

# **African-American Engineers: Social and Cultural Solutions for Underrepresentation**

**Levern Rollins-Haynes, PhD**  
**Dept. of Arts and Communication**  
**Orange County Community College**  
**Middletown, NY 10940**

**LTC Keith L. Haynes, PhD**  
**Dept. of Electrical Engineering and Computer Science**  
**United States Military Academy**  
**West Point, NY 10996**

African-Americans are seriously underrepresented in the engineering field. Of 12.3 % of the African-American US population, only 5.3 % were awarded bachelors degrees in 2001.<sup>1</sup> The numbers are even more dismal when considering the conferring of masters and doctorate degrees with 4.5% and 3.4%, respectively. African-Americans are not the only minorities that are insufficiently represented in engineering. Hispanics, Native Americans, and women are also disproportionately represented as compared to the population distribution. In terms of the reason for the shortage of diverse groups in this scientific field, there are differing and multiple reasons; each equally important and particular to the specific groups mentioned. Because of the complexity and varied reasons for the minority shortage and because of the limitations of this paper, the focus will be the issues and solutions to this problem as they pertain to African-Americans. By bringing into focus, the problematic aspects of this situation and possible social and cultural causes, we hope to help find ways of counteracting this problem, thereby, finding additional and more meaningful solutions.

Why is African-American underrepresentation problematic, or even important? The shortage of sufficient minorities within the engineering field is problematic for many reasons. First, the United States is a diverse nation that is fast becoming even more diverse through increased immigration and the birth of babies to minorities. When solving problems within a diverse population, different people are able to bring into the mix, different experiences. A diverse workforce and dissimilar personnel backgrounds allow for multifaceted perspectives which result in varied solutions to problems which would benefit the entire American population. An example of well-utilized diverse potential may be seen in creation of the award-winning Chrysler 300 sedan. As stated by Chrysler Group President and CEO Tom LaSorda, "One of the Chrysler Group's greatest strengths is a diverse workforce of individuals who weave their talents into the fabric of this company and the communities they represent. Ralph Gilles [Chrysler 300 sedan and Dodge Charger designer] has done exactly that with his passion and talent for design."<sup>2 3</sup>

Untapped resources and potentialities can result in unrealized growth and possibilities. Without utilizing all possible talents from diverse sources there could be a loss of possible creativity and talent which could otherwise benefit all citizens. Tulane University professor, Dr. Calvin Mackie writes,

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<sup>1</sup> National Science Foundation/Division of Science Resources Statistics and Cox, Matthews & Associates, *Black Issues in Higher Education* Analysis of U.S. Department of Education, 2005.

<sup>2</sup> Tanisha Perez, *UAW-Daimler Chrysler National Training Center Communications*, 2/9/06, <http://www.uaw-daimlerchryslerntc.org/resources/news.cfm?NewsID=1444>.

<sup>3</sup> Although born as Canadian-American, Gilles also refers to himself as African American.

How many Imhoteps or Einsteins possess menial jobs because access to quality education was not a choice in their community? How many Black owned high-flying technology companies like Netscape and Yahoo could have been created, if access to capital was equally available in this country? How many senior level executive managers would there be in Corporate America if there was no glass ceiling?<sup>4</sup>

Underrepresentation of African-Americans in engineering fields is also problematic because it could prevent the United States from continuing to compete globally. Through the partnering and utilization of talents within African-American and diverse groups of the United States, America will be able to sustain its leadership role in technological development within the world. This sustainability could lead to social and economic strength which would be advantageous to all.

Most importantly, the paucity of sufficient African-American engineers within the United States is problematic because imbalance within the field as compared to the general population is indicative of other problems of a social nature. At issue are socio-cultural problems such as stereotypical attitudes of intellectual inferiority, belief in lack of entitlement, anti-intellectualism, and the breakdown of the African-American family; all of which may be considered direct causes for the disproportionate numbers of African-American engineers and for which solutions are needed in order to bring about proper balance.

Even though it appears that few (if any) scientific causes have been identified, it is generally known that stereotypical attitudes such as those relating to intellectual inferiority play an important role in preventing many African-Americans from pursuing an education in engineering science. Stereotypical attitudes of inferior intelligence about those of black ancestry existed during the slavery era and continue to pervade not only the African-American community, but other communities as well. In his 1764 essay "Observations on the Feeling of the Beautiful and Sublime," Enlightenment philosopher, Immanuel Kant in agreement with philosopher, David Hume, felt that blacks were intellectually inferior to whites. Kant stated,

The Negroes of Africa have by nature no feeling that rises above the trifling. Mr. Hume challenges anyone to cite a single example in which a Negro has shown talents, and asserts that among the hundreds of thousands of blacks who are transported elsewhere from their countries, although many of them have even been set free, still not a single one was ever found who presented anything great in art or science or any other praiseworthy quality, even though among the whites some continually rise aloft from the lowest rabble, and through superior gifts earn respect in the world.<sup>5</sup>

Even today, books have been written in support of this stereotypical viewpoint perpetuating the concept of inferior intelligence within people of African ancestry. One such example is found in Charles Murray and Richard Herrnstein's 1995 book, *The Bell Curve*. Television host and author, Tony Brown states, "Blacks have learned to feel inferior from the low expectations that others have of them."<sup>6</sup> As with most things, one starts to believe information that is frequently heard. African-Americans are not excepted from this; despite the educational strides that have been made by many in the community.

Just as young African-Americans have internalized information relating to supposed intellectual inferiority, many young black Americans also feel disenfranchised from the general American society and

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<sup>4</sup> Calvin Mackie, Ph.D., "The African-American Engineer in the 21<sup>st</sup> Century: A Burden, Challenge, and Opportunity," *The Black Collegian Online*, 2006, <http://www.black-collegian.com/african/thinkaboutit.shtml>.

<sup>5</sup> Isaac Kramnick, ed. *The Portable Enlightenment Reader*, (New York: Penguin Books, 1995), 638.

<sup>6</sup> Tony Brown, *Black Lies, White Lies: The Truth According to Tony Brown* (New York: HarperCollins Publishers Inc., 1995), 282.

thus, are not entitled to or are incapable of experiencing the benefits of American citizenship. H. Rap Brown (a.k.a. Jamil Abdullah Al-Amin), in writing about a conversation with one of his acquaintances in his autobiography, mentioned,

We went and got some “pluck” (wine) and I told him I was in college. He asked what I wanted to be. I told him rich. He looked up at the ceiling and paused for a minute before he said, ‘You know, I’ve never given any thought to what I want to become.’ I told him he should think about it, but I knew I was shuckin’ and jivin’. Hell, hardly any of us had ever thought about what we wanted to become. What was the future? That was something white folks had. We just lived from day to day, expecting whatever life put on us and dealing with it the best way we knew how when it came. I had accepted the big lie of a Black man succeeding.<sup>7</sup>

This same general attitude of not being entitled to partaking in benefits of U.S. citizenship continues to exist within the poorer African-American communities even in today’s contemporary society. Many black American youths and older adults express discontentment with American society and affirm limited opportunities for economic growth, but yet desire financial success. For this reason, many youths turn to athletics, rap music, or even crime as “their way out” of dismal circumstances, not believing that education is a viable option or that they are even capable of achieving educational success. This is especially applicable in the areas of math and science.

Perhaps one reason for turning to popular culture (sports and music) as a means of obtaining economic freedom is because of the pervasive presence of some representatives of a culture that eschew the pursuit of academics and promote street culture and instant financial gratification. Rapper Kanye West underscores higher education as being unnecessary to financial success in his “School Spirit Skit 2” on his *College Dropout* CD. Although not all rap music caters to the belief that higher education is futile, many rappers flaunt a lifestyle that appears to be more glamorous and more financially successful than that of the 9-5 career tract. Because many of the poorer youths (and their families) feel disenfranchised, many of these African-Americans become attracted to this lifestyle in an effort to raise their self-esteem, obtain power, admiration and respect from others, and be noticed by women. Rapper Ludacris states,

It’s a fact. The gold back then, and the diamonds now...we wear that to get women. That’s all guys do is buy stuff for women to see and notice and hopefully admire....We all love something beautiful and rare. And jewelry suddenly changes your image and gives you power....And that’s exactly why bling is so crucial to hip hop. Because for us, it is all about making that impression, getting that shine, showing off success...even before you have any. When you sign that first deal or record that first, record, you get that first bling. This means, I’m successful, I’ve made it. This is me saying I’ve worked hard to get what I have what I have around my neck, so recognize it! Now of course, I could have congratulated myself by buying some stocks and bonds, but it wouldn’t be bling.<sup>8</sup>

Movie director Spike Lee feels that there is a direct correlation between excessive materialism and lack of educational pursuits. Lee states, “...enough is enough with the ‘pimp/ho’ arm of hip hop’s effect on black students, which glorifies bling and a piece of \*ss over education.”<sup>9</sup>

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<sup>7</sup> H. Rap Brown (a.k.a. Jamil Abdullah Al-Amin), *Die Nigger Die: A Political Autobiography*, 1969, 25, <http://historyisaweapon.com/defcon1/dnd.html>.

<sup>8</sup> Ludacris, Forward to *Bling Bling: Hip Hop’s Crown Jewels*, by Minya Oh (New York: Wenner Books, 2005), viii-ix.

<sup>9</sup> Pam Spaulding, “Spike Lee, *Essence Magazine* Speak Out on the Pimp/Ho Arm of Hip Hop, Friday, March 18, 2005,” *Pam’s House Blend*, <http://www.pamspaulding.com/weblog/2005/03/spike-lee-essence-magazine-speak-out.html>.

Pursuing scholastic goals is also considered being uncool or acting white, i.e., being anti-intellectual. Anti-intellectualism, as defined by Richard Hofstadter is “a resentment and suspicion of the life of the mind and of those who are considered to represent it; and a disposition constantly to minimize the value of life.... [and] is usually the incidental consequence of some other intention, often some justifiable intention.”<sup>10</sup>

Engineering scientist, Keith W. Jones’ description supports this definition. He states,

When the ability to understand and manipulate science, technology, mathematics, and abstract ideas reflects our intelligence, we try to play it down. Of course, as most of us know, in some parts of the African American community acting, thinking, talking, writing, and calculating in intelligent and thought provoking ways are forbidden. There is a severe problem in some communities where demonstrating intelligence means that you are less cool (see the reruns of the Steve Urkel character portrayed on, the old television show, “Family Matters”) or acting White.<sup>11</sup>

Not only is the portrayal of intellectualism a problem within the African-American community. The depiction of engineers in the general American community is also seen negatively. Business writer, Duncan Adams writes about this harmful image as observed by Virginia Tech’s Engineering dean, Richard Benson. Adams writes,

Portraying a raging laid-off engineer in the film “Falling Down,” actor Michael Douglas sported nerdy black-frame eyeglasses, a buzz cut and a pocket protector with three ballpoint pens. Thugs tried to steal his briefcase.

But when Douglas played tycoon Gordon Gekko in “Wall Street,” he wore expensive suits and silk ties. Gekko had a certain shady handsomeness.

The contrast between the roles was noted by Richard Benson, dean of Virginia Tech’s College of Engineering. Although he smiled about the dissimilar portrayals, Benson described as a pet peeve the culture’s stereotyping of engineers. Such typecasting helps discourage young people from pursuing an engineering career, he said.

“There is this image of engineers being kind of the Dilberts of the world,” said Benson.<sup>12</sup>

Anti-intellectualism exhibited because of typecasting (being “uncool” or “acting white”) may be symptomatic of low self-esteem and self-acceptance, which is also directly related to the breakdown of familial relationships. The breakdown of the African-American family is another cause of underrepresentation.

It is generally believed that there is a direct link between positive familial relationships and good self-esteem. With the erosion of the black family due primarily to rates of births to unwed and teenage mothers, fewer African-American parents are able to devote as much time to physically, spiritually, and emotionally nurturing their young as when the black family was more intact. Additionally, in many cases, the financial stability of single parent homes have also dwindled, allowing for more economic

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<sup>10</sup> Richard Hofstadter, *Anti-intellectualism in American Life*, (New York: Alfred A. Knopf, 1970), 7, 22.

<sup>11</sup> Keith W. Jones, “Are African Americans Anti-Science?” *African by Nature Presents Open Our Eyes*, [http://www.africanbynature.com/eyes/openeyes\\_keithjones1.html](http://www.africanbynature.com/eyes/openeyes_keithjones1.html).

<sup>12</sup> Duncan Adams, “Shortage or Surplus?” *The Roanoke Times*, Sunday, June 25, 2006, <http://www.roanoke.com/news/roanoke/wb/71004>.

disadvantages, fewer educational opportunities and successes, declines in childrearing skills and parental expectations, and a lessening of role models. All of these issues contribute to low self-esteem and the succumbing of many to materialistic lifestyles rather than those which emphasize educational pursuits.

To solve and to counteract the small numbers of African-Americans entering the science and engineering fields (and obtaining a general college education), many programs, associations, and/or individuals which encourage the use of role models and mentors have been utilized and are in force. In addressing the significance of medical role models, Christopher Snowbeck quotes physician Gerome Gloster, who states, “Having minority physicians and health-care workers lets the children see that they can maybe become a physician or have some other career—it helps them set goals.”<sup>13</sup>

Ralph “Gilles’ rise to prominence has made a lasting impression on other African Americans, especially kids who view him as a role model... Gilles is proud of the various roles he plays in making kids of any ethnic background aware of the breadth of opportunities in automotive design...” Gilles states, “I do my best to be a role model.”<sup>14</sup>

Princeton University’s applied mathematician and longtime mentor, Dr. William A. Massey, when addressing the issue of mentoring stated, “If you want to draw more minorities to the sciences, you have to create a minority science community.”<sup>15</sup>

No one disputes the reality and the significance of utilizing role models and mentors as a solution in transforming the small numbers of existing engineers, mathematicians, medical doctors, and other science-related professionals into larger ones. The question is..., how are we to bring more into the fold to serve as role models and mentors if there is an existing shortage? In reality, there will be schools, areas, and associations in which the population of the African-American professional is likely to be small, at least for a few more years, because the situation is not likely to change immediately. Conceivably, with improved multicultural education within the black *and* white communities, the relationship between the two groups will improve and result in more role models and mentors of color and of other ethnicities as well.

The major solution to this problem lies in cultural, diversity, and age-level education within the African-American community as well as within other communities. There must be more group and individual involvement in the lives of African-Americans on all levels. Local, regional, and national groups catering to the black community must enact various types of educational activities, to include affordable subject-level camps and clubs. Currently many math, science, and reading clubs and camps exist throughout the United States and are available to those who are financially able to afford them. These clubs and camps must be brought into needed communities for affordable prices and through scholarship means and should not be limited to pre-college students. Age-level camps and clubs should be made available to even the very young, especially since predisposition to such things will result in a more “natural” inclination toward mathematics and science.

Adult education in the form of learning, child-rearing practices, financial planning, and African-American and other cultural histories should be explored not only during African-American history month, but throughout the year as a way of life. In learning about the importance of education to early African-

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<sup>13</sup> Gerome Gloster, MD, “Role Models Needed in Health Care,” *Pittsburgh Pa Post-Gazette*, by Christopher Snowbeck, Tuesday, August 20, 2002, <http://www.post-gazette.com/healthscience/20020820hminority0820p3.asp>.

<sup>14</sup> Tanisha Perez, *UAW-Daimler Chrysler National Training Center Communications*, 2/9/06, <http://www.uaw-daimlerchryslerntc.org/resources/news.cfm?NewsID=1444>.

<sup>15</sup> Saira Moini, “Building a Community of Mathematicians” *Diverse Education Online*, Dec. 14, 2006, <http://www.diverseeducation.com/artman/publish.shtml>.

Americans and in seeing the similarities between many different ethnic groups, African-Americans can and will learn about the importance of education within the black community. In the process, though, they will also learn to appreciate their own history as well as appreciate the struggles other groups have also endured within the United States and elsewhere.

These adults must be taught to engage their children in academics throughout their daily lives to instill a love of learning. For example, when shopping for a new toy, the parent should encourage the child to determine the price of sale items. If a toy is reduced by 10% of its original price, use this time to calculate the new price together. When cooking, teach your children about measurements. When viewing the stars at night, discuss astronomy-related facts or when traveling on vacation or elsewhere, carry a dictionary in the car and encourage the entire family to learn the definition of one new word each day and endeavor to use and review each new word everyday in conversations.

In addition to engaging children in academics throughout daily living, African-American parents must be taught to change their manner of speaking. Parents must learn to speak to their children with expectations of a desired result to fully prepare them for needed education. Children should not be asked if they are going to college. They should be asked what college they want to attend or what subject of interest they will pursue. The same holds true for other life choices such as marriage for African-American boys and girls. They should be directed to take notice of the kind of future spouse they seek, not whether or not they will marry. Whether children decide to marry or not, will of course, be entirely up to them. This conversation will at least let them know that marriage is a viable option, not an unavailable alternative.

The church must renew its commitment to remain the backbone of the African-American community and other religious institutions must remain obligated to serving not only in a spiritual sense, but also in the physical and emotional senses. Before education can be promoted, physical and emotional needs must be attended to and maintained. Churches should aid in giving assistance as needed to help change the dire situations of those who desire help.

Predominately black churches and other religious and academic institutions should work toward partnering with other groups of diverse cultures so that all members can learn about and learn to accept and trust each other. It is through this coordinated effort and close association that many new role models and mentors might be identified to relieve the current shortage of African-American engineering and other professionals in the field. This newfound relationship could also help to debunk stereotypes.

The non-black communities and religious and academic institutions should also share in rectifying the shortage of black engineers and other science-related careers by realizing these and many other general facts:

- a. that racial inequality exists and is somewhere lurking in the minds of many African-Americans--much of it due to direct or indirect past experiences;
- b. that cultural and value differences exist and may be prioritized more in the African-American community than in other American communities. These cultural and value dissimilarities are not necessarily wrong, but might require a different method of evaluation and should not be viewed as inadequate;
- c. that all must work toward educating each other at all age levels and be willing to learn from one another for the benefit of all;
- d. that there are different realities for different people—even within the same ethnic group;

- e. that many African-Americans do not feel as though they are truly a part of America, and thus, feel that the American dream is suppressed and not within their reach;
- f. that a role model/mentor relationship is very possible if the African-American student is able to see that there is a genuine and sincere concern for his/her well-being;
- g. that there are more commonalities than differences between the all cultural groups.

One important way in which cultural, diversity, and age-level education might be implemented within and outside of the African-American community is through extensive visibility of successful, educated professionals in the “Gordon Gekko” manner. This visibility may be obtained through the use of the internet, television, radio, magazines, and through public visits by African-Americans (and diverse) engineers to local schools and communities with people of all ages and ethnicities. This could be coordinated by a public relations firm along with various engineering associations and institutions. Increased and saturated visibility and education of the benefits of engineering science must begin with the very young and continue *throughout* the school lives of these children to make a difference in the dismal numbers of minority engineers. Parents must also be included in this campaign for it is they who can influence and sway their children in this direction. Prospective engineers must be taught that alternatives to entertainment and sports are readily available to all who desire and are willing to work and that success in this field is not an option, but a reality.

In conclusion, one must remember that “we are all in this together” if the numbers of African-Americans (and others) within the engineering field are to improve. It will take the efforts of *everyone* to change and work toward balance. One must not only question the current state of affairs, but realize that the power to change comes from within. Perhaps this is stated best by engineering professor Calvin Mackie who said that

Regardless of the nurturing and edification one may receive in life, the decision to challenge the status quo is ultimately that of a person. Socioeconomic and cultural factors influence such decisions, but individual responsibility must outweigh all extenuations that may be derived from the harsh conditions of living in poverty, growing up "disadvantaged."....

The challenge for Black engineers in the next century is to design and implement programs that not only confront the ills of society that affect our daily lives, but to be at the forefront challenging their businesses and institutions in an effort to lead this new generation. The methodology is personal, but just accepting such as life's fate is unacceptable.<sup>16</sup>

In essence, we must be mindful of the words of Dr. Thomas O. Hunter who wrote that “Engineering is not the domain of any single race or gender. It is not constrained to follow a path prescribed by legacy or institutional edict. It is the path less taken, but it is the path on which much of the world’s hope for the future depends.”<sup>17</sup>

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<sup>16</sup> Calvin Mackie, Ph.D., “The African-American Engineer in the 21<sup>st</sup> Century: A Burden, Challenge, and Opportunity,” *The Black Collegian Online*, 2006, <http://www.black-collegian.com/african/thinkaboutit.shtml>.

<sup>17</sup> Thomas O. Hunter, Ph.D., “Engineering as a Life,” University of Florida College of Engineering Commencement Address, May 5, 2006, <http://www.sandia.gov/commencement.html>.

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