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OP-ED

Oscar-Nominated “Hidden Figures” and the Ongoing Legacy of Overlooked Contributions in STEM

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Hidden Figures, an inspirational film based on the true story of three Black women mathematicians and computers at NASA, has been nominated for three Oscars, including Best Picture. But is its box-office success due, in large measure, to the way it positions racism and sexism as things of the past?

The depiction of these women overcoming segregation-era odds to serve their country in winning the space race seems to offer something compelling for all audiences, especially at a time when many throughout the country feel divided. Some long for the return of an imagined “great America” of our past; others feel our racialized and gendered past all too tangibly in the present.

The use of people of color, particularly women, for perceived national needs is deeply woven into the fabric of our past. For **more than 45 years** (<http://www.awis.org/?page=AboutAWIS>), policymakers, researchers and practitioners in the US have invested time, thought and money toward solving diversity and inclusion issues facing the Science, Technology, Engineering and Mathematics (STEM) fields. Many of the resulting initiatives offer the premise that diversity is good for our **national economy** (<https://escholarship.org/uc/item/6zf09176>) and **scientific competitiveness** (<http://www.lifescied.org/content/15/3/rm3.full>). It is this very thread that in

Hidden Figures, at least temporarily, allowed for the setting aside of racial and gendered divisions so that the nation could beat the Russians. This thread tugs on the US's patriotic heart strings and unites even the most divergent audiences.

This framing not only overlooks the necessity for systemic change in scientific cultures, but also disregards our dark history and ongoing pattern of treating underrepresented groups like resources rather than people worthy of respect and recognition.

From the beginning of the [18th century \(https://www.jstor.org/stable/2739176\)](https://www.jstor.org/stable/2739176) until long after the [conclusion of World War II \(https://books.google.com/books?id=zVgit3XdoHcC&lpg=PR13&ots=GuHkyq92Ds&dq=kaplan%20and%20rogers%20race%20and%20gen](https://books.google.com/books?id=zVgit3XdoHcC&lpg=PR13&ots=GuHkyq92Ds&dq=kaplan%20and%20rogers%20race%20and%20gen) biologists and biomedical practitioners used the bodies of non-Europeans, women, Jews, LGBTQ people and other socially, economically and politically marginalized groups to “prove” their scientific inferiority. They compared skull size and its capacity to hold millet, palm size, skin color, hair texture, blood and more. These methodologies not only served the white-supremacist projects of science at the time, but also acted as rationales to maintain the current socio-economic status quo.

Women, people of color and the poor have served as test subjects for science many times since. While hormonal birth control is seen as an icon of feminist progression, it too has an often-hidden scientific past. At the time of its early development, white women longed for reproductive freedom while [women of color \(http://nyupress.org/books/9780814758274/\)](http://nyupress.org/books/9780814758274/), especially poor and disabled women of color, were forced to undergo sterilization. Early birth control pill testing in the mid-1950s was conducted on Puerto Rican, Haitian and Mexican women under the guise of a fertility study. Puerto Rican women, referred to by researchers as a “[cage of ovulating females \(http://www.pbs.org/wgbh/amex/pill/filmmore/pt.html\)](http://www.pbs.org/wgbh/amex/pill/filmmore/pt.html),” were chosen to get around Comstock Laws and to address fears of Puerto Rican [overpopulation \(http://www.ucpress.edu/book.php?isbn=9780520232587\)](http://www.ucpress.edu/book.php?isbn=9780520232587). The study participants experienced many painful and sometimes long-lasting side effects because of the high doses and many ended up sterilized.

Nonwhite neighborhoods, Indigenous communities and developing nations continue to serve as the primary sites for toxic industries, dumps and drilling. One need look no further than Flint, Michigan, or Standing Rock for examples of toxic colonialism. The innovations of engineering meant to fuel the national economy do so largely without respect for harms to already marginalized communities.

This history highlights the values that enter scientific work and demonstrates that socially and economically disadvantaged groups have long been used within science to the benefit of the socially and economically privileged. This history continues into the present where we face ongoing marginalization in STEM of women, people of color, people with disabilities, LGBTQ people and more. Women of color [remain underrepresented \(http://www.lifescied.org/content/15/3/rm3.full\)](http://www.lifescied.org/content/15/3/rm3.full) among STEM degree earners, particularly in

engineering, mathematics and computing. For instance, Black women earned fewer than 1.5 percent of engineering bachelor's, master's and doctoral degrees in 2014, even though they represent 6.7 percent of the US population ages 18–64.

To fail to consider this historical and ongoing social context leaves a key piece of the puzzle surrounding STEM participation, pathways and experiences missing. As engineer [Alice Pawley](https://www.academia.edu/249938/Where_Do_You_Draw_the_Line_A_Study_of_Academic_Engineering) (https://www.academia.edu/249938/Where_Do_You_Draw_the_Line_A_Study_of_Academic_Engineering) out, “[W]hy would these groups participate in an enterprise that chooses to systematically overlook their needs, desires, and problems, defining them out of engineering? Until engineering as a discipline decides to ask about, value, and respond to the needs of those groups of people who have historically and systematically been excluded from every official aspect of engineering problem definition and solution, then I suspect they will not be interested in becoming engineers.”

While *Hidden Figures* presents inspirational role models for young women of color who aspire to STEM careers, much remains to be done in our scientific and engineering spaces. Even when members of underrepresented groups choose to enter STEM, earn STEM degrees and enter the STEM workforce, an abundance of [research](http://www.lifescied.org/content/15/3/rm3.full) (<http://www.lifescied.org/content/15/3/rm3.full>) illustrates extensive experiences with bias, harassment, discrimination, and disparities in salary, leadership roles, recognition and awards, access to resources, and more. The legacy of the [pay gap](http://www.awis.org/?PayEquity) (<http://www.awis.org/?PayEquity>) seen in *Hidden Figures* is still alive and well today, even in fields like the biological and life sciences, where white women and women of color earn degrees closer to a representative level. In these fields, Black, Native American and Latina women earn 78 percent of what white men make and 85 percent of what white women make. In math and computing, this gap is 77 percent and 96 percent, respectively.

White women and women of color continue to have their scientific contributions undervalued and under-recognized. Rather than focusing on using underrepresented groups to serve the nation, we should be asking, “How can STEM serve all the people engaged in it?” Until we work to value the people in addition to the national economy, our efforts are unlikely to succeed in making participation in STEM fields sustainable and rewarding for all; and women, particularly women of color, will continue to remain hidden figures.

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