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# Perspectives on the Underrepresentation of Minorities in Mathematics

*An Interview with James C. Turner, Jr.*

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James C. Turner, Jr., is a professor of mathematics at Ohio State University and at Central State University, a historically black university in Wilberforce, Ohio. In addition to research and teaching, he heads a consortium designed to form educational and institutional research and development linkages among the top research-oriented Historically Black Colleges and Universities (HBCUs) and leading major research universities. A primary goal for the institutions participating in the consortium is a significant increase in the number of minority graduates obtaining Ph.D.s. There has been increasing interest in such issues within the academic community. The following article is an edited version of an interview with Turner, conducted by *Notices* Associate Managing Editor Allyn Jackson.

**Notices:** *Do you think there is discrimination against minority students who go into mathematics?*

**Turner:** Yes, there is discrimination. It is not always intentional and certainly not promoted by all or even the majority of mathematicians. Nevertheless, it's there. I've seen it in personal encounters and in stories related to me by minority colleagues and students. I suppose we should not be surprised at this, since the mathematical community is embedded in American society; and certainly there is compelling evidence of prejudices there.

**Notices:** *What kind of things have you encountered or do your students complain about?*

**Turner:** Let me put it this way. It's tough to have to constantly bend over backwards to prove that you belong. When you are one of the few minority students in that classroom, the only minority on that faculty, the only one on that important committee, etc., it gets tiresome and counterproductive having to prove that you do belong in this class, you can make a substantial contribution to this committee, you should be a member of this faculty. In my opinion, some of the biggest complaints about discrimination in the mathematics community by minority students and colleagues are linked to this theme. In addition, minorities often carry the added burden that if they fail, then somehow they have failed their entire race, since their failure may mean that there are no minority group members left at all. To me personally this is the hardest part.

The greatest damage done here is to place doubts in the minds of some minority students. Several outstanding mathematicians that I have known have expressed some level of doubt about their contributions to mathematics. To some extent, it is probably natural to have some doubts. However, for many minority students there is an added level of doubt that really shouldn't be there. It affects how much confidence they have in their ability to do mathematics. If you could remove the view that minority students are not capable in mathematics, then you could remove the burden of this added level of doubt.

For many reasons, including those I just mentioned, gifted minority students are attending medical, business, and law schools instead of graduate schools in mathematics. The unfortunate thing is that some of these students actually prefer mathematics. However, to many gifted minority students with several career choices, mathematics is not a good choice. Many view mathematics as having too many roadblocks, an area where they are unwelcome, where there will be limitations. Let me give you an example. I know of a student who came to Hampton University with a very good SAT score and graduated at the top of her class as a math major. She did well in every program she was placed in, including a summer program at Ohio State University. At the conclusion of her studies at Hampton, she told me quite frankly that she preferred mathematics, but from what she had seen of the mathematics profession, she would be better off in another profession. She is now a medical student at Duke University, exploring the possibilities of somehow satisfying her appetite for mathematics.

**Notices:** *One of the difficulties about going into mathematics is you first have to go and get a Ph.D., and its unclear how long that's going to take. Then you have to get a job, and then you have to get tenure. With medical school or law school, when you get in, you know when you're getting out, and you know you'll have a good job.*

**Turner:** On the surface it does seem that it is more difficult and that there are more risks involved in pursuing a Ph.D. in mathematics versus getting a medical or law degree. However, there is more beneath the surface. For example, it's certainly not true that everyone getting out of law school will get a "good job". Also, you have to consider the "tunneling factor". I really believe that some gifted minority students

go into medical, business, and law schools because they are "tunneled" into it, in much the same way in which many black male students go into basketball and football. These are proven success areas for blacks. I played basketball in high school and college, and for a long time I really thought that basketball was my best career choice. Luckily, someone showed me another viable choice. Being a minority often means that there are limited choices. We in the mathematical community must make mathematics a viable choice for gifted minority students interested in our discipline.

I might also add that the black community does not view mathematics as a viable choice. Minority students often don't receive crucial support back home if they choose mathematics. Most of the people in my family had no idea of what would be involved in my pursuing a career as a research mathematician. So to them, it seemed not at all wise for someone with some talent to go down a path where clearly very few blacks had been successful. Many told me that law school would definitely be a better choice. These views affect the choices that young people make.

**Notices:** *People sometimes say blacks just can't do mathematics, but nobody says blacks can't do French literature, for example. Are people affected by those kinds of stereotypes?*

**Turner:** Absolutely. Unfortunately it's easy for young students to be affected by the truly ugly side of these stereotypes. For instance, the stereotypes may become believable to someone like me who has never taken an undergraduate or graduate course from a black mathematics professor. I have taken all these mathematics courses, from freshman to Ph.D. candidacy, and I have never had a black mathematics professor. It does seem to give support to the stereotype. It's hard not to wonder, "Can we do this?" To a young minority student there seems to be plenty of evidence to support the stereotype. And of course it's our job to show these students that there is even more evidence to disprove the stereotype. I spend a lot of time trying to convince my students that mathematics is hard for everyone. They don't always realize that everybody has to work hard. It's easy for some of them to fall into the trap of believing that it comes much easier for nonblacks. This is one of the ways in which the damage of stereotyping is manifested.

**Notices:** *So how did you get through?*

**Turner:** Luckily, I had the good fortune of excellent mentors. At the University of Michigan it was Lamberto Cesari, who worked very closely with me for three years. During this period I also met George Fix, who was the reason I went to Carnegie Mellon for my doctoral studies. Finally, my thesis advisor, Max Gunzburger, played the strongest role in my getting through. These professors made all the difference in the world. There is no doubt that I would not have the Ph.D. if it were not for my association with these mentors. Most minority students are not so lucky. I would really like to see more minority students get this type of mentorship. Mentoring is clearly one of the keys to success.

**Notices:** *Can white people be good mentors and role models for black students?*

**Turner:** I certainly do hope so, especially considering that

at the Ph.D.-granting institutions, the number of blacks serving as role models is so small. At HBCUs, this issue is probably less controversial. I can't think of any good reason why a good mentor relationship could not develop between any two people regardless of race or sex. On the other hand, there can be a clear advantage in such a relationship if the mentor happens to share many of the student's experiences. For example, a white mentor may not have a clear understanding of educational issues unique to African American students.



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**Notices:** *Can you tell me something about the programs you've been involved in?*

**Turner:** Before I came to Central State University, I was on the faculty at Hampton University. At that time, the university had just received a large grant to increase the number of minority students attending graduate school in mathematics, science, and engineering. I felt that it was appropriate for me to develop attraction and retention strategies for these students, in particular, strategies that deal with transition points, such as the one between attending Hampton University as an undergraduate and attending institutions such as Ohio State University and Carnegie Mellon for graduate studies. One such strategy was to develop summer programs that ease the transition to the graduate programs at these institutions. In these programs, students attend seminars and colloquia and engage in research projects with mentors from Hampton, Ohio State, and Carnegie Mellon. In this way, minority faculty from HBCUs can form a link with faculty at OSU or CMU to produce good minority Ph.D. students. We have had some level of success, and I attribute that success to the fact that the HBCUs and the major research universities are working together on a problem that both would like to solve. In my opinion it would be very tough to put together a strategy

focusing on this transition point without including both sides of the transition point.

This is one of the activities of the consortium of HBCUs and research universities that I now head. The consortium recognized that these initiatives not only provided students and faculty members from both institutions with exciting opportunities, but they also created a useful model for many other effective minority-oriented initiatives needed throughout the consortium. These initiatives also show that there can be successful, mutually beneficial interaction among members of the consortium.

**Notices:** *You now have twenty-seven schools in the consortium?*

**Turner:** Yes—in fact, let me give you a little history. The University Consortium for Research and Development was organized in April 1990 by the presidents of a number of leading colleges and universities. They decided to “break the mold” in terms of addressing the nation’s demand for new knowledge, new scientists and engineers, and increased minority participation in research and technology. They concluded that the traditional approaches of targeting schools, programs, and groups needed to be supplemented. Most importantly, they recognized the need for new approaches to interuniversity research in areas of high technology, for expanded knowledge and personnel in critical areas of technology, and for enhanced HBCU research and development activity. They also recognized that such a consortium had never been organized before, but they were convinced that it could succeed, to the direct benefit of the nation.

Within the consortium, a strong partnership developed between the mathematics departments at Hampton University and Ohio State University. As a result of this, I was asked by the Consortium to serve as director and to develop a series of programs that would achieve its goals.

I might add that this consortium is unique in the sense that it is the only one that has the following three characteristics: first, it has mathematics as a main theme; second, it has HBCUs and major research universities working together; and third, it is to my knowledge the only consortium that has a director who is a faculty member at both a historically black university and a major research university.

**Notices:** *How many underrepresented minority Ph.D.s are there in a given year?*

**Turner:** Over the years I have never seen this figure higher than twelve. Nowadays there are about 1,100 Ph.D.s in the mathematical sciences awarded each year by American universities. The percentage going to minorities is depressingly low and has not changed significantly over the last two decades.

**Notices:** *What about at the undergraduate level? How many blacks are there?*

**Turner:** In 1990-1991, for example, 825 blacks received bachelor’s degrees in mathematics. A significant number of these blacks would like to attend graduate school. The undergraduate pool is probably sufficient to dramatically increase the number of minority Ph.D.s.

**Notices:** *What do you think professional organizations like the AMS and the MAA can do?*

**Turner:** Well, I know that there is some good work being done by the National Association of Mathematicians in conjunction with the MAA and the AMS. In addition, these organizations should do more in the areas of minority scholarships or research grants, summer research programs, mentoring programs, and travel grants for meetings. Many other societies offer these kinds of support to minorities.

**Notices:** *I was reading an article about the poor job market in science and mathematics, and it mentioned programs to encourage minority participation in mathematics and science. Some people were asking, are they really doing these students a favor, if there are no jobs? What do you think of that?*

**Turner:** Every time I hear that, I have mixed feelings. People call me all the time, asking me if I know of any minority students looking for positions. Since there are so few minorities with Ph.D.s in mathematics at HBCUs, for example, there always seems to be a market there. Recently, one chairman at a prominent HBCU told me that he had five positions to fill this year. When I get the call, “Give me a minority candidate,” it’s difficult for me to deliver. I know the job market is bad. However, I do think it’s a different market for minorities. I also hate to see the market being used as an excuse not to produce minority Ph.D.s.

A lot of minority mathematicians, myself included, wonder when the mathematical community will see the issue of underrepresentation of minorities as a front-burner issue. I am really proud of what the mathematics community has done for foreign students. We welcomed them; many of them received their Ph.D.s from American universities, and that’s great for mathematics. What we have done for women in mathematics, although the job is not complete, has produced a tremendous turnaround over the situation ten or twenty years ago. That’s also great. So the big question is, “When is it our turn?” When will the mathematical community and the major research universities say, “We’re just not doing a very good job at the graduate level for minorities; it’s time to take this problem seriously?” This hasn’t happened yet.