HEALTH

How Racism Creeps Into Medicine

The history of a medical instrument reveals the dubious science of racial difference.

HAMZA SHABAN AUG 29, 2014

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In 1864, the year before the Civil War ended, a massive study was launched to quantify the bodies of Union soldiers. One key finding in what would become a 613-page report was that soldiers classified as "White" had a higher lung capacity than those labeled "Full Blacks" or "Mulattoes." The study relied on the spirometer —a medical instrument that measures lung capacity. This device was previously used by plantation physicians to show that black slaves had weaker lungs than white citizens. The Civil War study seemed to validate this view. As early as Thomas Jefferson's *Notes on the State of Virginia*, in which he remarked on the dysfunction of the "pulmonary apparatus" of blacks, lungs were used as a marker of difference, a sign that black bodies were fit for the field and little else. (Forced labor was seen as a way to "vitalize the blood" of flawed black physiology. By this logic, slavery is what kept black bodies alive.)

The notion that people of color have a racially defined deficiency isn't new. The 19th century practice of measuring skulls, and equating them with morality and intelligence, is perhaps the most infamous example. But race-based measurements still persist. Today, doctors examine our lungs using spirometers that are "race corrected." Normal values for lung health are reduced for patients that doctors identify as black. Not only might this practice mask economic or environmental explanations for lower lung capacity, but the logic of innate, racial difference is built into things like disability estimates, pre-employment physicals, and clinical diagnoses that rely on the spirometer. Race has become a biologically distinct, scientifically valid category despite the unnatural and social process of its creation.

In her recent book *Breathing Race into the Machine*, Lundy Braun, a professor of Africana studies and medical science at Brown University, reveals the political and social influences that constantly shape science and technology. She traces the history of the spirometer and explains its role in establishing a hierarchy of human health, and the belief that race is a kind of genetic essence. I spoke with her about the science of racial difference, its history, and its resurgence.

Hamza Shaban: How did the idea of race corrections and differing lung capacity come about?

Lundy Braun: My research suggests that Samuel Cartwright, a Southern physician and plantation owner, was the first person to use the spirometer to compare lung capacity in blacks and whites. The first major study making racial comparisons of lung capacity with a large sample size was the anthropometric study of Union soldiers directed by Benjamin Apthorp Gould, published in 1869.

The idea about the pathology of black lungs circulated in medical groups in the late 19th century but the next scientifically modern racial comparison was published in the *Journal of the American Medical Association* in 1922. This paper was followed by a flurry of studies in the 1920s, some of which continue to be cited in the 2000s. Gould's book also continues to be cited.

Shaban: So within the medical community this is a well-established concept?

Braun: If you look at the scientific literature, virtually everyone in the world has lower lung capacity than people classified as whites. There is a scientific consensus. The question I'm interested in is: How did this idea of difference get

into science? And how was difference explained? The problem here is the survival of the framework of innate racial difference.

Shaban: Race correction is actually built into the spirometer, right?

Braun: When I interviewed physicians they were sort of vaguely aware of race correction. But they don't necessarily know that they're activating a correction factor when they push the button or select a certain drop-down menu. Some even argued that they didn't race correct, interestingly enough, but when I looked at the specification sheet, a correction factor was built into the machine.

Shaban: When a patient goes to see their doctor about their lungs, how does the doctor racially classify their patient?

Braun: In my interviews I asked physicians how they assessed race. I got a variety of responses. Many said they just "eyeballed" it—and never asked the individual any questions about their race. Others asked people to self-identify. But it can be awkward to ask someone their race for a lung function test. Patients might wonder why race is relevant for this particular test. So, in general, my research suggests that operators/clinicians simply guess a patient's race based on the usual simplistic physical characteristics historically associated with "race," like skin color—a poor marker for race globally. This guess may have little to do with how someone self-identifies or the richness of their ancestry.

"Race correction" is built into the software of the spirometer globally. To evaluate lung function and to make a recording, the operator/clinician must determine a patient's race. For most modern spirometers, this entails selecting a race option from a drop down menu or pressing a button. And the options vary by manufacturer.

Shaban: Early and rigorous critiques of a racialized understanding of lung capacity were made by leading black intellectuals: W.E.B Du Bois and Kelly Miller. They recognized how these studies lent support for racist ideology and prejudiced public policy. Why were their criticisms drowned out, even when they pointed to dubious science?

Braun: The short answer would be racism. The more complex answer is that they were almost alone in arguing against racism in science. Then, as now, it's hard to

shift mainstream thinking. Lung capacity difference was a deeply entrenched idea by the late 19th century.

An alternative narrative that I point out was by the physician Jedidiah H. Baxter.

Shaban: Baxter did a separate study of black Union soldiers that showed no difference in lung function, right? His findings conflicted with Gould's.

Braun: Yes. And what's interesting there, it gets to the tension between knowledge produced by qualitative and quantitative research: Quantitative data is stripped of context. Gould's was just numbers assembled into a table. He hardly comments at all. His work looks very, very objective, and very scientific.

Baxter produced quantitative data, but he also included rich narratives from army surgeons in the field. These narratives are racist but the army surgeons weren't willing to write blacks off as having lower lung capacity or that they were incapable of fighting for freedom. The two studies produced different results, and although Baxter's narratives were acknowledged, Gould's study is cited in science journals even today.

The argument I make is that Gould's study looked most legibly scientific—and it drowned out Baxter, and it drowned out Kelly Miller, and it drowned out Du Bois.

Shaban: Why have environmental or socioeconomic explanations for differing lung capacity never been taken seriously over some innate racial factor?

Braun: There have been scientific studies showing that people who live around high pollution areas have lower lung capacity. High pollution areas also map onto minority status. Why we have chosen both in the U.S. and internationally to focus on race to the exclusion of social class, I can only speculate. One piece of the story is that the accumulation of scientific research around a particular idea can make it hard to dislodge. With the spirometer, having the correction factor actually built into the machine makes racial assumptions invisible.

This is a problem not just with lung capacity measurements but with health inequality more generally. There's vastly, vastly, vastly more research on genomics than on the social determinants of health. Part of the problem is the infrastructure of science. What kinds of questions are considered scientific?

Shaban: When you look at the race categories of the U.S. census and medical dictionaries throughout history, you find a baffling array of contradiction, bias, and hierarchy. Why has race as a biological concept, rather than a social or historical one, continued to attract scientific inquiry?

Braun: I wish I had an answer to that. Why race science is getting reinvigorated at this particular moment, I think is very interesting. Why is race-as-biology being reinvigorated at a time when we are claiming to be color-blind?

One possible piece of the puzzle is: There's a long history of using science to solve social problems. And genomics is very exciting and it seems apolitical. The actual science of it is appealing. It's been sold to the public as a solution to health. But addressing the social aspects of racism and class and gender discrimination is not something we have taken on, or wanted to take on, for centuries.

I am not making an argument never to use race in health research. I think the use of race as a social category is entirely appropriate to study the health effects of a discriminatory social world—but always in combination with gender and measures of class.

It's an entirely different matter to use race as a natural/scientific category to study genetic difference.

Shaban: In the scientific community there's this insurgent belief that political correctness is getting in the way of discovery. This argument holds that the question "Is race real?" is a scientific problem whose truth should be pursued, whereas "Should we study it?" is a different, political question, one that scientists shouldn't be too concerned about. What's your take on this point?

Braun: The scientific and the social are inextricably linked. From the questions that you decide to ask, from the design of your study, from the way the science is interpreted, it's always bound up with the social.

The claim of political correctness is a silencing mechanism. And it's usually invoked to silence social and political questioning. I think a much more productive and interesting project is to examine how beliefs and values get into science—and medical instruments.

It is difficult to convey that race is real in terms of its social impact on people's lives and health, yet it is not rooted in nature. Humans are diverse, including genetically, but classifying that diversity is fundamentally a social process.

One strong piece of evidence, something we have known since 1972, against the biological/genetic concept of race is that there is more genetic variation among individuals within conventionally defined racial groups than between individuals of different racial groups. This has been demonstrated by numerous researchers using different methodologies. It is clear from this evidence that looking to genes according to racial group to explain health inequality is misguided.

Shaban: Is history clear that the science of racial difference has always been used to discriminate against non-whites, minorities, or one's enemies?

Braun: Here I can speak as someone trained as a scientist; scientists are not trained in history. Many people who are working on the genetics of racial difference are very well-intentioned. They're hoping to find something that will help people. What that something might be and how you're actually going to help people through genetics is another story.

There's also the notion that if you are well-intentioned you can avoid some of the past problems.

Because eugenics became so associated with Nazi experimentation, we actually haven't fully appreciated that 20th century eugenics was "normal" science. We tend to overlook the normality of works like craniometry, the measuring of skulls in the 19th century. Eugenics was embraced by people across the political spectrum, and it was seen by many as a way to improve society.

I'm not saying we're in a eugenical period. But the history of the debate around race and science needs to be part of the curriculum in medicine as well as graduate education so that scientists and physicians have a deeper sense of that history, that science is informed by the social and that the social in turn is informed by the scientific.

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this thing about one body. it was the black feminist metaphysicians who first said it wouldn't be enough. never had been enough. was not the actual scale of breathing. they were the controversial priestesses who came out and said it in a way that people could understand (which is the same as saying they were the ones who said it in a way that the foolish would ignore, and then complain about and then co-opt without ever mentioning the black feminist metaphysicians again, like with intersectionality, but that's another apocalypse).

the Lorde of their understanding had taught them. *this work began before I was born and it will continue . . .*

the university taught them through its selective genocide. one body. the unitary body. one body was not a sustainable unit for the project at hand. the project itself being black feminist metaphysics. which is to say, breathing.

hindsight is everything (and also one of the key reasons that the individual body is not a workable unit of impact), but if the biochemists had diverted their energy towards this type of theoretical antioxidant around the time of the explicit emergence of this idea (let's say the end of the second-to-last century), everything could have been different. if the environmentalists sampling the ozone had factored this in, the possibilities would have expanded exponentially.

that wouldn't have happened (and of course we see that it didn't) because of the primary incompatibility. the constitutive element of individualism being adverse, if not antithetical to the dark feminine, which is to say, everything.

to put it in tweetable terms, they believed they had to hate black women in order to be themselves.

even many of the black women believed it sometimes. (which is also to say that some of the people on the planet believed they themselves were actually other than black women. which was a false and

impossible belief about origin. they were all, in their origin, maintenance, and measure of survival more parts black woman than anything else.) it was like saying they were no parts water. (which they must have believed as well. you can see what they did to the water.)

the problematic core construct was that in order to be sane, which is to live in one body, which is to live one lifetime at one time, which is to disconnect from the black simultaneity of the universe, you could and must deny black femininity. and somehow breathe. the fundamental fallacy being (obvious now. obscured at the time.) that there is no separation from the black simultaneity of the universe also known as everything also known as the black feminist pragmatic intergenerational sphere. everything is everything.

they thought escaping the dark feminine was the only way to earn breathing room in this life. they were wrong.

you can have breathing and the reality of the radical black porousness of love (aka black feminist metaphysics aka us all of us, *us*) or you cannot. there is only both or neither. there is no either or. there is no this or that. there is only all.

this was their downfall. they hated the black women who were themselves. a suicidal form of genocide. so that was it. they could only make the planet unbreathable.[2]

Image of a significant portion of the Black American women with PhDs in physics, astronomy, materials science, and physics education, courtesy of African-American Women in Physics.

Black Women Physicists In the Wake

Science and slavery are inextricably entwined in our history

Chanda Prescod-Weinstein
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This paper was presented in a 2017 Society for the Social Studies of Science session entitled "Can the subaltern research?" Here is my answer. I encourage folks who can to choose the audio over the text to get a feel for the message and because I editorialize a little. I will try at some point to update the text to reflect the audio presentation, but below is almost identical to what I said. And I am happy for feedback from people who interpret for deaf/hard of hearing people about how to helpfully accentuate the text. Special thanks to Christina Sharpe for her important text In the Wake*, which read to me as a science, technology, and*

society studies text, even if that wasn't the author's intention. Edit: At the bottom, I include a variation on how this ends which was presented at the 2017 Society for History of Technology meeting.

Slavery is rarely the starting point for discussions about what many of us would call the post-enlightenment era development of science, which Jonathan Marks helpfully defines as "the production of convincing knowledge in modern society." (We'll save discussion the problematic use of "modern" here for the "Decolonizing STS" meetup at lunch.) Yet as Christina Sharpe teaches us in her many turns around "the wake," science and slavery entwine repeatedly: whether it's the early evolution of insurance and actuarial science to calculate the value of jettisoned cargo — brutally murdered people — or efforts to minimize the bow wave — the wake — of ships, to make them faster, to speed the movement of kidnapped Africans from the torturous Middle Passage to a tortured lifetime and usually death in the bondage of chattel slavery. In slavery begins what Katherine McKittrick calls "mathematics of Black life," which extends to the writing of the American constitution, wherein a complex political and economic calculus renders us 3/5ths of a person because even on paper our wholeness is dangerous.

We never start with slavery, but my narrative as a queer Afro-Caribbean Black Ashkenazi Jewish femme particle physicist necessarily starts with it because my existence is shaped entirely in the wake of slavery, in the wake of trying to imagine what science means to the slave and her great great grandchildren.

How am I constructed and unconstructed? What is on my ontology? And what are the epistemologies I am allowed?

I am a Black woman in cosmology and particle physics with an interest in the early universe. I arrived at this place because the natural curiosity that I share with all my fellow apes extended to the physical world in childhood after I discovered fairly early on a particular pleasure in counting. Then I learned you could get paid to worry about the origins and evolution of the universe.

Twenty-five years after first falling in love with the idea of becoming a theoretical cosmologist, my pleasure in counting has transformed into a kind of masochism, obsessively looking around nearly every professional space and noticing I am The Only One — the only woman, the only Black African origin person, definitely always the only

Black woman. I say obsessively not to minimize the experience of those who are diagnosed with OCD but rather in connection: the summer after my freshman year of college, the first year I did this kind of counting, when I was still 17, I began picking at the skin around my fingers, and 17 years later, I travel with bandaids, always, because sometimes they bleed.

In a white supremacist society, a highly gifted Black woman child can count herself into dermotillomania, an impulse control disorder whereby my anger at the numbers not adding up gets turned inward on myself. 2000 PhDs are granted in physics in the US each year, Black women make up about 7% of the population, and maybe 5 of those PhDs goes to one of us. At the same time, I'm told that I'm still a postdoc and not a professor because I notice this and talk about it rather than shutting up and calculating. But, as a trained particle physicist — an expert in the uses and abuses of symmetry — am I not supposed to notice the physical contents — the people — of my professional space and that *I* am breaking its white, masculine symmetries?

What does it mean to speak of the pleasure of counting when what needs counting is the painful absence of other people like me? How do Black women rewrite themselves to mediate these two ways of knowing and relating to numbers? Is their research as physicists an act of self-consciously and reflexively asserting themselves, to borrow a turn of phrase from Hortense Spillers? If as Fred Moten posits, Black Atlantic lives are a matter of continuous improvisation, are we self-consciously constructing ourselves as physicists through performative improvisation? When we read texts like *Hidden Human Computers* by Duchess Harris and *Hidden Figures* by Margot Lee Shetterley, are we reading ourselves into existence through historiographic excavation? How does race figure into the science, technology, and society studies discourse about the contingency of ideas? Will the subaltern's research product, process, and priorities be identical to that of the dominant culture? By becoming a physicist, am I assimilating or asserting the hope and the dream of the slave who longed to find a way home?

In trying to answer these questions I identify tensions:

Between the idea of universality — that the laws of physics are the same everywhere in the universe and no matter who writes them down — and objectivity — that who is constructed to investigate, explore, uncover, and discover these universal laws does not matter. Even the centrality of words like "explore" and "discover" with their colonialist

embeddings teach us about how, as Adrienne Rich said, this is the oppressor's language, yet I need it to talk to you.

The tension of constructions of "who":

1. Blackness coming into being as a path to elevate those who are cast as white, thus Blackness as deathly imposition
2. Blackness as self-constructing, improvised identity formed in the wake, a Blackness beyond white control, or as Spillers put it, "outer-directed forces are not definitive, although they have been, in the case of diasporic African communities, unrelenting and overwhelming"

The tension of whether it's even okay to ask "who":

1. Does it ever matter?
2. When it is argued that it doesn't, who does it serve?
3. When the mattering only serves the discipline as it is, and not the people at the margins of the discipline, what are the implications for the relationship between the people and the discipline? Whom does the discipline serve? Was the Manhattan Project serving Japanese people?

Tensions between power and imagination:

1. Claims that science is all about imagination belie the power dynamics associated with who is typically given the opportunity to explore, and the way science has distinguished itself at times from the arts as a militaristic tool
2. Yet, could it come to be about imagination and improvisation?
3. How is improvisation both in the wake of racism and a beautiful high jump over the barrier of racism?

Tensions between present and past:

1. In the wake, science is a tool of oppression, the way the boat is better designed, the way pure astronomy is funded to help make distance measurements between the

Gold Coast and the West Indies more accurate, etc.

2. But also in the wake, science is stolen intellectual property. Enslaved Africans were midwives, herbalists, nurses, engineers, agriculturalists, chemists, mathematicians, and amateur astronomers, following the drinking gourd — what Europeans called the Big Dipper — to freedom.

3. So also in the wake, curiosity cannot be controlled by whiteness

4. Now in 2017 Black girls self-construct and improvise their way to engineering degrees after which they may build boats or like Renee Horton, President of the National Society of Black Physicists, help build space faring machines

In 2005, Sylvester James Gates, a prominent Black American theoretical physicist, gave an interview in which he told a story about Nobel Laureate in Physics, Abdus Salam:

> *In the early eighties Professor Salam commented he suspected that when a sufficient number of people of the African Diaspora start to do physics, something like jazz would appear. It took 15 or 20 years before I had the intimate knowledge of physics necessary to interpret this statement well enough to understand his meaning . . . When enough people of African heritage do physics, they're going to bring a different aesthetic, and it will be new and valuable. Because classical music and jazz exist we don't think that we're musically poorer. Had jazz never come into existence we would've been musically poorer, but before jazz, musicians could say, "We're doing just fine. We have this wonderful art form here."*

Whereas I hear one thing when Jim talks, others hear something different. This quote is sometimes repeated in the discourse of diversity, whereby underrepresented minority — Black American, Native American, Latinx, and Pacific Islander — scientists are constructed as a valued commodity in science because of the intellectual products we might contribute. In the wake of slavery, what does it mean to reduce the Black need for Black equality to a matter of a majority white society needing Black ideas? Has anything changed?

One reading is that Gates and Salam are essentializing Black people.

This reading intimates a failure to understand the roots of Jazz, which rather than being a deficient attempt at European-only thought modes, is a distinctly Black American

thought mode which takes the same musical instruments and constructs something *different, not deficient* with it. As Amiri Baraka explains in *Blues People*, Charlie Parker played the way people talked. Now I understand better why I picked up the alto so that I could play bepop — to hear myself talking in a language that decidedly did not belong to the oppressor.

This was in fact what initially attracted me to particle physics, for what could be further from the terrible things which inspired the Los Angeles Uprising that we had just lived through than the details of what we are made of, than the pleasure of counting, a universally interesting activity?

Little did I know that the oppressor had the tightest grip on this work especially. In 2017 I am the only Black woman with a PhD working in theoretical cosmology in North America, and one of only two in theoretical particle physics, the field considered the most abstract and thus in white supremacist patriarchal tradition, the most elite in physics.

And now I don't just count but I begin to ask questions I was trained not to ask: why am I here in this room and what is it that I have to offer that none of these (mostly white) men around me can offer? To ask this question is itself an act of improvisation — an act of turning off self-censorship in the moment — i.e. I have been trained not to ask, yet I do. I have been trained to believe that physics is objective, and it gets no more objective than when it gets mathematical, when it gets theoretical. And that means that if there are no other Black women in the room, it's because Black women are broken. Even when I know that's wrong, 17 years of professional training says that it's right. And that is the barrier I improvise my way over, every time. And now I wonder, because I am a scientist, trained to ask questions, what other ways do improvisation serve me as a scientist?

Evelyn Fox Keller talks about western epistemic constructions of science as "male" and nature as "female," leading to what Banu Subramaniam and Mary Wyer have called dementoring — the training of women in STEM by "untraining them as women" and assimilating them as scientists. Black women, famously in the double bind, face untraining as women along with efforts to "patch up" the 2/5s deficit in our humanity. Here, the wake is telegraphed by society: by virtue of birth we are unconstructed as potential scientists.

Yet Black improvisation of a human identity, of a peoplehood, what we might call jazz as a shorthand, is telegraphed by family-community. Improvising ourselves into existence becomes a way of life, a way of playing the world, a way of making meaning of the world, returning to and reconfiguring Marks: a way of producing knowledge about the universe that is convincing to us, reconfiguring a white supremacist multi-ethnic society's definition of who can be an observer.

. . .

To analyze the lives of Black women scientists and technologists without accounting for the unique challenges of personhood and peoplehood construction that Black Americans and Black women especially have faced is indeed a failure to tell part of the story.

Thus, I find myself interested in experiments in biography, especially Jan Golinski's recent biography of chemist Humphry Davy, which looks at Davy through the lens of personae he himself constructed and presented to varying degrees both publicly and privately.

Simultaneously, I believe that ethnography is a critical facet of the investigation of how individual scientists and technologists are made into legitimized observers.

As musician and academic Vijay Iyer has said, "You have to teach someone not to improvise." Looked at through a prism, my questions are about how to describe individual members of a people who were repeatedly taught not to improvise themselves into humanity, but did it anyway, with varying degrees of engagement with how the establishment conceives of personhood, but also through innovation in the wake.