“Speaking truth to power and to the people”: Scientist bloggers of color as public intellectuals

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“Speaking truth to power and to the people”: Scientist bloggers of color as public intellectuals

by

Lisette E. Torres-Gerald

A dissertation submitted to the graduate faculty

in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Major: Education (Educational Leadership)

Program of Study Committee:
Isaac Gottesman, Co-major Professor
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The student author, whose presentation of the scholarship herein was approved by the program of study committee, is solely responsible for the content of this dissertation. The Graduate College will ensure this dissertation is globally accessible and will not permit alterations after a degree is conferred.

Iowa State University
Ames, IA
2019

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DEDICATION

This dissertation is dedicated to my abuelita Vidalina Casiano (1925-2010), the second oldest of 12 children who grew up in poverty in Puerto Rico and migrated to the mainland U.S. to work in a factory for pennies and government cheese. Though she only made it to the third grade, she knew the value of an education and supported my dream of becoming a doctor. Not a day goes by where I do not miss her. *Te amaré y te extrañaré siempre*, Grandma.
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ABSTRACT

This dissertation is a virtual ethnography of the lived racialized and gendered experiences of scientist bloggers of color. It looks to extend and complicate the literature in the fields of higher education, science communication, and science education by examining how scientists of color use blogs to speak the truth to power and to the people. The goal of my study was to learn how scientists of color use blogs to share their work; disrupt or promote normalized views of what a scientist should be; advocate for change or maintain the status quo within the scientific community; and encourage other people of color to participate in science.

I conducted semi-structured interviews with five scientist bloggers of color (4 women, 1 man) three times over a 6-month time period. Using the theoretical anchors of critical race theory (CRT), intersectionality, and science identity, I engaged in inductive coding of transcripts and a critical discourse analysis (CDA) of participant blog posts. This unveiled six themes (with 27 sub-themes): (1) Starting and Staying in Science; (2) General Costs and Benefits of Blogging; (3) Nuts and Bolts of the Work; (4) Negotiating Being “Conspicuously Invisible” Online; (5) Putting “Expertise and Networks to Serve”; and (6) Multiple, Intentional Forms of Engagement Can Reaffirm Identity.

This study is significant because of the lack of critical attention paid to scientists of color in college/university settings who engage with the public. Despite their dedication and contributions to science knowledge production and public engagement, scientists of color are often (in)visible to the scientific community. This work highlights the experiences of scientists of color and interrogates who has the power and privilege to be a public science knower/public intellectual in an online environment.
CHAPTER 1: INTRODUCTION

The pattern that sets the course for the intellectual as outsider is best exemplified by the condition of exile, the state of never being fully adjusted, always feeling outside the chatty, familiar world inhabited by natives, so to speak, tending to avoid and even dislike the trappings of accommodation and national well-being. Exile for the intellectual in this metaphysical sense is restlessness, movement, constantly being unsettled, and unsettling others.


The approach suggested by the experiences of outsiders within is one where intellectuals learn to trust their own personal and cultural biographies as significant sources of knowledge. In contrast to approaches that require submerging these dimensions of self in the process of becoming an allegedly unbiased, objective social scientist, outsiders within bring these ways of knowing back into the research process.


The metaphor of the public intellectual as outsider or “outsider within” (Collins, 1986) encapsulates the experience of many academics of color aiming to use their scholarship in service to their communities. Feeling like “guests in someone else’s house” (Turner, 1994) in predominantly White male spaces, they never fully settle into their expected racialized and gendered roles within academia, which ask them to submerge their intersecting identities to
engage in objective research that maintains White hegemonic knowledge production (e.g., Maldonado-Torres, 2002). However, as sociologist Patricia Hill Collins (1986, 2013) argues, it is this very position as outsider that provides scholars of color with the critical consciousness and oppositional knowledge needed for liberation and social transformation. They have access to and mastery of dominant and oppositional academic discourse while simultaneously being marginalized members of society and the academy. This unique perspective provides them with the ability—and literary theorist Edward Said (1994) would say, the obligation—to speak the truth to power and to the people (or the public\(^1\)) through their scholarship (Collins, 2013).

This also places scholars of color in a precarious situation, as they try to simultaneously speak to the powers that be and to the people. The reality is that we are all both the oppressor and the oppressed. Scholars of color must acknowledge their own power and privilege, making their words and work accessible. They must unveil uncomfortable truths about oppressive systems even if it makes them vulnerable to further marginalization. Yet, at the same time, they must provide hope and a means for others to come up with their own solutions.

**The Problem-Space**

As a scientist of color, speaking the truth to power and to the public is not easy. I know

\(^1\) Given that my dissertation is focused on *public* intellectualism, you will note my occasional interchangeable use of the terms *public* and *people* when discussing speaking truth, though this may cause the phrase to lose some of its historical and political impact in its use in activist movements. I also understand the complications with using *public* as an all-encompassing term, as all women, particularly women of color, have never had the privilege of deciding what issues and topics were of public or private concern (Fraser, 1990).
from experience. During my doctoral education experience in the natural sciences, I once attended a small climate change conference in Nevada with my adviser and lab mates. All the best scientific minds in my field were present. All of them were either White Americans or White Europeans and most of them were male. I was one of a few females and the only scientist of color. We were discussing ways to educate the public about global warming, and everyone was excitedly sharing their thoughts. Stimulated by the conversation, I chose to speak up and suggested that we make brochures in both English and Spanish given the growing number of Latino/as in the U.S. My idea was greeted by 30 seconds of complete silence. It was a small act, but my speaking for Latino/as and Spanish-speaking people like me, in that moment, was speaking the truth to the scientific community, to power. In a few sentences, coupled with my very visible presence, I revealed to them that the scientific community had a “diversity problem” and that their research and actions did not numerically and epistemologically represent all of humanity. Unfortunately, this resulted in my further marginalization as a female scholar of color in a predominantly White and male field, which, coupled with racial microaggressions (Sue et al., 2007), lack of mentorship, and isolation, convinced me to leave the sciences (Torres, 2016).

Speaking the truth to the public can be just as challenging. In this post-Civil Rights, “we-had-a-Black-President” era of color-evasiveness², many White Americans still believe that we

---

² I use the term “color-evasiveness” rather than “colorblindness” because the latter is an ableist framing of how White society chooses to ignore racism, pretending that it does not exist. “Color-evasiveness” is also a more accurate and active concept, where White people choose to engage in strategies that help them to avoid conversations around race (Anamma, Jackson, & Morrison, 2017).
have made greater racial progress than we actually have (Brodish, Brazy, & Devine, 2008),
though the assumed linear progress cannot explain continued racial inequities and injustices
(Ray, Randolph, Underhill, & Luke, 2017). More importantly, the overtly racist (and sexist)
discourse during and after the election of Donald Trump illustrates that racism is alive and well
in America (Bobo, 2017), impacting all sectors of society, including science and higher
education.

At least for the past 20 years, it has been a U.S. economic and educational imperative for
the nation to remain competitive in a global economy and maintain national security through
investing in STEM (science, technology, engineering, and mathematics) education.
Consequently, higher education institutions have been tasked with getting a larger number of
students to attain bachelor degrees and careers in STEM fields (e.g., National Academy of
Sciences, 2010; President’s Council of Advisors on Science and Technology, 2012). Yet, women
and people of color are significantly underrepresented in STEM at the undergraduate (Hurtado,
Cabrera, Lin, Arellano, & Espinosa, 2009; Estrada et al., 2016) and doctoral level (York &
Griffin, 2017; Hrabowski, III, 2018; Fisher et al., 2019) despite their initial interest in science
(Blackburn, 2017). In fact, analysis of data collected from the Beginning Postsecondary Study
(BPS) has recently shown that STEM postsecondary fields have a uniquely large gap in
persistence to graduation between Black and Latina/o undergraduates and their White
counterparts, which the authors attribute to opportunity hoarding by Whites (Riegle-Crumb,
King, & Irizarry, 2019). Women of color are particularly underutilized and ignored even though
there is 40 years of research documenting their experiences in STEM (Ong, Wright, Espinosa, &
Orfield, 2011). Despite this expansive research, according to the rumblings of many White
science faculty, there is no “diversity problem” because science is universal and value-neutral; anyone can participate.

**Significance of the Problem-Space**

Those who acknowledge a problem with the lack of diversity in science chalk it up to deficiencies in individual’s inherent abilities and intelligence (e.g., Leslie, Cimpian, Meyer, & Freeland, 2015), work-life balance and career preferences (e.g., Ceci & Williams, 2011), or interest and dedication to science (e.g., Newbill & Cennamo, 2008), rather than recognizing and calling out the systemic racism and sexism that exists (politely referred to as “bias” in the literature - e.g., Moss-Racusin, Dovidio, Brescoll, Graham, & Handelsman, 2012). This is despite the fact that it has been demonstrated that successful STEM programs for women, for example, appear to be those that attempt to “consciously and strategically position themselves within the structure of their institution and work toward systemic [emphasis added] transformation and change” (Fox, Sonnert, & Nikiforova, 2009, p. 348).

Sadly, I have witnessed gender-blind, color-evasive discourses, coupled with the epistemology and socialization processes of the sciences, convince many within communities of color that either (1) science is too hard for them (despite their interest) or, for those who excel in science, that (2) there is no racism or sexism in the field and that those who leave do so by choice (i.e., they could not hack it). For example, my colleagues and I within the LSAMP (Louis Stokes Alliance in Minority Participation) program at Nebraska Wesleyan University find it difficult to engage our students of color in conversations about racial and gender equity. Some of them deny that it exists or that it impacts them in any way, while others are afraid to share their experiences. Our attempts to strategize ways that they can individually and collectively manage and dismantle structural inequality (Collins, 2013) in the sciences is often met with silence and
resistance by White gatekeepers in various departments on campus. Thus, speaking truth to the public and to power is extremely difficult and complex.

The fact that STEM fields are overly White is a significant problem because a lack of numerical, symbolic, and epistemic representation by people of color negatively impacts recruitment and retention of students of color in science. For example, in a study on ethnic variation in gender-STEM stereotypes and STEM participation, O’Brien, Blodorn, Adams, Garcia, and Hammer (2014) found that stereotypes associated with science and questions of belonging were instrumental in students’ interest, goals, and performance in science. Similarly, student interests, self-efficacy, and attitudes toward science are influenced by images of scientists (Christidou, 2011). Therefore, the mere presence of people of color in STEM is vital to the development of a science identity (Carlone and Johnson, 2007) for students of color at all educational levels, as science faculty of color help to confront and dismantle stereotypical images of scientists (Painter, Tretter, Jones and Kubasko 2006). There not only needs to be a critical mass of scientists of color, but there also needs to be images, stories, symbols, and ways of being and knowing from communities of color informing science.

From an epistemic and social justice standpoint, people of color need to be involved in science so that we can generate our own science knowledge and write ourselves into history. Through cultural, community, and historical locatedness (Wang, 2016), we can shape research questions in STEM and design studies that address the needs and concerns of marginalized communities without their continued exploitation and oppression. We need to reap the benefits of STEM careers that are being hoarded for the benefit of Whites (Riegle-Crumb, King, & Irizarry, 2019) while simultaneously (re)imagining a new way to do science for the people,
Questions About the Problem-Space

In this dissertation, I seek to understand how scientists of color engage in public intellectualism in order to speak truth to power and to the public. Given the dominant belief that women and people of color do not possess the inherent “brilliance” needed to be successful in STEM disciplines (Leslie et al., 2015), I want to understand the tensions, negotiations, and decisions that scientists of color make when they decide to become public intellectuals at the risk of their work being marginalized and not taken seriously. I also want to explore how race and gender intersect to inform these tensions, negotiations, and decisions. I am interested in examining how men and women scientists of color challenge deficit-focused master narratives, or stories constructed by the dominant group to justify why things are the way they are (Delgado, 1995) and to shift the focus away from institutional/structural inequity to a focus on the inherent flaws of particular individuals or groups of people. This work is an attempt to (re)write what it means to be a scientist as well as to examine how scientists of color may (unintentionally) continue to support the status quo.

I focus my research study on scientists of color as public intellectuals to engage the problem-space of numerical and epistemic representation in STEM. Scientists of color who engage in public intellectualism are putting themselves out there and openly sharing what it is to be a scientist, potentially helping to contest racialized and gendered master narratives, or stories by the dominant group that ascribe normalized racial and gender characteristics to groups for the purposes of exclusion and control (Delgado, 1995). I believe that their experiences and practices can help us to (re)think and (re)evaluate what and how science should be done. One way by which scientists of color connect with the public is through blogging. Blogs allow individuals to
freely write their own narratives and to share them with the world; as such, scientists of color could use them to (re)write who can be scientists and the role of science in society.

In this dissertation study, I examined the relationship of scientist bloggers of color to public intellectualism and their science identity, defined as “who one is and who one wants to be” in science (Shanahan, 2009, p. 57), as well as the relationship of their blogs to resistance, which I define as the contestation of or refusal to conform to master narratives within STEM. The goal was to learn how scientists of color use blogs to share their work; disrupt or promote normalized views of what a scientist should be; advocate for change or maintain the status quo within the scientific community; and encourage other people of color to participate in science. As such, the overarching question for this study was: What does it mean to be a scientist of color who blogs? To begin to understand the lived experiences of scientist bloggers of color, my dissertation focused on the following sub-questions:

1. How are the science identities of scientist bloggers of color racialized and gendered?
2. How do scientist bloggers of color perform as public intellectuals who are also science knowers?
   a. How are they racialized and gendered as public intellectuals online and offline?
   b. How do they disrupt or maintain the master narratives around science identity and public engagement?

Inquiry Overview

This dissertation study used virtual ethnography (Hine, 2000) as a means to begin to unpack these questions about how scientists of color utilize the online environment to engage in public intellectualism. Informed by women of color epistemologies and feminist theories, I used critical race theory, intersectionality, and science identity as theoretical anchors to explore how
scientists of color act as public intellectuals and how their engagement with the public is racialized and gendered. I also sought to understand how my participants “spoke” to power and to the public and how their engagement online conveyed particular messages about what it means to be a (racialized and gendered) scientist.

Following the three-interview series format articulated by Seidman (2006), I interviewed each of five scientist bloggers of color three times over a 6-month time period. I also visited their blog sites and collected blog posts from each participant’s blog to look at their rhetorical strategies and messaging. I was under the assumption that this would reveal their political stance and approach to science, but this was not completely the case. Most blogs were written in tempered, logical prose and were not as informative about how scientists of color thought about and engaged in public intellectualism as the interviews. Thus, the blogs wound up serving as a means to contextualize the interviews. Then, through inductive data analysis guided by my theoretical anchors, I generated codes that unveiled the intricacies of what it means to be a racialized and gendered scientist who engages in computer-mediated public intellectualism.

Situating Myself Within the Work

I am a woman of color (Latina/Boricua) who left her doctoral program in the sciences after being confronted with the reality that the scientific community tends to be unwelcoming and unwilling to serve those who do not fit the White male norm. Some of my experiences with gendered racism in science have been documented elsewhere in a counter-story (Torres, 2016) I wrote for the edited book Envisioning critical race praxis in higher education through counter-storytelling (Croom & Marsh, 2016); using critical race theory, I recount and analyze the moments that led me to my decision to leave the sciences. I will not share that story here. I will,
however, explain how my racialized and gendered experiences have brought me to this work and have shaped my approach.

I was extremely naïve as a young female scientist of color. I bought wholeheartedly into the notion that science was meritocratic, objective, and universal. I thought that anyone anywhere can engage in scientific research and that, as long as their methods and analysis were rigorous, then their contributions to the field would be valued. I was completely wrong and I learned it the hard way. I can recall two particular instances in graduate school that were wake-up calls for me and demonstrated the power and privilege of knowledge production and public intellectualism.

The first eye-opening (and personally traumatic) experience was with my first doctoral advisor, who was a White male in his forties. I gave a presentation to our department regarding my proposed dissertation research. Afterwards, he asked me to have lunch with him to discuss it. I was thrilled because it was the first time that he actually showed interest in me and my research. As we were eating at a local restaurant, he told me that “the best part of the presentation was that it was organized.” He then proceeded to criticize my ideas and tried to convince me to change research topics (though later I found out that he slightly modified my project and gave it to two other graduate students in his lab). At the time, his words shattered me and forced me to question my competence and my identification with the science community. Upon reflection, I now realize that his belief in Whiteness as (intellectual) property (Harris, 1993) led to his expectation that he, the older White male “expert,” should be the one to define “legitimate” scientific research and that he had the right to exclude my ideas, which were informed by my “inferior” subaltern woman-of-color epistemology. He felt threatened.
The second event that brought me to this work was the development of my dissertation project with my second doctoral advisor (also a White male, but in his fifties). Given my difficulties working with my previous advisor and my continued questioning of the practices and purpose of science, I decided that I would try to make my dissertation more relevant and applicable to the needs of the public. After researching biological field stations across the country and their potential to engage and educate a wide variety of people, I decided that my dissertation would involve developing ways to utilize long-term ecological data sets to share research with and educate the public. When I shared my idea with my advisor, he did not think that it was “scientific enough” or that it met the requirements of my doctoral program. I was devastated (yet again). It was around this time that I started to seriously think about leaving science, with the aforementioned scientific conference officially ending my aspirations of becoming a science faculty member.

Around the same time as my exit from the science community, a colleague of mine in the same department and same doctoral program – an attractive and kind White woman – shared her dissertation topic with me. With the blessing of her advisor and committee, she had decided that she was going to use photography as a means to educate the public about the environment. I was floored! How was it acceptable for her to take pictures to teach others and have it count toward a science doctorate while I could not even use quantitative, long-term data sets to essentially do the same thing? The only two reasons I could come up with had to do with my race and my advisor’s male gender identity being tied to the cultural stereotype of science as being “tough, rigorous, rational, impersonal, competitive, and unemotional” (Harding, 1986, p. 63). Stuck in the “double bind” (Malcom, Hall, & Brown, 1976; Malcom & Malcom, 2011) of being a woman of color, I was being held to a different standard as my White male and female peers within the doctoral
program. I had to prove that I could engage in acceptable, traditional scientific research before I would be allowed to participate in interdisciplinary/transdisciplinary scholarship (if ever).

Thus, during the process of thinking about potential avenues of research for this current work, I was drawn to scientific knowledge production, intersectionality, and engagement with the public. In 2015, a year before the start of this dissertation work, I began to play an active role in revitalizing Science for the People, a science activist organization originally born out of the anti-war movement of the late 1960s (https://scienceforthepeople.org/). I soon became involved in relaunching the Science for the People Magazine (https://magazine.scienceforthepeople.org/) with the intent on reaching a broad range of audiences with accessible articles on the intersection of science and social justice.

My life experiences and my activism made me question who is considered a knower within science and how do their multiple social identities influence their engagement with the public as a (un)recognized science “expert.” As a woman of color, I was especially interested in intersectionality as a framework because it was “oriented toward unrecognized knowers and overlooked forms of meaning” (May, 2015, p. 19) and acknowledged how lived identities intersect with sites of privilege and marginalization, with knowledge production being one such site. Feminist theorist Vivian May (2015) talks about intersectionality as not only a theoretical framework but as a multifaceted form of social action and a “resistant imaginary” that identifies historic omissions and uncovers submerged stories of resistance. She writes,

… in asking whose voices have been heard, documented, or recognized, intersectionality not only raises questions about who ‘counts’ as a knower, but also what counts as evidence of resistance or insurgency: in so doing, it entails a redefinition of the past, a rethinking of the archive. (p. 56)
Thus, this dissertation was an attempt to document the often-unacknowledged stories of scientists of color engaged in public intellectualism and to create a resistant imaginary that challenges traditional conceptions of who can engage in science knowledge production and dissemination.

**Overview of Dissertation Chapters**

This chapter was an introduction to the dissertation and the problem of speaking truth to power and to the public when you are a scientist of color. In Chapter 2, I describe the bodies of literature in which this dissertation study is situated—public intellectualism in higher education, science communication (including blogging), and science identity. Chapter 3 is the methodology chapter, where I articulate my research questions and elaborate my reasons for how my theoretical anchors—critical race theory (CRT), intersectionality, and science identity—guided their construction. I describe each theoretical anchor and move on to explain my chosen method of inquiry, virtual ethnography. I define virtual ethnography and the subsequent study design and data analysis. I end the chapter with a brief discussion of trustworthiness and potential limitations of the work. Chapter 4 is my findings chapter. I review my research questions and use them to introduce the six themes and 27 sub-themes that were unveiled in my conversations with my participants.

In the final chapter (Chapter 5), I synthesize and discuss the findings as well as the implications of this work to the fields of science and science communication. Specifically, I revise the conceptual diagram that I introduce in Chapter 2 to try to connect science identity to structural issues in STEM. I also reflect on my use of intersectionality as a theoretical anchor, noting the challenges of using theory in practice. Similarly, I consider the pros and cons of virtual ethnography as a methodology, and highlight four areas of exploration revealed by its use
in this study – digital amphibians, writing for liberation, fugitive spaces in STEM, and science activism. Lastly, I discuss other potential research that can come from this dissertation work, ending the chapter with a final reflection.
CHAPTER 2: LITERATURE REVIEW

In this chapter, I discuss the bodies of literature that inform this dissertation. I first define public intellectualism and discuss how other scholars have theorized the role of public intellectuals in society. I review the discourse around public intellectualism in higher education, connecting it to the literature on science communication and public engagement. I then focus on a particular kind of science communication, blogging. I end the literature review by describing how I see these areas of study relating to science identity.

What is a Public Intellectual?

The definition of an intellectual has been a matter of debate since its conception during the age of Enlightenment (Rahe, 2003), though the term’s use as a noun did not gain prominence until the 1893 Dreyfus affair in France (Diggins, 2003). In the U.S., the intellectual was central to the nation’s creation and independence, “those capable of articulating the reasons that give philosophical legitimacy to the right of revolution” (Diggins, 2003, p. 93). Yet, the term “public intellectual” was not coined until 1987 (Diggins, 2003), when the historian Russell Jacoby used

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3 The Dreyfus affair was a political controversy in France initiated by arguments over the guilt or innocence of Jewish army captain Alfred Dreyfus, who was charged with treason for allegedly giving national secrets to Germany. Growing national anti-Semitism and right-wing fanaticism led the intellectual and novelist Émile Zola to rally the public in a discussion of the trial, resulting in a split within the nation. Those in support of Dreyfus, including Zola, believed anti-Semitism drove a sloppy investigation that suffered from a lack of evidence and that it was a moral imperative to exonerate him. Meanwhile, opponents claimed there was a (Jewish) plot to degrade the French army and weaken France (Begley, 2009).
the term in his book *The Last Intellectuals* to distinguish those with the innate ability to address complex issues to a general audience from those academic scholars concerned solely with their university colleagues and the jargon of their discipline. The history and character of the public intellectual as well as the question of their existence have been (re)visited on numerous occasions. Given the long and extensive literature that exists on this topic, I will highlight the most influential treatises and the most recent works related to public intellectualism. I acknowledge that this is not an exhaustive review, but I believe that it demonstrates the changing nature of the role of the public intellectual as well as identifies a gap in the literature in regards to the history and role of scientists as public intellectuals.

Traditionally, a public intellectual is a writer and thinker whose work is addressed to “a general and educated audience” (Jacoby, 1987, p. 5); though not openly expressed, this individual is also often assumed to be White and male. A lover of ideas, the public intellectual is distinguished by the tension between their detachment from the world and their intellectual engagement with it. Political scientist Arthur Melzer (2003) writes,

> It is only this extreme detachment and withdrawal – founded on the love of ideas and a certain contempt for society – that can render a man relatively immune to the seductions of interest and partisanship and thus make him a worthy guide for society. Thus the public intellectual is necessarily defined by a posture of detachment, alienation, and nonconformity: he is the outsider, the misfit, the bohemian. (p. 11)

Thus, the public intellectual is an exile (Said, 1994) who aims to guide society with transformational ideas rooted in a belief in progress (Melzer, 2003). They attempt to participate in something greater than themselves, hoping that their ideas “however small or partial, once ‘published’ in the modern sense . . . will reach out beyond [them], combining additively with the
contributions of thousands of others in order somehow to ‘make a difference’ and improve society” (Melzer, 2003, p. 8).

Historically cyclical in the dominance of radicalized versus conservative perspectives and the extent to which they are engaged with society (Diggins, 2003), the public intellectual has moved from the urban cafés and cultural centers (Jacoby, 1987) to the silos of the ivory tower, placed under increasing expectations to acquire ever more specialized knowledge and language and to follow the professional standards of the academy (Joffe, 2003). Just as the location, political stance, and (in)visibility of the public intellectual has changed over time, so has the definition of the public intellectual. The following subsections briefly summarize the various conceptualizations of the public intellectual, organized by their centralized themes.

**Class-based, counter-hegemonic perspectives**

Influential theoretical work on the role of the intellectual by scholars such as Antonio Gramsci, Noam Chomsky, Michel Foucault, and Henry Giroux, argued that the purpose of the intellectual is to fight political and economic dominance by the ruling class. For example, inspired by Marxist philosophy, Gramsci believed that everyone is an intellectual by the mere fact that we use our intellect to make reasoned, logical decisions, though not everyone has the social function of an intellectual. The intellectual is created through a “complex of social relations” within a class-based system of “intellectual activities” (Gramsci, 1971/2014, p. 8). According to Gramsci, there are two groups of intellectuals – the traditional intellectuals (e.g., priests, literary scholars, scientists, lawyers, doctors, teachers), who come from past and current class relations, are distinguished by their profession, and are allied to the ruling class; and the organic intellectuals, who develop from within their class alongside the ruling class. The organic intellectuals are groomed through the education system to uphold the hegemony (dominance) of
the ruling class. Gramsci saw the potential of the organic intellectual utilizing ideas they acquired from the bourgeois (i.e., the capitalist, middle-class) to help the proletariat (working class) improve their condition through subversive counter-hegemonic practices.

To Gramsci, the organic intellectual is more than a writer or orator; they are a new stratum of intellectuals with the responsibility to help the working class become “capable of thinking, studying, and ruling – or controlling those who rule” (Gramsci, 1971/2014, p. 40). They actively participate in public life to try to create a counter hegemony:

The mode of being of the new intellectual can no longer consist in eloquence, which is an exterior and momentary mover of feelings and passions, but in active participation in practical life, as constructor, organiser, “permanent persuader” and not just a simple orator (but superior at the same time to the abstract mathematical spirit). (Gramsci, 1971/2014, p. 10)

Thus, Gramsci believed that it is through the cultivation and active participation of working-class organic intellectuals and the conversion of traditional intellectuals to the socialist cause that would bring about true equality.

Unlike Gramsci, French philosopher and social theorist Michel Foucault felt that the Marxian perspective on the intellectual was outdated; to him, the notion of a “left” intellectual speaking as “master of truth and justice” and as the “spokesman of the universal” was “from a faded Marxism” (Foucault, 1977/1980, p. 126). He proposed that, after World War II, this “universal intellectual” was replaced by the “specific intellectual,” one who works in a specific position within specific areas connected to their life situation. By being personally engaged with the conditions of their situation and making connections to theory, they have an “immediate and concrete awareness of struggles” that are different from yet similar to the proletariat (Foucault,
Foucault (1977/1980) used atomic physicist Robert Oppenheimer as an example of the transition between the former universal intellectual and the more recent specific intellectual:

> It’s because he had a direct and localized relation to scientific knowledge and institutions that the atomic scientist could make his intervention; but, since the nuclear threat affected the whole human race and the fate of the world, his discourse could at the same time be the discourse of the universal. Under the rubric of this protest, which concerned the entire world, the atomic expert brought into play his specific position in the order of knowledge. And for the first time, I think, the [Western] intellectual was hounded by political powers, no longer on account of a general discourse which he conducted, but because of the knowledge at his disposal: it was at this level that he constituted a political threat. (pp. 127-128)

The “local” work of scientists like Oppenheimer had global implications, and, therefore, Foucault felt their expertise gave them the power to shape discourse and intervene in political struggles given their power to “benefit or irrevocably destroy life” (Foucault, 1977/1980, p. 129).

Foucault called for a reevaluation of the function of the specific intellectual given their increasing importance in society and knowledge production. According to him, by combining three specific characteristics—class, the conditions of life and work as an intellectual, and the politics of truth of society, the specific intellectual can have a large impact on the structure and functioning of society through their “local, specific struggle” (Foucault, 1977/1980, p. 132). Thus, it is the responsibility of the intellectual to change the “political, economic, institutional régime of the production of truth” (Foucault, 1977/1980, p. 133) in order to emancipate
subjugated knowledges, raise questions about the status of truth, and detach the power of truth from hegemony.

Another scholar focused on the class-based, counter-hegemonic role of intellectuals is libertarian socialist and professor of linguistics at MIT, Noam Chomsky. Concerned about growing inequality in the United States and the strength of neoliberalism globally, Chomsky has spent most of his career trying to rally intellectuals to challenge hegemony. Over the years, he has used case studies, like the Vietnam War and the Spanish Revolution, to illustrate how power, shared ideology, and professionalization can interact to negatively influence intellectuals and society. Similar to Gramsci’s organic intellectual and Foucault’s specific intellectual, Chomsky believes that intellectuals have acquired greater access to power due to their education and expertise. Consequently, they are becoming “a doubly privileged elite” as American citizens in a globalized world and as American citizens with expert knowledge (Chomsky, 1969/2003, p. 5).

Thus, Chomsky argues that it is up to the intellectual to understand their privilege and to undertake their work responsibly by collecting and looking at all the evidence before them (not just the data that support nationalism, for example). He believes that it is the responsibility of the intellectual to uncover the truth, to analyze current events utilizing a historical perspective, and “to expose the lies of governments, to analyze actions according to their causes and motives and often hidden intentions” (Chomsky, 1967, para. 2). He is also particularly concerned with the influence intellectuals have on the “creation and analysis of ideology” (Chomsky, 1967, para. 33) nationally and globally. He insists that they must reflect and question their actions, especially those actions that are used to justify the defense of freedom.

Like Chomsky, education scholar Henry Giroux was inspired by Marxist scholars to question the responsibility of scholars in challenging the status quo, particularly within
educational institutions. Similar to Gramsci, Giroux feels that educational systems can be transformative institutions if educators teach others how to contest hegemony. In a recent post on his *Philosophers for Change* blog where he quotes Edward Said, he urges educators to engage in disruptive pedagogy, stating that

> The very notion of being an engaged public intellectual is neither foreign to nor a violation of what it means to be an academic scholar, but central to its very definition. Academics have a duty to enter into the public sphere unafraid to take positions and generate controversy, functioning as moral witnesses, raising political awareness, making connections to those elements of power and politics often hidden from public view, and reminding ‘the audience of the moral questions that may be hidden in the clamor and din of the public debate.’ (Giroux, 2015, para. 20)

Hence, similar to Foucault’s specific intellectual, Giroux believes that educators can have a substantial impact on the structure and functioning of society. They can and should raise questions and expose underlying inequities. Though not overtly class-focused, Giroux’s emphasis on the importance of educators engaging in public life in order to counter hegemony is also akin to Gramsci’s organic intellectual.

Giroux’s views of the importance of teachers as intellectuals have remained relatively unchanged since his work with sociologist Stanley Aronowitz in 1985, where they described their notion of teachers as transformative intellectuals. Like Gramsci, they felt that all human beings use their intellect daily and have the ability to integrate thinking and practice. However, unlike Gramsci who believed that the organic intellectual could bring about a socialist state, Aronowitz and Giroux argued that intellectuals could assist the advancement of democracy, where the educator as intellectual becomes “a way of linking the purpose of teacher education,
public schooling, and in-service training to the very principles necessary for the development of a democratic order and society” (Aronowitz & Giroux, 1985, p. 31).

Examining the social function of educators as intellectuals, Aronowitz and Giroux (1985) proposed four categories of intellectuals: hegemonic intellectuals, accommodating intellectuals, critical intellectuals, and transformative intellectuals. Hegemonic intellectuals “self-consciously define themselves through the forms of moral and intellectual leadership they provide for dominant groups and classes” (Aronowitz & Giroux, 1985, p. 39). They support the ruling class by preserving hegemonic policies, practices, and ideology. Meanwhile, accommodating intellectuals unintentionally support the interests of dominant society by not acknowledging and avoiding social conflicts or politics. They are not risk-takers and tend to believe in objectivity. Their primary function is “to mediate uncritically ideas and social practices that serve to reproduce the status quo” (Aronowitz & Giroux, 1985, p. 39). Conversely, critical intellectuals are ideologically distinct from hegemonic and accommodating intellectuals; they feel their obligation is to be critical of social injustices. However, they “often refuse or are unable to move beyond their isolated posture to the terrain of collective solidarity and struggle” (Aronowitz & Giroux, 1985, p. 37) because they think it is futile.

In contrast to the three aforementioned categories, Aronowitz and Giroux (1985) advocated for educators to become transformative intellectuals. Transformative intellectuals are similar to Gramsci’s organic intellectuals in the fact that they can emerge from and work with any social group, including the working class, but they are extremely self-reflexive and are tasked with “making the pedagogical more political and the political more pedagogical” (Aronowitz & Giroux, 1985, p. 36). Similar to Foucault’s specific intellectual, they understand the connection between and struggle for knowledge and power, and thus, they problematize
knowledge production and give students “an active voice in their learning experiences” (Aronowitz & Giroux, 1985, pp. 36-37). They engage in emancipatory, counterhegemonic movements; they influence and are influenced by social movements rather than being detached or observing from afar.

**Intellectuals as a separate, elite group**

Whereas Gramsci, Chomsky, Foucault, and Giroux theorized the definition of an intellectual based on social location (particularly class) and believed that anyone could become one, Russell Jacoby, Edward Said, and Pierre Boudieu put their own twist on Foucault’s specific intellectual and envisioned the intellectual as a liminal scholar uniquely positioned between the general public and those in power. These individuals have the inherent ability to speak to and reach a broad audience and comprise an elite educated group within society. For example, historian and critic of academic culture Russell Jacoby coined the term “public intellectual” to describe a unique group of free-lance writers and poets that existed before 1940 who answered to no one and had the uncanny ability to speak directly to the public through their writing. They were committed “not simply to a professional or private domain but to a public world – and a public language, the vernacular” (Jacoby, 1987, p. 235). While acknowledging that intellectuals exist in a reformulated manner, Jacoby believes that the “demise of public intellectuals” (Jacoby, 1987, pp. 236) is due to the mainstreaming of bohemia, the expansion of suburbs, the gentrification of cities, and increased professionalization in the academy after World War II. He particularly blames professionalization for the depoliticization of scholarship and for redirecting the focus of intellectuals from writing for the public to writing for a small, specialized audience.

Whereas Jacoby’s public intellectuals are virtually extinct, the intellectual of literary and cultural critic Edward W. Said is alive and plays a specific role in society, similar to Foucault’s
specific intellectual. Describing the intellectual “as exile and marginal, as amateur, and as the
author of a language that tries to speak the truth to power” (Said, 1994, p. xvi), Said argues that
the intellectual as exile has a natural ability “for representing, embodying, articulating a message,
a view, an attitude, philosophy or opinion to, as well as for, a public” (Said, 1994, p. 11). In
describing the intellectual as exile, Said (1994) writes,

The pattern that sets the course for the intellectual as outsider is best exemplified by the
condition of exile, the state of never being fully adjusted, always feeling outside the
chatty, familiar world inhabited by natives, so to speak, tending to avoid and even dislike
the trappings of accommodation and national well-being. Exile for the intellectual in this
metaphysical sense is restlessness, movement, constantly being unsettled, and unsettling
others. You cannot go back to some earlier and perhaps more stable condition of being at
home; and, alas, you can never fully arrive, be at one with your new home or situation.
(p. 53)

Despite the apparent loneliness of never being fully rested and at home, Said goes on to explain
that this unsettling state makes the intellectual happy since they never take anything for granted
and learn to adapt to uncertain circumstances. They find joy in working toward enlightenment
and emancipation.

As exiles, these (public) intellectuals are familiar with being outside power and privilege
and this intimate understanding makes them feel obligated to act on universal principles. They
believe that all human beings have the right to be free and treated fairly and that it is up to them
to universalize experiences of collective suffering and crisis. Therefore, Said (1994) also
describes the intellectual as an amateur, someone who believes that being a concerned member
of society “entitle[s] [one] to raise moral issues at the heart of even the most technical and
professionalized activity as it involves one’s country, its power, its mode of interacting with its citizens as well as with other societies” (pp. 82-83). The intellectual utilizes “personal inflection” and “private sensibility” (Said, 1994, p. 12) to give meaning to their work, and they stake their whole being “on a critical sense, a sense of being unwilling to accept easy formulas, or ready-made clichés, or the smooth, ever-so-accommodating confirmations of what the powerful or conventional have to say, and what they do” (Said, 1994, p. 23). Thus, the intellectual as exile rejects professionalism, working towards something greater than a paycheck or acceptance by the dominant group and engaging in self-reflexivity.

Similar to Jacoby and Said, sociologist Pierre Bourdieu envisioned an elite group of intellectuals who would work collaboratively to address pressing social issues by facilitating political interventions (Bourdieu, 1999/2010). He referred to these individuals as collective intellectuals and he believed that they could foster the social conditions needed to create “the collective production of realistic utopias” (Bourdieu, 2010, p. 1999/182). These intellectuals would engage in “scholarship with commitment” (Bourdieu, 1999/2010, p. 184), critiquing abuses of power, particularly those associated with the misuse of intellectual authority. Like Foucault’s specific intellectual, Bourdieu believed collective intellectuals would use their multiple competences and authority to “organize or orchestrate joint research on novel forms of political action, on new manners of mobilizing and of making mobilized people work together, on new ways of elaborating projects and bringing them to fruition together” (Bourdieu, 1999/2010, p. 182). They would also “work to produce and disseminate instruments of defense against symbolic domination” (Bourdieu, 1999/2010, pp. 181). Utilizing the collective skill sets and knowledge of other scholars working for the same cause, they would critique and challenge
the language of and reasoning behind dominant discourses as well as reveal how these discourses are produced.

**Black intellectualism and coalitions across difference**

With the exception of Said’s scholarship on colonialism and exile, the aforementioned scholars tended to focus on class, the distinct talents of public intellectuals, and the collective action of scholars against hegemony. They engaged with oppression but were not explicitly talking about racial oppression. On the other hand, Black intellectuals in America are unique in that regard. According to historian and Africana and Latin American studies scholar Charles Pete Banner-Haley (2010), Black intellectuals historically and currently are similar to Foucault’s specific intellectual in that they are personally engaged with the conditions of their situation and are aware of the struggles within their communities. However, they feel morally and ethically responsible for not only understanding and challenging racism but for envisioning a transformative, free society. They work toward liberation with their communities as well as across difference, drawing on the past to remind the public about the existence and experiences of people of color and to “demolish denial; to replace invisibility with visibility and to move the nation through the realization of social justice and responsibility to the fulfillment of the American creed” (Banner-Haley, 2010, p. 6).

In their book *Breaking bread: Insurgent Black intellectual life* (1991), feminist scholar bell hooks and philosopher Cornel West have a conversation about what it means to be a Black intellectual in the academy. Similar to the sentiments expressed by Said (1994), West asserts, “The choice of becoming a Black intellectual is an act of self-imposed marginality; it assures a peripheral status in and to the Black community” (hooks & West, 1991, p. 132). Despite this life on the margins, West believes that the priority of the Black intellectual should be to stay
organically linked to the Black community and foster “the creation or reactivation of institutional networks that promote high-quality critical habits primarily for the purpose of Black insurgency” (hooks & West, 1991, p. 144). Thus, he proposes the insurgency model of Black intellectualism, where scholars of color work to create counter narratives and reveal and remove normative discourses. Insurgent intellectuals emphasize human will and “collective intellectual work that contributes to communal resistance and struggle” (hooks & West, 1991, p. 144). Scholarship is then done with and for the Black community.

Agreeing with West’s formulation of the insurgent intellectual, bell hooks encourages scholars to do intellectual work that builds coalitions across differences in class, race, and educational backgrounds. Black intellectuals in particular need to share their work and concerns in a variety of ways in order to stay connected to the Black community. hooks also highlights that intellectuals have an inherent need to “[trade] in ideas by transgressing discursive frontiers” in order to influence “a wider political culture” (hooks & West, 1991, p. 152). However, it is often assumed that these intellectuals are White and male. She states,

> It is the sexist/racist Western conception of who and what an intellectual is that rules out the possibility that Black women will come to mind as representatives of intellectual vocation. Indeed, within White supremacist capitalist patriarchy, the entire culture works to deny Black women the opportunity to pursue a life of the mind, makes the intellectual realm a place ‘off limits.’ (hooks & West, 1991, p. 153)

Therefore, unlike the previous conceptions of the (public) intellectual, hooks points out the importance of intersectionality within discussions of intellectualism in the academy.

Sociologist Patricia Hill Collins also emphasizes intersectionality in her work as she uses herself as an example to explain the practice of a public intellectual. Describing her work as
“intellectual activism,” she defines it as “a synergy of thinking and doing” (Collins, 2013, p. 122) that is highly influenced by one’s social location (similar to Foucault’s specific intellectual as well as bell hook’s emphasis on intersectionality). She writes, “. . . I am comfortable with a worldview that sees objectivity and activism as linked – to be intellectual and activist is to be knowledgeable, critical, passionate, and caring, all at the same time. The term ‘intellectual activism’ reflects this synergy” (Collins, 2013, p. 147). Collins believes that scholars should “place the power of their ideas in service to social justice” (Collins, 2013, p. viiii) by speaking truth to power and to the people. For Collins (2013), speaking the truth as a public intellectual requires confronting power relations as well as advocating for and empowering the less powerful. This truth-telling must be accompanied by “talking, reason, honesty, love, courage, and care” (Collins, 2013, p. xiii), with the goal of positive institutional and social transformation.

Fundamental to intellectual activism is interaction with multiple publics via engaged scholarship, with a focus on its content and process. According to Collins, intellectuals must ask good questions as well as use accessible language, metaphors, narrative and historical context. They must develop a critical consciousness and empathy, recognizing differences in power and privilege and their impact on relationships. Lastly, intellectuals should engage in scholarship that is in service to social justice, meaning that they would be held accountable for the outcomes and impact of their work. Collins (2013) elaborates,

Positioning one’s scholarship within a service framework by doing scholarship in service to social justice may mean being underpaid or even not getting paid at all, making choices that put one at odds with prevailing academic norms, having one’s altruism mistaken for a passion for service, and/or assuming the risks of censure, failure, persecution, and other negative outcomes. (p. 43)
Thus, similar to Said’s amateur exile, intellectuals should build community and courageously confront the status quo without worrying about professional gain.

This brief summation of the scholarship on public intellectualism demonstrates how the role of the public intellectual has primarily been to question authority and transform society through scholarly critique and public engagement with their ideas. According to many of the aforementioned scholars, being a public intellectual is a great responsibility and requires self-reflexivity and care. While most of them see the public as an individual, Bourdieu challenges us to create groups of scholars engaged in a collective struggle to challenge power and privilege. Meanwhile, Foucault has us question the role of scientists in public intellectualism, and bell hooks and Patricia Hill Collins remind us of the lack of attention paid to the contributions of women of color as public intellectuals. Yet, what has been the recent discourse around public intellectuals in higher education? Now I will review media coverage on public intellectualism in the field of higher education before turning my attention to how scientists communicate with the public.

**Review of Media Coverage on Public Intellectuals in Higher Education**

Reading through articles in *The Chronicle of Higher Education* in recent years offers a window into how the higher education community engages in conversation about public intellectualism in some shape or form. Many of the earlier articles were letters to the editor calling for “renewing” the notion of and “preparing the next generation” of public intellectuals. Some authors lamented the denigration of the term (e.g., “publicity intellectuals,” “talking heads”) while others were disheartened by the fact that so few public intellectuals remain and that universities have stunted their growth. Several articles referenced specific individuals considered to be public intellectuals, such as Henry Louis Gates Jr., Noam Chomsky, Pierre
Bourdieu, Cornel West, Camille Paglia, bell hooks, Michael E. Dyson, and William Julius Wilson. More recent articles question whether or not public intellectuals still exist and if they are even needed. They attempt to interrogate and reexamine the definition and purpose of public intellectuals as well as how they currently interact with the public.

For example, in a call to broaden the definition of what it means to be a public intellectual, African American studies scholar Imani Perry (2010) reflects on the history of Black intellectualism and urges academics looking to add meaning to their work to engage with the public beyond writing newspaper articles. She writes,

One need not be camera-friendly or media-savvy to work for a civic or political organization. There is so much work to be done, particularly in communities of color, on a wide range of issues, including educational outcomes, imprisonment, nutrition, political representation, and unemployment. (para. 8)

Perry argues that today’s urgent social issues require that we reassess the role of public intellectuals and how they can be more effective inside and outside the academy. She believes we must explore the multiple ways that public intellectuals can engage more actively with the public, such as participating in theatrical performances, working with nonprofit organizations, volunteering in public schools, organizing book clubs, and writing policy.

Similarly, a recent article on public intellectualism by literary studies scholar Mark Greif (“What’s wrong with public intellectuals?,” February 15, 2015) looks at the nostalgia for the Partisan Review, a cultural literary journal founded in 1934 and acclaimed for its support of public intellectuals, and suggests that public intellectuals of today, like those of yore, should consider themselves members of the public. They need to have an “aspirational estimation of ‘the public’” (para. 29), where their writing should debate priorities and ideals as well as cause
them and the public to stretch their intellect. Speaking on the changed view of the public, Greif writes,

The idea of the public intellectual in the 21st century should be less about the intellectuals and how, or where, they ought to come from vocationally, than about restoring the highest estimation of the public. Public intellect is most valuable if you don’t accept the construction of the public handed to us by current media. (para. 33)

According to him, it is the job of the public intellectual to help the public become “more brilliant, more skeptical, more disobedient, more capable of self-defense, and more dangerous again” (para. 34) by challenging the dumbing down of America by the media. Unlike Imani Perry, Greif adheres to a more traditional interpretation of the public intellectual, seeing engagement with the public primarily through scholarship presented via accessible text.

One potential way of connecting Perry’s ideas about broadening what public intellectualism looks like to Greif’s call to make the public “more dangerous” is through the online environment. Comparative media studies scholar Henry Jenkins (2008) believes that public intellectualism can be cultivated and states that his MIT students who aim to become public intellectuals in the “new media landscape” are using technology to try to “translate their ideas into a more citizenly discourse that speaks across disciplinary boundaries and communicates with a diverse audience” (para. 7). He argues that blog posts, in particular, are a form of “just-in-time scholarship” that “places academics in a more proactive position, intervening more effectively in popular debates around the topics they research” (para. 14). According to Jenkins (2008), blogs allow public intellectuals to provide quick, cutting-edge commentary on and generate discussion about fast-changing debates and social issues; to expand upon previous publications; to connect with a diversity of readers; and to gain greater visibility.
This section has demonstrated that there is a renewed concern about the role of the public intellectual in higher education and an attempt to cultivate public intellectualism in the classroom and through the use of online technology. Though it cannot replace personal interaction with the public, the Internet offers public intellectuals the opportunity for their scholarship to reach the masses quickly and to possibly influence social issues in real-time. However, how have scientists reacted to this push for greater engagement with the public? Now I will discuss the history of science communication with the public, followed by how scientists are getting involved on the web.

**Scientists and Communication with the Public**

Since the beginnings of the Enlightenment, dominant notions of Western/Eurocentric science were developed by and shared with the public. The scientific enterprise in Europe was initially driven by laypeople who were affluent, educated, White men, and it was not until the late 18th and early 19th centuries where we saw the first scientific laboratories “in which scientists ‘worked’ rather than pursued their interests” (Gregory & Miller, 1998, p. 21). Scientists gave public lectures where they shared their work with the White working class and the elite; the most famous lectures were given by chemist Michael Faraday at the Royal Institution of London. Their aim was to “bring to the masses the joy and moral benefit of knowledge,” “to reveal the hand of God in Nature,” and to show the world “an organized, ordered system, to keep the working class in their place” (Gregory & Miller, 1998, p. 23). By the 20th century, Western science was an established profession, creating a demarcation between insiders and outsiders – academic science and popular science (Paul, 2004). The popularization of science was taken up by science journalists (and later science broadcasters) rather than the scientists themselves. By the 1970s, the only professional scientists who engaged with the public to popularize science
were a few high-profile scientists like Carl Sagan, Paul Ehrlich, and Margaret Mead (Gregory & Miller, 1998), not all of whom would necessarily be considered public intellectuals.

The “public understanding of science” movement, developed in the 1980s, grew out of the concerns of scientists and science educators regarding the scientific literacy of the public (Gregory & Miller, 1998). Taking a deficit model approach to science communication (Smith, 2015), the assumption of the movement (particularly by scientists) was that the public needed to be educated about the nature of science by science experts in order to make informed decisions (the “dominant view” of science popularization – Hilgartner, 1990; see also review by Besley & Nisbet, 2011). This sentiment still exists today as the predominant view among many scientists is that the public lacks knowledge about science due to too little STEM education in K-12, lack of public interest, and poor media coverage, despite the fact that a majority of the public (75%) view science positively (Pew Research Center, 2015) and that “experts” have the ability to shape media coverage of biomedical and scientific issues (Kruvand, 2012). Consequently, the focus of science communication has been the simple transmission of facts and figures rather than the quality of the communication (Bucchi, 2013; Brownell, Price, & Steinman, 2013) and the development of a “culture of public engagement” (Bucchi, 2013, p. 905).

However, as further research is conducted within the sub-disciplines of science education, science communication, and public understanding of science, scholars are coming to realize that (1) publics are diverse and emergent (Fraser, 1990; Michael, 2009; Stilgoe, Lock, & Wilsdon, 2014); (2) the dominant view of science popularization is oversimplified and political (Hilgartner, 1990; Myers, 2003; Paul, 2004); and (3) the goal may not be a complete understanding of science but a building of trust with the public (Gregory & Miller, 1998) and an opportunity for institutions to rethink policies and practices (Stilgoe, Lock, & Wilsdon, 2014). In
addition, in order to have effective science communication and research for the public good, scholars will also have to (re)consider the way discourse communities “shape not only the discourse, but also, the members of a discourse community” (Provençal, 2011, p. 103; Myers, 2003).

There is now a shift from the “public understanding of science” to “public engagement with science” (Kouper, 2010; Bauer & Jensen, 2011) and a question of to what extent are scientists “mobilized” to engage in public engagement activities, which include lecturing in public or in schools, being interviewed by the media, collaborating with non-governmental organizations (NGOs), writing for the public, etc. (Bauer & Jensen, 2011). For example, in Norway, Kyvik (2005) found that scientists in the natural and medical sciences and technology published less popular scientific articles than their counterparts in the humanities and social sciences; meanwhile, prolific scientists tended to publish more work for the public than less productive scientists. Meanwhile, Poliakoff and Webb (2007) discovered that scientists were more likely to participate in public engagement activities if they viewed those activities positively, had confidence in their ability to contribute, and believed that their colleagues participate in similar activities. Yet, further research is needed, particularly since there have been no studies examining the engagement activities of scientists of color.

With this relatively new “public engagement with science” movement comes a (re)evaluation of the responsibilities associated with being a scientist. Historically, scientists have spoken on social issues above and beyond their “expertise” (i.e., public intellectuals) – individually (such as Albert Einstein and J. Robert Oppenheimer - Gregory & Miller, 1998) and collectively (such as the 1970s socialist science movement magazines Science for the People in the U.S. and Science for People in the U.K. – Bell, 2013). Yet, the increased professionalization,
specialization, and conservatism of academia (Jacoby, 1987) led to the deradicalization of scientists. More recently, there is a small group of scholars who want scientists to become more involved in society. For example, Greenwood and Riordan (2001) call for scientists to embrace a civic scientist identity, a term originally coined in 1997 by National Science Foundation director Neal Lane. Appealing to a sense of civic duty, they believe that a civil scientist “requires a deeply personal call to action” and must be willing to give “his or her time and experience as a public service, in small or large ways, and often with few visible forms of recognition or remuneration” (Greenwood & Riordan, 2001, p. 31). Similarly, reflecting on the works of Ralph Waldo Emerson and Edward Said, Alan Lightman, a physicist, writer, and humanities professor at MIT believes that scientists have been moving past the “taboo” and “professional stigma” of writing for the general public (Lightman, 2000, para. 21) since the 1960s due to the popular books of Rachel Carson, Richard Feynman, and James Watson. However, he warns scientists about the immense responsibility that comes with becoming a public intellectual as there is a hierarchy of levels of the public intellectual that require greater responsibility the further up one goes. Thus, a study of public intellectualism in science would be a timely addition to the literature.

The “public engagement with science” movement provides a new opportunity for scientists to reconnect with the radical history of science and to work with and for the public to address today’s pressing social and environmental issues. Though the movement has tried to advocate a move from “deficit to dialogue” (Stilgoe, Lock, & Wilsdon, 2014, p. 5), scientists and institutions of science have yet to see the significance and meaning behind public engagement beyond public financial support of scientific research and self-promotion. With the reemergence of the use of biological concepts of race in genomics research (Yudell, Roberts, DeSalle,
Tischkoff, 2016), climate deniers, environmental racism (environmental disasters that disproportionately affect communities of color and low-income residents, like the Flint, Michigan water crisis and fracking in California), and racial health disparities, the role of scientist public intellectuals and how they engage with the public needs to be (re)examined. In an interview with *The Chronicle of Higher Education* about his involvement in revealing the inaction of city officials to address the lead contamination of Flint’s water supply, Marc Edwards, a professor of civil engineering at Virginia Tech, shared,

> I am very concerned about the culture of academia in this country and the perverse incentives that are given to young faculty. The pressures to get funding are just extraordinary. We’re all on this hedonistic treadmill — pursuing funding, pursuing fame, pursuing h-index — and the idea of *science as a public good* [emphasis added] is being lost. (Kolowich, 2016, para. 7)

If science truly is a public good, then we need more scientists to speak out, not just for themselves, but for marginalized and oppressed communities. We need them to use science in service of the people without expectations of financial gain or public recognition. Now more than ever, we need scientists to dialogue and work with the public to address the needs of the 21st century. Perhaps a place to start is through social media, like science blogging.

**Science Blogging**

Whether we [scientists] like it or not, social media is for more than just catching up with old flames or sharing what you ate for breakfast – it is an integral part of conducting and disseminating science in today’s world. Our hesitation as a whole to embrace these new technologies has placed us in a perilous position. Not only must we rectify our reticence, we must destroy the stigma attached to these online communication mediums and
encourage their use in scholarly pursuits. If we are putting our time and resources into
communicating science but we’re not on social media, we’re like a tree falling in an
empty forest – yes, we’re making noise, but no one is listening. (Wilcox, 2012, p. 87)

As suggested by Wilcox (2012), scientists have been slow to utilize social media,
particularly blogging (the use of a frequently updated webpage (weblog) for online
communication), in their research and to disseminate their work to the general public despite the
many benefits that come with an online presence (e.g., enhanced professional profile, improved
research efficiency, improved communication with the public, better networking – Bik &
Goldstein, 2013; humanizing science, contextualize science – Wilkins, 2008). Many of them are
uncomfortable with blogging given its personal dimension, and they lack the time to learn and
contribute online (Bonetta, 2007). Still, science blogging is being increasingly used by scientists
(Amsen, 2013) and is becoming an area of research within the fields of science communication
and public understanding of science.

The current literature has primarily focused on who blogs, motivations for blogging,
blogging topics, and the practice of blogging (e.g., audience recruitment – Ranger & Bultitude,
2014; rhetorical strategies – Luzón, 2013; models of participation – Kouper, 2010). Most science
blogs are written by practicing scientists or individuals with some form of scientific training
(Batts, Anthis, & Smith, 2008), and most science bloggers are male (Munger, 2010). Science
blogs can be written by individuals, by a recognized group with contributions from one or more
people (name brand blog), or by multiple people via multiple blogs (aggregated blogs; e.g.,
ScienceBlogs) (Putnam, 2011). Science bloggers are often driven by personal motivations to
write (Ranger & Bultitude, 2014), and the function and accessibility of a science blog is
determined by the blogger, which, in turn influences how readers interact with the blogger and the content of the blog (Mahrt & Puschmann, 2014).

The content and reasons why science bloggers write are diverse, with two main genres being research blogging and science popularization (Blanchard, 2011). Though they are not sure who their audience actually is, science bloggers have their own ideas of the composition of their audience (Bell, 2012), typically assuming that their readers have an interest in science but may not have extensive knowledge of science (Ranger & Bultitude, 2014). Thus, they adjust information depending on their perceived audience’s needs, utilize informal and personal language, and focus on the main topic and its significance in an effort to recontextualize scientific discourse (Luzón, 2013). The most popular blogs are also often the ones that are updated frequently, cover a greater variety of topics, and include images and video (Ranger & Bultitude, 2014). However, despite the quality and number of updates, topics, and images, blogs can present a challenge to public engagement with science due to their heterogeneity, and it may be up to scientists and science educators to “re-think the role of blogging in the promotion of participatory science” (Kouper, 2010, p. 8).

Despite the fact that science bloggers can potentially “provide a unique educational bridge between academia and the public” (Batts, Anthis, & Smith, 2008, p.1837), there has been no analysis of the radical possibilities of blogging as a form of public intellectualism or as a means to engage the scientific community in a dialogue about science and racial and gender inequities. George Veletsianos, author of Social Media in Academia (2016), argues that there needs to be greater understanding of networked scholarship and social media use (e.g., blogs, Facebook, Twitter) within higher education generally. He defines networked scholarship (originally coined in Veletsianos & Kimmons, 2012) as “the emergent practice of scholars’ use
of social technologies and online social networks to pursue, share, reflect upon, critique, improve, validate, and further their scholarship” (Veletsianos, 2016, p. 15). He believes that there is now a gradual shift in the academy where scholarly practices that once promoted the disembodied and objective pursuit of knowledge are moving toward practices that build upon socio-constructivist ideas around knowledge production. Scholars seem to be more interested in connecting their work with their identities, both online and offline. Veletsianos (2016) feels that this connection between scholarship and identity “may serve to frame their research in a way that is increasingly embodied, experiential, and social” (p. 23), influencing how knowledge is produced and disseminated.

**Science Identity**

To my knowledge, no study has examined scientist bloggers of color or how blogging practices may inform an individual’s science identity, which is theorized by Heidi Carlone and Angela Johnson (2007) as being comprised of the overlapping traits of competence, performance, and recognition. Based on their work with women of color deemed “successful” STEM students, Carlone and Johnson (2007) describe competence as being able to demonstrate a deep understanding of science knowledge and a motivation “to understand the world scientifically” (p. 1190). An individual with a “successful” science identity must also validate their competence by performing accepted science practices. Lastly, they must recognize themselves and be recognized by others as a science knower. The findings of Carlone and Johnson (2007) revealed the significance of recognition to the science identities of women of color and how some of these women were able to redefine what it meant to be recognized as a scientist. Thus, the racialized and gendered social identities of scientists can impact their science identity development through the complex interplay of competence, performance, and
recognition. Unfortunately, science identity is still undertheorized and has yet to be utilized to inform the lived experiences of scientists of color who blog and have already achieved STEM degrees.

My dissertation begins to examine these gaps in the literature and unsettles what it means to be a “scientist” and “public intellectual,” both online and offline. To clarify what I see as the connections between public intellectualism, science popularization, science identity, and racialized and gendered identities, I must first define and explain the significance of these concepts. As I illustrated at the beginning of this chapter, public intellectualism has changed and shifted over the years, and it will continue to change as more scholars begin to utilize digital technologies in various ways (Veletsianos, 2016). As a scholar-activist woman of color, I am inclined to align my conceptualization of public intellectualism with Patricia Hill Collins’ (2013) notion of intellectual activism, where scholars participate in engaged, liberatory scholarship with and for the people. This is a perspective that suggests that it is a moral and ethical imperative that scholars understand their privilege of being a “knower” and to use their acquired knowledge to examine, address, and contest issues of power, privilege, and oppression as well as reimagine a more equitable and just world. According to this view, informed by the needs and wants of their communities, public intellectuals should provide a vision of what could and should be that aligns with our espoused values and egalitarian ideals.

Within STEM, this means that scientists have an obligation to participate in the popularization of science. The popularization of science requires that scientists make science accessible and relevant to the lives of all people, especially those who have historically and currently been left out of STEM knowledge production (e.g., research agendas, theories, funding) and dissemination (e.g., science articles, conferences, news, reports, science education),
as well as local, regional, and national policy decisions on STEM issues. Scientists should encourage others to see how Western science can be used to address certain social and environmental issues while simultaneously humanizing science by recognizing that it has its limitations and is but one of many ways of knowing the world. Thus, unlike the deficit approach to science popularization that separates and elevates scientists as an elite group from and above non-science knowers (Gregory & Miller, 1998), scientists must reevaluate and reflect on their power, privilege, and social responsibility. Communicating and engaging with the public about science should not be self-serving or a means to “maintain science’s privileged status” (Gregory & Miller, 1998, p. 82). Given today’s ethical and social challenges (e.g., climate change, availability of clean water, food deserts and hunger), we cannot afford such elitist and patriarchal attitudes that originate from the racist, sexist, classist, and colonial history of science.

If the goal of public intellectualism is to challenge the status quo through engaged, liberatory scholarship and the aim of science popularization is to make science accessible and relevant to the public for the benefit of humanity and the environment (rather than for individuals and the scientific enterprise), then this forces us to question science identity (competence, performance, and recognition) and the role of scientist public intellectuals in society. It contests normative assumptions around who can be a science knower, who can talk to the public about science, and how science is communicated and to whom.

The reality is that we cannot discuss these things without considering the racialized and gendered identities of scientists. Time and time again, we see how one’s racialized and gendered identity matters within the context of science. For example, since the late 1950s, studies based on the Draw-a-Scientist Test (DAST), where participants draw pictures of scientists at work and provide written descriptions of what they are doing, have confirmed that children and
adolescents’ still perceive scientists as being as White men with beards, glasses, and lab coats who work in laboratories (e.g., Fort & Varney, 1989; Finson, Beaver, & Cramond 1995; Korkmaz 2011; Laubach, Crofford, & Marek, 2012). In a world where women of color are “visibly invisible” (Bowen, 2012) in the sciences and are generally “presumed incompetent” (Gutiérrez y Muhs, Niemann, Gonzàlez, & Harris, 2012) in academia and where they are forced to fragment their identities (e.g., by “passing”) or perform embodied practices of multiplicity (e.g., stereotype manipulation) (Ong, 2005), it is clear that racialized and gendered identities influence who the academy and society deem as science knowers and who has the authority to speak on behalf of the scientific community about science.

Based on these ideas, I have designed a conceptual diagram (Figure 1) that shows how the racialized and gendered identities of scientist bloggers of color can inform and disrupt or maintain the master narratives surrounding science identity within the scientific community. As aforementioned, the primary aspects associated with a science identity are competence, performance, and recognition; their interrelatedness is symbolized by the dotted lines within the diagram. When one considers how these components are racialized and gendered, four master narratives come to mind – the intellectual inferiority of women and people of color, the irrationality and emotionality of women and people of color (as compared to the logical and objective mind of White men of science, a dichotomous myth – Fox Keller, 1985; Harding, 1986), the unidirectional/top-down/formal public engagement by science experts, and the public as uninformed and predominantly White. Within the conceptual diagram, these master narratives are connected to particular aspects of science identity. For example, the master narrative of the intellectual inferiority of women and people of color is related to competence and indirectly to
performance and recognition, as oftentimes perceived competence differs from actual competence (something that Carlone and Johnson (2007) do not address).

The racialized and gendered identities of scientist bloggers of color have the potential to inform, and disrupt (-) or maintain (+) these master narratives by the very nature of who they are, how they choose to act like a scientist, how and why they choose to connect with the public, who they believe the public is, and how they feel others recognize them as science knowers. For example, the fact that they are scientists of color who blog already suggests that they are moving away from a deficit-oriented, patriarchal notion of science communication and may be trying to reach a particular audience that is not assumed to be uninformed and White. This challenges how scientists should perform and who recognizes them as science knowers. In addition, the fact that scientist bloggers of color are willing to blog about their personal experiences with science potentially helps to disrupt the master narrative surrounding the need for scientists to be objective and unemotional (performance) and the inherent irrationality and emotionality of women and people of color (which oftentimes feeds into recognition and questions around one’s competence with science). Therefore, my dissertation begins to examine and complicate the role of scientist public intellectuals of color, beginning with scientists of color who blog.
Figure 1 – Conceptual diagram, utilizing the theoretical frameworks of intersectionality and science identity, of how the racialized and gendered identities of scientist bloggers of color can inform and potentially disrupt (-) or maintain (+) master narratives surrounding science identity. Dotted lines show the interrelatedness of competence, performance, and recognition within science identity while the influence of racialized and gendered identities on master narratives and science identity is represented by the circle.
CHAPTER 3: METHODOLOGY

Most work on public intellectualism focuses on defining an intellectual rather than investigating and describing the “image, the signature, the actual intervention and performance” (Said, 1994, p. 13) of an intellectual (with the notable exception of Collins (2013) who describes her process of engaging in “intellectual activism”). This dissertation looked to extend and complicate this literature by examining the relationship of scientists of color to public intellectualism and questioning whether or not they try to speak truth to power and to the public. Specifically, given the increasing dissemination of academic scholarship to the public via the Internet (particularly through social media; Veletsianos, 2016), this work looked at how scientists of color utilize blogs as public intellectuals and questions the relationship between their blogging and resistance.

This dissertation study on the lived experiences of scientist bloggers of color focused on the following research questions:

1. How are the science identities of scientist bloggers of color racialized and gendered?
2. How do scientist bloggers of color perform as public intellectuals who are also science knowers?
   a. How are they racialized and gendered as public intellectuals online and offline?
   b. How do they disrupt or maintain the master narratives around science identity and public engagement?

This chapter discusses the theoretical anchors—critical race theory (CRT), intersectionality, and science identity—that guided the creation of the research questions, methodology and data analysis. From there, I discuss my reasoning for choosing virtual ethnography as my method of
inquiry, followed by details regarding the design study, participant selection, interview process, and data analysis. Finally, I conclude with a brief discussion of trustworthiness and limitations.

**Theoretical Anchors**

The theories that informed this work were CRT, intersectionality, and science identity. I was intentional about threading these theoretical anchors throughout the entire study, from the generation of research questions to the methodology and from the interview questions to the data analysis. CRT and intersectionality appear in my focus on master narratives and the social identities of race and gender; my underlying assumption that my participants have experienced challenges as a result of being racialized and gendered; and my attempt to avoid posing single-axis questions, which I discuss further in the section on intersectionality. Science identity showed up in the research questions about the performance of science identity and public intellectualism as well as interview questions involving the educational journeys of my participants (Appendix B). It also served as the basis for the conceptual diagrams in Chapters 2 and 5. More information on how the theoretical anchors are threaded in the research design can be found throughout the chapter.

**Critical race theory**

Originating from critical legal studies of the 1970s (Delgado & Stefancic, 2001), CRT has expanded to other disciplines, including education. There are at least five premises that inform the work of CRT in education: (1) the centrality of race, racism, intersectionality and other forms of oppression, (2) the importance of challenging the dominant ideology (e.g., meritocracy, objectivity, colorblindness, equal opportunity), (3) a commitment to social justice, (4) the significance of experiential knowledge, and (5) the use of interdisciplinary methods to
ground research in a historical and contemporary context (Solórzano & Delgado Bernal 2001; Solórzano & Yosso, 2001). These tenets served as one theoretical anchor in this study.

My work was particularly informed by the fact that race is a social construction that shifts in different contexts and can be manipulated by society through racialization (Delgado & Stefancic, 2001). Following CRT’s voice-of-color thesis, I wanted to have my participants share their personal experiences of racialization and gendering in science through counter-storytelling (Solórzano & Yosso, 2001). By focusing on their multiple social identities and challenges with structural racist sexism, their stories demonstrated and adhered to CRT’s concepts of anti-essentialism and intersectionality (Delgado & Stefancic, 2001). Intersectionality, in particular, was vital to my methodology and analysis.

**Intersectionality**

Intersectionality is a term coined in 1989 by Kimberlé Crenshaw, a leading CRT scholar, though the concept itself has been in existence within the epistemologies and philosophies of Black feminist scholars since Sojourner Truth’s 19th-century articulation “Ain’t I a Woman?” (Rice, Harrison, & Friedman, 2019). Using the interconnection of race and gender to illuminate the oppressive circumstances of Black women in the United States, Black women theorists, activists, and scholars have generated a valuable theoretical framework to critically examine structural racism and sexism that disproportionately impacts different marginalized groups. In her article “Demarginalizing the intersection of race and sex: A Black feminist critique of antidiscrimination doctrine, feminist theory and antiracist politics,” Crenshaw (1989) challenges dominant logics within the legal system and reveals how the lived identities of Black women intersect with sites of privilege and marginalization, often times rendering them invisible. As she noted in a recording of her 2016 keynote address at the Women of the World Festival,
“Intersectionality is not primarily about identity. It’s about how *structures* make certain identities the consequence of and the vehicle for vulnerability” [emphasis added].

I humbly honor the genealogy of Black feminist thought in my work, as most published scholarship has appropriated and depoliticized intersectionality, erasing the contributions of Black women (Rice, Harrison, & Friedman, 2019). This dissertation lists (Cooper, 2017) and seriously recognizes the knowledge production of Sojourner Truth, Maria Stewart, Anna Julia Cooper, Mary Church Terrell, Fannie Barrier Williams, Pauli Murray, Angela Davis, Audre Lorde, the Combahee River Collective, Kimberlé Crenshaw, Patricia Hill Collins, and Brittney Cooper. I draw on these intellectual ancestors to demonstrate how racialized gendered structures within STEM that reinforce Whiteness/maleness leave scientist bloggers of color, at its best, vulnerable to presumed incompetence and microaggressions and, at its worst, knowledge suppression and psychological and physical violence. I want to highlight the knowledge production and scholar activism of scientists of color, especially women of color who face the greatest challenges in succeeding in STEM. My work embraces social justice, promotes the intellectual contributions of scholars of color, and engages “in citation and research practices that disrupt the political status quo across social structures and academic disciplines” (Rice, Harrison, & Friedman, 2019, p. 7).

I used intersectionality as a theoretical anchor because it is “oriented toward unrecognized knowers and overlooked forms of meaning” (May, 2015, p. 19). Informed by Black feminist theory, critical race theory, and women of color praxis, it challenges dominant logics and acknowledges how lived identities intersect with sites of privilege and marginalization, with knowledge production being one such site. Within the context of race and gender, intersectionality involves examining and recognizing that how we experience the world
is impacted by the complex interplay of our privileges and oppressions in certain places and
spaces. It conceptualizes social relationships as being within a “matrix of domination,” where
interlocking systems of oppression work simultaneously with and through each other to racialize,
gender, class, and sexualize individuals (Collins, 2004). Yet, May (2015) also talks about
intersectionality as a multifaceted form of social action and a “resistant imaginary” that identifies
historic omissions and submerged stories of resistance.

Thus, this study documented the unacknowledged stories of scientists of color engaged in
public intellectualism and creates a resistant imaginary that challenges traditional conceptions of
who can engage in science knowledge production and dissemination. Following an intersectional
approach, I avoided posing single-axis questions that treat race and gender as separate categories
during interviews, though I could not guarantee that the questions were not interpreted as
additive (Bowleg, 2008). I focused on their blogging and science activities to allow them “to
speak to the salient intersections in their lives” (Hunting, 2014, p. 12) in order to highlight the
multiple aspects of their experiences.

Most importantly, I engaged in critical self-reflexivity (Rice, Harrison, & Friedman,
2019) throughout my study, questioning my emic/etic (or insider/outsider) status and whether or
not I recognized how my positionality impacted the research process. Critical intersectional
research requires that the researcher “continuously and unequivocally interrog[ate] at every stage
of the process, ‘Am I doing justice?’” (Rice, Harrison, & Friedman, 2019, p. 10). As such, I was
careful to not use my power as a researcher to interject, name, or narrate things for my
participants (Rice, Harrison, & Friedman, 2019) and to allow the research process to unfold
organically.
Science identity

Science identity can be defined as “who one is and who one wants to be” within STEM disciplines as “individuals learn about [and internalize] the community of practice and what is expected of its members [through interactions]” (Shanahan, 2009, p. 57). Most studies on science identity in K-12 (Shanahan, 2009) and higher education (Szelényi, Bresonis, & Mars, 2016) have focused on individual personalities and interactions. An often-cited work is Carlone and Johnson (2007), where they conceptualized science identity as being comprised of the overlapping traits of competence, performance, and recognition. Based on their work with women of color deemed “successful” STEM students, they describe competence as being able to demonstrate a deep understanding of science knowledge and a motivation “to understand the world scientifically” (p. 1190). An individual with a “successful” science identity must also validate their competence by performing accepted science practices. Lastly, they must recognize themselves and be recognized by others as a science knower.

Drawing from my own experience of socialization within science and the value placed on competence, performance, and recognition within the scientific community and the literature on public intellectualism, I used Carlone and Johnson’s (2007) construction of science identity as a means to think through how my participants contested or upheld normative assumptions of who should be in and communicate science and to whom. Based on my participants’ responses and informed by CRT and intersectionality, I expanded upon the authors’ original conceptualization to include the influence of racialized and gendered identities on master narratives and science identity. This modified diagram attempts to bridge individual agency and social interactions, which are typically emphasized in studies of science identity, with hegemonic social structures (Shanahan, 2009). I expound upon this in the dissertation conclusion (Chapter 5).
As someone with intimate knowledge of the sociocultural context of science, it is important for me to acknowledge my own fluctuating science identity and its role in the research process. I consider myself to be along the insider-outsider continuum (Hellawell, 2006), potentially what Milligan (2016) refers to as an “inbetweener.” I no longer actively engage in science research, but I am familiar with STEM discourses and practices. I am still connected to the science community as I am married to a biology faculty member, have friends who are scientists, and advise science students in two NSF-funded programs. I am neither a complete insider or outsider; rather, I tried to view my “inbetweeness” as “as a balancing act between the positioning that the researcher actively takes and the ways in which their role is defined by how others involved in the project, research participants and further afield, view the researcher” (Milligan, 2016, p. 240).

From time to time throughout my work, I made “active attempts” (Milligan, 2016) to move from insider to outsider and vice versa, but my role was also influenced by my participants. For example, at the beginning of the research process, I had never written a blog post and swore that I would never join Twitter, two things all of my participants engaged in. I was an outsider in this regard. However, as time progressed, my participants coaxed me into becoming more of an insider by joining them on Twitter and encouraging me to write a guest blog post. Thanks to this “inbetweener” practice, I believe that I have a richer understanding of what it means to be a scientist blogger of color.

**Inquiry Method – Virtual Ethnography**

Viewing the Internet as both a culture and cultural artifact (Hine, 2000) and blogging as a performative and pedagogical writing act (Dennis, 2015), I used virtual ethnography to critically examine the ways in which scientist bloggers of color use blogging, why they choose to blog,
and how they view their online and offline presence. I selected virtual ethnography as my methodology because I was questioning the use of computer-mediated communication (blogging) as a way for scientists of color to perform as public intellectuals to speak the truth to power and to the public. Through virtual ethnography, my goal was to unsettle dominant assumptions of what it means to be a scientist as well as who can be a public intellectual in science. I also aimed to reveal the ways in which scientists of color can and have used blogs as a form of resistance.

Virtual ethnography, first conceptualized by sociologist Christine Hine, is a relatively new way of examining and understanding social interactions and practices mediated through online technology. In virtual ethnography, the researcher spends extensive time online, engaging in the lives of participants and viewing the Internet as a site for communication, community-building, and meaning-making. Rather than focusing on a specific, physical field site for research, virtual ethnography focuses on “flow and connectivity rather than location and boundary as the organizing principle” (Hine, 2000, p. 64). Boundaries between the ‘real’ and the ‘virtual’ are explored, with the researcher attempting to comprehend their connection and what they mean to the lives of their participants in context, “where context is understood as both the circumstances in which the Internet is used (offline) and the social spaces that emerge through its use (online)” (Hine, 2000, p. 39).

Recent virtual ethnographies in the literature have examined virtual worlds (e.g., The Palace – Guimarães Jr., 2005; World of Warcraft, Second Life – Boellstorff, Nardi, Pearce, & Taylor, 2012), websites (Hine, 2000), blogs (Doostdar, 2004; Efimova, 2009; Dennis, 2015), databases and teleconferencing (Ruhleder, 2000), virtual communities (e.g., The Cybergrrrl Web Station, Women Halting Online Abuse – Ward, 1999; online sex workers – Sanders, 2005; breast
cancer patients – Orgad, 2005), and newsgroups (Hine, 2000; Rutter & Smith, 2005). My dissertation may be the first to look at how scientists of color connect and create community through blogging. Though, to my knowledge, none of them were aware that the others were involved in my dissertation project, I discovered through my conversations with participants that each of them knew each other and interacted through Twitter. Through this research, I was able to enter and be a part of this unique virtual community of public intellectuals in STEM.

**Research Design**

My methods for the virtual ethnography were similar to those of Nardi, Schiano, Gumbrecht, and Swartz (2004) in the study of blogging as a form of communication and everyday practice. Snowball sampling was used to identify a group of scientist bloggers of color. A list of names was generated from a combination of search engines (e.g., Google), social media (e.g., Facebook, Twitter), professional organizations (e.g., SACNAS), personal contacts, and contacts provided by informants. Participants were then selected based on whether they: (1) self-identified as being a member of a racialized community; (2) were raised in the U.S.; (3) had a doctorate in a STEM field; and (4) were currently or formerly employed by a college or university. Scientist bloggers of color were from a range of science disciplines because it was difficult to determine the fields bloggers belonged to a priori, since there is no blog index or searchable blogger database. At the start of the study, I was not sure how many participants I would be able to locate and interview; I wound up with 5 scientist bloggers of color willing to be a part of the study.

**Blogs**

Blogging is a popular way for individuals to share their experiences, hobbies, and interests online. The growth of the blogosphere and other online environments has “stimulated
rather than retarded the quality and diversity of public intellectuals” (Drezner, 2009, p. 50; Jenkins, 2008). Scientists have even taken up blogging to discuss topics in their field, keep others informed of their research, educate the general public about science, and stay connected with other members of the scientific community (Amsen, 2013). However, there is still significant stigma surrounding writing for the general public (Lightman, 2000; Hill, 2012; though see Kezar, Drivalas, & Kitchen, 2018). In fact, many scholars writing for the public are stuck in a “zero-sum language game” (Provençal, 2011) where their success in making their work accessible can cost them success in academia. So, why do scientist bloggers continue to blog, especially scientists of color who are already marginalized in the academy?

For the purpose of triangulation and to add to my “thick description” (Geertz, 1973), I collected and analyzed the blogs of my participants to see what types of things they were communicating with the public about and how. I also wanted to see if they shared or focused on things that their White, male counterparts in STEM would not necessarily write about. This would demonstrate how their racially gendered identities influenced their writing and, thus, their performance as public intellectuals. Therefore, in between participant interview sessions, I read and reread blog posts for each participant, noting rhetorical strategies and blog topics. Reader comments were ignored since the focus was on how scientist bloggers of color communicate to the public and not on readers’ reactions to blog posts.

I collected, printed out, and read blog posts published during the same 6-month time period as the interview sessions. Participants varied in the frequency of their posting, as has been demonstrated in other studies on bloggers (Nardi et al., 2004). A total number of 93 blog posts were analyzed, ranging from 2 posts to 33 posts per participant and varying in length, use of
imagery, and blogging experience. The blog posts provided additional fodder for follow-up questions during interview sessions, helping me to probe and elicit responses from participants.

Unfortunately, my participants’ blog posts were not as informative as the actual one-on-one interviews. Blog posts tended to be pretty mainstream, covering academic topics and providing standard advice. There were only a few posts that included openly political statements or ideological beliefs, and none of the blogs expressed my participants’ rationales for blogging.

**Interviews**

Five scientist bloggers of color (4 women, 1 man) were asked to participate in virtual face-to-face, semi-structured interviews using Google Hangout. These interviews were digitally audio-recorded, and I conducted all of the interviews in the privacy of my office, which was located on an isolated corner of the third floor of a campus library. Following the three-interview series format articulated by Seidman (2006), each blogger was interviewed three times over a 6-month time period (at the beginning, middle, and end), and each interview was between 35 and 80 minutes. I followed-up with participants via e-mail and Twitter to clarify statements, gain additional insights, and send transcripts for review. These follow-ups allowed me to maintain a relationship with participants during the period between interviews and reminded participants of our conversation prior to the next interview session. Twitter was especially useful because all of my participants were quite active on that platform, and, with their permission, I was able to observe their interactions with other scientists and science communicators, including fellow bloggers. Meanwhile, the spacing between interviews allowed me to follow participants’ blogs in preparation for subsequent interviews.

Seidman’s (2006) interview method is designed to “understand the lived experience of other people and the meaning they make of that experience” (p. 9). In this research, I similarly
sought to understand the lived experience of scientist bloggers of color and the meaning they make of being public intellectuals. Informed by phenomenology, Seidman’s in-depth interview method utilizes primarily open-ended questions. The goal is to layer participant narratives during three separate interview sessions in a way that allows participants to reconstruct their experience. The first interview session focuses on the participants’ life histories, while the second session is meant to concentrate on the details of experiences highlighted in the first session. The third interview session is then used to reflect on the meaning of the experiences.

Each of the three interview sessions covered particular aspects of participants’ experiences and were framed using literature on blogging (Nardi et al., 2004; Kjellberg, 2010; Ranger & Bultitude, 2014), intersectionality (May, 2015; Bowleg, 2008; Bowleg, 2013; Hunting, 2014), science identity (Carlone & Johnson, 2007), and literature on public intellectuals (e.g., Collins, 2013; Lightman, 2000; Said, 1994). Interviews were open-ended and conducted as a “negotiated accomplishment,” where the interaction between the interviewee and the researcher was an empathetic and reflexive give-and-take (Fontana & Prokos, 2007). The first interview session was focused on participants’ life histories and informed by the science identity model (Carlone & Johnson, 2007). I asked participants about how they became interested in science, their science educational journey, and how they came to blog. The second interview addressed participants’ present lived experience as gendered scientist bloggers of color. Specifically, questions addressed why they continued to blog, their blogging process, what it was like to be a gendered scientist blogger of color, how blogging impacted their professional lives, and whether they communicated or engaged with the public beyond blogging. The third and final interview session was a reflection on the meaning of their experience as a gendered scientist blogger of color. Thus, questions revolved around how blogging affected participants’ multiple identities.
(racialized, gendered, science) and vice versa; how they saw blogging affecting science; whether they saw themselves as public intellectuals; and how they performed and experienced public intellectualism.

Participants

The majority of my five participants identified as Black scientists and as scientists in the biological sciences (Table 1). Though they used their real names on their blogs and other social media platforms, most of them requested pseudonyms for this study. I understood their concern, as the science communication community and the number of scientists of color are small and the potential repercussions to their careers could be large. Thus, at their request, I carefully selected pseudonyms for each of my participants. I chose the names Alice Ball, Arliner Young, and Everett Just; they were the names of notable scientists of color. Nnenna was a name chosen by my participant, whereas Guabancex is the name of the Taíno Goddess of Transformation, which I thought was a fitting name for the participant from Puerto Rico. I also broadened my participants’ fields of study and current positions of employment to provide further anonymity.

I am hesitant to provide further details about my participants without revealing their true identities. I can disclose that they are in their mid- to late-thirties and have been in academic science a median of 17 years. They have been blogging an average of 5 years and aim to post at least once every one to two months, if time permits. I am unable to provide the total number of hits their blogs receive or their audience sizes because none of them had hit counters on their blog sites. When asked, none of my participants were able to give an estimate of how many people they reach with their posts, on average.
Table 1 – Demographics for scientist bloggers of color

<table>
<thead>
<tr>
<th>Participant Pseudonym</th>
<th>Race or Ethnicity</th>
<th>Gender</th>
<th>Field</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alice Ball</td>
<td>Black</td>
<td>Female</td>
<td>Physical Sciences</td>
<td>Assistant Professor</td>
</tr>
<tr>
<td>Arliner Young</td>
<td>Black</td>
<td>Female</td>
<td>Biological Sciences</td>
<td>Visiting Assistant Professor</td>
</tr>
<tr>
<td>Nnenna</td>
<td>African American</td>
<td>Female</td>
<td>Biological Sciences</td>
<td>Research Fellow</td>
</tr>
<tr>
<td>Guabancex</td>
<td>Latina/Puerto Rican</td>
<td>Female</td>
<td>Biological Sciences</td>
<td>Science Program Manager</td>
</tr>
<tr>
<td>Everett Just</td>
<td>Black</td>
<td>Male</td>
<td>Biological Sciences</td>
<td>Research Scientist</td>
</tr>
</tbody>
</table>

Data Analysis

Interview transcripts were read multiple times and analyzed with an intersectional lens. Intersectionality was infused throughout the analysis through an examination of the interplay of racialized and gendered identities with a public intellectual and scientific identity (Carlone & Johnson, 2007). As I read over transcripts, I attended to within-group differences and both/and logics, recognizing that identities and histories are “intermingled and divergent” (May, 2015, p. 234) as well as contextual. I also questioned and “bracket[ed]” (May, 2015) seemingly rational and conventional responses from participants in order to resist hegemonic (i.e., dominant) interpretations of my data. Therefore, I looked for “layers of suppressed meaning” (Code, 2011, p. 206) to identify and address unasked questions, question normalized phrases, and unsettle everyday practices. I tried to highlight how oppressive and resistant forces are continuously
relational and paid close attention to the “opacities and silences” (May, 2015, p. 239) within my data. Lastly, I engaged in constant critical self-reflexivity (Rice, Harrison, & Friedman, 2019), thinking about how my positionality and choice of theoretical frameworks influenced my methodology and data analysis and vice versa.

I used inductive data analysis (Bhattacharya, 2017) using NVivo 11: Pro Edition for Windows (QSR International). During a first round of coding, data was chunked into identified codes (or nodes) based on observed patterns and guided by my theoretical anchors as described earlier. With the assistance of the cluster analysis feature of NVivo (using Jaccard’s coefficient of coding similarity), I engaged in a second and third round of coding to cluster my codes into broader categories and then themes, making sure that they aligned with my conceptual diagram described in Chapter 2. I wrote reflexively in my research notebook about the patterns I was observing and discussed my findings with my doctoral adviser.

CDA was used to interrogate images and text used in blog posts. Originating from the work of French philosopher/poststructuralist Michel Foucault, CDA questions how visual and textual statements shape the way we think about and act in the world. It emphasizes the need to understand how discursive images and texts (i.e., images and texts that convey multiple cultural meanings) inform one another (i.e., intertextuality), producing particular conceptions about human subjects that are viewed as truth (Rose, 2001). These apparent truths are normalized, or are made commonplace, within society by those with the power to control discursive meaning, linking power and knowledge (Foucault, 1977/1980). Similar to intersectionality, CDA emphasizes the complexity and contradictions within discourses as well as the absence of certain discourses (Rose, 2001). Given that the text we see on the Internet is a “temporally shifted and packaged form of interaction” and “a collection of texts” (Hine, 2000, p. 50), CDA was an ideal
complement to virtual ethnography’s attempt to understand the meanings behind and produced by computer-mediated textual practices like blogging.

In my analysis of blog posts, I paid particular attention to the intertextuality of texts and images, normalized assumptions and turns of phrase, connections between power/oppression and knowledge, and silences within the texts of the blog posts. I tried to underscore how scientist bloggers of color create a normative (i.e., standard form of) or resistant social imaginary of a public intellectual in science, where social imaginary was defined as “a loosely integrated system of metaphors, images, assumptions, ways of thinking, with powerful if tacit features that generate and underwrite possibilities of knowledge production, interpretation, uptake, and implementation” (Code, 2011, p. 210). However, my analysis did not reveal as much about my participants’ experiences and identities as scientist bloggers of color as their interviews.

Therefore, I ultimately used the blogs to help me make meaning of the interviews and to frame my findings rather than using them as stand-alone data. They helped me to understand my participants’ personalities better, allowing me to see why they approached their public intellectualism in certain ways. The blogs helped me to make connections across interviews and to serve as examples for particular themes unveiled in the study.

**Trustworthiness**

Trustworthiness and rigor were maintained in a variety of ways. I was given permission by my participants to read their blogs and follow them on Twitter, which allowed me to verify who they were and the stories that they shared with me. I performed member checks and emailed them all transcripts to check for accuracy and to give them an opportunity to provide edits or explanations. Similarly, I kept a field notebook for reflections and sent codes and themes to my dissertation advisor for debriefing. I presented most quotes in the findings chapter in their
entirety; I did not want to unintentionally alter the true meaning behind my participants’ words. Most importantly, I stayed true to the tenets of CRT and intersectionality throughout the process.

**Limitations**

The biggest limitation of the study is sample size. I think it would have been nice to have more examples from other participants to draw from to elucidate themes; however, as a woman of color who left a science doctoral program all-but-dissertation, I think the stories shared by my participants are sufficient enough to illustrate some of the structural issues impacting the success and wellbeing of scientists of color.

Another limitation of this study is the use of blogs as the computer-mediated communication of interest. What I discovered was that there is a much larger number of scientists of color utilizing Twitter to speak truth to power and to the public. I do not know why this is the case, but if I would have used Twitter, I would have had a larger pool of potential participants to recruit from. In addition, I found that the blogs themselves were not as informative as the interviews with my participants, as my participants knew that they were being judged by their White peers and that they had to temper what they wrote about. A future study on how scientists of color use Twitter is needed.
CHAPTER 4: UNVEILINGS

This dissertation used virtual ethnography to explore what it means to be a racially gendered scientist/blogger online and offline. The goal was to use CRT, intersectionality, and science identity as my theoretical anchors to begin to understand how scientists of color use blogs to share their scholarship with others and to encourage other people of color to be involved in STEM. Given the dominant belief that women and people of color do not possess the inherent “brilliance” needed to be successful in STEM disciplines (Leslie et al., 2015), I wanted to reveal how race and gender intersect to inform the tensions, negotiations, and decisions that scientists of color make when they decide to become public intellectuals to challenge deficit-focused master narratives in an attempt to rewrite what it means to be a scientist as well as how they may (unintentionally) continue to support the status quo. What does it mean to be a scientist of color who blogs?

Therefore, my dissertation focused on the following questions:

1. How are the science identities of scientist bloggers of color racialized and gendered?
2. How do scientist bloggers of color perform as public intellectuals who are also science knowers?
   a. How are they racialized and gendered as public intellectuals online and offline?
   b. How do they disrupt or maintain the master narratives around science identity and public engagement?

Staying true to intersectionality and frequently returning to these research questions, I reflexively analyzed participant transcripts and arrived at six themes and 27 sub-themes as denoted in the dendrogram in Figure 2. The six major themes, represented by the circles on the dendrogram, are the following: (1) Starting and Staying in Science, (2) General Costs and Benefits of Blogging, (3) Nuts and Bolts of the Work, (4) Negotiating Being “Conspicuously Invisible” Online, (5)
Putting “Expertise and Networks to Serve,” and (6) Multiple, Intentional Forms of Engagement Can Reaffirm Identity. Throughout the rest of this chapter, I will discuss the themes and select subthemes that align with my research questions.

This chapter is organized into four sub-sections based on each research question/sub-question. The sub-sections are: Racially Gendered Science Identities; Performance of Public Intellectualism; Racially Gendered Public Intellectualism Online and Off; and Disrupting Master Narratives. Each sub-section then covers themes and sub-themes unveiled in my interview sessions with participants. I end the chapter with a brief summary.

**Racially Gendered Science Identities**

I was interested in how my participants developed their science identities in the first place, given the severe numerical underrepresentation of scientists of color in STEM fields, and how those identities were racialized and gendered. I also wanted to know at what point they decided to blog and why. My participants were very kind and forthcoming with disclosing their educational journeys.

**Starting and staying in science**

Like most scientists of color, none of my participants grew up thinking that they would be scientists. They were all curious about the world and had families who cared about education; however, they did not recognize their interests as being grounded in science. Guabancex shared,

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4 I would like to note that the dendrogram appears to show a separation within the theme Starting and Staying in Science, where the sub-themes of Exploitation and Neoliberalism diverge from the other sub-themes. This separation is driven primarily by a couple of the participants (Nnenna and Everett). For example, Nnenna provided many of the instances of Neoliberalism, as
she spoke multiple times about her desire to become an entrepreneur and wanted to brand herself as a science expert. Similarly, Everett, and to some extent, Alice, talked about how Black scientists, particularly Black women, are expected to do things for free. Reflecting on his male privilege, Everett shared,

Uh . . . so, we’re sharin’ our time, expertise, you know, all these things we bring to the table and there’s an expectation that we should do it for free. Now . . . if I say somethin’ about that, there’s gonna, there, there would be some pushback cuz, “Oh. Okay. You know, this guy’s Black” or whatever, but for women to . . . know themselves and know their value and, and put it on the table, like, “Look. You know. This is the expertise I have. Other people would be compensated for doin’ the same thing. Or, you know, maybe there is a quid pro quo that we can work out something”. . . But there’s a pushback against that, and . . . and, in general, I think for women of color, it’s even . . . I won’t get into the, the, the degrees of which particular group of women of color, but for women of color to be professional and assertive . . . that doesn’t go over well with people . . . a lot of people still.

A clear feminist, Everett acknowledged that women of color in science have a difficult time being respected and given the appropriate compensation for their contributions. There is an unspoken expectation by White members of the scientific community that women of color should provide their expertise pro bono. If they do not give it freely and try to assert their independence, then they can expect negative consequences for their career. I will return to Everett’s astute observation when I discuss the double bind (Malcom, Hall, & Brown, 1976; Malcom & Malcom, 2011) in the theme Negotiating Being “Conspicuously Invisible” Online.
Um . . . so, I was always very interested in nature and I loved animals. I still do. **clears throat** Um . . . and, but, you know, funny enough, I didn’t know, I didn’t know I could be a scientist. Um . . . I didn’t know that . . . I didn’t even know that there were academic institutions . . . that did research.

She was not alone in her lack of access to scientists and science careers. They also did not have people in their immediate family, friends, or neighbors who were scientists. Everett disclosed,

A lot of times, people are like, “I’ve been wantin’ to do this since I was a kid.” Uh . . . I didn’t know what it was until I was in college. You know, I didn’t know what investigative research was until I got to college, and my professors, you know, were the first scientists I was around.

Everett’s experience is the experience of most first-generation students of color who lack social and cultural capital (Bourdieu, 1997); they often encounter science education, research, and career options for the first time in college, which can leave them at a disadvantage compared to their White peers who may have more STEM experience (similar to the Matthew and Matilda effects of cumulative advantage, Merton 1968; Merton, 1988; Rossiter, 1993).

My participants serendipitously found themselves on STEM career trajectories as undergraduates, all of them influenced by being participants in special science recruitment initiatives and Research Experiences for Undergraduate (REU) Programs. For example, Nnenna enjoyed classes in anatomy and physiology but did not fully immerse herself in science research until she was invited to become a Ronald McNair Scholar. Everett did not get serious about a career in science until he did summer research in Wisconsin and became a participant in the Maximizing Access to Research Careers (MARC) Program at his undergraduate institution. He
felt blessed to attend college and get a science degree because he knew other men of color he grew up with who were in prison or dead.

Participants also fell into science communication and learned as they went. Guabancex relayed that she “stumbled upon science communication.” She elaborated,

Like, I didn’t know that science communication existed. I, I, like I had no awareness.

You know, I loved watching the Discovery Channel. I liked nature documentaries . . . but in my head, it was never, it never clicked that I was like, “Oh! That is science communication.” It, it just never occurred to me.

Most of my participants were like Guabancex, where science communication was not something they thought about or planned as part of their careers initially. For example, Alice happened to see a flyer for a science communication course on her way to a copy machine in the mailroom when she was a graduate student; she thought it would be a useful skill to develop. Meanwhile, Everett and Nnenna always wanted to write science blogs, but they initially did not know how to start and learned as they went.

Arliner was the only participant who had an interest in science communication from the outset, dreaming of becoming the host of her own wildlife show geared toward teenagers. Thinking about her original plan, she said,

There was nothing that focused on wildlife that they [teenagers] could actually see themselves; everything was exotic over in Africa. There were no women. You know, there were definitely no Black women. So, I was, like, I was going to, I wanted to put all these things together in one package, and I started blogging – 1.) as an exploration of those ideas and 2.) if I could start creating this blog and then put it out there, maybe I could get a following, and then a confluence of things and luck and connections – maybe
I can finally get this show. The show part didn’t happen, but I still met a lot of the goals from, from those ideas, uh, and with the Internet changing, and what has happened with that is that . . . this public figure, but it’s not quite the way I envisioned.

Though the vision of having her own show did not come to fruition, Arliner was still able to build herself up as a visible woman scientist of color who speaks about racialized gender justice. Her blogging did attract followers and has created a network for her within the scientific community, specifically, and in academia, generally.

What contributed to the successful careers of my participants was their determination, strategy, and entrepreneurial spirit, or as Arliner referred to as her ability to “side hustle.” Out of the entire group, only Arliner and Everett openly self-identified as growing up in working-class neighborhoods, both in the South. Whereas Everett talked about his classed upbringing as getting out of the neighborhood and showing the next generation that they, too, can be successful, Arliner was the only participant who detailed how class played a role in her past and present career decisions. She explained that working class families encourage their children to side hustle at a very young age. Looking back at her childhood, Arliner recalled how her family conversations were different from those of middleclass backgrounds,

My parents had discussions that working poor families have; when I finally got into the middle class and then upper-middle class people, which I was much later in life, they have . . . they don’t talk like that. Different conversations around the dinner table. Like, when these kids say, “Hey, I want to do some fancy-pants art” . . . or shadow someone from the country club or from parents’ work to get experience or an informal internship before leavin’ for college as opposed to, you know, when you’re 7, 8 years old in a working family, you’re encouraged to start hustling. They’re like, “You need to collect
cans. You need to go start babysitting.” Like, you know, we’re, you know, we’re taught really, really early on the importance of side hustles. *Really,* really early, and you don’t lose that. I’m *still* side hustling. They just keep *side* hustling, and that, you know, folks are like, “I’m always still countin’ all the money around me because, I’m like, I need more thirds⁵ on tap⁶.” A completely different way of thinking.

Arliner’s thoughts and actions regarding her career were strongly influenced by her working-class background. Working hard and saving money was ingrained in her since she was 7 years old, and the expectation was that she would find a variety of ways to raise money and contribute to the household, something that is not of concern for middle-class families.

When I followed up and asked Arliner about how she now hustles as a scientist, she smiled and replied,

> [T]he hustle now is, um . . . is constantly trying to secure funding . . . [for] research, or . . . additional training. So, that’s a hustle. In college, my hustle was keeping the scholarship money. **chuckle** That was, that was my hustle. Um . . . how to make connections and stay kind of ahead of things. My social media has been my hustle, um, as far as . . . making . . . making myself, connecting myself to other opportunities . . . uh, connecting myself to people and institutions who . . . have the ability to grant me access to resources I need professionally . . . or mentoring. That is, that’s still my hustle. Yeah, I’m still hustling.

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⁵ Thirsts – A nonalcoholic beverage that is one third sprite, ginger ale, and coke

⁶ On tap – Ready to be poured or readily available
Arliner considered one of the expectations of tenure-track faculty positions – grant writing – to be a side hustle she must engage in to keep her lab running. She also felt that her networking and social media presence is another way by which she hustles in academia, as these activities help her to locate potential funding, research, and mentoring opportunities. For Arliner, her racialized gendered identity was grounded within her working-class background, which, in turn, shaped her science identity.

**General costs and benefits of blogging**

As expected, my participants saw many benefits to blogging about science. They felt that it democratized access to scientific information, “promoting and sharing knowledge about the process of science but from a different perspective.” Anyone with “a level of expertise” to contribute could “chime in” and “engage in scientific discourse.” Alice, in particular, felt that blogging allowed for greater discourse in science, explaining,

> You’re supposed to publish things for people to discuss them, for people to try to duplicate them, for advancements. That’s just not how it works anymore. Right? We, we don’t do that. People, most people, most papers don’t get read, but what you can see, though, with the blogging and Facebooking is you see the kind of deed of discourse that people *dream* about in, in science. And you see it happening in *real time*, unedited and unfiltered by editors. It is literally a discussion, and I think that’s great.

She noted how academia claims to follow the scientific method, publishing results for discussion, duplication, and disciplinary advancement. However, the reality is that those presumed open conversations and engagement with the data through the publication of academic articles rarely happen. Alice claimed that blogging, on the other hand, can offer these real time, unedited discussions.
All of my participants thought that blogging provided scientists of color with a platform to speak that they would not have otherwise. Guabancex believed that it gave scientists of color a chance to “kind of be in the driver’s seat” and “share their experiences, not just about their research but . . . about their experiences as scientists of color, whereas before, maybe there wasn’t a platform.” As will be discussed later in this chapter, my participants talked about how their blogging platforms made them more visible but also gave them a level of control over their own narratives. It allowed them to speak truth to power in their own ways.

For example, Arliner felt that blogging “is all about just calling things, calling it out and bringing attention to things.” Blogging allowed her to voice the injustices and microaggressions she witnessed and experienced, perhaps providing her with some measure of stress relief. She spoke about using blogging to move past the illusion of meritocracy and mobility perpetuated by academia,

I find these ways of doing things [in academic science] that have nothing to do with authentic merit; I find these ways of doing things that privilege individuals from historically privileged groups, um . . . I find them to be structurally inequitable. I realize that, and once I fully took, took it into my head, so, during my graduate career, and I quit tryin’ to fight to make it, to make it what it promised it was . . . I quit trying to do that, like, in my head, and I decided to take that . . . dialogue outside of my head and cast it out. So, being a gendered scientist of color who blogs about science and science culture means I’m now taking all this stuff in my head that I had been implicitly gas, uh, gas-lighted over the years **chuckle** I’m feelin’ and I’m now putting it out there. So, it feels like having a conversation . . . out loud . . . where you’re simultaneously . . . you . . . well, you’re simultaneously talking to the people who you have collegial relationships
with, but then you’re also making them terribly uncomfortable all the time . . . because you’re calling out the structural inequality that favors them, and they just refuse to acknowledge it exists. It’s very, very . . . energetically consuming. **laugh**

Blogging allowed Arliner to “cast out” the negative experiences and speak out against the structural inequalities she had witnessed in the science community over the years. White scientists assume that academia is objective and that success as a scholar is dictated by one’s inherent ability and success (Leslie et al., 2015), but Arliner wanted to show that is not the case. Scientists of color often do not benefit from the Matthews Effect of accumulated advantage the way White scientists do (Merton, 1968, 1988) and, even worse, women of color are denied intellectual recognition due to their race and gender (Matilda Effect - Rossiter, 1993). As implied by Arliner above, the pervasiveness of Whiteness and colorblind racism in science is difficult for White scientists, particularly those who identify as liberal, to accept (Bonilla-Silva, 2006). However, despite its energetic expense, blogging allowed Arliner to get her thoughts and feelings off her chest and to confront them about these issues.

Like Arliner, Alice felt that blogging gave her and other marginalized scientists an opportunity to “protest.” Comparing writing to the impact that the musical Hamilton: An American musical had on the discourse around the numerical and symbolic representation as well as the visibility of people of color, she stated,

I think for certain writers and certain . . . folks that even the action of doing the writing and putting it out there is again some form of protest. Who knows what it’s against?!

Right? It could be something silly. It could be something serious, but I think, especially for people of color, I think for LGBTQ. I think we’re seeing that, right? With as trivial as people tried to make that Hamilton thing – being there, being on stage, being on stage in
what’s called the *Great White Way*[^7]... **laugh** and, and, and using your voice, like, itself is a form of protest. And I think the same thing goes for science writing. Just *doing* it and getting it *out* there, not even if it’s in the lens, or, or you’re not even explicitly saying these things, that it is a way for you to say that “I am here,” that “I’m an expert in my field,” and that “I have something to say.”

Alice believed that people of color and members of other marginalized groups could challenge the status quo just by existing and acting in the world. Similar to the actors of color in *Hamilton*, they could create change simply by using their voices in their writing and by being visible. Being a visible scholar in their discipline allows scientists of color to fight injustice through their writing and research.

Visibility was incredibly important to all of my participants, and it was a large motivating factor for their blogging. They all believed that scientists of color needed to be visible to show young people of color that they exist and that they can become scientists, too. They wanted to create a network of support and mentoring for current and future scientists of color. For example, Guabancex thought that blogging has

... helped *visibility* for scientists of color... you know... often we’re one of the few or the “lonely only” in wherever space, physical space you occupy, and blogging and, more broadly, social media has allowed... scientists of color to kind of find each other to, to give visibility to each other, to give visibility to issues that affect *them* as groups, that

[^7]: The Great White Way is the nickname of a section of Broadway in New York City that encompasses the Theatre District and is named for the bright lights on the theatre signs that shine above the streets.
affect their communities. Um . . . so I think it’s been a great . . . tool for . . . for visibility and for, for just sharing experiences that before . . . were being ignored or even suppressed.

Thus, blogging and, more generally, social media provided a virtual space for isolated scientists of color to connect, reenergize, heal, support, and rally. For example, Everett wrote a blog post detailing his creation of a group for scientists of color to come together and strategize ways to communicate science. Blogging creates an online fugitive space where “building requires tearing down in order to make anew” (Stovall, 2015, p. 71). For scientists of color, this means tearing down the barriers that exclude them from full participation in STEM, sharing their truths, and (re)imagining a true “science community.”

Though blogging was used as way to provide information to the public, especially communities of color, participants did not use it as the sole or primary means to speak about science and society. All of them engage heavily on Twitter, participate in online STEM groups, and connect with communities through face-to-face outreach. Alice was the only one who used Periscope on a regular basis to demonstrate what it is like to be a woman of color doing science in real time. She also appeared regularly on a science television channel. However, Alice and the rest of my participants preferred interacting with people face-to-face.

Despite their love of blogging, many, if not all, of my participants felt that they were overcommitted and could not give their writing the kind of time they wanted to give it. For example, Arliner had to cut back the frequency of her posting because she just started a tenure-track position. She explained, “Now, I’ve found myself hard at finding hard, uh, time to sit down and actually write out posts . . . That has happened to me since starting this job. Um . . . but I still have plenty to say.” Alice was in the same employment situation and bemoaned, “But lately it’s
been, because of other commitments, I just don’t have the time to do . . . all the stuff. I, I, I need to feel comfortable with the stuff I’m gonna put out there. Right?” She was not willing to rush her writing process and risk posting sub-par, under-researched material, for reasons that will be elaborated elsewhere.

**Trying to put “expertise and networks to serve” – Exclusion in STEM**

As much as my participants tried to use their science “expertise and networks to serve” communities of color, they often encountered people and situations that reminded them that they are “outsider[s] within” (Collins, 1986) STEM and science communication. Careful to mention that her observations of the treatment of other scientists of color were anecdotal, Guabancex felt that it was harder for scientist bloggers of color to “break into” the field of science communication not necessarily because it was saturated but because “the experience of being a person of color within science is dismissed as, ‘Well, that’s not science.’” Similarly, Nnenna mentioned that she, like most women of color, exist in a “blur of exclusion and sisterhood” throughout her life. The following are specific examples of exclusion in STEM brought up by my participants as they shared their lived experiences of being scientist bloggers of color.

**Alice’s blog post on Black hair in the lab**

Alice, who self-identified as an intersectional Black feminist in the physical sciences, was not shy away from discussing the challenges of being taken seriously as a Black woman scientist. Women of color are often criticized for acting or looking unprofessional in an attempt to exclude them from academia, and Alice and I chatted about how this plays out in lab spaces. According to Alice, “professional hair” is equated with straight hair. Thus, in order to conform to the standards of science culture, Black women must buy into Whiteness and relax their hair (Patton, 2006), though Alice felt that this attitude is beginning to change thanks to the natural hair
movement. In one of her blog posts, she wrote about how her hair was never her own because society has continuously tried to control her hairstyle – from men’s preference for long hair, to expectations for short “professional hair,” to racist pats on the head. Another one of her blog posts covered how Black hair texture is protected from discrimination by law but Black hairstyles (e.g., afro, dreadlocks, twists, cornrows, etc.) are not. Women of color can consequently be fired for wearing their hair in braids.

I followed up with Alice about these blog posts during our interview. She noted how the criteria for “professional hair” is different for White men and White women as compared to those for Black women. She chuckled,

Um . . . and what cracks me up, though, too, is you’ll have male scientists who have some *scraggley-ass hair*! He might even have, like, a mohawk. Like, again, like, mohawk guy from NASA [from live coverage of the Curiosity rover landing on Mars]. Everybody ate that up! Nobody was like . . . “If only he had professional hair, I’d take him more seriously’ . . . You know. Um . . . it’s not really about the hair. That’s what cracks me up because there are, again, White women with some crazy-ass hair. What’s up with the ombre-thing? You know, they got like a flip and an under-dye and low lights and highlights, and it’s like a mess. I’m like, “Get outta here.” And, but it’s my hair that’s the problem. No, no, no. And so once you realize, when I really got into it, it’s not the hair.

The hair is just a medium for another control of your Blackness . . .

Despite her good humor, I could sense Alice’s frustration in her tone and word choice. White scientists do not have to be concerned about whether or not they look “professional.” Their competence is never questioned, no matter how they do their hair. As Alice perceptively pointed out, it was never about the hair. It is about controlling scientists of color, forcing them to
conform to White ways of being in order to be considered legitimate scientists (e.g., Ong, 2005). The reality is that criteria for what scientists should look like are used to “other” people of color and to ultimately push out and exclude them from STEM.

Woke and resilient Alice did not let pushback about her hair and her Blackness derail her during her undergraduate and graduate education. Ignoring criticism, she embraced her natural hair and, over time, considered it to be part of what it means to be a visible Black scientist. Reflecting on attempts by others to contain Blackness and her own approach to hair in the lab, Alice expressed,

Um . . . but I think, so, that too, is that, again, part of being visible and being a visible Black scholar is I also try to be visible. Like, I wear my hair natural and, and it did not start out as a political statement. It was because [whispers] I’m so lazy . . . and so, I decided about it that way, and now as I’ve, again, as I’ve gotten older, and you realize what it’s really about, it’s a little bit, again, I’m just showing that I’m here and I exist as I am, and that will be protest enough . . . against the bullshit. **chuckle** And so . . . um . . . and so I definitely do that, but again, in a . . . lab, everybody’s hair’s up now . . . and I don’t care who you are.

Alice came to the realization that the resistance she has received (and most likely, will continue to receive) is part and parcel to being a woman of color scientist in a predominantly White, male field. Therefore, her very existence, let alone her hair, is a political statement that sets her apart from other scientists. Yet, Alice was quick to point out that she is a professional and expects everyone to obey lab safety procedures, no exceptions.
March for Science examples

The inaugural March for Science (M4S) in the United States occurred during my dissertation study, on April 22, 2017 in Washington, D.C. and numerous satellite marches across the country. Up until the day of the actual event, the march was a topic of conversation throughout the scientific community, as fear of the annihilation of federal departments and programs as well as resistance to funding cuts by the Trump Administration were at an all-time high. Countless folks debated whether science is or should be political since march organizers claimed that the event would be apolitical, nonpartisan, and separate from identity politics. This led to lively discussions on Facebook and Twitter about the planning of M4S. A detailed chronology of events and a critical analysis of M4S can be found on the website of applied sociologist Dr. Zuleyka Zevallos (https://othersociologist.com/sociology-of-the-march-for-science/).

Most of my participants were involved in calling out the M4S organizers on Twitter, tweeting their thoughts and concerns. They and other scientists of color felt “dismissed.” They did not feel included in the planning of the march; their voices were not heard. As a qualitative researcher and as a member of the newly revitalized Science for the People, I followed these public conversations closely, later co-writing a statement on behalf of the coalition (https://scienceforthepoople.org/2017/04/) and speaking to my participants about M4S during their interview sessions. They all reacted to the exclusion of diversity in the march in different ways. For example, two of my participants, Nnenna and Guabancex, chose to focus on and positively engage with their local marches. Nnenna stated that she personally felt that it was important to “leverage the public” at this time, though she confessed, “I’m very afraid of backlash . . . I’m very afraid of backlash.” She wanted to balance freedom of speech on science
policy and her position because she did not “want to burn bridges.” It is possible that this fear originates from her immigrant experience and goal of becoming a science entrepreneur. Speaking out against the Trump Administration’s policies would make her appear un-American and could potentially ruin her attempts to brand herself as an expert.

Meanwhile, Guabancex worked closely with a couple of local M4S groups, electing to critique the national march on Twitter and then avoiding further engagement. She and the other organizers of her local march chose to emphasize personal stories in science to unify the community. Guabancex shared, “I really do believe [in] the power of storytelling to connect, um . . . so that it’s about the ‘why’ and the ‘so what’ of why people are in science, instead of the ‘what’ and the ‘how.’” In regards to the controversy around diversity, she believed that the flagship march was “incredibly poorly with this issue” and were “incredibly tone deaf.” However, Guabancex understood why organizations and other scientists of color would support the national march because, through its networks and connections, M4S established itself as the go-to STEM organization. Using one particular science organization as an example, she reasoned,

[T]hey decided to still engage with the march, which . . . I understand why they’re doing it. Um . . . you know, they’re, I think their perspective is “Yes! They . . . it’s, it’s a shit show and they’ve done a terrible job but, you know, this is a, a very unique, unique and potentially historic opportunity, and as, you know . . . they already brand themselves as being the STEM diversity organization.” So, I think in spite of . . . they have to engage, and they would rather have a seat at the table . . .

Guabancex recognized the existing power structure among STEM organizations and where her referenced organization stood given that most of its members are scientists of color. Despite their
personal feelings, they had to make sure to support the march or else face exclusion from major science policy decisions.

Arliner and Everett also noticed the underlying power hierarchy influencing the participation of STEM organizations in M4S. Thinking about the implications of the march on science policy, Arliner predicted that prevailing power structures and disparities would continue to exist and even strengthen,

I think we’re gonna see . . . doubling down of the existing power lines that we already have in science. It’s going to be reflected in . . . in whatever this next iteration of March for Science is. The, the lobbying part – I think it’s just going to reflect and double down. . . um, the existing power structures and disparities that already exist in science. So . . . it’s revolutionary from the point of view that it’s never been done before . . . but it’s not revolutionary as far as . . . what it’s going to achieve and who, who are gonna be the face of it and what, what they’re asking for.

Arliner highlighted that some people may think that the M4S will usher in major changes in the science community, but from her perspective as a woman of color scientist, she believed that the community will continue viewing Whiteness as property (Harris, 1993) and will increase their efforts to dominate STEM, primarily fighting for the needs of White scientists.

Everett noted how money played a large role in M4S and in science policy, generally. In the months leading up to the march, he created a document based on his policy experience that he shared online with a script and explanation of how to talk to members of Congress, emphasizing dollars and cents. This policy lens came into play when M4S started to announce their organizational partners. In his conversation with me, Everett remarked how STEM organizations supporting the march were looking out for their own interests. He logically
concluded,

So, now that these big organizations are . . . signin’ on and givin’ ‘em money . . . it, it makes it even more difficult to be critical or for a criticism to be heard because it’s kind of like . . . you know, how people . . . if it was true, these organizations wouldn’t partner with them.

As suggested by Everett, small science organizations and scientists with marginalized identities are forced to conform to the larger scientific community and support M4S. If they do not, they could be excluded from funding and support as well as have their legitimacy as scientists and their allegiance to science questioned.

Despite the possibility of exclusion, Everett was very active on social media speaking to the M4S organizers about changes they needed to make to be more inclusive. He and other scientists of color tried to reason with them, but to no avail. During our conversation, he quickly sent me a flurry of screen captions and links. He seemed frustrated, not about the organizers dismissing him, but by how other marginalized scientists, particularly women of color, were being ignored. He said,

Uh . . . I’ve moved beyond disappointment to full-out outrage with them, and one of the reasons is . . . they seem to have somewhat of a coordinated effort, like, some of the . . . some backchannel ways of communicating. So . . . anytime that . . . somebody’s being critical, especially women, specifically women of color and women, in general, they always have somebody to jump in that thread . . . and basically start trollin’ people. And what’s interestin’ about that is, I will be on those same threads . . . So, it’s, it’s, it’s really . . . like, the, the level of misogyny, misogynoir, or, like, misog-brown, it, it’s, women of color, it’s . . . it’s . . . it’s startlin’. It’s basically like . . . oh! I’ve had other conversations
with people. I jump in and I start criticizin’ them and they . . . they won’t even respond to me. But if a woman of color is in that conversation, they will keep talkin’ to them, even when other people get in the conversation. They don’t really interact with men.

In an attempt to be an ally to women of color, Everett tried to redirect attacks towards him on social media, but his strategy did not work. He is angered and irritated by how difficult it is to identify and reach M4S organizers, going so far as to hypothesize that they have individuals who are tasked with jumping into threads to troll march dissenters, many of who are women of color scientists. It cannot be confirmed if the trollers were from flagship M4S, but Everett’s evidence and comments support how patriarchy tried to reassert itself within the science community during the planning of the march to exclude women.

Everett was not the only one upset by M4S; Alice absolutely refused to take part in the event, stating that “there’s always been scientists that have been activists.” Annoyed by the fact that White scientists were making the march out to be a new, inventive idea, Alice bristled,

So, for people to act like this is new . . . is getting nothing but . . . “I don’t think so” from me . . . cuz this is not how this works, and what happened is, no, what you had is predominantly White scientists who realized that their pay and their grant money was gonna be affected in a real way. They didn’t show up for . . . [anything] else. They weren’t at any other protests. This was, this is always, there’s always, we, we have been living in an era of a war on, a war on science . . . for a long time now. This isn’t new. Um . . . and so, for them to act like this is a new level of affront, is to me, it’s insulting. [. . .] Like . . . and so, now you wanna get all up in your feelings about it.

When literally, like, when I think about how many, again, underrepresented minorities have been fighting for a long time, just to have access . . . to be able to do the thing that
you’re now mad that YOU. Might. Not. Be. Able. To do. So, you can go march. You go
do that, but we’ve been fighting this whole, like, that . . . I’m just like [makes a face with
a side-eye]. We’ve been fighting this whole time. Where have you been? We’ve been
marching and protesting and calling and trying to get access and money and funds and
programs, but now that they finally come to the White House, you wanna be mad about
it. And at the same time, actually have the audacity to say science isn’t political.

Alice was offended by the obvious interest convergence (Bell, 1980) at play during the
organizing of M4S. White scientists were willing to protest and rally others to stand up for the
rights of the science community now that their funding was in trouble. She noted that federal
funding for research was in decline for years and that women and scientists of color had been
disadvantaged by the established grant structure (Guglielmi, 2018; National Institute of Health,
2018). No one stood up then. As demonstrated by the thematic repetition within the passage,
Alice was clearly livid that White scientists were coopting a political strategy historically used
by communities of color (e.g., March on Washington) for their own benefit while simultaneously
renaming it as apolitical and excluding scientists of color.

As one of the women of color scientists engaged in heated Twitter conversations about
M4S, Alice experienced and talked about the opposition a scientist can face if they decided to
critique or avoid participating in the march. White scientists tried to push marginalized scientists
to partake in the event, claiming that “we’re all in this together” and setting Alice off. Listing the
ways in which science has exploited and harmed people of color throughout history (e.g.,
Tuskegee experiment, forced sterilizations of women of color), she stated bluntly, “We have
never been all in this together, and that’s disingenuous on its face.”
Alice’s frustration as she reflected on the history of exclusion in STEM culminated in her interpretation of the message M4S organizers and supporters are sending to those who criticize the march via social media. She gave a biting analysis, stating

You make it seem as if, again, they set it up as . . . “If you’re not with us, you’re against us.” No. If you’re not with me . . . like, why do you get to set the tone of, “Well, then you’re not really serious.” Again, you’ve . . . they’ve taken ownership of what it means . . . to be a scientist . . . and to, and to be pro-science. And, you know, the amazing . . . in an eleventh-hour coup . . . they have yet still also managed . . . to, to change the entire interpretation in the course of being like, “Well, if you’re not going to be for us, then you’re against science.”

According to Alice, White scientists who support the march are attempting to control what it means to be a scientist and what it means to support science. Those who question or do not completely back the event are automatically labeled as “not really serious” about science or anti-science. They do not belong in science. Alice appeared tired of Whiteness as property (Harris, 1993) in STEM but also hurt by the fact that the very community she is a member of (the science community) is attempting to exclude her and other marginalized scientists again.

**Arliner’s “livin’ in a Venn”**

In sharing her entry into science communication and blogging, Arliner expressed her annoyance with the current discourse about the recruitment of people of color in STEM.

We’re already in STEM; so, even though, yes, we’re still talkin’ about diversity and inclusion, but how we treat the handful of Black, Latino, indigenous, alternative – whether it’s people with disabilities, LGBTQ – the folks who are just already . . . how we treat people who just already exist matters before we can attract more.
She said this was one of the reasons why she does the work that she does, to voice the concerns of people of color already in the science community. I noticed that she stopped short of describing how the “handful” of marginalized scientists are treated, and I was not sure why she chose to self-censor; perhaps she was reflecting on how she has been treated. Regardless, it led to her creation of a wonderful metaphor for her lived experience as a scientist blogger of color.

Arliner beautifully encapsulated what it means to be a racialized gendered scientist blogger of color by referencing a Venn diagram. Talking about the different audiences she tries to speak truth to as a blogger, she shared,

So, I’m in the Venn. That’s what I call it. So, I’m a scientist but I’m also a person of color, and these two communities don’t overlap nearly enough. Those of us who live in the Venn – we represent this really, really tiny sliver of individuals who speak both science and our culture. This one time, this, some of the time I’m talking just to scientists, which don’t tend to be enough people of color. Then, other times, I’m talkin’ to my community, primarily African Americans, where many, many people aren’t science or STEM, and that’s a big disconnect. Like . . . livin’ in a Venn is . . . is tough sometimes. Sometimes you’re literally caught in the crosshairs. You’re accused of being on the wrong side. You’re accused of having split alliances. There’s . . . it can be lonely. It can be really, really lonely sometimes, but, but because I still fully belong to both, I really care about getting it right. I care about scientists getting it right – how we talk to and interact with people from underrepresented groups, and it . . . how, even within my group, how we talk about and use science. It’s, it matters for both. Yeah.

Arliner is literally and mathematically the intersection of two different communities. Similar to W.E.B. Du Bois’ “double consciousness” and Malcom and Malcom’s (2011) “double bind,” she,
like most of the other participants, felt as though she had to walk a fine line between two worlds – a predominantly White science community and the Black community. Scientist bloggers of color must navigate marginalization and –isms (racism, sexism, etc.) on the one hand and distrust of science on the other.

Arliner lamented, “We still can’t seem to shift the narrative,” to get communities of color to trust science and scientists. However, she recognized the legitimate fear and mistrust those communities have of established institutions, like science and higher education, based on their experiences of colonialism, Jim Crow, and structural racism and inequality. According to Arliner, these institutions “worked in the service of White supremacy and colonialism” and were “one of the most effective and successful . . . um, tools of oppression, exclusion, and harm of people of color.” It is very difficult for communities of color to automatically trust Western science when they have been lied to, abused, exploited, and killed by that same institution.

Thinking about the history of science in relation to the Black community, Arliner sadly reflected,

There’s still this very latent, real [visceral] memory of . . . medicine and of science. [long pause] Telling people, “Oh, no, no, no. It’s not like that,” when they still see examples. Just, “Though there’s still some cases of some egregious things, but maybe not as egregious” . . . So, it’s kinda hard to do that.

Arliner found it difficult to exist at the intersection of the Venn of the science community and the Black community, as she often felt excluded by both groups. I could see that it especially bothered her that she had to try to convince her own people to trust her, but I also understood that she was willing to take on the burden because too much was at stake for the Black community for her to give up. Arliner, like the rest of my participants, was committed to communicating
Performance of Public Intellectualism

I was interested in how my participants performed as public intellectuals. That entailed finding out their decision-making regarding blog topics and rhetoric as well as their strategies for and motivation behind why they communicate science the way they do online. My participants’ online engagement coalesced into the themes Nuts and Bolts of the Work and Multiple, Intentional Forms of Engagement Can Reaffirm Identity, as well as the sub-theme Collaboration and Solidarity (from the theme Putting “Expertise and Networks to Serve”). The former theme was comprised of the sub-themes: Interest in Blogging, Learning by Doing, Accessible, Cultural Relevance, and Motivation. To clarify, the sub-theme Interest in Blogging dealt with the initial draw blogging had on participants while the sub-theme Motivation focused on what kept them blogging. The theme Multiple, Intentional Forms of Engagement Can Reaffirm Identity, contained the following sub-themes: Blogging Shapes Identity, Cultural Pride, Engagement not for Everyone, and Recasting Public Intellectualism.

Ultimately, my participants’ engagement as public intellectuals boiled down to cultural intuition, accessibility, and solidarity. The following sections illustrate this through general trends among participants as well as specific examples from participant interviews.

Nuts and bolts of the work

My participants shared their personal connections to blogging, deeming it a viable way to contribute their expertise with fewer structural barriers and to enhance the visibility of scientists of color. They also viewed it as a space for interaction, questioning, and reevaluating their thought processes. Alice and Arliner were especially attracted to blogging because it provided
them with a level of control over their own narratives. For example, Alice felt that blogging can be a creative outlet and liked blogging because,

> You can have your voice out there, and, and you can talk about the things that are important to *you*, um . . . and, and have real control over the narrative, and, and you can also, you know, since it’s your blog, turn off the comments . . . **chuckle** it could be anything you want it to be, if you put in the work.

Arliner had similar sentiments, describing blogging as a “monologue,” a “medium to kind of explain things and put things out there,” and a “living portfolio that demonstrated my values” that “represents my voice.” Big believers in the democratic possibilities of social media, Alice and Arliner thought that blogging gave scientists of color the power to create their own counter narratives to the master narrative that science is for White men.

Despite the control blogging may provide scientists of color, my participants recommended that new bloggers should be selective and intentional. It takes a lot of work to get a new blog off the ground. They also suggested that new bloggers should find out what they are good at and set goals. However, once they decide to write, they should just start and “see how it goes.”

When I probed further in regards to their own writing process, all of my participants said that they were driven by emotion and intuition to write. For example, Guabancex described it as “an itch that if I don’t scratch it, it’s just gonna kill me.” Arliner shared that she aimed to be a conduit for science access by writing about “[b]asically, whatever’s making me feel very, very passionate and heated in my belly.” Using related imagery, Everett stated that there are times when he writes about things that he has been thinking about for a while, but “then every so often, like, something happens, and there’s, like . . . it, it’s like a *fire* gets lit in my belly.” He
elaborated,

[A]ctually, for me, a lot of times, it’s like somethin’ happens and there’s like, this, like ...

*gut feelin’ or passion* about it. Like, the *thoughts* just flow. I don’t, you know, take a

topic and, like, you know, “Let me research this and develop somethin’.” It’s more like,

“Okay. This is . . . you know, I feel a certain way about it” and, you know, I try to

marshal my . . . knowledge of it and, like, you know . . . my experience with it, and then
do research to say, “Okay. This is how I feel about it. What is there actually for me to
say? Am I on the same page?”

Thus, my participants listen to their cultural intuition (Delgado Bernal, 1998) to guide their
writing. Like Everett, they research their blog topics to inform and confirm or reevaluate their
experiential knowledge of the topic. In the next sections, Alice, Everett, and Guabancex further
illustrate how my participants uniquely performed as public intellectuals online.

**Alice’s use of humor and cultural relevance in blogs**

Alice’s blogs were the best examples of writing that aim to attract a general group of
science enthusiasts using culturally relevant themes, language, and humor. With cheeky phrases,
slang, memes, and GIFs, her blogs had little to no jargon and demonstrated how she tried to

“write in a, in a fun . . . informative style, but . . . being very careful to be technically correct.”

Alice was a firm believer in making her blogs entertaining, sometimes being funny and sarcastic
and other times taking a more serious “narrative arc.” She balanced technical scientific writing
with cultural references, slang, African American Vernacular English (AAVE), and wacky
images to make science relatable.

In talking about how she tries to make her writing accessible, Alice joked,

I am like, “Grammar is for suckers!” No. But I always go with what *sounds* better . . .
than what *looks* better. Um . . . and that’s just my rule because I think about how I read other people’s stuff. You know, how you read it? And you’re, like, in your head, I’m like reading it out loud even though I’m not reading it out loud, I’m like, “Well, that was awkward!” Like, I’m just like, “How? That’s not . . . like, would you really say . . .?”

Alice was not concerned with “proper” English grammar rules, something that often occupies White academics. She would read her writing out loud and listen to her own wording. Her goal was to write in a conversational tone that invited readers to the topic she wanted to share with them.

Similarly, Alice was motivated to write about things that either impacted her or the Black community in some way or grabbed her attention “not only as [a physical scientist] but also as a person of color in STEM and a woman in STEM, more importantly a woman of color in STEM, because that’s a unique . . . thing, and, and an intersectional experience.” Clear examples are her multiple blogs on Black hair, discussing riot control in Ferguson, and typical household chemicals. She wanted to humanize scientists by connecting STEM to social issues. She explained,

[S]o, I don’t just write about science. I do write about . . . you know, social issues because for me, I, that’s, it’s not, I don’t, I’m not just a scientist and the social, social constructs permeate every level of society, every job, and they impact my ability to do my job.

Alice aimed to bring her whole self in her writing, intentionally thinking about tone, voice, flow, and humor. Like my other participants, she wanted to talk about serious issues that impacted her and her multiple communities using accessible language and her intersectional lens as a Black woman.
**Everett’s take on jargon**

Everett was adamant about scientists having the ability to communicate science to the public using little to no jargon. He said that people who can write scholarly articles “in an easy, readable way” have products that go “over a *lot better* . . . because you don’t, you don’t want people working while they’re reading. You want reading to be easy.” He felt that writing in an accessible way provides a benefit to the writer in terms of getting their message out. Using his own writing as an example, Everett shared,

> [S]o, I try to write in a way that is accessible, and what I find is, is that, if you write in a way that’s *accessible*, . . . what I generally find is that I blow up . . . I’m, I’m able to blow up a lot of . . . the counterarguments. Right? Cuz, so, basically, what I, what I hope is if somebody sees somethin’ that I’ve written and they’re like, you know, they’re mad about it . . . they’re gonna have to *actually* sit and put together a *coherent* argument because I’ve . . . brought up what they’re want--., I’ve tried to bring up arguments in the, in the writing so that it’s like, well, you’re not just gonna be able to come up with somethin’ obvious. You have to come up with somethin’ thoughtful, and you might be right! I’m not tryin’ . . . cuz I’ve wrote somethin’ doesn’t mean I’m, I’m absolutely right, but what I’m tryin’ to say is, “This is what I *think*, and if there’s somethin’ better, you should *articulate* it and articulate it in a way that people can understand it.” Because if you *can’t* do that, then, like, “Okay then. Why are you talkin’ to me again? Oh. You’re just venting about whatever. Okay.”

Everett aimed to get his blog readers thinking about the topics he wrote about. He intentionally avoided jargon and explained science concepts in detail, all the while scaffolding his argument.
and encouraging critical thinking. He was willing to relinquish being right as long as the person opposing his view could articulate their argument in a creative and accessible way.

Everett was sought out by other scholars for assistance with communicating science to a broader audience. Yet, these same scholars refused to change the way they wrote. Everett encountered this resistance because they still wanted to infuse their writing with academic language, and he found this amusing, saying,

You spend a lot of time writing scholarly articles. You know, you’re writing to your peers and it’s almost, like, you have to tell them, “Look. Okay. Nobody cares how much of a wordsmith you are or how smart you sound. Like . . . nobody cares. The point is – who’s your audience? If you write like this, first of all, it’s not gonna get published in certain places because they’re going to be like . . . the editors might be like, ‘I don’t even understand, you know, 20% of what you just wrote!’”

Everett emphasized focusing the message to a particular audience rather than assuming that every reader will be a scientist or will have the science background to follow along. He also explained the practical nature of being a science writer outside of academia; an editor is not going to publish a piece of writing that they or their readers are not going to comprehend.

Reflecting on his own blogging, Everett wanted to get people thinking about social issues related to STEM by posing questions in his writing. It was his attempt at creating a more egalitarian space online. He explained,

What I try to do is I write it in a way that I’m makin’ my point, I’m makin’ arguments, and . . . and in the, like, the way I try to write is, I try to pose questions. And . . . cuz the main thing I want to do is make people think about, “Oh, okay. He just said this. Here’s a question. Here’s a potential answer.” And . . . you could contribute to answerin’ this
question. Uh . . . but I’m not trying to . . . I’m, I’m not tryin’ to be in the Ivory Tower. To me, that’s, that’s probably more of what I’m doin’, is that . . . scientists have to, you know, and academics, have to come down from the Ivory Tower and, and, and interact with the masses. And it’s, the thing is, is that . . . I can take for granted that I’m around scientists all the time, that I know a ton of Black scientists, and that’s normalized for me. It’s not normal for a lot of other people.

Everett wanted to involve the public in questioning, thinking, and talking about science and social justice, but he did not want to be seen as the expert or the person with all the answers. To him, scientists and academics, in general, should be working with the public to address science questions that directly impact society. For example, he wrote a blog post that attempted to get fellow scientists to use their research skills to mentor youth in the community. He acknowledged that he has the privilege of knowing and interacting with scientists of color on a regular basis; so, he wanted to make science accessible to others in the Black community.

**Guabancex’s focus on being “a more conscious communicator”**

Guabancex loved being a science communicator and used blogging as “a way to kind of summarize and track [her] ideas,” beliefs, and opinions. She valued blogging because it helped her to be more effective and to develop her writing. She referred to it as her *bitácora*, (or binnacle) which is a stand on the deck of a ship that stores navigational tools for quick reference and protection. Guabancex felt her *bitácora* made her “a more conscious communicator,” helping her to reflect on what she wanted to say and how she wanted to say it. She mused, “Is that really how I want to say it? Um . . . you know, I try to be very, um . . . intentional and, and *strategic* and *mindful* about the words and how I say things.”
Guabancex walked a fine line between intentionality and visceral reactive writing. She admitted that she often needed to write in an attempt to express her complex feelings about things. In talking about her writing process and topics that inspired her to write, Guabancex chuckled,

Um . . . so, you know, for those kind of [emotional/reactive] posts, it’s, it’s like that. It’s like, you know, I really have something to say and if I don’t say it, I’m gonna explode. And so, usually the process is, like, I need to say this and then I, you know, depending if, if I’m on the go, like, I’ll type notes frantically on my phone. Or if I’m in front of a computer, then I’ll just start a draft, um . . . but then the process of publishing, it’s much more, it’s much less kind of an instinctive reaction . . . and I usually take the time to . . . to edit myself and to worry about purpose. Like, alright, you know, initially this was the emotion. This was the feeling. This was the idea. Here’s what I wanted to say. You know? Is that really what I want to say?

Guabancex wrote her blog posts from the heart first, getting her initial thoughts and emotions on the page. However, she reviewed and revised her work using a critical eye and making intentional choices with her wording.

Guabancex gave a lot of care to science writing, including articles and blog posts, but it was not because she felt that she had to censor herself. On the contrary, she wanted to clearly articulate her own opinions and experiences. Reflecting on her career growth as a science communicator, she divulged,

[Y]ou know, I loved writing articles and learning about what people were doing, but I, I really . . . as I progressed [in my career], I kind of, there was this increasing need of expressing, like, my own views, um . . . and, and my personal experiences and tell my
own stories, not just tell other people’s stories, and you know, I’ve kind of come to understand the value of that visibility, of, of, you know, really kind of reasserting that identity and, and, and, you know, that my experience is valuable, um . . . in this science space. Um . . . but, you know, I think that’s something that I got . . . actually, I think I started getting comfortable with . . . that idea of being like, you know, “This is my opinion and I don’t really give a shit if you agree with me or not.”

Guabancex became more aware of how important it is for her to reveal her own personal narrative of being a woman of color in science, writing a post about an experience that revealed to her the importance of Latina/o scientists being visible. She shifted her writing from telling the stories of other scientists to “bridg[ing] that gap . . . between . . . your community and cultural values and . . . the values and your identity as a scientist.” She became more comfortable with being a visible scientist of color.

Similar to Everett, Guabancex saw using accessible language in her blogging as an issue of power and privilege in science. She understood that she was one of a small percentage of people with a doctorate in science, which gave her access to information, resources, and networks that others are often denied. She reasoned,

It’s like a really low number of people get Ph.D.s and, you know . . . being a scientist is a powerful position cuz you, you know, you have access to . . . not, depending on the institution and other, and the context, but, you know, generally speaking, you have access to . . . a lot of resources. Obviously you have access to . . . to a lot of education . . . um, networks of power. [Y]ou know, you have the privilege of, of generating knowledge, um . . . and, you know, you’re kind of like . . . a guardian of, of, a creator and guardian of knowledge, um . . . and that’s a very privileged position to, to be in, and, you know, I, I
think a lot about how, you know, knowledge is power and, and how because of the position I’m in, you know, we are gatekeepers. Scientists can, are gatekeepers of, of knowledge and, and the process of the creation of knowledge, and so I often think about how I can make that more accessible to, to people, particularly people who are not . . . participating in, in the process of science or don’t have access . . . um . . . already access to scientific knowledge. Um . . . how can I . . . make that knowledge and that process more accessible so people can be empowered to use it in their own lives? Um . . . and so, you know, one thing I’m thinking is how can I use my position of, of privilege to . . . to, to make science and scientists more accessible to, to the communities that I care about, which are communities that are, have traditionally been excluded, even oppressed by science.

Guabancex undoubtedly comprehended that she and other scientists are privileged to be knowledge producers and knowledge holders. Yet, unlike dominant thinkers within the science community, she and my participants felt obligated to make the scientific process and information accessible to marginalized communities. To them, a vital component of being a public intellectual is accessibility—access to language, knowledge, and connections in order to empower communities of color to question and make informed decisions.

**Putting “expertise and networks to serve” – Collaboration and solidarity**

All of my participants were adamant about using their science expertise and networks in service to their communities. Nnenna wanted to give African immigrants more visibility through her work, while Guabancex focused on reaching out to the Latinx community. Alice self-identified as a visible Black scholar to inspire other women of color in science, and Everett was focused on guiding young science students and scientists of color. He made sure to recommend
other scientists of color for opportunities that come his way, insisting, “Let’s make sure they get some shine.”

Meanwhile, Arliner emphasized building relationships with communities of color in her interviews. She described forming relationships with neighborhood children and teachers to get to know her field site and recruit research assistants. She explained why this process was so important,

You know, like, I want to continue doing research in this area. I need people who live here. You know, to be a part of it. I also need people to help me collect this data . . . so, then you’re getting this training to do it. Um . . . so . . . so, it’s about relationship-building. This is the part that I think a lot of folks don’t appreciate when it comes to . . . science outreach or community engagement. It’s that people are too impatient. They want things to happen immediately. This is a long game. You know, I don’t get to just show up in the community and go, “I’m here.” This isn’t, like, so like, what I’m doin’ now? This isn’t data for me right now. It’s not. I accept that. This is ground-building. This is networking such that if I’m lucky, I can start getting data in a year, but so many people are too impatient and they feel like, “Oh. You’re too invested.” You’re right. If you’re . . . that means you don’t really want to be a part of the community. You don’t really want to engage them; you’re not willing to wait for them to give you permission . . . to be in their community. Uh . . . but that’s how you do it.

Unlike most White scientists socialized in Western, colonial science, Arliner suggested a decolonial practice where scientists need to ask permission to work within marginalized communities (Tuhiwai Smith, 1999). They should take the time to develop relationships with
community members and involve them in the research process. There should be reciprocity and respect.

Similar to Arliner, Everett’s perspective was that scientists should be involved in social issues because they are impacted by them as well. To him, it is just logical to support others. Everett clarified,

What you see is . . . it doesn’t matter until it impacts me. Right? So, you look at all these issues, especially social issues, most of them have, have not mattered until it’s like, “Oh! That impacts me!” And it’s like, “Yeah, dummy!” If you would just, like, pay attention to what other people were saying and stop being, frank in a lot of ways, racist, whether you know it or not . . . and, and pay attention and, and, you know, and help support people, what you will find is . . . that, like, that’s how you have the whole situation like “A rising tide raises all boats.” If you take people as much directly impacted . . . and put them in a more prominent position and support them, you won’t be impacted . . .

At first glance, Everett appeared to be pointing to interest convergence (Bell, 1980) as a way to encourage allyship among White scientists. However, by talking about identifying and empowering those who are most impacted by social issues, he was pointing to true solidarity and social justice. Everett thought that we should learn how to organize and work with others by following the example of women of color.

**Multiple, intentional forms of engagement can reaffirm identity**

All of my participants used multiple ways to communicate science and were intentional with how they engaged with the public. By being mindful of their audiences and multimedia use, they felt that they learned more about themselves as scholars of color. For example, Nnenna shared, “Being an African American first-generation Nigerian is a unique experience. I want
folks to see the entirety of who I am, that I’m an immigrant who has done what I’m supposed to do.” She wanted to present a holistic depiction of what it means to be a first-generation African immigrant in STEM, though her qualifying statement (“who has done what I’m supposed to do”) is troubling since it suggests that she believed that there is a correct way of being an immigrant to the U.S. and within science.

Meanwhile, Guabancex believed that blogging transformed her professional identity, making her “hyperaware of . . . how I . . . share that identity and, like, the story of that identity” as well as the intersection of her multiple social identities. She felt that the totality of her lived experiences made her resourceful and resilient. Likewise, Arliner shared that blogging allowed her to express and own her identity. She articulated that blogging made her voice more activist, focusing on “being really, really clear and completely unambiguous about who I am, what I care about, and what I do, and making sure that there, that those three things are indistinguishable.” Arliner was true to her word as she read to me her lab’s mission statement and showed me the logo she designed.

Through blogging, my participants worked to be seen as legitimate scientists and intellectuals, but also as real people. They took care to craft their messages, noting their audiences and making sure to write about science in accessible, culturally-relevant ways. They collaborated with other scientists of color and aimed to build relationships with communities through a more decolonial research process. The online performance of public intellectualism by

I did not probe Nnenna further about her statement, but I assume that she being the “right” immigrant to the U.S. would entail documentation, no criminal record, hard work, and a belief in meritocracy.
my participants was intentional and communal, with the goals of spurring greater science literacy\(^9\) and inspiring a new generation of scientists of color.

**Racially Gendered Public Intellectualism Online and Off**

Looking at how my participants performed as public intellectuals through their blogging, I wanted to understand how they were then racialized and gendered. I was curious to see if they were treated differently online and offline based on their race/ethnicity or gender. As a woman of color myself, I was not surprised by the fact that my participants developed strategies to establish their credibility and defend themselves from trolls. Despite some of the benefits of being visible scholars of color on their blogging platforms, they continually had to prove their competence to the predominantly White science community. It seemed that by minimizing the number of ways that they could be attacked online, participants were able to reaffirm their own racialized gendered science identities. I elaborate further in the following sections using the theme Negotiating Being “Conspicuously Invisible” Online and the subthemes Cultural Pride and Engagement not for Everyone (from the theme Multiple, Intentional Forms of Engagement Can Reaffirm Identity).

\(^9\) The National Academies of Sciences, Engineering, and Medicine’s Committee on Science Literacy and Public Perception of Science (2016) documented the shifts in the definition of science literacy over time, but noted some key aspects that should be identified at the individual and community level - the understanding of scientific practices, content knowledge, and understanding of science as a social process. These aspects are what I refer to here.
Negotiating being “conspicuously invisible” online

Talking about her interactions with fellow scientists online and offline, Arliner mentioned how she still felt “conspicuously invisible” even though she is very active in the public sphere. When appropriate, she would share her blogs and TEDx talk with White colleagues, and they would be surprised that she was involved in particular activities or that she knew “big name” scientists and science communicators. There was a disconnect between her online and offline professional identity, where the in-real-life Arliner, who is a Black woman, could not possibly be the virtual scientist blogger Arliner. She was like Schrödinger's cat—simultaneously visible and invisible.

My participants had to negotiate this conspicuous invisibility as scientist bloggers of color. The women of color (Guabancex, Nnenna, Alice, and Arliner), in particular, were doubted, challenged, mansplained, and often not taken seriously as a scientist. They felt that their work did not get amplified like the work of White scientists. In regards to blogging and science writing generally, Alice pointed out that the amplification of voices “still, key . . . big people, names that people always say with science writing are still White men . . . occasionally White women . . . and, so unless . . . you’re on their radar, you’re not gonna get out there. And that can be a real challenge.” She stated that, as a woman scientist blogger of color, “It seems as if you have to hustle and really hustle to get kind of mainstream.”

Alice also thought that there was an unspoken expectation for women of color to be maternal and domestic. She reflected on her experience as a Black woman in science,

[When you show up at different professional realms, especially talking about things that are very technical or scientific, that colors how sometimes people treat you. You should be feeding them. You should be educating them in the way they want as the help, not in
the way of which you are best able to help them with your area of expertise, experience, and knowledge. So, those are two different things. Who gets to tell an expert how they’re going to be an expert? Right? **chuckle** So, I think that I’ve noticed, too, the, the kind of stereotypes of women in science, especially women of color. . . . it’s a *double-whammy.* There’s this idea that women don’t have the *whatever* to be a scientist, and then, there’s *definitely* the hangover of people of color — *really,* specifically indigenous, Black, and Latino (We don’t see this type of behavior with Asian Americans because they have their own stereotype burden) — being sufficiently scholastic, not being, having a high-enough IQ, and so, having that double hit. . . . can mean that you are always second-guessed. Um. . . . “Is this really your work? Are these really your words? Is this really your idea?” You’re constant CV-checking almost, like, almost. “But is it really though? Did you really come up with this?”

Alice illustrated the disconnect between the online and offline professional identities of women of color bloggers in science, as White people often refuse to acknowledge that the virtual and real-life scientist of color are one and the same. They expect women of color to perpetuate racist and sexist stereotypes, particularly by having a low intellect. As Alice noted, women of Asian descent are often the exception, as they are challenged with the model minority myth, a harmful culturally racist stereotype that pigeonholes all Asian people as being hardworking, intelligent, and naturally proficient in STEM disciplines in an effort to shame and control other racialized groups (Trytten, Lowe, & Walden, 2012; Poon, Squire, Kodama, & Byrd, 2016). These stereotypes are reinforced within institutions and can function intersectionally, causing women of color scientists to experience greater imposter syndrome and stereotype threat (Lindemann, Britton, & Zundl, 2016). They doubt their own intellect, abilities, and achievements.
Being “conspicuously invisible” was burdensome for my participants. Alice described it best by stating, “In addition to doing your job, you now have an extra job of managing someone else’s behavior . . . You’re helping yourself, but you’re still taking care of someone else’s shit.” Consequently, she and the other participants had to strategize and develop ways to minimize the impact of racialized gendered micro- and macro-aggressions (Sue et al., 2007). For example, Alice recognized and reflected on power dynamics in her online interactions,

I, I literally assess the medium. “Do you have any power over me?” Cuz, let’s be real. If the person you’re dealing with has real, tangible power over you, the thought process you go through is very different; your response may be very different. If it’s online, I might screencap [screen capture], block, and I’ll share the screencap because I want people to see what people are dealing with. That it’s not overblown. It’s not over exaggerated. It’s not . . . you know, they need to see that this is the kind of stuff that people say to . . . us.

And then I will block. I do not engage, unless it amuses me to do so.

Knowing and experiencing much of the trolling faced by women of color, Alice had the most developed approach for dealing with online harassment. She would analyze the intentions of the commenter and the power dynamics at play. Then she would proceed to screen capture the posts, share the post publicly, block the troll, and avoid further engagement with that person. If the person did have power over her, she would code switch and respond to their post in a tactful, professional way that cannot be argued. She collected evidence of the behavior of White supremacists, including archiving threatening emails, to document how scientists of color, especially women, are treated.

Alice wanted to make sure that other scientists would be prepared to be public intellectuals. She would advise them to be aware of their environment, as the policies and
practices of their institution could impact their engagement and career. As a tempered radical (Meyerson & Scully, 1995) and practical scientist, she tells peers to prioritize taking care of family and paying the bills before making waves. She warns,

Every university is different, and so, but every institution you work for is different, every workplace is different. Sometimes I’ve given workshops to scientists about . . . this, and I say, “You need to know where you are.” Right? What is their rules and guidelines for your engagement? Because they absolutely can . . . fire you . . . at-will. And a lot of states are at-will employment. If you violate – maybe they’re not even at-will – if they’re cause, and . . . your employee manual has any kind of . . . clause in it about . . . morals or . . . embarrassment or operating off mission, like whatever . . . you need to know where you’re at and you need to conform.

Alice recommended that scientists should be aware of and follow their institution’s policies because the reality is that they have bills to pay and people to care for that are more important than blogging. If they do choose to speak on a controversial topic, they just need to be aware of their rights and the potential consequences as well as realize that they will not impress everyone or solve everything. They need to “do [their] due diligence,” “go in with [their] eyes open,” and “be understood perfectly.”

The other participants had their own strategies for negotiating their conspicuous invisibility. Nnenna, an African immigrant, and Guabancex, a fair-skinned woman of color, both elected to not dwell on their negative experiences and, rather, focus on the positive, though Guabancex acknowledged, “I’m fortunate, very, very, very fortunate that, I’m privileged that I don’t . . . experience some of those . . . aggressions and, and, like, blatant discrimination . . . as often as I know other people do.” Related to Alice’s concern about employment, Arliner
identified herself as being “realistic” and a hustler who understood that nothing is permanent; so, she always had a backup plan.

Lastly, Everett tried to be diplomatic in his blogs and avoided dichotomies. He would present all the evidence and provide questions for his readers to think about. If he did make a mistake on his blog, he would not delete it; he would just apologize. Everett recommended, “It’s like . . . you know, you say somethin’ . . . the best thing to do if you say somethin’ crazy – leave it up there and just apologize. Don’t start deletin’ stuff.” He also believed that blogs and other social media can be used “to communicate with them [scientists of color], to help them understand that, first of all, you’re not alone out here. And the next thing is you have to learn how to utilize your network.”

Despite the challenges of being “conspicuously invisible,” my participants were overall positive about having increased visibility as scholars of color. For example, Everett thought, “You should be talking and visible because . . . people are not . . . people may [listen and] trust you a little more . . .,” especially given the history of mistrust communities of color have of science (as Arliner elaborated using the Venn metaphor). Guabancex believed that visibility helped her to get a seat at the table to open doors for other scientists of color; it demonstrated that “we belong here.” Alice had a similar sentiment, asserting,

Being visible is protest against whatever the status quo is, which, for a very long time, has been lack of inclusion, lack of advancement, and so, by being there, just literally just being there and existing, that can be enough.

She even felt that it was her responsibility to stay visible, stating,

I am . . . a tenure-track faculty professor at a minority-serving institution; so, actually, in my mind, my burden is to be a more visible person of color and scholar . . . not to be less.
And I need to be more critical on my analysis of things because of the community I serve, which is mostly people of color. Thus, Alice put the onus on herself to be a visible Black woman scientist doing excellent, rigorous work in service to her community. Though the other participants did not verbalize the exact same sentiment, they were all committed to being visible public intellectuals of color within science for their communities, despite the racist sexism they encounter along the way. They just made sure to stay on their game and have strategies to counteract the pushback.

**Cultural pride and engagement not for everyone**

My participants were proud of being scientist bloggers of color; they felt that it reaffirmed their racialized gendered identities. It provided them with a means to express themselves and to determine their own narratives. Yet, when I asked them if more scientists should be public intellectuals and use blogging as a means to communicate science, the answer was “it depends.” The following sections offer a couple of examples (Guabancex and Everett) of how blogging strengthened pride in participants’ racialized gender identities as well as why, despite the positive outcomes from blogging, participants believed that engagement with the public was not for everyone.

**Guabancex’s story on being told she’s White**

It was obvious in my conversations with Guabancex that she was very proud to be Boricua and a woman of color, commonalities that she and I shared. They were also the source of her frustration since she was fair-skinned and spoke fluent English. She was adamant about making sure that people online and offline knew that she identified as a woman of color and Puerto Rican. Though she acknowledged her passing privileges, she did not like being referred to as White, stating,
Um . . . I, sometimes I can . . . or people don’t see that I’m a woman of color, but that’s something that I don’t want to hide. Um . . . so, I’m actually very, very upfront about that because I am bothered by the fact that some people think I’m White.

Uh . . . yeah, I am. It bothers me when people are like, “Oh! You don’t look Puerto Rican.” Or like, “Oh! You don’t have an accent.” And I’m like, [with a thick accent] “Of course I do!”

Guabancex did not want to be seen as a White woman; she was a woman of color, as Puerto Ricans are a racial/ethnic mix of Taino, African, and Spanish ancestry. She was proud to be Boricua and made it a point for everyone to know that. Unfortunately, the perception of others cannot be controlled.

Despite being able to manage her image online, Guabancex would often encounter people offline who tried to force her into their view of a woman of color. She recounted a story about a small conference she attended several years ago, where she was an invited panelist for a session on girls of color in science. Ironically, the meeting itself had “very few people of color” – approximately 5 out of 70 conference attendees, a point that was brought up by an older, Southern White woman in the audience. Guabancex recalled,

She said, she said, “There’s very few women of color in the room,” and I had the mic in my hand and I said, “Well, I’m a woman of color.” And she said, “You’re not. You’re White.” And I was like, “Excuse me?” And I was like, “Uh, no. I’m, I’m Latina. I am a woman of color.” And she’s like, “No. You’re White.” And I was like, “I may look White, but I’m, I’m not.” And then, she went on to say, like, “Well, you know, the problem, the main challenge that Latinos had was language.” Um, cuz, you know, we don’t face any other barriers. It’s just, like, we cannot speak the fucking language.
I sensed her anger in the progression of her narrative, particularly at the end with her selection of expletive. Guabancex resented the White audience member for trying to dictate her self-identification and erase her cultural heritage; she was a woman of color/Puerto Rican, not White. She also noted the absurdity of the White woman speaking out about a lack of numerical representation at the meeting while then authoritatively declaring that the real barrier to Latinx STEM success was language. This is another clear example of the persistent need of the White dominant group to classify others and to determine the direction of racialized gender discourse as it relates to recruitment in science.

Guabancex’s narrative illustrated the tension felt by White-appearing/White-passing people of color who are proud of their ethnic backgrounds. Scientists of color who have passing privilege could stay under the radar or they could constantly remind everyone they meet that they are people of color and risk pushback or questioning by both non-White and White scientists. This tension is especially felt by Guabancex, who is proud of her ancestry and critical of Whiteness and White supremacy. Her fair appearance may have opened doors for her, allowing her into privileged conversations that she could use to help other scientists of color, but it also made it potentially difficult for others to fully trust her.

**Everett’s story on embracing being a Black man**

Growing up as a Black man in the South, Everett was extremely aware of his social identities and how they impacted his interactions with others. He openly shared with me his various experiences with discrimination—a White teacher who did not appreciate his questions and intellectual retorts in class; a White football coach who said that “people don’t respect degrees from those schools” when Everett told him about his acceptance into a historically black college/university (HBCU); even a Black nurse at a medical clinic who underestimated what he
knew about medicine. He understood that, no matter how many degrees he has to his name, people will first see him as a Black man and will treat him according to existing stereotypes.

In talking about an incident with a White woman on a subway, Everett disclosed his thought process regarding his decision on how to react,

[I] accidentally, like, put my bag on this lady’s foot. It was right next to it, and she, like, kicked my bag. And I was like . . . and I’m like . . . and it’s, and it’s like, and I had, and I was like, and I had to think for a second, “You’re not just [Everett]. You’re Dr. [Just].” So, I was like . . . “You know, depending on how you respond to this, it’s not . . . people aren’t gonna be like, ‘Yeah!’ You know, it’s not gonna be, ‘This woman did somethin’ and, like, that’s how most people respond.’ It’d be like, ‘Oh! This guy is supposed to be highly educated and trained, and he’s still actin’, actin’ hood or somethin’.” So, like, this stuff happens, and so . . . for me, I’m like, if my identity is gonna be the leading thing that people see and how they engage with me, I’m not gonna shy away from that. I’m gonna talk about . . . you know, my discipline. I’m gonna talk about my research. I’m gonna talk about . . . science, in general, from my perspective.

Everett seemed to have no fear or reservations about being a Black public intellectual and science knower because he encountered disrespect and bigotry on a daily basis. However, he was very aware of how his actions and responses could influence people’s perception of him, even if a particular reaction was justified. Knowing that he would always be judged based on his phenotype first, Everett decided to embrace being a Black man and use blogging as means to communicate about his research and experiences in STEM.
We all can’t be Neil DeGrasse Tyson

When discussing public intellectualism and outreach within the science community, Arliner insisted, “Everyone should be engaged. Everyone shouldn’t be tryin’ to become the next Neil DeGrasse Tyson, and that’s the problem.” She and the other participants mentioned Tyson on multiple occasions because he has become a household name due to his work in science communication. He is also the first, if only, scientist of color, recognized by White scientists and science enthusiasts. Now, many science communicators, particularly scientists of color, try to replicate Tyson’s national/international success.

Arliner and my other participants emphasized that all scientists should aim to better communicate science but that not all scientists should necessarily work with the public. They felt that context should determine the level of engagement and that sharing and supporting fellow scientists involved in public scholarship, outreach, and engagement is just as valuable. If scientists do choose to work with the public, my participants stressed that they should be trained. Arliner pointed out “. . . the fact is too many people are trying to engage in one type of way” and that folks are focused on making a national presence while ignoring the local and “hyperlocal.” Ultimately, my participants welcomed a greater number of science communicators and scientists connecting with communities with the stipulations that (1) engagement should not be a requirement; (2) if they decide to interact with the public, then they should be trained first; and (3) they should work with their hyperlocal communities.

Arliner was the only participant who was especially concerned about White scientists entering communities of color. She expressed,

Now, some people shouldn’t be allowed to engage with certain audiences. I am absolutely . . . what’s the, what’s the right word? I am absolutely protective of my
communities. I make no bones about that. Like, folks like, “I want to do outreach in inner cities.” “Are you from the inner city? Then, no, no. This ain’t for you.” I, I question your motive. I question your interest, not because I think you’re a bad person, but because if your only reason of do--, in other words, what’s your motivation? If you’re doing it because someone told you this is the “special get” . . . No! That goes back to that . . . jacked up thinking that there has to be a certain way of doing it. You have audiences. Go to your neighborhood. You know, you want to proselytize science? You go do it to little Jimmy and little Timmy. Okay? In the suburbs. Go talk to them. You can absolutely do that, but there is no universal communicator. So, yeah. Some people shouldn’t be allowed to communicate with some audiences.

Based on the history of abuse and oppression science has inflicted on people of color, Arliner was worried about having White researchers entering marginalized communities. She did not want them to be further exploited for personal and financial gain. She was a proponent of scientists engaging with the public, but she wanted to make sure that scientists who understand and have relationships with communities of color work with those communities.

Disrupting Master Narratives

My final research question aimed to unveil whether my participants disrupted or maintained the master narratives that exist around science identity and public engagement. The short answer is that they were dedicated to unsettling what it means to be a racialized gendered scientist and to generating counter narratives to existing STEM master narratives. I updated my original conceptual diagram of the master narratives (Chapter 5, Figure 3), which I will elaborate on in my concluding chapter, but first, I will use the theme Putting “Expertise and Networks to Serve” and the sub-theme Recasting Public Intellectualism (from the theme Multiple, Intentional
Forms of Engagement Can Reaffirm Identity) to share the ways in which my participants thought about and fought against the status quo in STEM through their public scholarship and engagement.

Putting “expertise and networks to serve”

As aforementioned, all of my participants sought to use their science expertise and networks to serve their communities. Their research, blogging, outreach, and other science communication work aimed to educate and advance communities of color. For example, Everett commented, “I think blogging and using social media is a way to . . . make sure that we can . . . raise awareness and put our voices out there and address issues and, you know, rally people.” Guabancex wanted to inspire her community and to rid society of stereotypes associated with science. She stated,

So, you know, I think those are certainly challenges, not just for me, but I think for . . . future generations, and you know, that’s one of the inspirations behind . . . a lot of what I do is that visibility, um . . . is very important to me, um . . . to dispel the misconceptions of . . . who can do science, who does science belong to, um . . . particularly in the context of, of, of Puerto Ricans. You know, my own experience was that . . . I, I didn’t know that I could be a scientist until I got to college cuz I never . . . saw scientists that looked like me, sounded like me . . . anything like me. **chuckle** And so, you know, that’s something that is very important to me, and it’s a challenge. I am very conscious of, that people don’t . . . maybe don’t expect that I would do a certain thing, that I would be in certain spaces.
Through her blogging and visibility, she and the other participants wanted to challenge who could be considered a legitimate scientist. They wanted to show young people of color and other scientists that people of color do belong in STEM.

As demonstrated throughout this chapter of unveilings, my participants felt they had a responsibility to serve and work beside communities of color. By using a more egalitarian approach to their blogging and public engagement and focusing much of their work for audiences of color, they contested the master narrative of the unidirectional/top-down/formal public engagement by science experts as well as the master narrative of the public as uninformed and predominantly White.

**Recasting public intellectualism**

Most participants (with the exception of Everett, who preferred the terms “science communicator” and “STEM advocate”) were more comfortable with being called a “public scholar” rather than a “public intellectual” because they viewed the use of the term “intellectual” as elitist (as well as racist and sexist, Cooper (2017)). However, all participants did feel that a public scholar should have some level of expertise, should be contributing to their field in some way, or should have thought “very deeply” about the topic in question. Guabancex explained, “There has to be some level of expertise, but how we define an expert has to be more nuanced than you’re in an academic institution or, I mean, more so, like, you’re in an elite academic institution.” She and Everett believed that a public scholar had to reject or, at minimum, come down from the Ivory Tower to share their knowledge but to help people form their own opinion on the subject matter. Guabancex also noted that the science community needs to stop seeing the public through a deficit lens and to learn how to have conversations with them.
Nnenna believed that public scholars are “activist scholars with rigor who want to better the world.” She emphasized that they had to have “rigor” because she felt that “we are getting into an age where there is a lack of rigor in the media.” According to Nnenna, a public scholar needed to have the ability to “rebuild expertise” multiple times in one’s life. Alice concurred, describing a public scholar as a person with a growth mindset who can “put [themselves] out in public and share [their] scholarship and engage in a public, transparent way.” The engagement with the public also had to be reciprocal, with the public scholar listening to and inspiring community members to act. Arliner added that a public scholar should take the time to build trust and relationships with communities of color before asking permission to engage in research with and for the community. Public scholars of science needed to be culturally competent and to provide accessible information.

All of my participants strongly felt that the science community needed to address the numerical and epistemic representation and retention of people of color, and they wanted to use their blogging to wake people up to that fact. For example, Alice thought that there needed to be a “complete cultural shift” in STEM. She asserted, “I think the first step is to acknowledge that, ‘Why are certain groups invisible to me? Or why . . . not even invisible, but I’m consciously or, or unconsciously dismissive . . . of the contributions?’” She was one who practiced what she preached; some of her blog posts were related to her commitment to learning and being a better ally to multiple marginalized groups.

Beyond recognizing the need to question why certain groups of people are missing or ignored and continual learning, Alice wanted people to remember that certain behaviors, practices, and situations are marginalizing and oppressive and should be called out. She said,
I think, you know, all that we can do at some point is just keep going, “Wow! This is really fucked up!” Like, I mean . . . and, and, and you have to keep saying it because it becomes normalized. People get used to anything . . . as you and I both know. I mean, people get used to living in the most horrific circumstances under . . . pain, illness, and violence. And if you don’t recognize it and take a moment to be like, “No, this is still not right” . . . but it becomes okay. And then it becomes the norm. Then people are fine with it, and we can’t do that. We have to continuously just say, “You know, this is your daily reminder. Not okay.” Right? **laugh** And I might just put that up on my blog – “This is your daily reminder! Things are not alright.” **chuckle**

Alice’s laughter is an attempt to lighten the reality of the dangers of normalizing marginalization, violence, and oppression. She wants to use her blog to constantly remind people that we must continue to speak truth to power to disrupt majoritarian narratives that try to normalize injustices.

Similarly, reflecting on how she was socialized as a Black woman in science, Arliner felt that folks assumed that her speaking things “very, very plainly” meant that she had no clue what her place was in science. She stated, “I think a lot of folks make the assumption about me that I do things because I don’t know better. I completely understand this entire field. I’m saying I think it’s bullshit.” Arliner felt that it is her responsibility to use social media to speak plainly about inequity in STEM. She shared,

So, it means making a lot of people uncomfortable because I’m calling things out, not because I’m calling people out . . . to make them feel bad. I’m just simply goin’, “N-n-n-no! This is, this has always been available. I’ve just simply spoken it plainly . . . because you don’t have a problem with the system. You have a problem when I break it down and
I explain it like that. So, which one is it? Did you not ever realize this is what it was; so, now let’s fix it? Or you too busy in your feelins right now, you can’t deal with it?”

Like Alice, Arliner wants to call out the “bullshit” and identify the systemic issues that have been normalized that need to be addressed. She does not want colleagues within science to take it personally, but she does want them to become uncomfortable enough with their connection to and perpetuation of an unjust system to actually enact change. Being a public scholar blogging about science was about more than just the individual – it was about transforming who gets to be a scientist and how we engage in and communicate science with and for the people.

**Chapter Summary**

The findings in this chapter illustrate the complexity of being a scientist of color engaged in public intellectualism through blogging. My participants developed science identities and identities as “public scholars” through luck, determination, strategy, and hustle. They saw blogging as an opportunity to speak out against injustice, to "protest" on behalf of other marginalized people. They also wanted to reveal how they and other scientists of color face exclusion, often existing in a Venn between the White science community and communities of color. Despite being "conspicuously invisible," my participants embraced their racialized gendered identities and blogged in the hopes that their visibility could serve their community and encourage young people of color to consider STEM careers. Their engagement as public intellectuals was motivated by cultural intuition, accessibility, and solidarity, all of which can be done even at the hyper-local level by any scientist willing to learn.
Figure 2 – Dendrogram with 6 major themes and 27 sub-themes unveiled by participants about their lived experiences as scientist bloggers of color. The 6 major themes, represented by the
numbered circles on the dendrogram, are the following: (1) Starting and Staying in Science, (2) General Costs and Benefits of Blogging, (3) Nuts and Bolts of the Work, (4) Negotiating Being “Conspicuously Invisible” Online, (5) Putting “Expertise and Networks to Serve,” and (6) Multiple, Intentional Forms of Engagement Can Reaffirm Identity.
**cough** It’s exhausting just being a woman, a gendered person of color. Uh, just, it’s because you represent so many, you, you represent a group that’s historically, not just marginalized, but disenfranchised. And I know sometimes we use those terms interchangeably, but they do mean different things. Like, to be “on the margins” means, um, just that, like, “Okay. We just don’t see a lot of you. You’re on the edge.” Disenfranchised has to do with power. And so, it’s not that you’re just on the edge, but you have been physically hamstrunged. Your wings have been clipped, preventing you from doing everything you can to get the same amount of access or money or . . . ability to finish your research. So . . . it’s two of those things. Sometimes I’m sufferin’ more from marginalization, and sometimes I suffer more from disenfranchisement, but so often it’s the combination of both of those things in different, different degrees. And to deal with folks who consistently and intentionally ignore that reality . . . it’s very frustrating. It’s not just dealin’ with individuals, but it’s the fact that our field is built . . . not just built, like as a foundation, but then every bit of the support structures in science. Like, if this were our building [gestures with hands], the foundation, the plumbing, the girders, the support structures . . . **chuckle** everything is built on . . . structural inequality . . . and, it’s frustrating because you feel like you’re always, um . . . you have two options. You can, you can do the whole . . . “keep your nose down and work real hard, and it’ll all work out.” You can do that. I’ve done that . . . and I do recommend that to scholars early on because I need you to get in the race. If you’re serious about it, you are gonna have to concentrate. I’m not gonna tell you not to ever do that. Um, that is part of it, but then there comes a point when you do all the hard work, and you do it and you look around
and you go [looks around] . . . and there was a moment where I literally looked around, Ph.D. in hand, postdoc underway, and I’m like, “I’m still getting the *same bullshit* challenges,” and it just hit me. I was like, “It’s never gonna stop, is it?” Folks will never, ever *not* question my credibility on nothing more than the fact that this packaging, this skin packaging that I live in. That’ll never stop.

This quote from Arliner speaking on her experience as a Black woman scientist lies at the crux of this dissertation work. Scientist bloggers of color are done with the “same bullshit” of White supremacy and patriarchy in STEM. Their experiences have opened their eyes to the structural inequality within science that works to marginalize and disenfranchise them. No matter how many degrees or research experiences they have, their competence and credibility will always be questioned.

This dissertation began by asking how scientist bloggers of color are racialized and gendered, how they perform as public intellectuals, and how they disrupt or maintain master narratives in science. Yet, my conversations with participants unveiled inequity in knowledge production and access to science information driven by Whiteness/maleness in STEM. In this final chapter, I speak back to the literature and discuss the ramifications of my dissertation work, including a revised conceptual diagram on science identity and implications for intersectionality and virtual ethnography. I pose some directions for future research and conclude with a final reflection on science and public intellectualism in the digital age.

**Discussion**

Thanks to the generosity of my participants, I was given the opportunity to explore the intersection of racialized gender, science identity, and public intellectualism. They provided me with an initial understanding of how they are racialized and gendered both online and offline as
scientists and as bloggers of science. Based on what my participants have shared with me, it is evident that scientists of color are “conspicuously invisible.” When their presence is noticed, they are presumed incompetent and need to work twice as hard to be considered legitimate scientists. They are expected to conform to racialized gendered stereotypes, where they are supposed to feed and educate White people “in the way they want as the help,” as Alice puts it. Scientists of color are always second-guessed and forced to prove their intellectual abilities and knowledge of science.

As demonstrated by the experiences of my participants, scientists of color are constantly reminded that they do not belong, that they are “outsider[s] within” (Collins, 1986). They are not recognized and do not fit the Eurocentric standards governing who can be a scientist. They disrupt assumptions about the intellectual abilities of people of color and challenge the idea that science is the sole property of White men (Harris, 1993; Ong, Smith, & Ko, 2017). Given the economic and social benefits of being a member of the science community, White scientists act as gatekeepers to science knowledge, “jealously guard[ing]” it as White property “allowed only to those who met a strict standard of proof,” much like they do with White identity (Harris, 1993, p. 1726). Science from the lens of Whiteness as property, then, includes “the exclusive rights of possession, use, and disposition” (Harris, 1993, p. 1731), where White scientists have the right to transfer, the right to use and enjoy, and the right to exclude others from STEM. The perceived rigor and value of science knowledge is built on both the exclusion and racial subjugation (Harris, 1993) of people of color, making science a unique location of the entrenchment of White supremacy due to opportunity hoarding by White scientists (Riegle-Crumb, King, & Irizarry, 2019).
My participants taught me that, once “allowed” into the science community, one’s performance of a professional science identity is influenced by race, gender, and class. For example, Alice’s identity as a Black woman scientist shaped her approach to writing and compelled her to show others how Black hair is just as “professional” as White hair. To her, professional hair in the lab is just hair tied up and covered up properly to avoid injury. Similarly, Arliner’s working class background shaped her approach to science and grant funding, as she used her ingenuity and experience with side hustling to find new opportunities. Thus, the lived experiences of my participants as scientist bloggers of color have demonstrated not only the structural vulnerability (Kimberlé Crenshaw - Southbank Centre, 2016) they encounter but that their “intersecting identities . . . [can be seen] as a point of possibility” (Cooper, 2017, p. 6).

Despite the creativity and possibilities brought by intersectional identities, women of color, specifically Black women, are still not valued for their intellectual contributions and engagement with the public. As Cooper (2017) beautifully articulates, the truth is that Black women have always been “public intellectuals,”

. . . both because they cared about producing accessible forms of knowledge for and with communities involved in the Black freedom struggle, and because the confluence of racism and patriarchy exempted them from access to academic institutions and from the protections of the private sphere. Black women have never had the luxury of being private thinkers. (p. 15)

By not automatically declaring themselves “public intellectuals,” my participants are listening to their cultural intuition (Delgado Bernal, 1998) and are helping to “reimagine Black women’s political and activist work as work rooted deeply in a set of shared intellectual concerns about Black humanity and personhood . . . and about notions of community and unity” (Cooper, 2017,
Their reframing of themselves as “public scholars” actually draws on a long history of struggle to provide communities of color with access to knowledge and information. For scholars of color, intellectual work has always been with and for the people, even in science.

My participants decided to cultivate identities as public scholars within science to serve their communities, understanding the value, power, and privilege of science knowledge and its importance to the health, safety, and survival of people of color. Their engagement with the public was guided by cultural intuition (Delgado Bernal, 1998), accessibility, and solidarity. Recognizing their existence in “the Venn,” they were committed to navigating the distrust communities of color have of science at the risk of facing further marginalization by White scientists. My participants knew that it was vital for them to contribute to the long (and ignored) history of science activism by scientists of color because the goal of settler colonialism (Veracini, 2011) is “erase to replace” (Patel, 2019, p. 4).

In an attempt to reach communities of color, the scientists of color in this study adopted blogging as one of their primary social media tools, viewing it as a democratizing platform that gives them and other marginalized scientists control of their own narratives. Blogging gave them the freedom to speak against inequities as well as the myths and master narratives within STEM. They could not only inform communities of color about significant research and answer science questions, but they could also warn youth of color about the pervasiveness of Whiteness and colorblind racism (Bonilla-Silva, 2006) in science. Their work as public scholars tries to reveal and thwart disparities created by the Matthews/Matilda effects (Merton, 1968, 1988; Rossiter, 1993) and opportunity hoarding in science (Riegle-Crumb, King, & Irizarry, 2019). Blogging was a way for them to speak truth to power and to the people; their performances as scientists of
color who engage in public intellectualism were meant to confront the power, privilege, and oppression within STEM.

All of my participants saw the March for Science (M4S) as a larger example of the existing power structures within STEM that they were speaking truth about and a prime example of interest convergence (Bell, 1980). The march was organized to defend the funding interests of “all” scientists, despite the frequently unacknowledged fact that scientists of color have always been treated unequally when it came to grant funding (NIH, 2018; Guglielmi, 2018). In his study on STEM diversity efforts institutions of higher education, Baber (2015) concluded,

> The mask of objectivity and emphasis on individual improvement, rather than institutional transformation, reinforce the privilege of the established social hierarchy. This approach, in turn, reinforces universalist perception that . . . failure is a result of individual inefficacies, particularly among [people] of color who did not succeed despite the additional ‘advantage’ of diversity initiatives. (p. 266)

Objectivity and meritocracy in STEM support White supremacy, as failure to obtain grant funding by scientists of color is viewed as inherent inferiority and incompetence. However, given that grant funding was in danger of further reduction by the Trump Administration, White scientists began to unify via M4S to fight for more federal financial support, being seen as a structural issue this time, rather than an individual one.

Using a discourse that emphasized unity, objectivity, and the “apolitical” positioning of science, march organizers rallied scientists together but also reasserted Whiteness within STEM by forcing those who showed concern about or objected to particular aspects of the march (primarily scientists of color and disabled scientists) to conform. Dissention was silenced, sometimes aggressively through the trolling of women of color scientists. As Everett pointed out,
the silencing only increased with an increase in prominent science organizations announcing their support of M4S. The march is emblematic of what scientists of color frequently experience and is one of the reasons why Alice suggests that a “cultural shift” is needed in STEM.

To fight Whiteness in science and end the silencing and marginalization of people of color, my participants identified ways to transform STEM. They felt that scientists need training on how to engage in effective communication, public outreach, and engagement at the hyperlocal level, a point supported by a recent report by the Committee of the Science of Science Communication of the National Academies of Sciences, Engineering, and Medicine (2017). My participants also believed that scientists need to learn how to carry out culturally relevant and accessible science communication to inform, involve, and possibly recruit people of color to science activities, research, and careers. At the very minimum, scientists “need to be aware that messages from science may be heard differently by different groups and that certain communication channels, modes, messengers, or messages are likely to be effective for communicating science with some groups and not others” (National Academies of Sciences, Engineering, and Medicine, 2017, p. 35).

Based on my participants’ blogging practices, it appears that scientists also need to be intentional about humanizing STEM through their writing. They should pose questions, stay away from binaries, and avoid writing with a deficit lens. Most importantly, the science community needs to (re)gain the trust of communities of color through decolonized science.

**Implications for the Field**

**(Re)conceptualizing science identity**

As I elaborated within the first chapter, I designed a conceptual diagram (Figure 1) to demonstrate how the racialized and gendered identities of scientist bloggers of color can inform
and disrupt (-) or maintain (+) the master narratives surrounding science identity within the science community. When one considers how competence, performance, and recognition (Carlone and Johnson, 2007) are racialized and gendered, four master narratives are identified that are connected to science identity: the intellectual inferiority of women and people of color; the irrationality and emotionality of women and people of color; the unidirectional/top-down/formal public engagement by science experts; and the public as uninformed and predominantly White.

Based on the interview data collected in this study, I have revisited and revised my conceptual diagram (Figure 3) to illustrate how my participants’ intersectional identities contested and interrupted (rather than maintained) normative hegemonic assumptions about who can be a science-knower and science-communicator (i.e., a public intellectual in STEM). As shown in the diagram, scientist bloggers of color countered the master narrative of the intellectual inferiority of women and people of color by constructing logical arguments supported by peer-reviewed research (or the rhetorical device of “logos”) in their writing. They highlighted their areas of expertise (the rhetorical strategy of “ethos”) and made sure to “cross t’s and dot i’s,” a point emphasized by Alice in one of her interviews. Alice, for one, would include images of molecules and links to other chemistry studies in her posts.

My participants even relied on the support of other scientists of color, especially when they were being trolled online. For example, several of them referenced and blogged about the same sexist incident and their response to it. What was interesting, yet unsurprising, was the difference in how women of color scientists were disrespected and had their intellectual abilities questioned more often online and off as compared to their male counterparts. This finding is
supported by other studies on women of color in STEM at the undergraduate and graduate level (Ong, Smith, & Ko, 2017).

Scientist bloggers of color in some ways countered and supported the master narrative of the irrationality and emotionality of women and people of color. Participants admitted that their writing was fueled by passion; they generated many of their blog posts when they felt moved to peak on an event or topic. Even though being visible was “energetically consuming,” the writing process happened when they were “heated in [their] bell[ies],” not necessarily when they were feeling the most rational or relaxed. One of my participants (Alice) even used humor (and sometimes it was sarcasm) to connect with her audience. However, despite being driven by and using emotion (or the rhetorical device of “pathos”) in their writing, they were “conscious communicator[s],” who presented logical, evidence-filled prose. Their motivation to write was love—love for communities of color, love for science, and love for social justice.

My participants also simultaneously reinforced and contested the master narrative of the unidirectional/top-down/formal public engagement by science experts. For the most part, they believed that public scholars in STEM needed to have and be recognized as science knowers with some level of expertise, but they had to also see themselves as one of the people, “com[ing] down from the Ivory Tower” and serving the community. Continuing the legacy of Black feminist theorists (Cooper, 2017), my participants used accessible language and cultural references in their own writing. Unfortunately, engagement, at least through their blog posts, was unidirectional, as readers did not leave comments most of the time. I believe they attempted to counter this lack of dialogic interactions through using multiple media platforms (e.g., Twitter, GIFs, Periscope, YouTube, Storify) and face-to-face encounters (e.g., informal and formal science outreach events, STEM diversity conferences) with the public.
In regards to the master narrative of the public as uninformed and predominantly White, scientist bloggers of color in this study only maintained the master narrative in so far as they understood that a portion of their readership was White and male based on their numerical (and ideological) dominance in STEM. Though their primary goal was to speak to communities of color, they wanted to be inclusive of other marginalized identities and hoped to encourage greater science literacy in general. They did not assume that their audiences were ignorant about science; rather, they wrote at a college-level and offered resources for further reading. Lastly, as described by Arliner using her Venn metaphor, scientist bloggers of color in some ways did not feel completely separate from the public but also did not feel like members of the public. This was a “double bind” (Malcom, Hall, & Brown, 1976; Malcom & Malcom, 2011) that my women participants had to deal with as they were forced to navigate the distrust of their communities of color as well as the marginalization caused by White men scientists in the academy.

My participants’ experiences with the master narratives around science identity can help us to understand the nuanced ways in which scientists of color strategize and counter those narratives in order to stay in the sciences and to share science knowledge with communities of color. Their approach to public scholarship is important to the recruitment and retention of young scientists of color, but it can also show us how to make science communication, in general, more inclusive. Most importantly, further analysis of the experiences of scientist bloggers of color will force us to face the reality that public scholarship is literally a matter of life and death for scientists of color, as the Flint water crisis, Hurricane Maria, climate change, and a huge host of other social/science issues demonstrate.

“From a structural perspective, identity is defined by the requirements, norms and expectations imposed on individuals as a result of their membership and position within a social
group” (Shanahan, 2009, p. 45). My reimagined conceptual diagram for science identity, based on the one originally created by Carlone and Johnson (2007), is an attempt to connect the individual with the structural. I was trying to demonstrate how social identities and racist/sexist assumptions from master narratives influence one’s science identity. This approach extends Carlone and Johnson’s science identity formulation by going beyond solely building on recognition; it shows how racialized gendered identities influence one’s competence (perceived by self and others) and one’s performance. Structural discrimination based on the intersection of race and gender can impact the formation of a science identity, but individuals still have agency to fight stereotypes to determine and perform their own science identities. In addition, based on what my participants shared with me about their career trajectories, one’s science identity can be (re)created at any point during one’s lifetime.

My reconceptualization pushes on Carlone and Johnson’s model of science identity by centering racialized gender identity through intersectionality and CRT, and incorporating societal structures that influence how one’s science identity is perceived within that context. Race and gender feature prominently in the master narratives that shape science identity (i.e., competence, performance, and recognition as a scientist). My model also connects public intellectualism with science identity through performance and competence, as scientists are increasingly encouraged to be science knowers and engaging science communicators. It deliberately connects the individual with the structural, showing how White dominance in science and society impacts how science identity is conceptualized and established as the norm.

**Intersectionality**

“[F]or work to be meaningfully intersectional, it should address historical and contemporary social/cultural forces through a political lens” (Rice, Harrison, & Friedman, 2019,
As initially simple as that sounds, this study highlights the challenges of doing intersectional work well. As someone who takes Black feminist scholarship and critical race theory seriously, I tried my best to rigorously adhere to the original meaning of intersectionality by Kimberlé Crenshaw (1989) by connecting the individual experiences of my participants to structural issues within STEM. I tried to highlight sites of privilege and oppression while avoiding posing single-axis questions. I also engaged in careful, reflective analysis, paying attention to suppressed meanings (Code, 2011) and bracketing (May, 2015) participant responses for deeper examination. I believe I was able to successfully unveil the historic omissions and submerged stories of resistance of scientists of color.

However, making sure to use intersectionality appropriately throughout the entire study was not easy, particularly when it came to my interview sessions with participants. In my attempt to avoid posing single-axis questions and being additive with the social identities of my participants (Bowleg, 2008), my guiding interview questions used the phrase “racialized gendered scientist” rather than treating race and gender as separate categories. This confused my participants, and they were quick to ask me for clarification. I tried to redirect them or get them to think more deeply about the word choice, but I ultimately had to explain the phrase to them to keep them from getting agitated with me. I failed to prevent my interpretation from influencing how they thought about their intersectional identities.

Virtual ethnography

Virtual ethnography was beneficial to this study because it not only helped me to examine how scientists of color use computer-mediated communication (blogging) to perform as public intellectuals, but it allowed me to spend extensive time submerged online at my own pace. By reading their blogs and following them on Twitter, I was also able to observe my participants
make meaning and attempt to build community remotely through a virtual fugitive space (Stovall, 2015), which I elaborate on later in this chapter. From a practical standpoint, I benefited as a researcher because I did not have to travel and there were no major costs. It was also easier for my participants to commit to meeting online because it only required them to sit in front of their computers on a given day and time rather than reserving a large part of their day to meet with me at a certain location or to act as host in their homes. Another benefit was that we could send files and links to each other regarding things we were referencing at the same time we were talking.

As a disabled Latina scholar, virtual ethnography was a blessing; there were many times when flares from my chronic condition made it difficult for me to move. Since virtual ethnography was my methodology, I could easily interview my participants, even on my bad days, without having to reschedule or explain my condition to them. From my perspective, I see virtual ethnography as way to get more disabled scholars involved in ethnographic research. The disability community already uses social media to collaborate, socialize, and advocate; so, they would have a lot to contribute to virtual ethnography and research question related to computer-mediated communication.

Despite the benefits, it can be challenging to use virtual ethnography. My participants and I experienced numerous technical problems, including digitized interruptions, unclear audio, frozen images, lag, loud feedback, and a power outage. These difficulties led to postponement of interview sessions, loss of audio information, frantic email exchanges for clarifications, and a growing paranoia on my end, as the researcher, that the technology would fail throughout the study. Consequently, I double-checked all of my equipment, making sure to have enough
memory and battery life on my iPhone and computer for data collection. However, there was no way to guarantee that the Internet connection would be stable.

There were other practical problems. For example, given the temporal differences between geographic locations, I had to make sure that my participants and I were on the same page in terms of scheduling interview sessions. In addition, despite making sure to use a quiet, private office for interviews, there were quite a few interruptions, such as phone calls in the middle of recording, student employees knocking on my office door, and a participant’s child walking in during an interview. Lastly, due to the technical problems, there was always an initial awkward encounter between me and my participants, as we would greet each other multiple times to make sure they are heard.

After employing virtual ethnography in this dissertation study, I have a more intimate understanding of the methodology and have some critiques that may promote discussion among qualitative researchers. Given that I was conducting interviews online, I found myself often questioning the depth of my engagement with participants. I sometimes felt physically and psychologically disconnected from them. There seemed to be a loss of intimacy, as we did not share the same material space. Similarly, despite having their permission to read their blogs and follow them on social media, there were times when I felt as though I was stalking my participants rather than building relationships with them. As the researcher working with and observing participants from marginalized backgrounds, I began feeling like I was perpetuating the intrusive colonial gaze, even though I am also a scholar of color. Thus, researchers looking to employ virtual ethnography need to think about how to develop meaningful, deep connections with their participants as well as how to navigate the ethics of asynchronous “observations” of their participants.
Digital amphibians

Despite difficulties with virtual ethnography, I believe that this dissertation work has demonstrated how "digital amphibians" can potentially have a positive impact on science and science communication. Digital amphibians\(^{10}\) are people who are comfortable with exploring new tools and spaces, smoothly transitioning from online to offline environments and vice versa (Sharma, 2014; Bali, 2014). They are “able to discover new and exciting things not very obvious or even visible to folks on only one side” (Bali, 2014, para. 4). Given their movement among various real and virtual worlds, digital amphibians

\[\ldots\] know that there are different benefits for different people in the different environments within the online world. They enter and exit from different points, using social media. They go in because they know real people in the network; for them, the online world is not just a scary virtual place that gives them anxiety; they know that it is them who are in control, not the technology that makes them feel stupid; they have even started figuring out how to overcome the cross-contextual/cultural barriers and enjoy the learning experience. BUT they know that they are the privileged few, not just from the

\[^{10}\] The earliest mention of the term “digital amphibian” is in a 2014 blog post by Shyam Sharma, a scholar of writing and rhetoric at Stony Brook. He and Maha Bali (2014), a digital pedagogy scholar at the American University in Cairo, do not know the origins of the term (personal communication, May 2, 2019), though digital humanities scholar Jonathan Hsy believes that it was an adaption of Edward Said's notion of the "cultural amphibian" (personal communication, February 21, 2019).
peripheries of the technological and geopolitical ecology but also from the centers.

(Sharma, 2014, para. 14)

Thus, empathy and sensitivity “may need to be central when a digital amphibian wants to communicate with, interact with, people on either side who are not ‘amphibious’ themselves” (Bali, 2014, para. 6).

Interviews with my participants demonstrate how they are digital amphibians within the STEM community. They easily transition from blogging to social media to teaching in classrooms, working in a lab, and doing public outreach. They feel like they have control over their own narrative and use computer-mediated communication to build relationships with real people online and offline, creating networks of other scientists of color. My participants are also sensitive to the fact that their blogging is not the sole way for them to engage with communities, which is why they use multimedia engagement with the public to communicate science.

**Writing for liberation**

My participants wrote about science and how it was relevant to themselves and their communities. Their goal was to speak truth to power and to the people. In essence, they were “writing back” (Harris, 1994) as a form of resistance to the White supremacy within the science community. Talking about the role of scholar activism in CRT, Chapman and DeCuir-Gunby (2019) state,

> Writing back entails unraveling majoritarian tales, re-framing historical events, and questioning the very concepts of race and liberation . . . It is through the process of ‘writing back’ that scholars have the power to shift discourses on students of color, policy outcomes, and school practices; and, with those shifts, scholars create possible moments for empowerment. (p. 187)
My participants are using writing for liberation; they are (re)defining the roles of scientists and public intellectualism in society through their blogging. They are contesting the historic and current attempts at the erasure of scholars of color and their communities, and they are trying to shift the discourse in STEM from recruitment to retention and cultural transformation.

I want to also emphasize that most of my participants were women of color, the most vulnerable to structural discrimination online and within the science community. Their descriptions of themselves in terms of how they go about their writing process, how they see themselves in particular spaces, and their blog topics (e.g., Black hair) suggest that women of color scientist bloggers infuse an embodied discourse in their writing. An embodied discourse “refers to a form of Black female textual activism where in race women assertively demand the inclusion of their bodies and, in particular, working-class bodies and Black female bodies by placing them in the texts they write and speak” (Cooper, 2017, p. 3). Like Alice said in one of her interviews, her existence is resistance, including her presence in her very own writing.

**Fugitive spaces in STEM**

By engaging in liberatory writing online, I would argue that my participants were able to create a virtual fugitive space (Stovall, 2015) where they could disrupt normative discourses in science. They were escaping to their blogs to share their counter-stories and to (re)imagine the role of scientists in society. This fugitive space allowed them to call out the structural “bullshit” (as Arliner would say), giving them a sense of release and relief since they are not free to share the daily micro- and macro-aggressions they experience with their White colleagues. It should not be a surprise that my participants used virtual fugitive spaces to engage in educational literacy practices via blogs, as fugitivity has a long history of being connected to reading and writing in the U.S. (Patel, 2019).
There is a tension with using a fugitive space that is out in the open and that can be permeated and controlled by Whiteness. One could argue that there is no protected space, that the real-life panopticon (Foucault, 1995/1975) of Whiteness extends into the virtual realm as well. Scientists of color must continually (re)invent places to go to be themselves, free from exploitation, marginalization, and oppression. That is the nature of fugitivity – you must always be on the move, never comfortable in one spot for too long. More research is needed to identify other characteristics of fugitive spaces in STEM.

**Science activism**

My participants, along with most scientists of color, have been engaged in activism from the very beginning, and this work should be recognized and documented. However, I do believe that we are also in a unique point in science history where activism is making a resurgence within the science community, as signified by the March for Science. As a scholar activist and member of Science for the People, I believe that it is important for us to unify and support marginalized scientists as well as use science and science communication for the good of society. My participants have shown me that we cannot rely on one mode of communication and that one of our biggest barriers to our work is trust. Without trust, we will never be able to address power, privilege, and oppression in STEM.

**Future Research**

Thinking about avenues of potential research, I would like to continue examining the role of computer-mediated communication, especially Twitter, on the science community and public engagement. Through my dissertation work, I have been introduced online to a number of scientists of color and organizations who want to broaden science participation, public outreach, and engagement. It would be worthwhile to document their narratives and organizational
practices. Similarly, several of these science organizations are relatively young and are dedicated
to rethinking science culture, knowledge production, discourse, and practice. As someone
personally committed to science activism and involved in Science for the People, I want to know
about and document the history and current manifestations of the science activist movement.
Relatedly, the data from this dissertation study suggests that there may be a way to theorize
fugitive spaces (Stovall, 2015) in STEM. Where are there real-life and virtual fugitive spaces in
science? How can they be used to transform science to be more inclusive and to work with and
for the people?

Other potentially fruitful research studies I would consider pursuing are related to
communicating science to communities of color, generally. Based on the findings of my
dissertation work and the research agenda set by the National Academies of Sciences,
Engineering, and Medicine (2017), more research is needed on what types of science
communication can meet the needs and concerns of people of color. How can scientists
(re)connect with and (re)build trusting relationships with communities of color? What kinds of
training can we provide scientists regarding effective, culturally competent communication with
the public? Should we encourage the development of more digital amphibians?

In regards to science identity, I believe the work of Carlone and Johnson (2007) is still
ripe for further exploration. The aspect of performance within their model is understudied and, to
my knowledge, how science identity changes over time has not been fully explored. My
dissertation work suggests that science identity can be (re)shaped throughout one’s lifetime, but
the rate of change will be context-dependent.

There is a significant need for more research on women of color in science at the post-
undergraduate level and in academia. It is important for researchers to document how women of
color scholars navigate harassment online and offline, and develop policies and practices to protect and support them. In addition, there should be more research on and engagement with their intellectual contributions. As Cooper (2017) pointed out in her book *Beyond respectability: The intellectual thought of race women*, there is “still a dearth of real knowledge about Black women public intellectuals” (p. 145). Despite women of color epistemologies and countless theories by women of color scholars, the literature still prioritizes and recognizes the work of White men, as the Twitter hashtag #CiteASista demonstrates.

**Final Reflection**

It has been an honor and a blessing to work with my participants on this dissertation project. After getting to know them and seeing their challenges and successes as scientist bloggers of color, I often wonder about what would have happened if I had read a blog or tweeted with them as a young person of color interested in science. Would I still be in science? Would I have stuck it out and used their blogs to empower myself? Would I have been inspired to start my own blog to get me through? Would I be a tenured scientist of color with her own lab by now?

I will never know the answers to those questions. Yet, I do know that things happen for a reason and that I am happy with my interdisciplinary scholar-activist identity. I may no longer conduct my own experiments and I may not be recognized by others as a scientist anymore, but I will always be a scientist. Though I was pushed out of STEM, I am training a large number of young scientists of color in science communication, public engagement, and activism to take my place.
Figure 3 – Revisiting original conceptual diagram of how scientist bloggers of color inform science identity narratives. Negative signs (-) indicate disruption of master narratives while positive signs (+) indicate their perpetuation. Positive signs are smaller than adjacent negative signs because participants maintained a part of the narrative to disrupt in other areas (e.g., using emotion to connect with Black community). Dotted lines show interrelatedness of competence, performance, and recognition within science identity while the influence of racialized/gendered identities on master narratives and science identity is represented by the circle.
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APPENDIX A: IRB APPROVAL

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Institutional Review Board
Office for Responsible Research
Vice President for Research
1138 Pearson Hall
Ames, Iowa 50011-1057
515.294.3100
FAX 515.294.3102

APPENDIX A: IRB APPROVAL

Date: 4/7/2016
To: Lisette E Torres-Gerald
1706 Bedloe Court
Lincoln, NE 68505

CC: Dr. Nana Osei-Kofi
Difference, Power & Discrimination Program, Oregon State Univ, 316 Washo Hall
Dr. Isaac Gottesman
E155A Lagomarcino Hall

From: Office for Responsible Research

Title: Science, Intersectionality, and Public Intellectualism in the Digital Age

IRB ID: 16-149

Approval Date: 4/7/2016
Date for Continuing Review: 4/4/2016
Submission Type: New
Review Type: Full Committee

The project referenced above has received approval from the Institutional Review Board (IRB) at Iowa State University according to the dates shown above. Please refer to the IRB ID number shown above in all correspondence regarding this study.

To ensure compliance with federal regulations (45 CFR 46 & 21 CFR 56), please be sure to:

• Use only the approved study materials in your research, including the recruitment materials and informed consent documents that have the IRB approval stamp.

• Retain signed informed consent documents for 3 years after the close of the study, when documented consent is required.

• Obtain IRB approval prior to implementing any changes to the study by submitting a Modification Form for Non-Exempt Research or Amendment for Personnel Changes form, as necessary.

• Immediately inform the IRB of (1) all serious and/or unexpected adverse experiences involving risks to subjects or others; and (2) any other unanticipated problems involving risks to subjects or others.

• Stop all research activity if IRB approval lapses, unless continuation is necessary to prevent harm to research participants. Research activity can resume once IRB approval is reestablished.

• Complete a new continuing review form at least three to four weeks prior to the date for continuing review as noted above to provide sufficient time for the IRB to review and approve continuation of the study. We will send a courtesy reminder as this date approaches.

Please be aware that IRB approval means that you have met the requirements of federal regulations and ISU policies governing human subjects research. Approval from other entities may also be required. For example, access to data from private records (e.g., student, medical, or employment records, etc.) that are protected by FERPA, HIPAA, or other confidentiality policies requires permission from the holders of those records. Similarly, for research conducted in institutions other than ISU (e.g., schools, other colleges or universities, medical facilities, companies, etc.), investigators must obtain permission from the institution(s) as required by their policies. IRB approval in no way implies or guarantees that permission from these other entities will be granted.

Upon completion of the project, please submit a Project Closure Form to the Office for Responsible Research, 1138 Pearson Hall, to officially close the project.

Please don't hesitate to contact us if you have questions or concerns at 515-294-4565 or IRB@iastate.edu.
APPENDIX B: ALIGNMENT OF INTERVIEW QUESTIONS WITH SCI. IDENTITY

Interview #1 – Participants’ Life Histories

1. What is your position at your college/university? Competence
2. What is your particular STEM (science, technology, engineering, and mathematics) field? Competence
3. How did you develop your interest in science? Competence, Performance
4. Tell me about your science education journey throughout your life. Competence, Performance, Recognition
5. At what point did you start to blog and why? Performance, Recognition

Interview #2 – Participants’ Lived Experience as Scientist Bloggers of Color

1. Describe to me what it is like to be a scientist blogger of color. Competence, Performance, Recognition
2. Do you know any other scientists of color who blog? Performance, Recognition
3. How long have you been blogging and why do you continue to blog? Performance, Recognition
4. What do you hope to achieve through your blogging? Performance, Recognition
5. How often do you publish blog posts? Performance
6. What do you typically write about in your blog posts? Competence, Performance, Recognition
7. How do you decide what to blog about? Competence, Performance, Recognition
8. When do you typically blog? Performance
9. Who is your intended audience? Recognition
10. How has blogging impacted your professional life? *Competence, Performance, Recognition*

11. Do you communicate or engage with the public beyond blogging? If so, how? *Performance, Recognition*

Interview #3 – Participants’ Make Meaning of Their Experience as Scientist Bloggers of Color

1. I noticed that you posted about _____ since we last talked. Can you tell me more about that? *Competence, Performance, Recognition*

2. Given what you have told me about your science education journey and your experiences with blogging, tell me about how blogging has affected your identity as a scientist of color? *Competence, Performance, Recognition*

3. How do you think your identity as a scientist of color has influenced your blogging? *Competence, Performance, Recognition*

4. How do you see blogging affecting science? *Performance, Recognition*

5. Do you think more scientists should blog? If so, why? *Performance, Recognition*

6. Given your blogging practices, would you consider yourself to be a public intellectual? *Competence, Performance, Recognition*

7. How would you define a “public intellectual”? *Competence, Performance, Recognition*

8. Do you think more scientists should engage in public intellectualism? If so, why? *Performance, Recognition*