



## Even in Climate Crisis: We Need Representation

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I grew up in Miami, Florida, a city that, despite its clear signs of rising sea levels and intensified flooding events, has continued to grow and develop waterfront luxury homes at a speedy pace. Miami is a unique city in that it belongs to a melting pot of cultures, communities, and socioeconomic classes. Similarly, the impacts of the ever changing climate also are also experienced differently, for example, as city developers continue to look for higher ground to establish new buildings and **estates**. This fact represents unique stance in the battle against climate change, how it will disproportionately affect communities of color and communities of developing countries, and the current struggle to have these communities represented by policy and the scientists creating climate solutions. As the **NAACP** Environmental Climate Justice Program has laid out, American society has often fallen short of addressing the direct impact of environmental injustices, such as climate change, on communities of color. For example, **a study** by the Proceedings of the National Academies of Sciences found that Black and Hispanic communities in the U.S. are exposed to larger amounts of air pollution than they produce through driving or electricity use in comparison to white Americans, who contribute greater amounts of pollution but experience cleaner air.

This week nearly **100 nations** pledged to cut carbon emissions by 30% by 2030. These efforts, led by the United States and Europe are aimed at rapidly addressing what President Biden called “a cry that can’t be any more desperate or any more clear” in regards to the climate crisis during his Inaugural speech in January. Agreed, the desperate state of the planet could not be any more clear as countries around the world continue to face climate challenges such as the island nation of **Madagascar** which is facing severe drought and famine. Within the United States, we are facing heavy rains and warmer winter temperatures. Just several weeks ago, in early October, I watched as several of my neighbors, whose homes had flooded in **central Alabama** from unusually heavy rains, pulled their water-stricken furniture and what was left of their belongings to the front of their homes while clean-up crews went to task on their home’s walls and floors.

As the Biden Administration seeks to rouse efforts by major world economies, there will also be a central focus on bolstering the STEM workforce, especially scientists from various disciplines, and increasing funding towards tackling climate change issues from now and throughout the coming decades. However, as President Biden seeks to do so, it is essential that this STEM workforce contain not only scientists diverse in their fields of study, but also diverse in race and ethnicity to address the scientific complexities in understanding and combating climate change. Focusing on diversity and inclusivity in the scientists that will address climate change issues is essential, as the impact of climate change is known to disproportionately affect these communities.

However, meeting this need for diversity in the STEM workforce is no simple task. The STEM field has long struggled with diversity and inclusivity, despite a plethora of pipeline programs and funding. Additionally, retention of students throughout these pipeline programs often falls short of producing senior level scientists that would likely be assigned to arduous, high-level projects regarding climate change. Addressing these issues in the pipeline must become a top priority.

Many existing pipeline programs intended to bolster the presence of underrepresented minorities in science focus mainly on creating opportunities for diverse candidates. Typically, that means offering experiences in a research laboratory while enriching technical and critical thinking skills, and cultivating academic support within their pipeline niche. However, once these students exit the pipeline program, the support they need to sustain a career in STEM gradually declines and retention wanes. Indeed, a recent **study** found that about 37% of Hispanic students and 40% of black students dropped out of their STEM majors, compared to 29% of white students. This has often been called the ‘**leaky pipeline**’.

The reasons for these issues are often multifaceted and complex, rooted in longstanding systemic inequities, and are not due to academic ability or interest, as noted by one of the study’s authors, **Dr. Riegle-Crumb**. But

one reason may be the support students receive throughout their journey in the pipeline and long afterwards. Academic support throughout the convoluted pipeline has been deemed critical to the retention and persistence of students of color in **STEM careers**. Often, pipeline programs connect students to other faculty of color that can assist in guiding them through the initial phases of their career, though afterwards they lack the support they need from senior faculty to make it to the top of academia. Senior faculty, after all, is still predominately white.

For example in the fall of 2018, of the **1.5 million faculty** in degree-granting postsecondary institutions 80% of fulltime professors were white (53% white males and 27% white females) according to **the National Center for Education Statistics** (NCES). Similarly, NCES also reported that the participation of undergraduate students in science fields have increased from **28% to 45% from the fall of 1997 to the fall of 2017**. Likewise, in the same time frame, nonwhite faculty only grew by a small margin (about 10%). This implies that while pipeline programs can increase diverse representation in science, they fall short of retaining students through to the senior level positions they need to occupy.

Undergraduate and graduate programs receiving National Institute of Health (NIH) funds for research should require all faculty conducting research to take diversity and racial equity training to learn how to properly mentor, support, and encourage students of color, as well as junior faculty and trainees in their department. These curriculums should address topics such as systemic inequality in STEM education and what students and trainees need in order to be supported — backed by social research and testimony from members of minority communities. These courses should also have a focus on combating racial microaggressions that can cause minority colleagues to feel uncomfortable and excluded and serve to create hostile environments that drive people of color out of STEM.

As Biden's administration prepares to enhance the STEM workforce in order to tackle new challenges in climate change and medicine, it is imperative that policy regarding diversity and inclusivity is top of mind. Participation of diverse groups in the STEM workforce is essential to the advent of effective scientific solutions that will serve America's unique and diverse communities.