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Embracing the Social in Social Science

In a world where science is inextricably intermixed with society, the social sciences are essential to building trust in the scientific enterprise.

To begin thinking about why all the sciences should embrace the social in social science, I would like to start with cupcakes.

In my research, context is a recurring theme, so let me give you some context for cupcakes as metaphor. A few months ago, when I was asked to respond to an article in this magazine, I wrote: "In the production of science, social scientists can often feel like sprinkles on a cupcake: not essential. Social science is not the egg, the flour, or the sugar. Sprinkles are neither in the batter, nor do they see the oven. Sprinkles are a late addition. No matter the stylistic or aesthetic impact, they never alter the substance of the 'cake' in the cupcake."

In writing these sentences, I was, and still am, hopeful that all kinds of future scientific research will make social science a key component of the scientific "batter" and bake social scientific knowledge, skill, and expertise into twenty-first-century scientific "cupcakes."

But there are tensions and power differentials in the ways interdisciplinary science can be done. Most importantly, the formation of questions itself is a site of power. The questions we as a society ask science to address both reflect and create the values and power dynamics of social systems, whether the scientific disciplines recognize this influence or not. And some of those knowledge systems do not embrace the importance of insights from the social sciences because many institutions of science work hard to insulate the practice of science from the contingencies of society.

Moving forward, how do we, as researchers, develop questions that not only welcome intellectual variety within the sciences but also embrace the diversity represented in societies? As science continues to more powerfully blend, overlap, and intermix with society, embracing what social science can bring to the entire scientific enterprise is necessary. In order to accomplish these important goals, social concerns must be a key ingredient of the whole cupcake—not an afterthought, or decoration, but among the first thoughts.

The trust issue

Fundamentally integrating social scientific knowledge and perspectives into everything scientists do is essential to building societal trust in scientists as well as in science itself. As someone who studies technological change, I believe this moment looks different from the past. For instance, the National Science Foundation–supported 2022 General Social Survey found an appreciable drop in the public's "overall confidence in the scientific community" compared to 2021. The Pew Research Center

also discovered a decline in public confidence in both scientists and medical scientists from November 2020 to December 2021. These declines are not solely related to the COVID-19 pandemic.

In part, the decline in trust may be due to the increased murkiness of the boundaries between science and the public. Many do not see scientists as arbiters of truth because scientists no longer have exclusive access to the various types of evidence deployed to make scientific arguments. There are elements of insight in this. For example, citizen scientists have done work in environmental racism and biomedical research that would have previously been the exclusive domain of scientists— without them, those concerns might not have been recognized at all.

The trust issue may also have roots in the gap between the promises of science and the mundane realities of what science often delivers. Among those who conduct research and have been connected to, supported by, or helped distribute federal and private dollars, there is an understanding that scientific research can be risky and may not deliver expected or transformative results. But overall, most individuals and institutions involved in the enterprise believe that it is making a difference and worth the investment.

However, if this research is viewed from outside the enterprise, especially considering the big promises that science communicators and the for-profit scientific industry have promoted, it's possible to understand why some people might be disappointed in some of the outcomes. This may speak to larger questions about whether people feel that science is connected or relevant to their lives. The scientific enterprise overall needs to grapple with why people might distrust or be skeptical of science despite living in an amazing world made possible by human creativity and ingenuity, which is partially rooted in science and technology.

In the research I have done about Black people's relationship to science and technology, distrust runs deep. Many Black people feel exploited by scientists, and the historical record supports this sentiment. Science motivated and produced the thinking that brought us phrenology, eugenics, Henrietta Lacks's unacknowledged cell line, racially biased algorithms, and facial recognition systems that do not see Black and Brown faces.

On top of that, too much science—and often pseudoscience—has been deployed to understand what was once called the "problem" of Blackness. As early as 1898, sociologist W. E. B. Du Bois, in his article in *The Annals of the American Academy of Political and Social Science* titled "The Study of the Negro Problems," attempted to get science to not see Blackness and the Black "condition" as a problem, but as a set of social challenges precipitated by the long history of racism. Many others have tried to destabilize the well-worn narrative, but efforts to reinscribe the "Blackness as a problem" characterization—seen in more recent examples like the Moynihan Report and the Reagan-era War on Drugs—continue to recycle. It is also important to note that most Black folks are not particularly interested in the question. If this is true, why has it been necessary to keep asking it? Moreover, what kind of science could all this effort produce if it began from a position of equity? A position disinterested in proving the inferiority of Blackness and instead invested in ameliorating a set of institutionalized social conditions could have benefits for everyone regardless of race, gender, sexuality, or ethnicity.

Even though the scientific professions have, to some extent, found their way out of these discriminatory caverns reformed and repentant, the material impact is still felt by Black people. And it's important to recognize that this is not solely a Black experience. In this regard, I fully understand where people who feel marginalized in science because of their identity are coming from when they say that science does not speak to them, for them, or with them.

Residues of inequity

So how can science—and this includes social science—do better? In part, the scientific enterprise needs social science's help to be more reflective about science's messy past before moving forward. Research must be done to understand the longitudinal impact of the residues of inequity.

What do I mean by the residues of inequity? Most are familiar with the big moments when science has done people wrong: the Tuskegee Study of Untreated Syphilis in the Negro Male or the use of Henrietta Lacks's cells are prime examples. But much less time has been spent thinking and researching the moments when people feel that science is not interested in their concerns, their questions, or their lives. These are much smaller moments: a few minutes in a doctor's office that fail to diagnose a loved one's cancer, or the clinical use of a fingertip oximeter known to mismeasure when used on people with darker skin. At the same time, recent data shows a precipitous rise in maternal mortality for non-Hispanic Black women during pregnancy and childbirth.

In my study of Black people's relationships with technology, it is clear that these seemingly benign oversights and omissions can add up. That sandy residues can make the gears of scientific trust move slowly and undermine efforts to regain trust. For some Black people, and others who feel marginalized, science is suspect. Let's focus on these residues.

In the 1960s and 1970s, artists produced many dreamy images celebrating the idea of living on a thriving space colony or settlement. These images looked pretty amazing. But, when I look closely at many of the images, I primarily

see white, well-off, seemingly cisgender people with only an occasional hint of virtual integration. This portrayal highlights what those cinematic images subtly implied: that space was a refuge from the contentious issues of Earth, from armed conflict and environmental degradation to lousy neighbors. Going to space was a way to escape a troubled planet and start anew. But another reality was that not everyone could go. Some would certainly be left behind.

As a child of the 1970s, I saw only white astronauts, although I did have a Black G.I. Joe doll. I also remember wondering if any people who looked like me were part of the space program. For me, this major American technoscientific effort planted an early seed of skepticism and distrust of science. Such feelings are residues of inequities—each disconnected and perhaps easily enough remedied—but over a lifetime they have the longitudinal effect of reducing one's trust in the technoscientific complex.

And they do not stop. Recently, my wife asked me in a text: *Have you seen this?* It was a *New York Times* article about the exploitation of Black children in the development of RSV vaccines. According to the article, which quoted from

and engineering as among the least welcoming to Black people of nine professions listed. Survey respondents with postgraduate degrees were even less likely to view scientists and engineers as welcoming to Black people. This is a damning result. One would expect those with advanced degrees to view science and engineering as welcoming to Black professionals, but they did not. These results may suggest that the highly educated Black respondents had developed these perceptions from first-hand experience.

These conclusions are disheartening because there are so many recent and historical examples of Black people successfully pursuing scientific and technical careers and participating in work that has had tremendous impact in many areas. *Hidden Figures*—the book by Margot Lee Shetterly, which was made into a film in 2016—revealed how Black women mathematicians at NASA played crucial roles in the early years of the space program. It is an amazing and compelling story that portrays Black contributions to science and technology. It is a story that I love. There are many others, such as Walter Lincoln Hawkins, a pioneer of polymer chemistry, and Gladys West, an early developer

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a report published in the digital science magazine Undark, "In the 1960s, some of the first and youngest subjects to receive experimental shots, in a clinical trial of early attempts to develop R.S.V. vaccines, were Black and poor children, some in foster care. And though questions remain about what parents knew, 'archival documents housed at the N.I.H. suggest that parents did not give informed consent—or in some cases, any consent at all—for their children to receive the largely untested shot.'" Two of these children died, and part of one's lungs were removed and shared with the scientific community—for the good of science, of course.

In the article, *New York Times* columnist Charles Blow explains the effect of these residues perfectly when he writes that the "lack of surprise" among family members in learning about the vaccine's likely role in the children's deaths "is the scar tissue that Black Americans have built up—the knowledge that the worst is always possible. The mind and spirit continually make space for it, forever hoping, but preparing contingencies for hope's inevitable betrayal."

These residues are evident in a recent Pew Research Center survey of Black adults that found they see science

of satellite geodesy models, whose transformative work has shaped humans' understanding of the world.

Sharing the stories of Black scientists' contributions is important to shaping the narrative around who does science. But nonscientists also interact with science and technology every day. In my work, I developed the concept of Black vernacular technological creativity to recover and create space for understanding positive and optimistic Black engagements with science and technology. For example, hip-hop came from music enthusiasts who, based on their social experiences, cultural beliefs, and acoustic sensibilities, decided to redefine turntables and LP records from devices for listening to prerecorded sound into instruments used to create a new musical genre. Understanding hip-hop from social science perspectives creates opportunities to embrace this musical art form and understand how creative use of science and technology emanates from its embeddedness within society and culture.

But even these efforts do not fully rinse the residue of scientific inequity off Black bodies. What does it mean when the sciences are not concerned with your everyday existence?

"Guided missiles and misguided men"

In 1967, while speaking at Stanford University about supporting the country's poor, Martin Luther King Jr. leveled a biting critique of the space effort: "If we can spend $35 billion a year to fight an ill-considered war in Vietnam, and $20 billion to put a man on the moon, our nation can spend billions of dollars to put God's children on their own two feet, right here on earth."

King had a host of meaningful and prescient things to say about the relationships between science and society. In his 1967 book *Where Do We Go from Here: Chaos or Community?,* he wrote:

> We must work passionately … to bridge the gulf between scientific progress and our moral progress. One of the great problems of mankind is that we suffer from a poverty of spirit which stands in glaring contrast to our scientific and technological abundance. The richer we have become materially, the poorer we have become morally and spiritually.… When scientific power outruns moral power, we end up with guided missiles and misguided men.

Much of King's writing and speaking called upon the scientific community to do a moral gut check by pondering if the goal of science is to create more things that destroy the planet or to build knowledge that supports the sustenance of life.

How can science embrace the social and ask equitable questions—not only for the good of science but also for humanity? I believe that, first, scientists and policymakers must end attempts to separate science from society by insulating scientific research from the rest of human endeavors. By embracing the social in social science, all kinds of scientists can conduct research with, for, and about people to coproduce scientific knowledge that responds to their pressing needs.

This is not a particularly radical ambition. It is about doubling down on science in the service of humanity—and life and society—instead of science in service to itself. In terms of the cupcake metaphor, my goal is to get the scientific enterprise to consider how using social science as an egg rather than a sprinkle can help redirect research toward social relevance and social conditions to rebuild trust in science.

Radically inclusive questions

One way to create pathways to make the social a constituent element of all scientific research is to expand who gets to ask and frame the questions. We as a society need to think, in a big way, about what would be possible if the questions science addresses are coproduced with social scientists, affected communities, and other stakeholders. Instead, coproduction of science often means bringing others into the conversation once the research question has already been asked—sort of like putting sprinkles on a cupcake.

But what would it look like to rethink the questions and the process of question formation in a radically inclusive way? There is real power in forming the questions that scientific research asks. This is an important step to create and produce an equitable body of scientific knowledge in which those affected by the research are not on the outside or forgotten, not even solely on the inside as subjects or specimens, but equal actors in the work to be done.

How would science change if affected people were part of research question formation? How would scientific trust be improved if partnering with communities to build research questions became standard? Mostly, I am interested in asking all people—because everyone engages with science in some way—how to improve the pursuit of scientific inquiry and the production of scientific knowledge.

Making community involvement a regularized part of scientific research is a useful starting place. The challenge is for those invested in the future of the scientific enterprise to think deeply about how social research can aid in traversing the chasm between fundamental and applied scientific research. Centering the social and human condition can produce new questions to expand the scale and scope of research.

Citizen science, mentioned briefly above, is another place where new participants are producing socially relevant scientific research within intellectual spaces and geographic places that academic and institutional science can overlook. Extending the work of citizen science and deliberately connecting it to the open science movement can allow more people to access much more data to construct, collate, and distribute scientific evidence. To support this work, policies such as those announced in the 2022 White House Office of Science and Technology Policy memorandum "Ensuring Free, Immediate, and Equitable Access to Federally Funded Research" can significantly diminish barriers to science and increase trust. Doing so can enable those with limited access to scientific research findings—not only in the United States but potentially throughout the world—to gain opportunities to examine, study, and contribute to research once hidden behind paywalls, embargoes, and a host of affordances.

The ability for marginalized communities to gain increased access to scientific knowledge-making can only increase their trust in science by granting them access to research studies and results. Allowing a broader and more diverse group of people to contribute to science

relevant to their social conditions will help improve trust between those who traditionally conduct the research and those who feel they are simply subject to scientific recommendations.

Building the foundations for change

These scientific engagements cannot be spoken into existence; people in all parts of the conversation must commit to building networks of invested actors working to use science to make the planet a more just and equitable place for all of its inhabitants. Building networks capable of engaging many stakeholders around the translation and application of knowledge to the world's problems can create fertile places to intervene, to ask questions, and to shape science and technology's relationship to society. What can this look like at a practical level? In this regard, I would like to highlight two networks of which I am a member.

The first is the Lewis Latimer Fellowship Program, sponsored by the Edison Awards and designed to support Black innovators to build a brighter future. The fellowship is named in honor of Lewis Latimer, a

The network offers a lot of support, but it also offers an opportunity to open this process up to ask questions as a technology is being shaped. Moreover, part of the strength and value of this network is that it embraces the social as something that is central to its collective intellectual, scientific, and technical outputs.

A second network I belong to is the Digital Inquiry, Speculation, Collaboration, & Optimism (DISCO) Network, which brings together researchers, artists, technologists, policymakers, and practitioners to envision an alternative and inclusive digital future. Over the past two summers, members of the DISCO network authored two books, *Digital Optimism* and *Technoskepticism*. The network is using both optimism and skepticism as lenses for the sociotechnical future with the aim of producing important questions and pathways for alternative futures.

This network supports a multigenerational group of scholars focusing on the way society interweaves—for good and ill—race, gender, sexuality, disability, and other forms of difference into the digital platforms that mediate contemporary life. By better understanding

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Black inventor who collaborated with both Alexander Graham Bell and Thomas Edison. The fellowship brings together a transdisciplinary team and leverages the collective intelligence of the fellows. Scientific, technical, and social synergies are the foundation of a network geared toward financing and creating businesses focused on making sustainable change.

For example, science fiction writer Soton Rosanwo is a Latimer fellow who is using complex mathematical models to redesign insurance to cover outsized risks like climate disruption; Asegun Henry of the Massachusetts Institute of Technology has developed new ways to store energy at high temperatures; Lisa Dyson founded Air Protein, which extracts elements from the air to produce edible protein; and Ian Randall founded Maglev Aero, which developed a new aircraft propulsion system.

A lot of scientific efforts focus on supporting basic research, but this one is about building networks of people from academia, entertainment, and industry who wouldn't otherwise be together in one space and connecting them to other networks that can provide capital and expertise.

society's evolving social configurations, the network hopes to supply rich evidence rooted in social science that will inform how humans can live together more equitably and justly.

Networks can have powerful positive effects, but it is also necessary to think about ways to institutionalize change. Traditional scientific funding is more oriented toward supporting individual investigators than building networks, especially across disciplines, spaces, cultures, and time. At a high level, new structures and funding efforts are needed to build collaborations that imagine how to make life better for everyone on the planet.

At the meta level, changes to the actual practice of science and its incentive structures, currently measured by patents, drugs, and publications, are needed to include important outputs like improving human longevity and mitigating climate change. Instead of trying to disaggregate science and human life, the scientific enterprise needs to understand that questions concerned with how a society functions should be fundamental to the research it pursues.

At the local level, community-engaged research is a concept that many scientists subscribe to but do not necessarily practice. Scientists must have clearer incentives and formalized training to really involve themselves in the coproduction of knowledge with stakeholders. And that must become a norm that is sustained through implementation science: the scientific study of methods and strategies that facilitate the uptake of evidence-based research by practitioners, scientists, and policymakers. Organizations such as the Transforming Evidence Funders Network are already building foundations for this shift. The scientific enterprise must not only invest in studying how to better coproduce science, but should also develop models and tools to implement this work in a systematic fashion.

Federal agencies such as the National Science Foundation (NSF) are building the foundations to move in a positive direction. In its fiscal year 2024 budget request, NSF described its Create Opportunities Everywhere approach, which "focuses on expanding diversity, equity, inclusion, and access in STEM by including underrepresented and underserved individual, institutional, and geographic characteristics." By

the UNESCO Recommendation on Open Science can be a model to think about embracing the social. That document proposes that scientific knowledge should not only be widely accessible and easily shared, but that the production of knowledge should be inclusive, equitable, and sustainable. I am moved by the recommendation's specific commitments to quality and integrity, collective benefit, equity and fairness, and diversity and inclusiveness. This approach demands more than supporting and doing better science or prodding scientific institutions to make commitments to society; it impels us to reshape, reconfigure, and reorient science to face society with the explicit intent of serving society well. By actively situating society at the center of scientific endeavors to produce research that is reflective and responsive to the human condition, these goals can produce science that is in the collaborative service of society.

Embracing the social in social science and connecting scientific research to everyday life can also support positive steps to regain the public's trust in science and build it for the future. If scientists are in the business of truly making the world a better place for life in its myriad forms, it seems like a good idea to embrace and champion science that builds

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addressing research equity, building capacity, fostering collaborations and partnerships, and supporting the next generation of researchers, the initiative seeks to address the problem referred to as the missing millions: "the difference between the demographics of the research community and the demographics of the nation." These diversification efforts, embracing the contextual and substantive value of social science, will enable all of science to build a better world in which humanity can thrive.

Leaning into the social

Science and scientists live in a quickly changing world, which requires a rhetorical shift from talking about science "and" society and science "for" society to science "with" society. Producing equitable science necessitates leaning into the social. It is no longer good enough to use small doses of social science to inoculate research in the natural sciences and allow it to build up antibodies and develop immunity to social realities. This is, of course, certainly not to argue that the scientific enterprise should move away from basic and fundamental scientific inquiry; rather,

sustainable pathways for life to not only survive, but thrive.

Bringing equity to this process is not easy. The history of science itself—its traditions, beliefs, and institutions—makes fundamental change quite challenging. A substantial dose of epistemic humility, from all of us, is needed to embrace alternative and new ways of knowing. But I believe the collective scientific community is up to the task, and I look forward to working with you all to chart a new pathway forward.

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This article is drawn from Fouché's National Academy of Sciences' 2023 Henry and Bryna David Lecture, which honors a leading researcher who has drawn insights from the behavioral and social sciences to inform public policy.