Women in science education are placed in a juxtaposition of gender roles and gendered career roles. Using auto/biography and auto/ethnography, this book examines the challenges and choices of academic women in science education and how these challenges have changed, or remained consistent, since women have become a presence in science education. The book’s contributors span a temporal and spatial continuum and focus on how a variety of issues relate to the paradoxes for academic women in science education. Science is characterized as a masculine endeavor, while teaching is described as “women’s true profession.” Thus, female academics involved in science education are positioned in two paradoxes. First, as teachers they are involved in a feminized profession. However, within that profession, women faculty in science education work in a discipline viewed as a masculine enterprise. Further, these women work in educational institutions that have higher status and prestige than their sisters in elementary, middle or high schools. Second, female professors are “bearded mothers.” Women who have engaged in science education value rationality and logic and assume authority as participants in academe. The use of logic, the acceptance of authority and the assumption of power are masculine gender-stereotyped characteristics. This situation places women in a paradox, because others, including peers and students, expect them to display stereotypic female gender dispositions, such as mothering/nurturing, sacrificing their needs for others, and a commitment to the institution.

The topics include: discussing how their engagement with science impacted their career trajectories and re-direction from science to science education, the relationships of cultural and racial factors on career trajectories, and the dialectical relationship between women’s private/public lives and their agency (collective and individual) in the academy and its enactment within academic fields. The book documents the lives and careers of academic women in science education from the United States, Australia, the Caribbean, United Kingdom, and Europe.
Re-visioning Science Education from Feminist Perspectives
CULTURAL PERSPECTIVES IN SCIENCE EDUCATION:
DISTINGUISHED CONTRIBUTORS

Series Editors

Kenneth Tobin
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Cultural Perspectives in Science Education consists of handbooks and books that employ sociocultural theory and related methods to explicate key issues in science education. The series embraces diverse perspectives, endeavoring to learn from difference, polysemy and polyphony, and resisting a tendency to emphasize one preferred form of scholarship. The series presents cutting edge theory and research, historical perspectives, biographies and syntheses of research that are germane to different geographical regions. The strength deriving from differences in science education is evident in the works of scholars from the expanding international community in which science education is practiced. Through research in science education, each volume in the series seeks to make a difference to critical issues that face humanity, examining scientific literacies and their role in sustaining life in a diverse, dynamic ecosystem.
Re-visioning Science Education from Feminist Perspectives

Challenges, Choices and Careers

Kathryn Scantlebury
University of Delaware

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SECTION I: INTRODUCTION

The genesis for this book happened on a Sunday afternoon, Ken Tobin had emailed Kate and others in our wider network of scholars and friends to ask if we would send a supportive email to a female, untenured colleague whose department chair had questioned the value of her research contributions, implied that her upcoming tenure review would be unsuccessful, and that although she was ‘a good teacher’, that was the extent of her value to his department, the college and the university. Kate sent the email to her female colleagues and also began a conversation with Ken about how several other junior female colleagues in science education had been subjected to sexism, racism, and tokenism. From their personal stories, we noted inequities with negotiating for salaries and start-up costs, teaching loads and assignments, and the expectation from university administrators and senior colleagues who expected these beginning female scholars to prioritize others’ needs before their own.

In subsequent conversations, Kate began discussing these issues with other women colleagues who were at different stages of their academic careers and had a plethora of stories to tell and experiences to share. Issues of discrimination and inequitable treatment are pervasive in all areas of academia, however, the sciences, and by extension science education, are reinforced by the gendered nature of science as a male-dominated discipline, which reinforces a White, male hegemony. Expanded conversations with multiple cross-generational colleagues revealed that, even in 2009, women continue to be faced with challenges similar to those who entered the academy over forty years ago! As a result of these conversations, Kate invited Jane Butler Kahle, a senior colleague and Sonya Martin, a junior colleague, to join her in editing a collection of works from academic women in science education.

Specifically, we invited women who represent diverse perspectives and experiences on the issues facing them in science education. We asked that contributors share from a personal perspective the challenges and choices they have navigated throughout their academic careers and that they do so from a feminist perspective. We recognize that there is no single feminist perspective, and after reading and editing these collected chapters, we have been impressed by the diversity of thought as it relates to feminism and science education. We expected that women from different parts of the world, who vary with regards to race, ethnicity, religion, class, and sexual orientation would necessarily have different experiences to share and would do so using differing feminist theoretical lens. Some interesting differences we noted from reading these chapters is that the role feminism has played in the lives of these women has been largely informed by the greater socio-historical context of the time period in which these women have begun their careers. The role feminism has played in the life of a woman whom graduated college in 1955 is radically different than for a woman who graduated in 2005. Because we have chosen to elicit a variety of stories from women who are differently positioned with respect to varying feminist theories and ideologies, we will examine what it means historically to be a feminist and how this identity and terminology continues to evolve.
1. WOMEN IN SCIENCE EDUCATION

Introduction and Historical Overview

WHAT IS A FEMINIST PERSPECTIVE?

In this section, we provide a brief historical overview of Western feminism to serve as a backdrop for considering the lived experiences of women academics over time. Feminists and feminist scholars have divided the history of Western feminism into three waves. The term wave describes the transition of the feminist movement’s focus from gaining the right to vote, to fighting social and cultural inequalities, and to critically examining the power dynamics between different peoples (across race, gender, class, ability, sexual orientation, etc.) and in the context of trans-national and global politics.

First wave feminism generally refers to action/thought in relation to the suffragist movement of late 1880s-1930s in the United States and other Western countries. This first wave of feminism ‘ended’ as women attained suffrage, however, well into the 20th century, and in some countries the 21st century, Black, Middle Eastern or illiterate women did not have voting rights. Second-wave feminism refers to the women’s rights movement of 1960s through the late 1980s, where advocates sought equity for women within societal institutions such as education, business, career paths and health care. Second-wave feminists focused primarily on identity politics where race, ethnicity, class, and sexual orientation became a focus for discussing women’s rights within the context of cultural identity and issues. The third wave of feminism began in the early 1990’s and has been described by some as a response to perceived failures of the second wave and as a backlash against initiatives and movements started by second wave feminists (Krolokke & Sorensen, 2005). Third-wave feminists often focus on trans-national politics, seek to challenge notions of femininity and gender as defined by the second-wavers, and have tended to take critical approaches to previous feminist discourses, which are criticized for ignoring or marginalizing the experiences of non-White, middle class women.

Some scholars indicate that the second and third waves concurrently co-exist as a range of feminist theory standpoints (Harding, 2004) which stem from differing ideologies and include examples such as, liberal feminism, radical feminism, Black feminism, postcolonial feminism, post-structural feminism, socialist feminism, multiracial feminism, ecofeminism, and critical feminism, to name a few. We offer this overview to underscore the fact that there are many
feminist perspectives that are reflected by our invited authors. An interesting observation we have made from reading these chapters is related to how individual women place their lived experiences within the greater socio-historical context of the feminist movement. Where women find themselves within this continuum has implications for the perspective or lens from which they analyze their experiences as women. The editors of this book illustrate this point. Jane, who completed her doctorate in 1972, intimately experienced the early U.S. women’s liberation movement throughout the 1960s and has engaged with feminism throughout her career. Kate’s introduction to feminism began in Australia during the 1970’s and 80’s and has informed and framed her scholarship. Sonya’s engagement with the movement is different still, as it was not until she moved from rural Georgia to attend a women’s college in the early 1990’s that she considered the role of feminism in her life.

Where we place along this continuum of experience with feminism and the women’s movement is significant, because the struggles that young women who have come of age primarily within the third wave of feminism, do so with many privileges in place that are not always recognized as being hard won rights by women who lived and experienced the women’s movement of the 1960s-1980s and earlier. Thus, the stories of our contributors may resonate with women differently, depending on their individual experiences with not only the choices and challenges being described, but with understanding of the context of the lived experience. We raise this point because we want our readers to be cognizant that while they are reading the text, the reader is simultaneously layering the text of their own lived experience. So for those women who identify more with the politics of third wave feminism, the challenges women describe from their experiences in academia in the 1960s and 1970s are part of the history and in some circumstances viewed as irrelevant to today’s academic climate, work environment and politics.

As women representing experiences from across differing eras, race, ethnicity, class, religious beliefs, and sexual identity, we believe it is also necessary for us to preserve our individual voices. As such, we asked contributors to determine for themselves how they wanted to author their stories, choosing when and how to be inclusive of others, and when and how to separate and tease out their own individual stories. We have found many authors have chosen to utilize genres that both seek to merge voices and/or maintain individual perspectives. Some authors chose to deliberately blend their voices and some felt they were more empowered to maintain independent representation through metalogues, internal dialogues within the text in which authors critically examine and interact with one another through the text. For example, Molly and Bambi’s chapter that share their experiences of being Southern White women or the different life experience for Eileen and Felicia as African American women. Other authors have chosen to use biographical narratives, and have employed components of autobiography to share their experiences. Thus, some co-authored chapters represent contributions to authorship alphabetically so that the name order listed is not necessarily indicative of a lead author, but of co-authors. In the same spirit, throughout this and the concluding chapter, we editors have chosen to employ a blend of these writing
styles, sometimes choosing to blend our thoughts and perspectives into one voice. In other instances, we have chosen to preserve our individual perspectives, using metalogues to respond to and explore issues raised within the book’s subsections.

While many of the chapters are autobiographical in nature – meaning they tell the story of an individual woman, they are also biographical in that the experiences of these individuals are representative of the collective – of women in academia everywhere. Thus, we invite you to engage with these chapters from the multiple perspectives offered and from your own. For example, we invite the reader to consider in what way her lived experience as a young Hispanic woman from a wealthy family in the north-eastern United States informs her perspective as she reads a narrative account from a woman recounting her journey from her elementary school days in Jamaica to her career as an organic chemistry professor in a large university in New York City. Thus, we ask that you take into account the sociohistorical context of your lived experience in the world as you interact with the texts of these women’s lives and we ask you to consider the ways in which your lived experience informs the way in which you see and make sense of the different these accounts of life in academia. We encourage female and male readers to learn from the experiences these authors share and that you individually reflect upon your own such that we can continue these conversations in the academy and actively work together to effect transformation that expands opportunities for everyone.

LOOKING AHEAD

The editors and authors of Re-visioning Science Education from Feminist Perspectives: Choices, Challenges, and Careers have contrasting but complementary experiences and expertise in science education. Several authors began their academic careers in science and moved into education. Others “worked their way up the ranks” beginning their careers as elementary, middle or high school science teachers before moving into the academy. Their experience in science education ranges from over fifty years to those at the start of their academic careers. The range of age, race, class, geographic location, education, and life experiences inform the individual perspectives of each author around feminism and feminist thought as related to their personal stories and to the common story of women who share their experiences in the academy.

Thus, the book’s contributors span a temporal and spatial continuum, with each chapter focusing on a variety of issues related to paradoxes for academic women in science education. Topics discussed include how engagement with science has shaped the career trajectories of women, including re-directing some from science to science education. Several authors examine the nexus of gender, culture, race, and class as an influencing factor on their career trajectories. Other contributors explore the dialectical relationship between women’s private/public lives and their agency (collective and individual) in the academy and its enactment within different academic fields. Although contributors speak from different theoretical standpoints as related to their personal experience as a woman who has come from specific socioeconomic circumstances, geographical locations, racial and ethnic
backgrounds, and who holds certain religious beliefs, we have noted similar themes emerge across all of these works. For example, women’s careers are impacted by their reproductive choices and many women claim they struggle to maintain positive relationships with their family members without sacrificing their academic careers. In addition, our contributors offer readers their differing perspectives caring for elderly parents and dealing with life’s changing circumstances. Thus, these chapters provide analysis of experiences relevant to women who are in various stages of their careers, including those just starting out in academe and those who may be transitioning into administrative positions, retirement, or a new stage in their careers.

The chapters are organized into five sections. We begin each section with a brief introduction to describe the connections between the chapters and to provide a description of each chapter in the context of the identified themes. The first section contextualizes the role, careers, and trajectories of women across several generations, across race, class, and geographical location. From these stories, we seek to explore some of the individual/collective issues faced by women in science and science education in general, including women feeling pushed to the margins of science culture, feeling alienated from their families due to their successes in science, or learning to balance the pursuit of a family life with their career. The second section offers chapters by women who have pursued careers as academics in the sciences and who have transitioned into science education. The third section offers readers examples of the ways in which women in science education are transforming their experiences and the experiences of others in the academy through actions that promote equity, question the status quo, and serve as role models for other women academics who seek to expand learning opportunities for all students. The fourth section explores some of the ways in which women are working to define new expectations for themselves, their colleagues, and their institutions, with regards to scholarship, teaching, and the pursuit of fulfilling social lives outside of academia. The final section contains one chapter in which we, as the editors, identify patterns and contradictions, raise issues for further consideration, and discuss the implications of these works for current and future research and practice.

We expect the chapters in this book will resonate with a wide variety of readers, including those who are interested in pursuing careers in academe, conducting gender studies research, or who are interested in finding ways to transform structures that limit women from gaining equitable access to resources that will enable them to be successful in academe. Undergraduate and graduate students will find these stories informative, not only as historical accounts of the challenges women have faced in academe, but also as examples of issues with which women continue to struggle. Senior colleagues and junior colleagues in academe, both male and female, may consider their own role and responsibility to expand opportunities for women in academe, a chance to re-examine unconscious stereotypic biases towards female academics.
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SECTION II: ONGOING ISSUES FOR FEMALE SCIENCE EDUCATORS IN ACADEME

In this section, we seek to explore some of the individual/collective issues faced by women in science and science education to contextualize the different trajectories of women in academia. This section foregrounds a variety of issues and challenges that academic women face.

In this section’s five chapters the contributors each employ a variety of writing styles within the genre of auto/biography and auto/ethnography. The authors utilize a variety of methods to share their individual accounts, including using episodic stories, short vignettes, and autobiographical accounts interwoven with analytical responses from the perspective of the co-author, none of which conform to conventional writing formats. The first four chapters are each co-authored such that the contributors blend their voices to share and analyze their experiences as women in science from perspectives that range across generations, race, class, and geographical location. The final chapter is a solo contribution examining the ways in which science can serve to both liberate women from social constraints and alienate them from others as a result of their liberation.

Eileen Carlton Parsons and Felicia Moore Mensah (Chapter 2) offer a unique pairing of episodic snapshots from similar time periods in their lives to compare and contrast their experiences as African American women navigating their way through school and academia in the southern United States. From these snapshots, Parsons and Mensah then engage in a dialogue within the text, using Black Feminist theory (Collins, 1990) as a framework for examining common themes that emerge from their experiences and to highlight the ways in which their experiences have differed. They draw attention to the concept of intersectionality (Collins, 1990) exploring how race and gender are intersecting oppressions for Black women in society and how Black feminist thought, a critical social theory committed to justice for U.S. Black women as a collectivity, provides a backdrop for the articulation of their shared experiences as Black women in academia.

Chapter 3 provides yet another example of multi-voiced text in which Rose Pringle narrates major life experiences that have shaped and reshaped her identity as an educator as she has moved from high school science teacher in her home country of Jamaica to becoming an elementary science educator at a large university in Florida. Interwoven within her narrative is a paired metalogue, written by co-author Rowhea Elmesky. Elmesky provides a reflective voice and theoretical understandings as she analyzes Rose’s lived experiences through the frameworks of empowerment, structure, and agency (Sewell, 1992), and identity (Roth, 2006). Utilizing these lenses, Elmesky reframes the discussion of Pringle’s challenges as a complex interplay between schema (beliefs and values of Pringle and others) and resources (including Pringle’s access to human, material, and symbolic resources) to provide the reader with a theorized account of the structures that both afforded and truncated Pringle’s access and appropriation of resources as she has transitioned from a classroom teacher into academia. Thus, Pringle provides a personalized account of her experiences and
Elmesky parleys this account into a generalizable depiction of the experiences of many women in academia, particularly those who are racial minorities and immigrants.

The chapter that follows by Gale Seiler and Gale Blunck (Chapter 4) offers the reader a blend of individual autobiographical accounts along with a metalogic narrative in which each author responds to the other, providing critical discussion of the individual and shared events of their lives. Specifically, Seiler and Blunck embrace a notion asserted by sociocultural theorists that a person’s perspective changes as experiences change. Seiler and Blunck explore their trajectories into science education careers by first sharing a vignette from a lived experience of their past and then analyze these actions from their present perspective. As such, this chapter offers readers a temporal and phenomenological analysis of experiences from critical points in the careers of these two authors from a first person (past) and third person (present) perspective.

Using bell hooks’ (1984) notion of center and margin shifts, Molly Weinburgh and Bambi Bailey, weave an auto/biographical account their personal/public struggles to move from the margins of undergraduate science classrooms in the 1970s, where male professors held power over female students and discouraged them from advancing in science, to the center of their own classrooms where they actively seek to support and promote women in science. In Chapter 5, the authors draw attention to the role of privilege and power and the notion of center and margin shifts as they each discuss the privilege associated with being White in academia, thus shifting them to the center in some respects, but as women, they found themselves pushed yet again to the margins. This shift is demonstrated by Weinburgh and Bailey’s description of the significance of gender in academic social settings, where the “Good Old Boy” network provided opportunities for junior male faculty to make important social connections, but because they were excluded as women, they often were not informed about or invited to collaborate with colleagues on new projects. Weinburg and Bailey both discuss the significant role mentors, both male and female, have had in advancing their careers in academia and how they each have assumed the responsibility to be mentors to junior colleagues as a way to help shift more women from the margins to the center.

The final chapter (Chapter 6) in this section examines the role Nancy Brickhouse’s father, who was a scientist, enculturated her into science, and how her early experiences with science at home with her father and in school, have shaped her identity as a science learner and a researcher. Brickhouse examines her early experiences with science in relation to her gender and the expectations family, teacher, and society held for her as a young girl growing up in a small town in northeast Texas in the 1960s and 1970s. Her account traces the distance, both physically and philosophically, that a career in science has placed between her and the friends and family in the small town where she once lived. Specifically, Brickhouse explores her autobiographical experiences in relation to gender and her development of a science-related identity, which continues to inform and shape her research on gender and science learning in her career today, an identity which has, in some ways, separated her from her family and friends.
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EILEEN CARLTON PARSONS AND FELICIA MOORE MENSAH

2. BLACK FEMINIST THOUGHT

The Lived Experiences of Two Black Female Science Educators

INTRODUCTION

As Black females from working class origins in the rural South, we encounter a myriad of challenges and tensions in science education, a field that is predominantly White, male, and middle class. Even in writing this chapter, we struggled: Are we at liberty to use the communicative practices of our cultural communities? Do we structure our sharing in a manner that is more acceptable to the field? We decided to employ both communicative repertoires in the form of personal stories and conversation framed by theory. Within our stories, we relay episodic snippets of our childhood and adolescence as well as our years as undergraduates at The University of North Carolina at Chapel Hill (UNC). In our conversation, we discursively discuss our careers in relation to our worldviews. At the outset, we conform to the standard in the field by contextualizing our personal histories and dialogue within a conceptual framework, Black feminist thought.

THEORETICAL POSITIONING OF OUR ARTICULATIONS

Collins (2000) described oppression as unjust situations where another group systematically denies one group’s access to a society’s resources over an extended period of time. In the United States (U.S.), major forms of oppression stem from race, gender, and class. According to Collins (2000), these oppressions affect Black women in many ways; the impact most relevant to our articulations is intersectionality.

Intersectionality refers to particular suppressive forms that are manifested by the overlapping or intersection of oppressions. For example, race and gender are intersecting oppressions for Black women in a society where full membership is based upon Whiteness for feminist thought, maleness for Black social and political thought, and a combination of both for maximum participation in the mainstream (Collins, 2000; Frankenberg, 2003). The individual and collective experiences we share in our stories and discuss in our conversation demonstrate these intersecting oppressions. These intersecting oppressions like the ones we highlight in our articulations give rise to Black feminist thought, a critical social theory committed to justice for U.S. Black women as a collectivity.

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As described by Collins (2000), targeting U.S. Black women as a collectivity is founded upon the premise that the group shares common histories (e.g., legacies of struggle) and faces similar oppressions (e.g., differential treatment) but this collectivity does not presume homogeneity among Black women. African American women may not experience all the same oppressions and they may not perceive and feel them in the same way. Notwithstanding the variability among African American women, Black women occupy an outsider social location in the U.S. (Collins, 1986). Our varying stances highlight the significance of gender in the interpretation of our experiences; the convergence and divergence of our personal histories; and the past and present complementary and contradictory meanings we construct about and from them exemplify this collectivity-individuality/homogeneity-heterogeneity dialectic within Black feminist thought. Furthermore, in our stories and conversation, we attest to Black women’s outsider social location but within the context of science education. Being neither White nor male in a society where either one is accompanied by certain exclusive privileges necessitates Black feminist thought, a distinctive consciousness among Black women regarding their overall experiences in such a space.

Six features characterize Black feminist thought (Collins, 2000). First, the overarching purpose of Black feminist thought is to resist oppression by way of activism. This activism may be overt and confrontational or covert and subversive. Second, this activist stance against oppression is not delimited to the plight of U.S. Black women; it is part of a larger social justice project with the empowerment of the oppressed as its goal. Third, in order for Black feminist thought to function effectively within this wider social justice project, it must be fluid and adapt to the fluctuating social conditions that undergird and perpetuate oppression. The adaptability and fluidity of Black feminist thought is facilitated by heterogeneous collectivity, the fourth distinctive characteristic. Heterogeneous collectivity is the dialogical relationship among group knowledge and lived experiences. From this collectivity, a myriad of unique responses consisting of experience-based ideas emerges, the fifth distinguishing feature of Black feminist thought. Finally, the sixth distinctive characteristic of Black feminist thought is that African American women from all walks of life generate these experientially based ideas that may be used to resist oppression. Collins (2000) argues that “it is the convergence of these distinguishing features that gives U.S. Black feminist thought its distinctive contours” (p. 22), a gestalt embodied in our stories and conversation.

STORIES OF TWO AFRICANAMERICAN WOMEN SCIENCE EDUCATORS

Eileen

My story does not pivot around the activities of science but the circumstances in which I was born, reared, and educated. Life as part of the rural poor residing in Boomer,
North Carolina (NC). I developed a psychological and emotional toughness that serve me well as I, a Black woman, exists in the margins of higher education.

The Early Years

I am the youngest and only female child of six, born to parents who have less than a high school education. I learned much from my parents’ fortitude to provide, under the direst of circumstances, the best life they could envision for their children.

Life Lesson #1

My mom worked outside the home in numerous blue-collar jobs. For several years, she worked as a domestic caring for a White family. After a full day of caring for another family, Mom returned to our home for round two. As I grew older, my mother spoke of her work as a domestic in order to convey the message: You can always find the strength within to do what needs to be done.

Life Lesson #2

During the elementary years, there was one memorable incident, one in which I was punished unfairly. One day in the 4th grade, a White male student who eventually became one of my closest friends called me a nigger. Without hesitation, I physically attacked him. The teacher attended to the other student’s wounds and then deducted stars, rewards for academic success, from me but she did not punish the White male student. When I arrived home, I shared the incident with my mother.

meanings come not only from understanding my gender but also from being raised in the rural south, being African American from a working class family, and realizing a divine order to my life. These meanings enable me to survive and move forward in science education, where as an African American woman, I exist on the margins.

The Eldest Daughter

My early life experiences have been good, turbulent, and supportive. I grew up in Selma, North Carolina (NC) as the second born, yet eldest daughter, of five children; my brother is a couple of years older than I. I admit that the being the eldest daughter brings with it a great deal of responsibilities. As a young person I did not realize to what extent this meant for my family and my life now as an adult. The eldest position has and continues to shape the way I view the world.

The Country Was My Science Lab

I have always liked science, or nature. I would sit on the front porch morning, day, and night looking at the sky, making pictures out of the rolling clouds, imagining what it would be like to go to the moon, and dreaming about the stars in the sky at night. This was my quiet time to think, to escape, and to have time to be alone with my thoughts. I would catch bugs, dissect birds, and listen to sounds in the air–animals insects, the wind; eat from the plum trees that surrounded our house; the large pecan tree in the neighbor’s backyard; and the blackberries, wild sweet weeds and honeysuckle in the fields down the
The next day, with me by her side, my mother visited the school armed with a less than professional demeanor. She demanded to speak with the principal and the teacher. Even though the Black male principal suggested that I wait in the reception area, my mother insisted that I attend the meeting because I needed to know about life as a Black woman in this world. By the end of the day, the teacher replaced my stars. Shortly after that incident, my mother talked to me about doing better than what she and my father had done, the importance of knowing who you are from the inside out, and not giving power to others to define who you are and what you can do. The life lesson I learned from that indelible 4th grade experience was that being Black and female means that I must speak up, stand up, and fight for what is rightfully earned.

The previously stated life lessons helped me to achieve what few could envision for a poor, Black girl from the mountains of NC.

Entry into Science

The journey to a better life not enjoyed by my parents began with a Black, female, middle school teacher’s intervention, an individual I did not have for a class. Somehow, she knew about my tumultuous home circumstances, my destructive school behaviour (e.g., fighting peers outside of class), and my exceptional academic performance in the standard classes. One day, during my 9th grade year, she pulled me aside for a heart-to-heart, Black female-to-Black female conversation that literally changed the direction of my life. I began to dirt road where I lived; run through the corn fields and watch tobacco grow. Therefore, living in the country was like a large laboratory of things to do, see, and imagine. For me, science was alive in nature—a natural place for my curiosities, questions, and excitement about the living world.

Part of my interest in science was to become a physician because I believed that the doctors who were treating my mother did not know what they were doing. I thought if I went to college and majored in science, since I already liked it, then I could treat my mother and she would get well. This was an influential decision regarding my life at age nine.

Moving Up & Out

I was promoted from a lower track to the upper honors/college track in school. It first happened in the 7th grade, and then again in the 12th grade when I was moved from Algebra 3 to Calculus and Trigonometry—a two-hour block course. I was the only African American student, and I felt so out of place. The mathematics teacher was an African American woman—older, tough, strong, and “mean.” I felt it firsthand. As the only African American student in the class, I (and my classmates) felt like she picked on me. One day she called me to her room for a talk. Scared and nervous, I went. She said, in a very strong voice, leaning toward me, “Do you know why you are in my classroom?” I said, “No, ma’am.” She said, “Because I put you in here.” She went on to tell me that I was smart, that I could compete with the White students in my class. That conversation changed my life. I understood why
consider my future, view school as an opportunity, and to change what was primarily within my control—my actions. At the end of that year, the school recognized me for numerous achievements including a 4.0 grade point average. However, I now know that stellar performance in the standard, academic track was not enough to achieve that better life elusive to my parents.

The following year, my White sophomore English teacher spearheaded an effort to move me to the academically gifted (AG) track where I would be one of two Black students. AG opened the door to fully funded years of studies in higher education at prestigious universities but, before I could enter, I needed to make up a lot of ground I unknowingly lost in middle school via my previous placement in the lower track. As a consequence, an overload in course work led to my enrolment in science courses and subsequently an interest in science.

My interest in science did not develop because of my performance. I did equally well in all my courses. I graduated as valedictorian of my predominantly White high school with a 4.0 grade point average. Also, my interest in science did not emerge because I simply enjoyed the content. My interest in science was sparked by the meaningful interactions I had with my high school science teachers, who were female, and one of who was Black. I also appreciated the intellectual challenge afforded by the subject matter. This intellectual stimulation continued at UNC by way of entrance to the honors’ program. I was moved from one track to the next, from one math classroom to the next. This teacher also helped me to get two scholarships to attend my undergraduate institution, UNC-Chapel Hill.

Confronting Difference
It was not until my undergraduate years that my dreams were met with opposition. As an undergraduate pre-med major, I met other people with different expectations, backgrounds, and ways of learning. I found myself among other students from the “top ten percent” of their graduating classes, and the level of competition among these students was high. Although my math teacher said I could compete, I was not sure that I could and or wanted to. I was naïve. College was different from high school, and I felt very alienated. I was able to find supportive networks of friends, but most friendships lasted the length of a semester and then people were off to their next course. With the few African American female friends I made in college, our similar goals helped to maintain our friendships.

Gender and Race in Science
As a result of both gender socialization and racial prejudice, I learned science from a distance (Moore, 2003). Still, I maintained my interest in science despite the opposing forces within the system. I spent a great deal of time studying alone, learning in silence; however, I was very observant, making sure to do what was required of me as a science major. These ways of being
As part of the honors’ program, I attended small science classes where I, as the sole Black student, worked in isolation. I excelled in chemistry and took graduate level courses as an undergraduate; however, I did not see a science career as a viable avenue for directly impacting the lives of the impoverished. Inevitably, I pursued an undergraduate degree in science teaching and graduate degrees (M.S. and Ph.D.) in science education.

**My Journey in Science Education**

As I reflect upon my 10-year journey in science education, I am pleased with my successes (i.e., prestigious research grants, national and international publications) but perplexed by my lack of progress (i.e., perpetual status as an untenured assistant professor).

I received a Ph.D. from Cornell University in 1994, but my first college position in science education did not commence until 1995-1996. I accepted a tenure track assistant professor position at Lenoir-Rhyne, a liberal arts college located in North Carolina. After a Ford Postdoctoral fellowship followed by part-time employment at UNC-Charlotte, I accepted a tenure track position at North Carolina State University (NCSU).

During my four years at NCSU, my focus broadened from an exclusive emphasis upon science teacher preparation to include the preparation of science education researchers. While at NCSU, I did the kind of work I wanted to define my professional career. As doctoral chair of three Black females’ committees, I became more conscious of my outsider allowed me to develop my own sense of identity as a female science major. Therefore, I look at my gender socialization in science as an African American woman equally as oppression and opportunity (Zinn & Dill, 1996). My gender and early childhood experiences afforded me the privilege to learn science in my own way.

During my senior year at UNC, I worked in a genetics lab within the science department. Working in the genetics lab was where I found my place in science. I was provided the opportunity to work on a research team, conduct experiments that involved my interests, and think of alternative ways of doing research. I met with the senior researcher to discuss what I was doing and how it was connected to the overall research project. Therefore, my experiences as a female scientist shaped the perspectives I have in understanding, learning, and doing science now as a science educator.

**In a Position to Effect Change**

My first academic position was at Michigan State University as a postdoctoral fellow (Moore, 2005). The experiences I had there were foundational for my current position at Teachers College, Columbia University. I often tell people, “I love my job” because I am living my life’s purpose. At the same time, I am aware that my position is multiple, challenging, full of possibilities and contradictions. Nevertheless, I feel like that I am in a position to effect positive change in so many ways. One specific way is to change perceptions of African American women in positions of authority—who we are
position in science education. From this increased awareness, I deemed it imperative to prepare the Black females for a world in which they would likely be marginalized by helping them to develop a strong sense of self and a self-reliant disposition to “go it alone if necessary.” I attempted to develop the aforementioned by being supportive but very strict, brutally honest yet encouraging, and understanding but tough.

In yet another assistant professor position, I work to meet what I consider one of my life’s divinely appointed purposes. As in the past, I am certain lessons learned earlier in life will facilitate my forward movement in science education even if it is relegated to the margins.

and what we can do. Thus, my research, teaching, advising, and service are similar to what Ladson-Billings says of her work: “I, too, share a concern for situating myself as researcher—who I am, what I believe, what experiences I have had all impact what, how, and why I research. What may make these research revelations more problematic for me is my own membership in a marginalized racial/cultural group” (1995, p. 470). Problematic is my research in the sense that my concerns and issues are marginalized. However, I am optimistic. I work in the margins—perfecting my craft, and waiting patiently for someone to notice. While I consider the margins to be (a)lone(ly) space, I also see it as a full of opportunity. I work quietly, being observant to the forces around me, and anticipating the moment where marginalization becomes a past notion.

CONSTRUCTING PRESENT MEANING FROM PAST EXPERIENCES

_Eileen:_ The juxtaposition of our biographies is striking. We were reared among the working poor in two, small, rural towns of North Carolina—you in the east and I in the west. Although we studied in different science departments, we attended UNC-CH around the same time. Both of us elected to launch and continue our careers at predominately white institutions (PWIs), and we endured similar challenges along the way.

_Felicia:_ Yes, our background experiences are very similar. For me, a similarity I see in our parallel stories is the influence of our families, our mothers in particular, and the way we approach life. We have developed a toughness to survive that we have garnered from our mothers’ lives.

_Eileen:_ I’m also taken aback by our roles within our families. Your experiences of caring for your family at an early age resemble the responsibilities I now manage. Because I’m the child most educationally, financially, and socially positioned to do so, I govern the affairs of my aging and chronically ill parents who continue to live in poverty.

_Felicia:_ I think the centrality of our families in defining who we are may speak to our commonality as Black women. Even though I did not mention this in my personal history, another key factor in defining who I am is my religion. It is very
influential in how I view life, respond to events in my life, and look to the future. With regard to religion, I feel like being in science education is what I’m supposed to be doing—what I am purposed to do—a divine assignment, not a job but a mission. Even when I see things happening around me, the good and the challenging, I take them as life lessons that I’m supposed to learn. I find and pull strength from my faith.

_Eileen:_ The faith you mention is also at the core of who I am and what I do. Faith produces a confidence and certainty in how I act that others who do not share my faith cannot understand.

_Felicia:_ Sometimes, others misinterpret having this assurance that things will work out for our benefit as arrogance.

_Eileen:_ I agree. In your biography, I noticed you cited gender and then race. When I interpret my experiences and construct responses to them, race is more salient.

_Felicia:_ Here is where we are uniquely different. First, gender is salient for me because gender was emphasized in my early home life as a major division of roles and expectations for members of the family. My father worked and my mother stayed at home; she worked outside of the home after my youngest sister started school. Even with a part-time job outside of the home, my mother still maintained duties within the home. In addition, my mother baked cupcakes for special occasions, like Christmas and Valentine’s Day, for my elementary classmates. I suppose I grew up thinking that this was what mothers did; they kept the home and the fathers worked. In accordance to these gender roles in my household, my younger sisters and I had chores that centered on housework. I learned how to sew, go grocery shopping, to cook biscuits, cakes and other things from scratch as well as prepare meals, “do hair”, and take care of my younger sisters. My father was the authority in the home, and we respected and loved him, and were obedient to what he required of us.

_Eileen:_ My early life experiences did not distinguish between male and female roles. My mom worked outside and inside the home. During my early years, roles were not determined by societal expectations of what was appropriate and inappropriate for males and females but by need and who was best situated to address the need. For example, my brothers and I did so-called woman’s work such as cooking, cleaning, and doing laundry. Need, expertise, and circumstance continue to dictate who does what in my personal life. For instance, my husband and I both do “male jobs” and “female jobs.”

_Felicia:_ Well, being single. I do it all! And I suppose this will not change too much as I begin to fulfill my marital duties in the home and also work outside of the home.

_Eileen:_ I also think growing up in a male-dominated environment impacts how I view and enact myself as a female in science education. As I matured, my mom coached me on things like proper posturing etiquette, but, in areas where it mattered like standing up in face of opposition, she encouraged me to do it like
the boys. Incidents of oppression in higher education also diminish (not eliminate) the prominence of gender in my worldview. As in my unforgettable 4th grade experience, racial oppression continues to be prominent in my current professional experiences. One event is especially memorable. During my employment at one institution, I was one among several female assistant professors. We primarily differed in race and number of years employed in higher education with me being the more senior in experience. Because we were in some regards “sisters”, we on occasion discussed our tribulations. Through these conversations, I learned that we received conflicting information regarding career progression. They were coached on how to become a part of the profession’s ruling class, and I was encouraged to be a dutiful worker. I also had the lowest salary. To me, race and perhaps social class were major factors that circumscribed the advice and compensation I received. In order to offset this differentiation in expectation, information shared, and treatment, I acted on my somewhat naïve belief that individuals will do what is just and fair if informed so I openly highlighted issues. Today, because the event altered how I perceive and, to some extent, interact with the world, I continue to feel the impact. I realize the naïveté of the belief that individuals will be fair and just if informed about oppression. Now I purposefully challenge oppressions by first naming them and then I work to create and support structures to circumvent them—all with the intent of improving conditions for a future generation. One example of supporting structures to circumvent oppression (limited access) is my participation in the preconference workshops held at the annual meetings of the National Association for Research in Science Teaching. These workshops provide pertinent information regarding career trajectories in academe often withheld from people of color.

Felicia: That is interesting, Eileen. I can see oppression through the women in my life, mainly my three biological sisters and my closest girlfriends. So, again gender is salient but definitely connected to race and social class issues. However, gender, to me, is still the major influence, though the others are closely connected. I am a member of Sisters of the Academy (SOTA). I started as a graduate student member and have remained with the organization since its short, five-year history, even serving on the executive board of the organization since the beginning. As a SOTA member, here is where I work to help other African American females to advance in academe and administration. Our mission is to support and nurture through education, scholarship, and service. Similar, to you Eileen, being involved in professional organizations allows me to build supportive structures and to be in positions where obtaining information and passing it along truly helps the next generation of Black women specifically, but for all who are marginalized generally.

Eileen: Your declaration, “gender is major,” is not a sentiment common among Black women. How did you get to this place?

Felicia: My status as the eldest child is very influential and impacts what I do and how I interact with others. I do not want to say nurturing; but I am very supportive and helpful to everyone. This helpful, assisting kind of identity is a part of me, and it comes from my childhood. Because of my social class, I have learned how to
make do with what I have, and I really have no desire to accumulate a lot. I don’t work just to accumulate things. This influences what I do in science education and my research. For example, when I accepted my academic position I was given a budget for research to I buy what I needed. I just spent the last of the money after 4 years! I have learned to make good use of resources or work in ways that require very little financial resources.

Eileen: You seem to equate the significance of gender to a supportive, helpful, assisting role. Perhaps, it is this meaning being supportive, helpful, and assisting that gender is eminent but problematic for me. In my work with prospective science teachers, I am supportive, helpful, and assisting in a manner that is not stereotypical. My caring signifies the racial/cultural differences Siddle-Walker and Snarey (2004) discussed in their work. Particularly because we work in a field that is predominantly White and middle class, this expectation to mother students in a way that corresponds to the mainstream view of caring conjures unsettling images—historical caricatures like “Mammy” and real-life mental impressions of my mother as a domestic. Among my more pressing challenges in science education is balancing this external expectation to be a mother to students and my worldview indelibly shaped by the intersecting oppressions of race, social class, and gender I experience. Of the many reasons why I selected and continue to work at PWIs, projecting or reinforcing a mothering image is not one of them.

Felicia: Being at TC has been a blessing and a challenge in the sense of constructing the kind of image I want for myself as a faculty member. The most important reason for my selection of a PWI is being able to present an image that African American women can do research, can teach, and can be successful at a White institution. People are surprised by my success and sometimes my presence at one of the top, leading research institutions in the world. For me, it is not by accident. I am supposed to be here to do what I am supposed to do.

In the past, I tried this experiment; I would arrive to class before the students and sit in the audience. After everyone was present, I would stand up and say, “Hello, class, welcome to science education!” Eyes would get big; mouths would drop open. The students’ surprise told me a great deal about the unexpectedness of having an African American female science education professor. Second, I feel that my position of power, as my minister says, is to be there for other African American students and other students of color to support them in their personal and professional growth. Because there are so few Black faculty, who will be there to support students of color? I want to be in a position to effect change and to change oppressive structures for students and faculty who are with me and those who will come after me.

Eileen: The reasons you articulate as well as the oppressions we face are my motives for working at PWIs and for persevering in science education. The often pursued tangibles of material accumulation, prestige, position, etc. are not my motivations for what I do and how I do it. Although the mission is costly in many ways, I hope that our presence, our actions, and that of others who resist
oppression and empower the oppressed will change the landscape of science education such that the stories of the African American women behind us will herald more inclusive rather than marginalized experiences.

CONCLUSION
Comparisons and contrasts of our experiences as Black women in science education in the U.S. illustrate Collins’ Black feminist theory. On one hand, as Black women we share common challenges in milieus where Whiteness and maleness maximize participation. These common experiences exemplify the collectivity and homogeneity domains of the collectivity-individuality and homogeneity-heterogeneity dialectics of Black feminist thought. On the other hand, our experiences are unique and different, diverging on the salience of various oppressions in our lives. As revealed in our stories and discussion of life events, how oppressions intersect in our lives as Black females in science education manifest differently and elicit characteristically distinctive responses. Nevertheless, aligning with the primary aim of Black feminist thought, each of us devotes our lives and our careers to actively resist oppressions.

Intent on confronting oppression, we have elected to establish our careers in science education at PWIs. We use our mere presence in the college classroom to question stereotypical and derogatory images of African American women. Additionally, we utilize our positions to facilitate the personal and professional growth of marginalized others in science education, as we continuously resist oppression. In the physical setting of PWIs and in the professional setting of science education, we employed and will continue to share what we have gained in the form of knowledge and expertise from our lived experiences as individuals and as a part of the Black women collectivity as ways to educate the oppressor, to empower the oppressed, and to disrupt and alter oppressive systems.

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AFFILIATIONS

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