

Understanding the Systemic Indifference Related To the Retention of Underrepresented Geoscientists

Commentary-Michael J. Carroll Co-Founder National Association of Black Geoscientists

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It is truly encouraging and uplifting to see the present day energy around geoscience inclusion, especially to those of us in the National Association of Black Geoscientists, which has been targeting the issue of underrepresented individuals in Earth and Planetary Science since 1981. Because this has been an issue recognized and combated by the NABG for forty years, it is my obligation to weigh-in on the current discussion on shortage of African American youth entering the field. This discussion also gives insight as to why the NABG was formed. My intent is not to cast negativity on how the profession arrived at where it is, but to share with the geoscience community at large the relevant historical and current facts and to make sure that there is some common ground or a common starting understanding of the relevance of what has transpired to cause things to be where we they are, and to point to the heart of what has to occur to improve and retain underrepresented participation in geoscience. My desire herein, is to focus on the meaning of systemic bias and to point to the impact that it has had on our science.

For decades the NABG has touched the lives of hundreds of underrepresented geoscientists by providing basic mentorship and support. In fact some of the present day energy has been positively influenced by the NABG, as associates, supporters, previous scholarship recipients, and corporate sponsors have influenced efforts to address the shortages. As an organization we have recognized the challenges related to routine and widespread socially overt and covert conservative practices, and are still striving to demonstrate to talented youth that there are tremendous opportunities for them in geoscience. A review of the astonishing and unfortunate fact that there has not been a substantial sustained increase in underrepresented numbers and percentages of earth and planetary scientists can be summarized in one word: retention. Whether situations relative to attrition involve upward mobility, downsizing, lack of tenure or tenured pathways, or just not having representation in the decision-making process at key moments the percentages have not grown in the last forty plus years. A key reason is the inability to stay in the science and prosper in the face of socially conservative viewpoints, perspectives, and practices

Positively affecting the number of underrepresented geoscience professionals requires a substantial number of conditions that encompass social change, involves changes in state and local government leadership, the allocation of educational funding, federal mandates, an infusion of geoscientists and geoscience materiality into African American neighborhoods, addressing the poverty level in challenged communities, and the clear evidence of sustainable job opportunities at the educational journeys end. The understanding is that resolution of issues related to increasing geoscience participation of underrepresented individuals requires an investment of

policy changes, financially backed programs, and planning that has a clear focus of short, medium, and long term strategies. Over time there have been plumes of scientists produced, only to find a significant portion of those individuals become a part of group attrition related to downturns in industry and academia, the lack of meaningful leadership opportunities, business financing, and decreasing opportunities related to mergers and acquisitions.

The way to understand the underrepresentation of African American Geoscientists starts with understanding a little bit of history and by taking an evaluative perspective of the present day United States. Families in the segregated communities of most municipalities do not have the geologic profession on their radar, nor do they visualize a career in geoscience as an option for their talented young family member. Major African American populations have existed in the southeastern states and along the eastern seaboard since the onset of oppression. A basic map of present day demographics related to population clearly shows that family groups once “unencumbered”, either chose to not migrate far from the deep-south or simply could not afford to (Figure 1.). Although great migrations, toward the west coast, have taken place in the past, the fact is that high volume Black populations continue to exist in concentrated southeastern urban and rural locals from the Washington D.C. area through Virginia, the Carolinas, all the way to Louisiana and Texas. The State of Mississippi has the highest percentage of Black statewide population at roughly 38 percent with major accumulations within its major cities and along the Mississippi River Valley (Duffin).

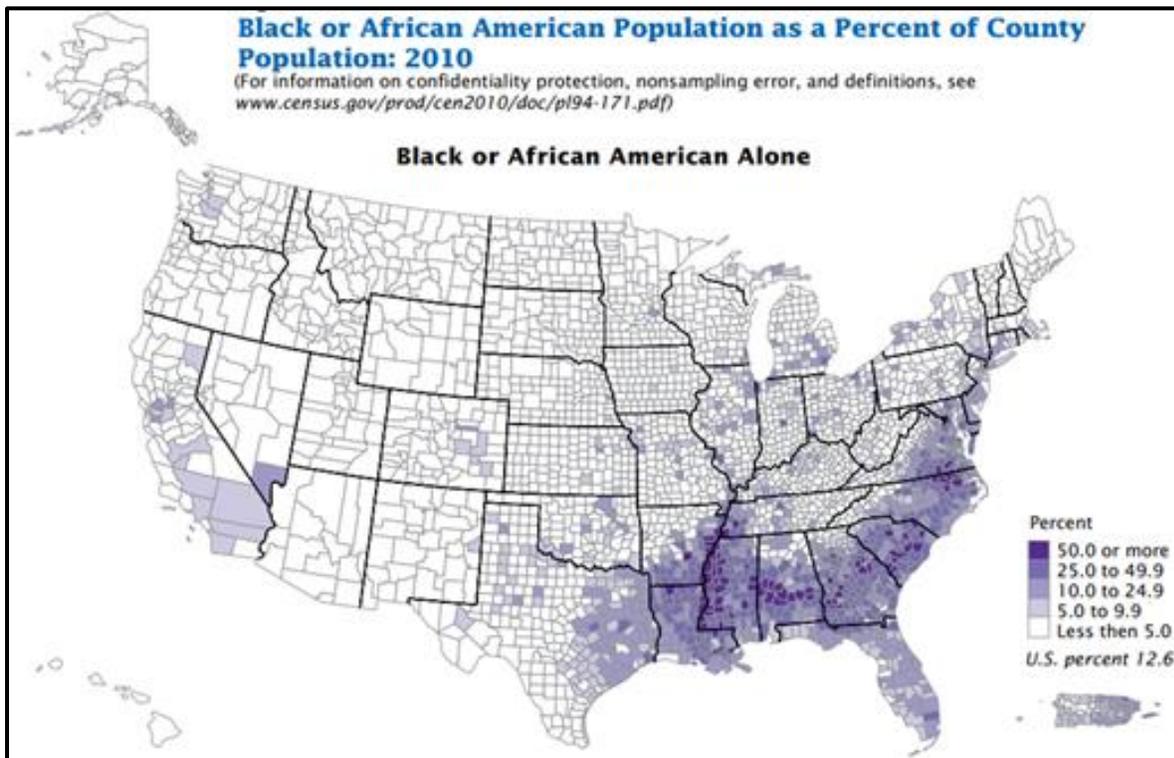


Figure 1. Map showing Black or African American Population as a Percent of County Population. The source is data based on analysis by the U.S. Census Bureau 2010.

Even when there is an awareness of Geoscience, it is viewed as a risk that many Black families cannot afford to take. There is a lack of cultural understanding of the intrinsic value of Earth Science to present day life. It is an unknown that does not have a clear return at the end of its journey. Geoscience requires many of the skills that careers in medicine, mathematics, engineering, and other STEM associated disciplines also require. Young people with acumen for STEM are presented with options that compare favorably to earth science. African Americans have experienced and to some degree still do experience multigenerational cyclic poverty and financial oppression. All too often family structures involve single parents with two plus jobs that are necessary to make ends meet. Therefore a choice of educational pathway has to be made correctly the first time. Family captivation in high interest loan accounts for basic necessities like furniture, appliances, and credit cards only exacerbate and make more acute the career choice problem. The external perception can be that a minority individual may be viewed through preconceived notions of apathy, education depravity, and laziness; however this is not the case. The focus for survival is on finding immediate remedies for day to day crises.

Many present day successful African Americans live with the “first in family syndrome”. The above mentioned financially struggling families invest their hard fought financial existence on the bright future of their young family member that appears to have promise. Traditionally, financial institutions make negative assumptions based on preconceived notions that affect the ability of African American families to obtain reasonable loans for day to day life much less educational funding. On average, African Americans have lower household incomes, and lower home ownership rates than majority groups. This all adds up to an evaluation of risk versus reward and to talented youth having one shot to get their future paths correct.

Within the African American community there is also the underlying subconscious desire to reestablish the cohesiveness of the family unit. Geoscience careers oftentimes require extended travel and movement away from the highly populous major metropolitan areas, rural communities, and havens of existence for Black family units. Like it or not there is still a family dynamic anxiety holdover related to forceful separations correlated to the history of this country (Horowitz). Most underrepresented individuals do not have a net positive view about the country’s racial progress and equity planning for the future. Unfortunately, this filters down to the geoscience community’s abilities to attract talented youth to a profession that is viewed as having initially started as a pastime for the wealthy naturalists. Specifically, there is apathy toward geoscience due to the overall public’s mildly understood origins and applications of the science coupled with the basic fact that the geology of the Southeastern U.S. is currently quiescent and that mountain building processes that transpired millions of years ago do not necessarily translate into prominent present day critical issues for most African Americans. In other words, the geologic history of the area along with less dynamically recognizable sedimentary processes like weathering, erosion, and deposition are significant factors in the lack

of enthusiasm and interest in geoscience for countless underrepresented families. For those of us within the science the dynamics of geology and geologic hazards offer obvious interests. However for the general population there remains the unanswered question of local relevance.

Before we travel to far down the road of geoscience relevance let us take a moment to understand the setup of the urban and rural communities in the southeastern United States from which we hope to find geoscientific youth. It is important to note that the history of systematic residential segregation that existed throughout most of the 20th century was practiced by federal, state, and local governments (McGrew). Neighborhood segregation is a government sponsored system that still is in affect present day. This is evidenced by the geographic layout of the majority of major metropolitan and rural areas throughout the country today. These intended setups empowered industry, academia, urban and rural politicians and others to maintain economic burdens on African American populations. In order to mitigate the economic outcomes related to the creation of these environments by the policy makers of the past, these issues must be addressed by the policy makers of today and the policy makers of the future. The very same institutions that originally implemented course of action in the past have to make a conscious effort to create a revised guiding principle system as forceful as that created previously.

Past zoning ordinances enacted by city governments still have a negative effect on Black neighborhoods. Major cities and metropolitan areas in the U.S. are set up along ethnic demographic lines that give rise to a sacrificed populous for independent discriminatory financial institutions and landlords. The social and economic difficulties, along with in practice segregation burden the chances for urbanites to postulate a future in Earth Science. The past negative effects of policies of the local, state, and federal levels have to be addressed so that the practices by private corporations and organizations can no longer exploit an entire segment of the population. Make no mistake it is extremely difficult to transition from the current politically drawn regions and in many cases gerrymandered districts to something that pushes toward economic and geographic fairness and equality. But if our true objective is to harvest the minds and talents of inner-city and rural African American youth then some of these issues have to be positively addressed by state and local officials that control the distribution of funds to various neighborhoods, public schools, state majority universities, and ultimately to Historically Black Colleges and Universities (“HBCUs New America”).

To that end it bears a modest review and possible comparisons of civic land setups, reviews of federal land grants, and the allocation of resources. During the ‘1940s and ‘1950s when some civic agencies addressed impoverished areas of the Black communities that had sub-standard living conditions this was a positive movement in that it aided with the flow of running water, electricity, and other critical survivalist conditions, however the solution in a number of cases was the funneling of minority individuals to prescribed areas and the continued development of housing projects. These project areas were developed as a series of cinder block units that housed a maximum number of low income individuals in a relatively small geographic area that may not have been equitable real estate. These developed areas were typically located

near or on portions of landfills or other geo-hazards and ultimately became subject to the localized government process of “Redlining”, where certain types of financial investment was frowned upon in underrepresented areas (Rothstein).

Like it or not close proximity of one series of these units next to another series of these units created a sense of competition based living either by design or misfortune. The inherent desire to survive in a low income, closely packed, contentious environment created some predictable tensions and became a haven for criminality. That is something that the Black neighborhood has to live with and address on its own. We can also point to the fact that preferential land disbursement was not restricted to the urban areas. Numerous examples of rural inequity can also be pointed out (“Summary Data”). An example, as mentioned earlier the majority of the underrepresented population resides along the southern Mississippi River Valley in low lying flood plain hazardous areas that put their existence at risk during extreme storm events (Figure 2).

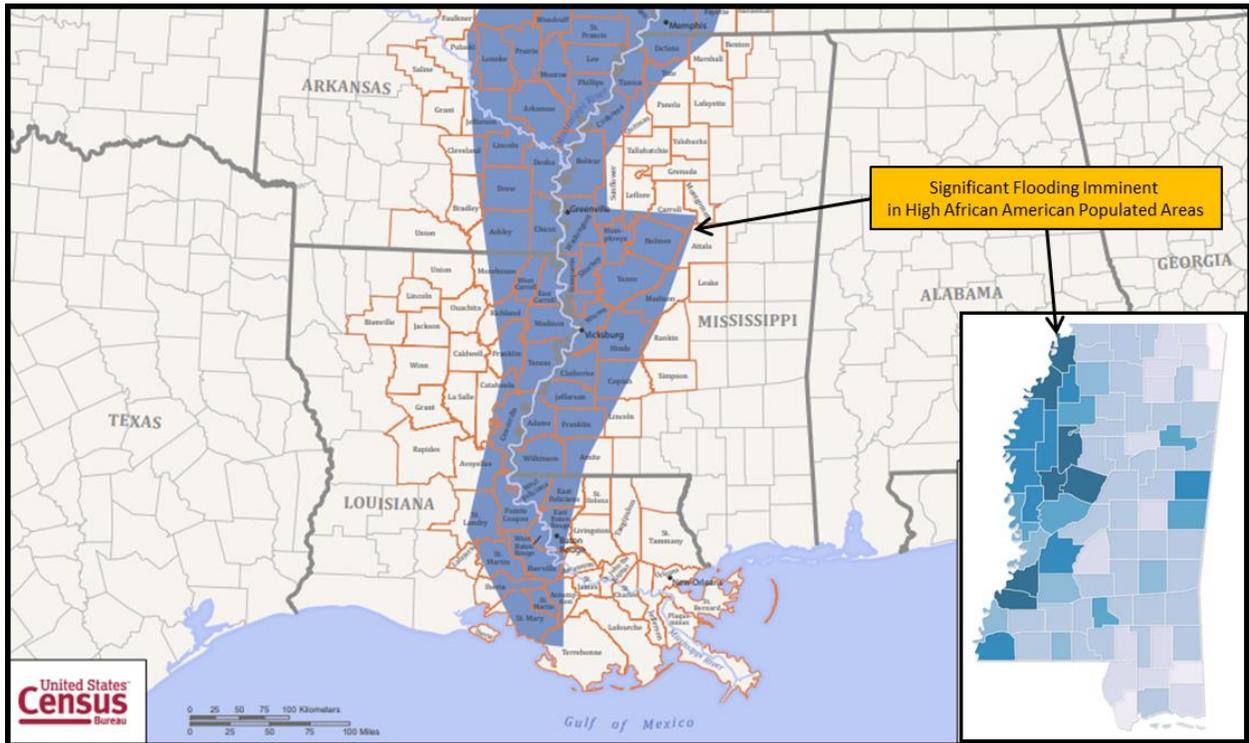


Figure2. Mississippi River: Significant Flood Outlook. The map shows a blue outline of areas where significant flooding is occurring or is imminent. The inset map lower right shows the counties in Mississippi with the highest African American population in darker blue shades. The source is the U.S. Census Bureau.

While on the subject of land and land distribution, let me quickly review the concept of land grants relative to state universities along the southeastern United States. When one examines the planning diversity initiated in the basic footprints established for minority serving

institutions versus majority serving institutions; the distinction implies that the decision was made to educate an exponentially smaller percentage of underrepresented individuals than majority individuals. There is an impressive list of majority universities along the southeastern corridor and each of them rightly so have been established under favorable conditions that guarantee their continued prosperity. The decisions to create these prosperous situations were made by state and local governments and federal government officials. Understandably larger footprints were created for the majority populous, however population comparable footprints were not created for the underrepresented populous. In some instances majority institutions are awarded as much as one million acres of land (Ramos) or may have been granted valued lands to manage to ensure an established revenue stream and the continued solvency of those universities by state General Assemblies (“University Lands”). None of this is negative until a comparative review of the establishment of HBCU’s is considered. The distribution of land areas is not proportionate nor was the establishment of a future funding framework that would allow for meaningful growth. Honestly all university systems struggle to maintain existence, however the struggle for HBCU’s takes on a different perspective and the struggle of STEM programs within these institutions requires extreme attention for survival. Absolute attention from government, the scientific industry, and majority institutions is necessary.

A bit of that type of attention was experienced when the United States implemented the policy of Affirmative Action that in principle “made positive steps toward increasing the representation of women and minorities in areas of employment, education, and culture from which they have been historically excluded” (“Affirmative Action”). Political change causes political upheaval and this policy generated intense controversy around 1972 with dissenters pointing to preferential selection. In practice the overall effect tapered by 1980 and continued to winnow into the ‘1990s until the Supreme Court’s decisions to uphold portions of the Affirmative Action mandates. So like other disciplines the geoscience profession was affected in the college, government, and industry sectors during this time period. The intersection of high commodity price structure, government policy, and geoscience awareness created the net effect of increased participation by both majority and underrepresented groups as a result of what proved to be a somewhat perfect alignment of conditions. Numerous graphs and charts of geoscience enrollment, employment, and association memberships show coincident profiles to the price of crude oil. Organization membership correlates directly to the number of jobs available in the petroleum industry or related careers (Fritz, R., 2020). An example of this distribution is demonstrated by a comparison shown on the American Association of Petroleum Geologists chart shared recently in the October 2020 Explorer (Figure 3).

The Mid ‘1980s price downturn disproportionately affected underrepresented geoscientists. In Fact numerous geoscientists lost their jobs in the high profile industry that had been a high volume employer. The oil and gas industry has encountered cycles of challenging commodity prices, changes in global supply and demand, and global political changes. From the early ‘1970s to today the industry has undergone expansion and contraction continuously as total

revenue streams have remained inconsistent. Companies in the conservative oil and gas industry have experienced diversity and inclusion regression during downturns in industry. It is very likely that other geoscience disciplines in academia, government, geothermal, and etc. have had their own parallel series of challenges and have therefore produced similar results during the same cyclic intervals. The mid '80s and early '90s saw the emergence of the acquisition and divestiture phase of the oil and gas industry that negatively affected the plume of underrepresented geoscientists and engineers in industry at that time. The unfortunate truth is that every discipline from Chief Financial Officer to delivery staff was affected by corporate mergers. The description of the employment outcome relative to minorities during one such company merger during the '90s was jokingly referred to by an experienced minority geophysicist as an "ethnic cleansing".

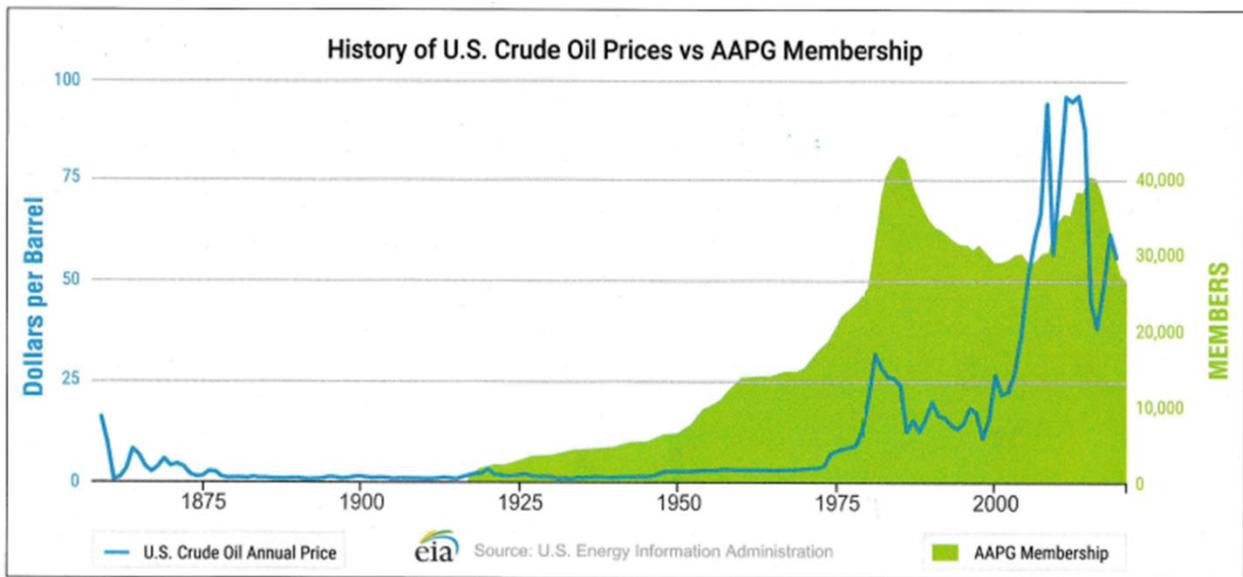


Figure3. Historically, the prices of a barrel of oil and geoscience organization memberships have been coincident over the last fifty plus years. This is represented using data from the EIA and the AAPG. The increases of African American memberships in geoscience organizations has mimicked those membership curves however the representation of that group has continued to exist at less than a percentage point of the total memberships.

Once again with commodity price structure remaining low and with an overall philosophical and technological shift from conventional exploration toward unconventional exploration the role of the geoscientists has changed significantly. Industry has created a Landman-Analyst-Engineer-Geoscientist domestic exploration model related to the focus on shale and horizontal drilling. As a result the Oil and Gas industry, a major employment sector for geoscientists, will face a restructuring of their domestic and international operations going forward. There will be continued consolidations and large scale companies will dominate the sector in a flat to down market (Barbosa). That being said the industry has experienced a history of innovation and has continually found ways to reshape itself both with technology and

financial adjustments. Even in the face of climate and environmental enthusiasts, tough commodity pricing, questionable supply and demand futures, and negative public sentiment; the need for hydrocarbon products are projected to be a part of our existence for decades to come. Upstream activities related to shale oil and shale gas have a shelf life and related costs are only going to be balanced by major and extremely efficient players.

What this means is that there will be fewer jobs available and fewer opportunities for funding for small operators, but there will be jobs. With the current pandemic companies are experiencing loss of revenue, operational challenges, and extreme economic challenges. The lesson that should be learned from previous downturns is that the diverse population in geoscience is not easily replaced. To some degree the geoscience community has been its own worst enemy when it comes to understanding that every successful entity needs a dedicated, informed, diverse hard working staff that can be attractive to a cross-section of scientists. Perhaps the unintentional consequence is risking inclusion and diversity when priorities and strategies are set by majority individuals making decisions without diverse representation in the decision making process. Underrepresented individuals struggle to continue to be included especially when they indeed are the “one and only” in a conservatively structured business model where they must depend on someone to recognize their value and the value of diversity as an advantage. This put’s a majority supporter in a position where they must swim upstream among their majority peers.

The profession of geoscience has to lessen bias by developing leadership staff from a diverse array of backgrounds. Private companies, academia, government agencies, and organizations with more diverse leadership and work forces will be positioned to perform better financially in a demanding global market.

SUMMARY AND RECOMMENDATIONS

Discussions about this kind of social inequity can no doubt be uncomfortable. This degree of high altitude description of the overview of what some of the obstructions to the Black community are described herein for the purpose of clarification and could definitely continue with increased granularity. However let us turn our attention to some of the things that could help address the titled “Underrepresented Indifference to Geoscience” and to low enrollments of minority groups in university geoscience programs nationwide.

There has to be a reimplementations of community actions programs designed to uplift and introduce additional pathways out of poverty through geoscience careers in underrepresented communities. A geoscience educational program directed at localized private and public non-profit organizations can play a role in helping communities focus on economic success related to Earth Science. The initial plume of African American geoscientists that developed during the commodity price highs of the mid to late ‘1970s and early ‘1980s has retired or is in the process

of retiring. Those that remain in the profession are few in number. They are a limited resource whose value has to be maximized through strategic engagement with communities, geoscience organizations, and academia.

Offering scholarships is essential but as a standalone will not positively affect numbers and underrepresented percentages over time. The charge of geoscientists is to address STEM opportunities in general. The more scientists created the higher the likelihood of some of them focusing on the geosciences. The inclusion of High School Earth and Planetary science in areas of high minority populations is essential along with direct connectivity to the HBCU geoscience departments. In addition, out of state tuition programs will have to be developed so that multiple interested individuals can have relief on attendance costs and lodging at majority institutions.

Political policies that fly in the face of the tribal geoscience divide must be implemented. State and federal funding guidelines for HBCU geoscience programs have to be refocused to include strengthening those programs and facilitating connectivity to majority programs. Several HBCU'S (HBCU Schools) that offer geoscience pathways need a steroidal injection and there must be sustained funded programs or endowments in place that will guarantee their existence.

The African American community needs a reinstatement of government support and STEM focused action that encourages the business sector and academia to get involved in sharing a pathway in geology. Federal policies that offer incentives to industry, academia, and government have to be designed and implemented. Some of the original Community Actions Programs that were established in 1964 were effective, but gained momentum was lost when related provisions under the Equal Opportunity Act were repealed in 1981. A community focused model of this type with efforts directed at science could produce positive results. Financial Institutions have to be encouraged to fund underrepresented entrepreneurs that can be given to opportunities to share in state and local engineering projects.

The question of relevance must be addressed. There is no substitute for the field experience that turns out to be the thing that captures the souls of the majority of geoscientists. With the absence dramatic tectonic features or processes that are imagination capturing along the southeast, there has to be a combined and orchestrated effort by geoscience organizations to introduce the grandeur of the field. If diversity is truly the goal, the community of diversity and inclusion champions from each of the major geoscience organizations, minor geoscience organizations, academia, government agencies, and industries have to work together to maintain some degree of connectivity with up and coming young scientific types as they develop. These individuals will need multiple mentors and the vision of multiple employment pathways and futures.

Geoscience and scientific concepts have to be demonstrated to have common place materiality in the "neighborhood". There should be a push to focus on a given topics like environmental justice or geo-hazards and the roll that geoscience can play to mitigate community

issues. Finally, bright young individuals need to be able to reach the conclusion that their assessment of a potential career as a geoscientist will provide them with an improved standard of living, prosperity, and economic growth.

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