

Why American College Students Hate Science

By BRENT STAPLES

The University of Maryland, Baltimore County, opened for business in a former cow pasture not far from downtown just 40 years ago. Still in its infancy as universities go, U.M.B.C. is less well known than Maryland's venerable flagship campus at College Park or the blue-blooded giant Johns Hopkins. But the upstart campus in the pasture is rocking the house when it comes to the increasingly critical mission of turning American college students into scientists.

A study of the university's science program published in the March 31 issue of the journal *Science* sets forth an eye-opening recipe for remaking science education in America generally — and in particular, for increasing minority participation, which lags even after decades of federally supported initiatives.

But following U.M.B.C.'s blueprint won't be easy. Among other things, it will require the scientific establishment to rethink its approach to teaching from the ground up.

Science education in this country faces two serious problems. The first is that too few Americans perform at the highest level in science, compared with our competitors abroad. The second problem is that large numbers of aspiring science majors, perhaps as many as half, are turned off by unimaginative teaching and migrate to other disciplines before graduating.

The science establishment explains these defections as part of a natural "weeding out" — a view flatly rejected by U.M.B.C. and a few other campuses where administrators are getting top performance from students who would ordinarily have become demoralized and jumped ship.

Initiated in 1989, U.M.B.C.'s Meyerhoff Scholars Program is so well known that the university no longer needs to recruit for it. High school counselors and teachers nominate about 1,900 students annually, mostly from Maryland, for merit-

based scholarships. About 100 scholarships are offered, and of these about 50 are accepted. The new students are welcomed into a well-established community of scientists and scientists-to-be through a summer program that sets the stage for the next four years.

And why the country needs them to love it.

The students are encouraged to study in groups and taught to solve complex problems collectively, as teams of scientists do. Most important, they are quickly exposed to cutting-edge science in laboratory settings, which demystifies the profession and gives them early access to work that often leads to early publication in scientific journals. At the same time, however, the students are pushed to perform at the highest level. Those who earn C's, for example, are encouraged to repeat those courses so they can master basic concepts before moving on.

The laboratory approach keeps the students excited and prevents them from drifting off into less challenging disciplines. Indeed, according to *Science*, 86 percent of the Meyerhoff participants have graduated with science or engineering degrees. Nearly 9 in 10 of those graduates went on to graduate or professional programs, with a significant number earning M.D.'s or Ph.D.'s, or both.

Critics have sometimes accused the Meyerhoff program of cherry-picking bright students who would perform spectacularly well wherever they went to school. But the numbers suggest that the school's instructional strategy makes a real difference. Meyerhoff students are twice as likely to earn undergraduate degrees in science or engineering as similar students who declined the scholarships

and went to school elsewhere. Most significantly, students who completed the Meyerhoff program are 5.3 times as likely to enroll in graduate study as the students who said no and went elsewhere.

The higher education establishment is generally startled to learn that more than half of the high-flying Meyerhoff students are black. This surprise stems from the unstated but nonetheless well-established belief that high-performing science students don't actually exist in the black community.

U.M.B.C.'s president, Freeman Hrabowski III, knows better. He has spent years expanding his school's access to high-performing minority students and has taken great pains to reassure black families that their children will be well looked after on his campus.

It has long been known that teachers' low expectations, particularly those related to race and racism, can depress student performance. At U.M.B.C., sustained success by minority students seems to have alleviated this poisonous problem. Faculty members who once looked askance when asked to take on minority students in their laboratories now clamor for them.

Off campus, meanwhile, the students are much sought after as research assistants and as candidates for summer internships. Those who finish their education and take their places in the ranks of researchers and professors often become powerful proselytizers for science.

The Meyerhoff model shows that a vibrant, well-structured science program can produce large numbers of students who excel and remain in the field. It has also debunked the myth that academic excellence and minority access are mutually exclusive goals.

The university community needs to absorb these lessons quickly, so the country can begin to train scientists in the numbers that it clearly needs. Without them, America is unlikely to preserve its privileged position in an increasingly competitive and science-based global economy.