

Preface

THE PERVASIVE AND PERSISTENT CHALLENGE OF RACIAL AND GENDER DISCRIMINATION IN STEM SETTINGS

In a recently released report for the National Science Foundation entitled, *Double Jeopardy? Gender Bias Against Women of Color in Science*, 60 female scientists were interviewed about their treatment in their work settings, 100% reported encountering gender bias (Williams, Phillips, & Hall, 2014). Among African American scientists interviewed for the report, 48% reported being mistaken for administrative or custodial staff at their own place of employment. This study and many others soundly indicate that gender-based and racial-based discrimination are persistent problems haunting both educational and professional STEM settings (Ceci, Williams, & Barnett, 2009; Espinosa, 2011; Freeman, 2004; Hollenshead & Thomas, 2001). With mounting studies revealing the pervasiveness of discrimination in STEM settings, the role of gender bias and racial discrimination play in the underrepresentation of woman in STEM fields has gained a great deal of attention as the shortage of STEM professional amasses. It is broadly accepted across STEM fields that addressing issues that negatively impact the recruitment and retention of women in STEM field is important not only to address the shortage of STEM professionals but to also uphold commitments to equality of opportunity and the expansion of human capital and productivity. The consequences of racial-based and gender-based discrimination in STEM fields has brought the importance of addressing these issues to the fore. In response, sectors of both government and industry have poured enormous amounts of money into programs and research aimed at addressing the underrepresentation of women and minorities to STEM professions. Comprehensive reform initiatives range from programs designed to combat STEM stereotypes held by teenage girls through mentoring such as National Aeronautics and Space Administration launches NASA G.I.R.L.S. online mentoring program to multi-million dollar grants such as the Robert Noyce Scholarship Program awarded to universities to increase participation in STEM careers.

THE STATE OF INTERVENTIONS

Despite ongoing efforts to end gender and racial gaps STEM professions, discrimination in work and educational settings still exists. Long-standing structural barriers and inappropriate organizational norms continue to subject women to disparaging practices. Many of the work place initiatives fall short of developing adequate measures to address not only subtle, but even blatant discriminatory behaviors

(Ceci, Williams, & Barnett, 2009; Xu, 2008). Undeniably, drastic changes are needed in both work and educational settings to end the underrepresentation of women and minorities in STEM professions. Changes must take place to not only alleviate the current shortage of STEM workers, but to ensure there are adequate STEM professionals in the workforce pipeline. According to U.S. Census Bureau, in 2011 racial and ethnic minorities comprised 50.4 percent of the children in the United States under the age of 1. In 2020, the majority of the population under the age of 18 will be an ethnic or racial minority (Colby & Ortman, 2014). If current practices continue, more than half of the potential STEM work force could be the target of gender and/or racial discrimination leading to a reduced recruitment and retention of STEM professionals. Ending or at least reducing the minority and female gap in STEM fields necessitates an end to hostile and prejudiced environments that discourage women of color from entering or succeeding in STEM settings. Not only does discrimination hurt women, but many aspects of organizational effectiveness in work and school settings suffer as well. Loss is produced in the form of decreased productivity, increased attrition, and civil litigation.

SEARCHING FOR A SOLUTION

What can be done to prevent or reduce gender and racial discrimination in STEM educational and professional settings? Gender-based and racial-based discrimination stems from a complex mixture of structural and cultural factors that are rooted in social norms as well as racial and gender stereotypes. At the core of the problem are social beliefs that shape societal perceptions regarding who is a scientist or a mathematician or an engineer. Compounding the problem, many of the individuals engaging in gender-based and racial-based discriminatory practices are not aware of their biases. Discriminatory workplace behaviors are carried out in a status quo manner and as a result STEM work environments maintain their male-dominated status quo. Because many unknowingly behave in prejudiced ways, combating racial and gender bias extends beyond anti-discrimination policies. After all, there is no reason to change one's behaviors, if one believes he is already in compliance with such policies. Therefore, one of the first steps in eradicating racial and gender-based discrimination is to educate those acting in discriminatory ways about the words and actions that convey prejudice. Women, especially women of color working in STEM professions have a range of experiences that they bring to the conversation when examining words and actions that convey prejudice. The sharing of their personal stories can be an effective instrument for increasing wrongdoers' awareness of the pervasiveness of discriminatory practices as well as the plethora of negative consequences associated with those practices.

THE PURPOSE OF THE BOOK

This book conveys the pathways and journeys of women of color in regards to their experiences as STEM professionals. Research based on those experiences as well as deliberations from the literature on gender relations and power for women of color is shared. Both the nature and significance of racial and gender discrimination in STEM settings are explored. The book also draws on the stories of women of color not only to highlight the prejudice encountered, but to also share pathways for overcoming prejudicial treatment. The chapter authors for this text are employed in a variety of settings including

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business, education, and medical settings. The chapter authors offer unique perspectives on gender and racial discrimination with regard to their specific settings. By including chapters about women of color in variety of STEM settings, including medical settings, this book contributes to the existing literature on women of color in STEM in a distinct manner.

Organization of the Book

The book is organized into 13 chapters. A brief description of each of the chapters follows:

Chapter 1: Grace under Fire – Examining the Underrepresentation and Persistence of Women in STEM Professions from an Ecological Systems Theory Perspective

This chapter explored a myriad of experiences that were communicated as contributing to the selection and maintenance of a STEM career for the female participants.

Chapter 2: Constructing Conducive Environment for Women of Color in Engineering Undergraduate Education

This chapter provides crucial implications for policy and practices concerning how administrators and faculty members can design engineering programs to create a healthier climate and to propose resources for women of color.

Chapter 3: Barriers to Success – Disadvantages of Gender Normative Language to Women in STEM

This chapter will talk about the account of women in academia, gender equity in higher education, and the cost of a gender normative language on women in academia.

Chapter 4: Overcoming the Myriad of Obstacles – The Ongoing Journey as a Female African American Physicist

This chapter documents the experiences of the ongoing journey of an African American female physicist. The target of this writing is to reflect a light on the status of affairs particularly in the terminal degree population.

Chapter 5: Standing Alone in Computer Science Education – A Story of Black Women in Academia

This chapter delves into problems that have plagued Black women in Canada and the Caribbean in their quest of advanced degrees and standard academic roles in Computer Science (CS) and related fields.

Chapter 6: Race and Gender Inequalities in Medicine and Biomedical Research

This chapter attends to racial and gender inequality in academic medicine and biomedical research. Racial and minorities and women remain sorely lacking in medicine, biomedical research, and healthcare administration.

Chapter 7: African American Women in STEM Education – The Cycle of Microaggressions from P-12 Classrooms to Higher Education and Back

This chapter examines the critical issues of stereotypes and gender bias that confront students, for the most part women, of color in higher education and into their careers, along with the deficiency of representation of women of color in higher education STEM related branches of learning.

Chapter 8: Are Female STEM Majors Academic Risk Takers?

The current project examined differences in academic risk-taking between STEM and non-STEM female students.

Chapter 9: Fortitude – A Study of African Americans in Surgery in New York City

Covert racism is ever-present in the field of medicine and medical education. The most heavily impacted are African American and Caribbean American females and males. This chapter details the actions of whites allies, and a dedication to maintain a continued watchful stance for this protected population.

Chapter 10: Black Women and Science in Higher Education – Not Much Has Changed: Still the Struggle

This chapter gives an account on the experiences of a female STEM faculty member's academic journey, and then entrance into the workforce as she negotiates the high and low points of being a black woman in a science field, as a science educator that will mentor other black women scientists, while also trying to maintain a feasible family life.

Chapter 11: STEM Fields and Ethnic Women in New Zealand – Issues and Opportunities

This chapter examines how public policy engages women in STEM and how it can enact gender issues.

Chapter 12: Prestigious College Courses and Race/Skin Color – Some Thoughts about Higher Education in Brazil

This text examines the context that exists between the opportunity for students of color in Brazil and the advanced college courses offered to them.

Chapter 13: Becoming a Surgeon

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This chapter documents the life and experiences of an African American female surgeon as she navigates institutional racism and sexism through a reflective narrative methodology. This chapter also documents her resolve as she continues in her career.

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