

## Interview

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Illustration by Shonagh Rae

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**M**athematician and educator Freeman A. Hrabowski III has led groundbreaking efforts to increase diversity in science, technology, engineering, and mathematics (STEM) fields throughout his career. As president of the University of Maryland, Baltimore County (UMBC) for three decades, Hrabowski transformed a regional commuter school into a top-tier research university. For more than 15 years, UMBC has been the top US producer of Black undergraduates who continue on to receive PhDs in the natural sciences and engineering.

The Howard Hughes Medical Institute recently launched the Freeman Hrabowski Scholars Program, a \$1.5 billion initiative that aims to advance diversity in the sciences. And in May 2023, Hrabowski will receive the National Academy of Sciences' Public Welfare Medal, which is presented annually to honor extraordinary use of science for the public good.

*Issues* editor Sara Frueh spoke with Hrabowski to get his insights on the importance of the humanities, culture change at universities, and scientists' involvement in civic life.

***When you think about the workforce America will need in the future, what does our education system need to do differently and better than it's doing now?***

**Hrabowski:** Starting with pre-K through higher ed, we need to be thinking about how our curriculum addresses connections across disciplines while thinking about ways to include more people in those discussions.

I'm a strong believer in the need to rethink who can do what well. We have this way of bifurcating people into two groups: we still tell children that people are either good in math and science or they're good in English and the arts. We need to start believing that we can teach students to build their skills and become even more interested in both areas.

This is important when thinking about the workforce. More and more, we need people who are experts in STEM and also have grounding in the humanities. If we are simply creating techies who can only work with the technology, we're in big trouble. We need people who can think about the increasingly important role of technology and look at the big ethical and philosophical questions that we'll be facing as we go through this next period in our development as a society.

***A little over a decade ago you were head of a National Academies study that offered recommendations for increasing the participation and success of students of color in STEM. Where are we with that now?***

**Hrabowski:** In 2021, my advisor Peter Henderson and I wrote an article for *Issues* saying that we'd only moved from 2.2% of the PhDs going to African Americans to 2.3%. So in that sense, we don't see progress.

We still have big challenges with bringing women into computing areas especially, we know that. But I do see progress through the ADVANCE program from the National Science Foundation, where institutions are encouraged to work on culture change that will lead to more women not only being recruited to the faculty, but also getting tenure and moving into administrative positions.

I have several examples of hope through major initiatives in the scientific community. The National Institutes of Health (NIH) has created a program to give grants to institutions that are proposing to increase diversity in the faculty—very much like the new Howard Hughes Medical Institute program in my name, which looks at ways of encouraging outstanding early-career faculty members to build diverse labs.

We also have a major challenge in that many more people of all races who start in STEM leave it within the first two years. I often ask audiences, "How many of you started off in premed and science or engineering, and became lawyers?" And you'd be amazed at the number of people who raise their hands.

The point is that in many places, we still think of the first year or two of science and engineering as weed-out courses. There are institutions working to change that, but we don't even expect most students who begin with STEM majors to succeed in those courses.

So I would say we still have a long way to go. And we have a lot of work to do in thinking about culture change.

***In your writing, you've described changing an institution's culture as "hard as hell." This year's report on racism in STEM from the National Academies of Sciences, Engineering, and Medicine pointed to the need for culture change to increase diversity, equity, and inclusion. So if an institution or university wants to start to shift its culture to be more inclusive, how does it begin?***

**Hrabowski:** We first have to have some understanding of that word "culture." Writer Eric Weiner says, "Culture is the sea we swim in—so pervasive, so all-consuming, that we fail to notice its existence until we step out of it." It's the assumptions we make. It's the incentives that we give for certain kinds of behavior. It's in the questions we ask and the ones we don't ask.

To change the culture, we must be empowered to look in the mirror and to be honest with ourselves first—to have the difficult conversations about what we do well, but also what are we not doing well.

I'll give you just one example of a need for culture change in our society. With the exception of the most prestigious institutions and the largest and richest public universities, when you look across the two-year institutions, most publics, and some private universities, what you will see across races is that the majority have six-year graduation rates well below 50%, often around 30-something percent. And that's not just for minorities, that's in general. A large portion of our population may start college, but they never graduate. Now, why is that important? And what does that have to do with culture change?

One of the reasons students at two-year institutions and many publics don't make it past the first year is that they don't do well in lower-level mathematics. If we look at every institution, we will see that many are still teaching that math course the way they did 50 years ago. There's a need for the difficult conversation. What we did at UMBC was to have those difficult conversations, and faculty wanted to work on course redesign—and to rethink, for example, first-year chemistry. They gave it more than just a lecture approach, and used collaborative learning, active learning, professional development, use of technology, real-time assessments, and group work.

It is in that collaboration and the group work and the asking of questions and the feeding off of each other that we solve problems. But too often we tend to teach in a way that says, "If somebody worked with somebody else, that's cheating in class." We do that from pre-K onward. And yet, if you look at how science problems are solved, or if you look at our human problems to solve, it's never just with one person.

***I want to talk a little bit more about the difficult conversations piece. You've written that a healthy campus is one where those difficult conversations can happen. How can educators equip their students to have productive conversations as they head out into a contentious and divided society?***

**Hrabowski:** All of us criticize elected officials, and we tend to criticize Congress for what it doesn't get done. Now, all those members of Congress—almost all—are graduates of our institutions of higher education, and yet many are not willing, it seems, to open their minds and learn how to agree to disagree and seek the truth.

Leaders of institutions need to take responsibility for attempting to create a culture, a climate, that encourages people to come to the table and talk about the difficult issues and to say what they really think without being attacked.

I would argue that too often we teach the importance of winning. Fred Lawrence, secretary of Phi Beta Kappa, talks about the importance of teaching students to be able to present their arguments and back up the arguments with

evidence—but also to have the willingness to listen to others who think differently, and to look for the evidence in what they say. And then having the wisdom to seek the common ground as we seek the truth.

I was always saying to students, "Don't let someone make you angry. When you don't agree, simply breathe deeply, and give yourself time to think about it. Then see if you can put yourself in the shoes of the other person: Why'd that person say that? What can you learn from what the person said, whether you like it or not?" What we are talking about is learning how to build trust. And through our expectations, to help people know what's important on campus.

In spite of the progress we've made in desegregating our higher education institutions, we still have, in some ways, hypersegregation in that every group keeps to itself. And while I understand the strength in people of any group with something in common coming together—women, LGBTQ students, Asian and Black and Hispanic groups—and in having time to celebrate commonality, I question the lack of proactive approaches to ensure students get to know people very different from themselves—not just in the classroom, but on campus.

The question I ask as we in the scientific community and higher education look in the mirror is: Are we intentional about ensuring that people who enter the institution will necessarily get to know people different from themselves? To have the substantive conversations with people different from themselves? When do we have those conversations about disagreements and different perspectives? If we don't learn to do it in universities, when would we ever learn to do it?

***What problem or question—in education or beyond—are you most interested in now?***

**Hrabowski:** One is a broad question about education: What would it take to create a society in which the vast majority of children of any race can read and think well? Because if you give me a child who can read well, I can teach her to solve math word problems. A large proportion of the children in our country are not literate when they graduate from high school, let alone from the eighth grade. And a larger percentage of those are children of color, and clearly a large percentage of those are from low-income backgrounds. That's a fundamental question that I'm working on—pre-K through twelfth grade.

And then more specifically, the question for me is: What is it going to take to create a professoriate that will make exceptional achievement in STEM by people of color the rule rather than the exception?

While I'm a strong believer in finding talent from all over the world and attracting people to the United States, I also want to see us doing what we can to build the talent that is from here. We need both.

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*You were involved in the Children’s March in Birmingham in 1963, and I’m wondering what insights your early experience with the civil rights movement gave you about the possibility and difficulty of society-wide change?*

**Hrabowski:** That story starts with me sitting in the back of church and doing my algebra word problems. I’m 12 years old, and I was listening to Dr. King, and he said, “If the children participate in this peaceful protest, all of America will know that even our young people know the difference between right and wrong, and they want a better education.”

And for me, I was so excited because it meant I might be able to go to the white schools. We had some great Black teachers, but there were so many messages to us in the quality of the physical facilities and the resources that our teachers had; the white schools had the new books while we got hand-me-down books. I had never previously thought about the possibility of going to a white school because the one time after the 1954 Supreme Court decision that some Black children tried to integrate one of our schools, good Christian people threw rocks at their heads.

And by 1963, I still thought it just wouldn’t happen. So when Dr. King said it could happen, it was the first time that I thought, “Well, maybe something could change.” That was the message—that maybe something can change—but I can’t sit on the sidelines. I’ve got to be a part of it. And the lesson for me was that we must empower children to believe they can help bring about change—and the way they can do it is by being their best.

I will say this: being in jail was horrific. We were treated like animals, like slaves. Not enough bathrooms. There were children much younger than me. And yet, somehow, the message from our parents and from Dr. King and his leaders was, “We’re not animals, we’re not slaves. We cannot allow anyone else to define who we are.”

The message from the civil rights movement is that we cannot give up. We can keep moving forward—it’s up to us. And that’s also true in terms of making science more inclusive and more representative. We went through a period during the COVID pandemic when the light was shining on the lack of trust that people of color and others have for science and medicine. This had been quietly known, but COVID really shone a light on it. And that was when the notion that we have to build trust became so real.

One of my ways of building trust was to say, “My wife and I are in this study, and we are doing okay. We’ve had the vaccine.” But secondly, I would point to this Black woman, Kizzmekia Corbett, who was leading a research team—and who is also a UMBC alumna. When I could tell African Americans that one of the leaders of the team at NIH who developed the Moderna vaccine was a Black woman—at first, they wouldn’t believe me.

But this fact does several things. It says to little girls of any race, “Wow. I maybe could do that.” It says to people of color, “Maybe I can trust the science, because people looking like me are helping to develop it.” Of all the messages, it’s that message about representation—that when people see people like themselves helping to solve the problems, they begin to believe in the value of those solutions.

*In the middle of all the challenges that our country is facing—including political polarization, threats to democracy, racism, and divisions over how to address it—what gives you hope?*

**Hrabowski:** History gives me hope. When I see the challenges that we face, and the need to talk about anti-racism or about how women are being treated in the wrong way, the first thought I have is, “Yeah. But we were having those problems, and we fought, and we moved to another level.” And I’m saying, “We can do it again.” It’s that notion that we make some progress, we move backwards, and then we’ve got to push forward.

But the other thing that gives me hope is my students and my graduates. They are so excited about the work that they do. Whether they are in the life sciences or in computer science or whatever the area, they’re so excited about changing the world. This is what’s so exciting about young people. They sometimes don’t know what they don’t know or what the barrier is. And I see my students knocking down barriers as if it’s no big deal.

I am so excited about that progress and their understanding that as scientists, as researchers, they must also be involved in civic life. As scientists and researchers, we must understand that unless we can be involved in the democratic process, we can’t accomplish what we want to accomplish. We need to understand the importance of finding common ground. That gives me hope.