

Full Engagement of Talent for Materials Research

We cannot afford untapped intellectual capacity in science and technology.

The goal of the Materials Research Society to double membership by 2015 furthers one element of our obligation to meet global research needs. Several predictable crises threaten human progress, and one that materials research is well poised to help solve is energy availability. Given the size and urgency of the task, we need our fair share of the human race's full intellectual horsepower, and right now we do not have it.

While there are several under-represented groups in science, the female sector is the largest. The pipeline for girls in physical sciences is not flowing at capacity.

Science pipeline leaks may be related to equal opportunity. In the United States in 2007, only nine women were elected to the National Academy of Sciences, a six-year low.¹ In some physical sciences, there is a noticeable gap between the pool of researchers with PhD degrees and the percentage of tenured faculty. For example, the United States has only 13% females in chemistry faculties compared to 33% of female candidates with PhD degrees in chemistry.² Although physics has near parity at 11% and 13%, respectively, only 6% of the American Physical Society membership is female. (It is therefore surprising that 40% of nuclear physicists at U.S. national laboratories are female!) The MRS membership is close to U.S. science and technology averages with 20% female. We actually do not know what percentage of the MRS is minority—more about that below—but the U.S. S&T average is 10%.³

The largest pipeline leak is before graduate school, and it affects not just women. Bright U.S. students who have the aptitude for science are lured away to law and business. Unfortunately, about half of our fair share of U.S. females opts out of physical sciences and engineering at this stage.

The standard excuse for losing talent to other professions is the attraction of higher salaries. However, U.S. students *already in S&T*, when asked why their colleagues opt out, frequently say, "They're just lazy."

¹Chronicle of Higher Education, <http://chronicle.com/daily/2007/05/2007050201n.htm>.

²Workshop on Building Strong Academic Chemistry Departments Through Gender Equity (January 2006), sponsored by DOE, NSF, NIH; www.chem.harvard.edu/groups/friend/GenderEquityWorkshop.

³National Science Board, *Science and Engineering Indicators 2006* 1, NSB 06-01; and 2, NSB 06-01A (National Science Foundation, Arlington, VA, 2006); www.nsf.gov/statistics/seind06.



"We cannot expect to win the energy game when, at the opening whistle, a quarter of our team does not show up."

Alan Hurd

Admittedly self-flattering, this explanation rings true. Easy-outing is familiar to *MRS Bulletin* readers, who know that the U.S. educational system lags behind S&T

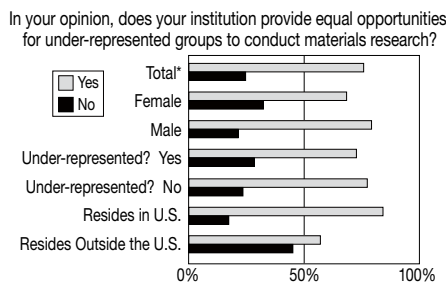
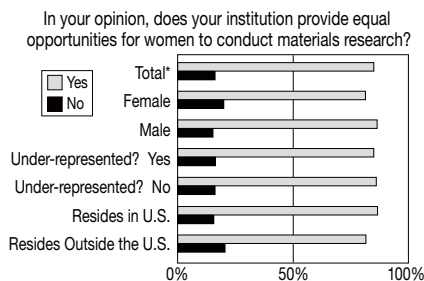


Figure 1. Results of a Materials Research Society opinion poll. (MRS One-Minute Polls represent non-scientific samples of visitors to www.mrs.org where members may view the data under the "Membership" tab.)

needs.⁴ The surge in S&T education after Sputnik has run its course, requiring the United States to rely on non-U.S.-born researchers. Remarkably, there were twice as many B.S. degrees in physics earned in the United States *the year before* Sputnik than in 2004. Fortunately, the American Competitiveness Initiative spawned hopeful legislation in 2007 to produce a new surge. Federal funding for education is not a panacea, but it is easier to legislate than industriousness.

We cannot expect to win the energy game when, at the opening whistle, a quarter of our team does not show up. While unequal opportunity has no doubt de-motivated prospective women scientists,⁵ the lower effort required to enter financially attractive fields has lured a generation of talent away from science.

Full engagement is also about the mix. Though fairness of opportunity argues for ethnic and gender diversity, *intellectual diversity* is a solid business case in research for alternative perspectives.

In October 2007, MRS members responded to equal opportunity questions in a non-scientific opinion poll (www.mrs.org, "Membership" tab). For the first time, MRS asked about diversity.

Both in the United States and internationally, 30% of respondents identified themselves as from under-represented groups. Within this group, half were women. In the overall MRS membership, 20% are women.

Over 80% of respondents felt that their institution provides equal opportunity for women, independent of residence, gender, and ethnicity. (On the flip side, nearly 15% report inequality!) Similarly, equal opportunity for under-represented groups was over 75% independent of gender and ethnicity, but over 40% of international respondents report unequal opportunity, a striking deviation from consistent responses. See Figure 1 for more information.

Materials research is more exciting than at any time in history, and the stakes may be higher. MRS growth is an indicator of society's need for materials research. We cannot meet the challenge without smart people.

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⁴*Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future*, (The National Academies Press, 2007); www.nap.edu.

⁵C. Dean, "Women in Science: The Battle Moves to the Trenches," *New York Times* (December 19, 2006); www.nytimes.com.