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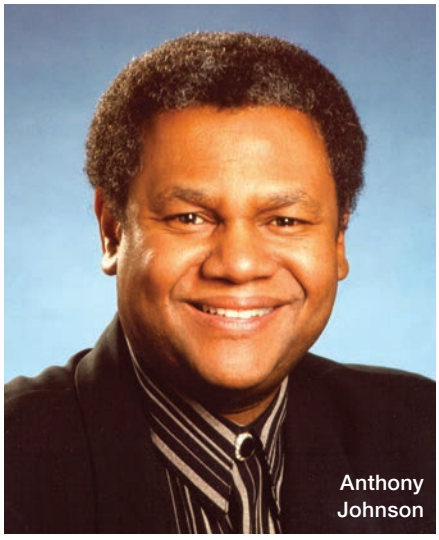
Minority Women Scientists: At the Culture-Gender Crossroads

Anthony Johnson

As we engage in efforts to increase diversity among scientists, culture is an important part of the conversation.

We all have memories of remarkable moments that we've experienced during our arduous career paths: the joy of discovery or the thrill of an accomplishment. Unfortunately, most of us can recount a few bad times as well, such as when we've been disparaged or embarrassed. A pivotal incident for me occurred early in my career, when I was nominated for my first committee assignment. Naturally, I was excited and honored to represent Bell Labs at such a prestigious meeting of OSA colleagues. As we were all standing around before the formal introductions had been made, another committee member hurried over to me and asked me to serve him coffee! From that moment on, I resolved to do something about the dearth of minority participation on important scientific committees.

Some 30 years later, my quest continues. Empirical data indicate that there is still much work to be done to improve participation among both minorities and women. Thankfully, women have made some small gains. However, for minority women in particular, the news is abysmal. What initially looks like promising data turns out to be specious. According to the 2010 Population Reference Bureau's most recent statistics, black and non-white Hispanic women comprise most of the minorities embarking in collegiate studies in science. Unfortunately, however, far fewer women ultimately complete their undergraduate degrees in physics, mathematics or engineering, and year after year they lag behind men.



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The American Institute of Physics' 2005 statistics on enrollment at Ph.D.-granting facilities in the United States cites that typically only one or two minority women will complete a Ph.D. in physics each year, as compared to about 175 physics doctorates awarded to all women. Put another way, in the United States about 14 percent of the Ph.D.s granted in physics each year go to women, but less than 0.5 percent of them are African-American, Native-American or Hispanic. The statistics are equally bad in the other science and engineering disciplines.

With all our outreach efforts addressing gender inequities in academia and

industry (inherent sexism, family obligations, maternity leave, child care), there has been little discussion in most scientific circles about culture (ethnicity, nationality, tribe or people), and how one's group identity also impacts women's careers in science. Culture, by definition, refers to generations of shared knowledge, perceptions, values, beliefs and rituals that are characteristic of a group.

These intrinsic imperatives cannot be educated out of an individual. In fact, research suggests that culture defines individuals even more than gender. Hence, it should be culture *and* gender that stipulate the diversity that is so necessary for creating a contemporary global community of scientists. Given the obvious disparities in the physics Ph.D.s granted to minority vs. non-minority women, I suggest that there are significant cultural variables that should be part of our strategic planning as we discuss women and science.

Over three decades, I've advised dozens of non-minority women in physics and engineering. However, my true passion has always been in serving minorities. Some of the experiences I've had mentoring have been invaluable. They have given me a sense of how culture influences behaviors and attitudes.

For example, I learned about a unique cultural issue among Hispanic women when I chaired the American Physical Society's (APS) Committee on Minorities in Physics. As part of the APS Site Visit Program, we visited the University of Texas, El Paso (UTEP) in 1992. At the time, UTEP had a Hispanic population of nearly 60 percent, giving it the potential to graduate the largest number of Spanish-speaking Ph.D.s in physics in the United States.

However, during the student discussion sessions, I noticed that elder Hispanic family members, and sometimes husbands or brothers, were inherently suspicious of the academic curriculum, which required students to work beyond standard daylight hours. Apparently it was considered shameful for young women to be out after hours.

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It did not matter that these fledgling scientists were involved in their requisite academic activities— i.e., using libraries, laboratories and research facilities. These culture-specific misgivings were so pervasive that many female students could not pursue science careers, even though I recommended an orientation program for the families. I had hoped to help eliminate any misunderstandings that could erode support for these young women. Unfortunately, the disapproving attitudes nevertheless affected these young women, dissuading them from choosing a science curriculum.

Several of the physicists and electrical engineers I've had in my research groups have been African-American women. One crucial element of black culture is not to ask for help, even when it's really needed. Black women pride themselves on being strong, and needing assistance in one's personal or professional life is perceived as a sign of weakness or ineptitude. Thus, stalwart silence is the preferred preemptive defense mechanism.

Gender studies suggest, however, that women—taken as a whole group—take less exception to help-seeking behaviors. In fact, many have have been conditioned from early childhood to ask for assistance. This fairly universal tenet of black culture to work in isolation can inadvertently self-sabotage research, and abruptly end careers.

It's a fascinating phenomenon that could have played out repeatedly in my own labs. I've learned that one of the keys to good communication is to be perceived as approachable first, and competent or knowledgeable second. Finessing this subtle characteristic can be challenging. Within my own research group, I've anticipated problems and set up opportunities for discussions about the practical pitfalls of optics research, rather than waiting for my students to come to me for help. Now my regular mandatory practice sessions and individual rehearsals have become widely appreciated, and I think they've given my students more self-confidence and polish at scientific conferences.

I don't know of anyone who has mentored indigenous people as graduate students, postdocs or even established scientists … which is telling in and of itself. Native-American women who have earned their doctorates are typically the first in their families to attend college, let alone graduate school. The financial compromises made for the daughters of Native-American families are incalculable, and the subsequent careers of these graduates and postdocs must be commensurate with what has been sacrificed. Frequently, the meager earnings of postdocs or fledgling scientists must support an entire extended family, and it is simply too discouraging for these professional Native-American women to work for so little after enduring so lengthy a course of study.

Multi-generational living is the norm in Native-American culture, and all family resources are shared, including

salaries. Also, the life of a scientists often requires frequent relocation and travel, begetting feelings of separation, isolation and loneliness, conditions that are more emotionally devastating to Native-Americans than other nationalities. The culture of many indigenous people is one of spiritual communion; their belief is that they are connected to the earth, nature and each other.

To my knowledge, withdrawal from one's people, and the subsequent personal loneliness that would uniquely affect Native-American women, has not been addressed by the scientific community, perhaps because the numbers of indigenous peoples, regardless of gender, are as yet so small. Still, it behooves us to begin such a dialogue because good emotional health has been demonstrated to be a factor in increased productivity, creativity and even intelligence.

Of course, I recognize that there are many factors beyond culture and gender that affect students, postdocs and scientists. But I'm intrigued by how culture poses so significant an influence, often subconsciously, and I suspect that it may contribute considerably to the disparity in minority women who enter, exit or excel in science careers. Our outreach efforts must emphasize more individualized objectives and directives in order to better address a rich heritage of diverse backgrounds, as well as to continue the mentoring, role models, bridge programs and internships we've already been doing.

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Given the appallingly low number of Ph.D.s granted to minority women each year, I think it's time for us to make culture as well as gender a part of everyday diversity conversations.

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