next stage could entail—especially as any formal Federal pressure using Title IX will be slow. The strongly positive impact that Title IX has had for collegiate athletics was neither accomplished overnight nor without women fighting for their rightful place (and rightful share of the money), including a willingness to use the courts.

How does one thus reform institutions that seem mired in dysfunction? \*\*

Firstly: Remember what psychology, sociology, and economics have taught us about how people can be influenced to change their behavior. Redirect the reward structure. The nominal demands for faculty success in STEM disciplines more and more appear to 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. In my view, tenure should be abolished, with job security, and the heart of merit compensation, related to scholarly and educational contributions.

Secondly: Persuasive coercion. The possible loss of Federal R&D dollars as a consequence of Title IX compliance reviews will undoubtedly focus the attention of the powers-that-

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scholarship by men doing science was historically sustained by a sociological and emotional infrastructure first provided by monasteries and then by wives.

\*\* 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, we wouldn’t be holding this meeting.

be in the existing academic culture: Administrators and those faculty most rewarded by the current system.<sup>††</sup> Improving the environment in STEM institutions will require more than one solution, even if Title IX is the most implacable hammer we can take to it. A wide range of strategies to transform the culture becomes immediately more appealing—and less threatening—in the face of possible Title IX action.

Thirdly: Money. Women who chose career paths as research faculty or staff should not be faced with choosing between their career advancement and their personal life, especially whether or not to raise children. Childcare, whether provided on-site as day care or underwritten in the home or nearby community (including adult care), costs infrastructural resources and money.

Fourthly: Grass-roots activism. Change strategies can range from actions by the individual to mechanisms to extend Title-IX-like actions beyond Federal funds, for example, professional society, foundation-derived, and even intra-institutional funds and resources could be withheld from poorly diversified departments. As individuals and members of professional institutions and societies, we can remind our colleagues and students that we are life-long learners. It is time for us all (and especially our search, hiring, promotion/merit, and award committees) to learn about—and learn how to level—a psychological playing field that is skewed by unconscious biases and beliefs, which are tied to culturally embedded gender and racial schemas.<sup>(7) ‡‡</sup> It would also be healthy for science in general to run the myth of pure objectivity in evaluating merit (and data) to its rightful dead-endpoint.

Finally: Market dynamics. Gratifying as it is to have seen things progress this far with respect to Title IX and STEM,<sup>(8,9,10) §§</sup> including the 2004 release of the GAO report on Title IX and Science, in my view the next stage may have to be more market-oriented—something with the flavor of "denial of service." I suggest we assemble a STEM data base on the nature of the graduate experience at the top 50 Research I departments, comparable to that being derived by Kuck et al. for chemistry.<sup>(11)</sup> The information should then be disaggregated faculty member by faculty member and available on the Web for consideration by the relevant consumer (i.e., the faculty at the four-year

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<sup>††</sup> I am not yet convinced that the most powerful administrators (at most universities) see any real need to change—there is still far too much of the attitude that one just needs to learn how the game is played in academe to do well in academe, without recognizing that the game board needs to be thrown up in the air with only certain pieces retained.

<sup>‡‡</sup> One of the sanest things I have ever heard a politician say was when Congressman Vernon J. Ehlers (R-MI) opened his comments at a Capitol Hill breakfast discussing diversity in academia (on 11 October 2001) with: "Hello. My name is Vern. And I'm a recovering racist and a recovering sexist."

<sup>§§</sup> The progress includes the U.S. Senate hearing on 3 October 2002 on "Title IX and the Sciences"<sup>(2)</sup> at which Senator Ron Wyden (D-OR), then chair of the Subcommittee on Space, Science, and Technology, 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." This hearing led to amendments to the bill authorizing appropriations for the National Science Foundation that required the NSF to charge the National Academies of Science with examining gender differences on issues such as STEM faculty hiring, promotion, tenure, and allocation of resources including laboratory space.<sup>(8)</sup> This study, which echoes the issues raised by the 1999 MIT report showing a pattern of gender discrimination among the faculty of the College of Science at MIT,<sup>(9)</sup> is underway,<sup>(10)</sup> and will provide the data to determine if such imbalances exist in our STEM departments. Title IX permits "the consideration in any hearing or proceeding under this chapter of statistical evidence tending to show that such an imbalance exists."

colleges and their outstanding STEM-majoring undergraduate juniors/seniors). Critical statistical factors could include the number of women in each research group (professor by professor) over the past twenty years and the fraction of those women who graduated with Ph.D.s relative to the men in the group; the number of women who went into academics (e.g., top 25 Research I departments versus any research university versus four-year colleges and universities); and the number of women who remained in STEM career paths. Important sidebar information could be “peer review” (i.e., anonymous) comments on the nature of the graduate environment in the department and the group.

With such a database, the lifeblood of the U.S. STEM university research enterprise—undergraduate juniors/seniors who choose to go on for graduate training—could make a far-more informed selection among graduate programs. There will always be students who are shopping solely for pedigree, but so many of these young people want to do cutting-edge science in an environment good for people. Such market information could rapidly skew which universities and departments and groups win the acceptance of this prize demographic. We can then see who among the lovers of the status quo in the research universities really wants to play hardball. It is time to “out” the toxic departments and research groups.

The problem is not with the women (was it ever?); it lies with a culture that is unappealing 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.<sup>(12)</sup> One of the greatest indictments I know of academics is the comment that has been made to me by far too many senior faculty, upper administrators, and (saddest of all) students: they thank me for my courage in making the arguments with respect to applying Title IX to science. I find that statement enormously depressing because it says all that needs to be said about how sick the university culture has become—and how far we have moved from tenure as a process that ensures academic freedom in service to innovative scholarship.

I often end my “uppity woman” lecture on these issues with a marvelous quote from the poet Adrienne Rich: “The most notable fact that culture imprints on woman is the sense of our limits. The most important thing one woman can do for another is to illuminate and expand her sense of actual possibilities.”<sup>(13)</sup> It is not coincidental that the world we seek to create, one in which we can do our science to the best of our abilities, will be one in which men flourish, too.

## References and Notes

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3. *Chemical & Engineering News*: (a) J. R. Long, **2000**, 78, 56 (25 September); (b) A. Byrum, **2001**, 79, 98 (1 October); (c) J. R. Long, **2002**, 80, 110 (23 September); (d) C. A. Marasco, **2003**, 81, 58 (27 October); (e) C. A. Marasco, **2004**, 82, 32 (27 September).

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4. C. A. Trower and R. P. Chait, *Harvard Magazine*, **2002**, 104, 33 (April–March).
  5. D. F. Noble, *A World Without Women—The Christian Clerical Culture of Western Science*, Knopf: New York, 1992.
  6. GAO Report 04-639: *Gender Issues: Women's Participation in the Sciences Has Increased, but Agencies Need to Do More to Ensure Compliance with Title IX*, available at <<http://www.gao.gov/new.items/d04639.pdf>>.
  7. V. Valian, *Why So Slow? The Advancement of Women*, MIT Press: Cambridge, MA, 1998.
  8. The text for the 107<sup>th</sup> Congressional enrolled bill H.R. 4664 “An act to authorize appropriations for fiscal years 2003, 2004, 2005, 2006, and 2007 for the National Science Foundation and other purposes” can be found by searching <<http://frwebgate.access.gpo.gov>>.
  9. “A Study on the Status of Women Faculty in Science at MIT,” *MIT Faculty Newsletter* **1999**, 11 (March), available at <<http://web.mit.edu/fnl/women/women.html>>, summarizes a 150-page unpublished report prepared in 1994.
  10. The NRC Committee on Gender Differences in Careers of Science, Engineering, and Mathematics Faculty held its first meeting on 29–30 January 2004 in Washington, DC; more information is available at <[http://www7.nationalacademies.org/cwse/gender\\_differences.html](http://www7.nationalacademies.org/cwse/gender_differences.html)>.
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  13. A. Rich, *Of Woman Born*, 1976 (reissued by W. W. Norton: New York, 1995).