

## The Science of Diversifying Science

For over 30 years the U.S. has spent billions of public and private dollars to get more ethnic minorities into science, technology, engineering, and mathematics (STEM) majors and careers.

Sadly, the result has been a perpetually small pool of competitively eligible STEM students from underrepresented groups. And it is this small pool we compete over for our graduate programs and professions, perpetuating the status quo of too few minority scientists, engineers, physicians, etc., to meet the U.S. workforce needs.

The success of underrepresented, ethnic minorities in the University of California, Berkeley (UCB), Biology Scholars Program (BSP) over the last 14 years provides insights into what we must do differently to address underrepresentation and its toll (e.g., economic, health) on America.

BSP is a majority female (70%) and majority minority (60%) program. Since 1992, 1,400 UCB undergraduates have participated in BSP. Nine hundred of its graduates have entered graduate and professional programs.

Funded by the Howard Hughes Medical Institute and the Gordon and Betty Moore Foundation, the program aims to increase the diversity of UCB undergraduates who succeed in their biology majors and related careers.

BSP shares components similar to other science diversity programs across the U.S., including study groups, paid research opportunities, academic advising, and faculty mentoring.

How successful have BSP students been? In comparison with majority students not in BSP, minority (African American, Hispanic, and Native American) BSP members have graduated with biology degrees in equivalent percentages and with equivalent final University of California GPAs; this in spite of entering UCB with lower high school GPAs and lower SATs. By their success in biology at UCB, BSP minority graduates have attained parity, closing the minority-majority performance gap.<sup>1</sup>

So what is the “BSP lesson” that will help us tackle underrepresentation in STEM? Students are most often not the problem. They do not need to be made “better.” Rather it is our programs and institutions that must change for the better.

Since diversity programs began in the 1960s, the science diversity community (including BSP) has done essentially the same traditional list of interventions and activities with students. The result? A perpetually small pool of competitively eligible minorities over which we continue to compete for our graduate programs and professions.

Some would characterize this as “insanity”—doing the same things over and over again and expecting different outcomes. How do we break this cycle and realize our goal of diversifying our STEM majors and professions?

The key point is that we have done neither (1) substantive research on what’s working, what’s not, and for whom, nor (2) have we tied funding of our work to rigorous assessment/evaluation. Why not?

In my opinion, diversity work is not treated as real work. Rather it is viewed as retrofit or adjunct to the main fabric of our disciplines. The “science” of diversity work is not taken seriously, and is not held to the same high standards of scholarship as our work at “the bench.”

Accordingly we have limped along uncritically doing the same things (“the list”) with our students, not researching what works, what doesn’t, and for whom. And we continue to receive funds for work based on outcomes that are not rigorously analyzed or evaluated. In what legitimate discipline would this occur?

In defense, some would rationalize our behavior in light of the imprecise “fuzzy” nature of diversity work. Factors often cited as “out of our control” range from the “micro” (e.g., students’ level of preparation, motivation, and/or ability) to the “macro” (e.g., historical inequities in society and our institutions).

Unfortunately, framed in this way, the focus shifts outward to what we can’t control, rather than looking at what we’re doing. Over what do we have control? What should we do? And, what resources do we need to do it?

First, we must work on understanding our diversity work through rigorous research that enlists the expertise of our social science colleagues.

Second, we must hold ourselves accountable for what we do through assessment/evaluation and tying funding to student outcomes.

To do this we need resources, not doing more of the same. We need money, training, and an interdisciplinary effort that taps the expertise of social scientists to help us do what we haven’t been trained to do as scientists—to understand what works, what doesn’t, and for whom.

Finally, and more difficult, we need the personal, political, and professional will to be self-critical regarding how our actions may or may not address the problem of underrepresentation. We must elevate program assessment and research on the effectiveness of diversity work to the status of, for example, our studies of cytoskeleton regulation.

Only then will we make STEM majors and careers accessible to all motivated and interested students. This is our challenge. This is where our real work lies. ■

—John Matsui

### Reference

<sup>1</sup>Matsui, et. al. (2003). *Cell Biology Education* 2,117–121.

