AWIS

ASSOCIATION FOR WOMEN IN SCIENCE

Transforming STEM Leadership Culture

GRAND CHALLENGE SERIES

Abstract

Women now earn more than half of all STEM degrees[1], a pinnacle and necessary credential for advancement in many STEM professions. However, women remain in STEM occupations at half the rate of men. Women leave their STEM fields after they have expressed an interest in STEM, have succeeded in rigorous programs to develop their knowledge, earned college-level degrees, and entered the workforce. Research has repeatedly demonstrated that diverse teams, especially in leadership, outperform homogenous teams in innovation, research quality, decision-making, and complex thinking and bolster their organization's financial success[2]. Despite the benefits of diversity in leadership, organizations are not adequately addressing the barriers women, especially women of color, encounter in their pursuit of STEM leadership roles. In fact, among the primary reasons cited by a diversity of women for leaving their STEM fields altogether are pay and promotion inequities[3]. This second report in the AWIS Grand Challenge Series, Transforming Leadership Culture, deepens our understanding of the leadership barriers STEM women face and provides organizations with steps they can take to create more inclusive leadership cultures.

Pictured on the cover are AWIS members (counter-clockwise):
Rita Isabel Lechuga, MD, MPH, Senior Manager, NASTAD, President AWIS DC Chapter
Poorva Dharkar, PhD, STEM Consultant, President, AWIS Bethesda Chapter
Amber Kaplan, PhD, Chief Scientific Officer, NKMax Biotech
Jennifer Blum, PhD, Astrophysics, AWIS National Governing Board Member
Tawni Koutchesfahani, MS, Senior Director, CMO Drug Product, Catalyst Biosciences
Cipriana D.T. Eckford, P.E., PTOE, Project Engineer, Rummel, Klepper & Kahl

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Introduction

Despite evidence that diversity in leadership is good for innovation and for organizational financial outcomes in the public and private sector, AWIS research has shown that gender and racial disparities in leadership positions are still pervasive in STEM. Organizations continue to promote homogeneity among their leadership teams through cultures rife with bias and microaggressions that inhibit women's advancement and prevent institutions from making full use of the leadership talent they already have, but often overlook.

This new AWIS research contributes to our understanding of systemic barriers to equitable leadership and provides key steps to creating more innovative and productive leadership teams.

In this report, we share straightforward and attainable steps organizations can take to:

- Expand their leadership talent pools
- Fairly evaluate candidates for leadership roles
- Cultivate more inclusive leadership cultures

AWIS research that follows is based on our analysis of data on leadership positions in academia, government, and industry as well as findings from our 2019 AWIS Membership Leadership Survey. AWIS research shows plainly across academia, government and industry that a diversity of skilled STEM-trained women are absent from leadership positions and explores the underlying reasons why.

With data illustrating the leadership patterns for 1.2 million STEM degree earners[1]; over 350 leadership positions at U.S. national laboratories and research facilities[4]; over 6,000 leadership positions at U.S.-based biotechnology companies making their initial public offerings since 2013[5]; and 125 women among our AWIS membership, this report offers valuable insights into the state of leadership inclusion across STEM in the U.S.

The representation of women in STEM leadership grows in disparity with rank, while the opposite is true for men. This is especially problematic for Black, Latinx and Indigenous women.

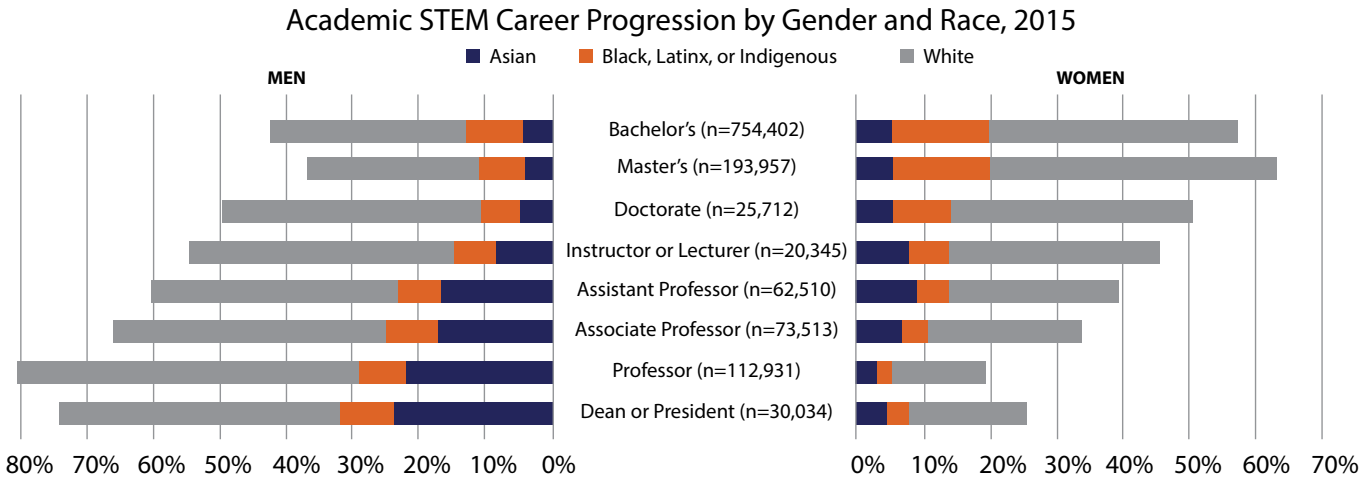
Academia

Academic faculty leadership positions provide a level of job security through tenure that is unparalleled in other sectors. In addition, academic leadership in administration, such as dean and president roles, are the most highly paid academic positions and come with the ability to shape disciplines and institutions for years to come.

Our analysis of National Science Foundation data shows women as whole earned over half of all bachelor's, master's, and doctoral degrees in STEM, while women of color earned 20 percent of bachelor's and master's degrees and about 15 percent of doctoral degrees. Generally speaking, as they progress up the faculty ranks, the proportion of women, especially Black/African American, Latinx and Indigenous women, sharply declines. At the dean and president level, this also disproportionately affects Asian women.

For men, the opposite is true. Men's representation grows the higher up the academic hierarchy they go, especially white and Asian men. Black/African American, Latinx and Indigenous men's representation remains stagnant across the ranks.

In academic STEM, search committees regularly attribute the absence of women, especially women of color, among their candidate pools and hires to a lack of available women. However, our previous research demonstrates that job unavailability and barriers to getting hired are a major reason Black and Indigenous women leave their STEM fields[6]. A diverse pool of skilled STEM women is out there, but organizations must make concerted efforts to expand their networks to include them.



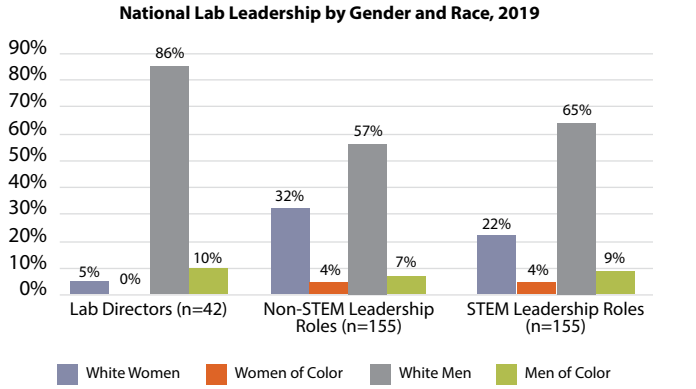
Source: Metcalf, H. and Russell, A. (2019). Original Analysis of 2015 NSF Survey of Doctorate Recipient and IPEDS Data.

GRAPH 1

Leadership at the federally-funded national laboratories and R&D centers is largely directed by white men, who hold 86 percent of the top-level director positions.

Government: National Labs

There are 46 federally funded research and development (R&D) centers across the United States[7]. These research labs are one of the top employers of STEM talent and invest billions of dollars into science and technology development. As our societies become more intertwined producing new, complex issues that are scaling at an unprecedented speed, now, more than ever, retention and promotion of STEM talent should be at the forefront. However, this is not the case at our federal government's R&D centers.



Source: Metcalf, H. (2019). Original Analysis of National Lab leadership positions posted on lab websites.

GRAPH 2

Only two of the 42 labs* included in this analysis are directed by women, both of whom are white. White men hold 306 of the 478 leadership positions at the labs (64 percent). Women of color occupy 3 percent of lab leadership roles, while white women and men of color hold 24 percent and 9 percent respectively.

In addition, when women are in leadership positions at the labs, they have greater representation in positions that are not directly STEM-oriented, such as human resources, general counsel, communications, and business development. Women lead 36 percent of these positions, which tend to offer lower pay and less influence over the trajectory of R&D. Roughly 4 percent of STEM leadership roles are held by women of color and 22 percent by white women.

> "Increasing diversity in the workforce is a necessity no matter where you work, but the bottom line is that it is not enough to hire the best people; you have to provide programs that support them and help them grow their skills, whether they are scientific, technical or managerial."
>
> *– Pat Falcone, PhD, Deputy Director for Science and Technology at Lawrence Livermore National Laboratory*

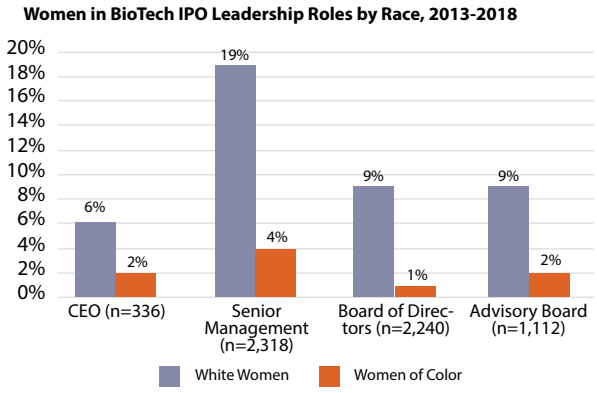
The lack of representation of women, especially by women of color, in these key decision-making and STEM roles not only means that their expertise is under-utilized, but they have little power or influence in determining the direction of these federally funded projects on energy, defense, health, security, space, and more and the impact innovation has on their communities.

* Four labs did not have leadership data publicly available and were excluded from this analysis.

Despite women's high representation in biotech fields, they are still significantly marginalized when it comes to leadership.

Private Sector: BioTech IPO

Biotechnology companies are the fastest growing segment of STEM-based startups to go public over the past ten years. The biotechnology entrepreneurship space presents a unique opportunity for women. Women already lead 45 percent of businesses in the U.S.[8] and out-earn men in life science degrees at all levels[6]. In addition, women tend to seek out entrepreneurship as a means to garner greater autonomy over their innovations than academic or government careers offer. Taken together, all of this should amount to women's greater leadership representation in the biotech segment of industry. When it comes to initial public offerings, however, this is not the case.



Source: Metcalf, H., Russell, A., and Blum, J. (2019). Original Analysis of US-based Biotechnology Company IPO Data, 2013-2018.

GRAPH 3

Between 2013-2018, only 19 white women and 6 women of color have been CEOs of biotech companies making their initial public offerings (IPOs). Nearly 15 percent of these 336 companies have had no women in a leadership role whatsoever. As with the national labs, when women are in leadership roles at these companies, they tend to be in senior management positions that are not STEM-related, like human resources, diversity and inclusion positions, and communications. Nineteen percent of these roles are held by white women and 4 percent by women of color.

> "Our institutions have not progressed in the way they treat women who raise issues of discrimination. Historically, when women raise the alarm of fairness, men, and sometimes other women, in positions of power shut them down. We are ignored, ridiculed, defamed, and are more closely investigated than the accused...Eliminating discrimination is not only the right thing to do, but the smartest way to move our entire economy to its highest potential."
>
> *Maria Artunduaga, MD, MPH, MTM, CEO, Respira Labs*

Approximately 40 percent of these biotech companies have no women on their Boards of Directors and 67 percent have no women on their Scientific Advisory Boards. Women of color represent less than 3 percent of these positions. These positions play a key role in determining organizational policies and practices and which problems these budding companies will solve and for whom. Without

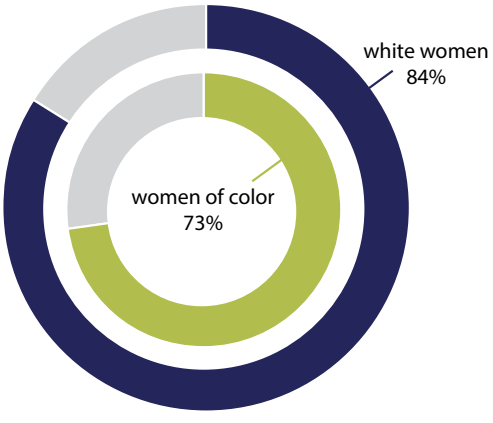
a diversity of voices at the table, narrow consumer bases will continue to be served and critical health problems left unaddressed for the most marginalized populations in our society.

From this research, the case is clear. Despite having an ample pool of highly qualified women, they are not being hired or promoted into these key leadership roles.

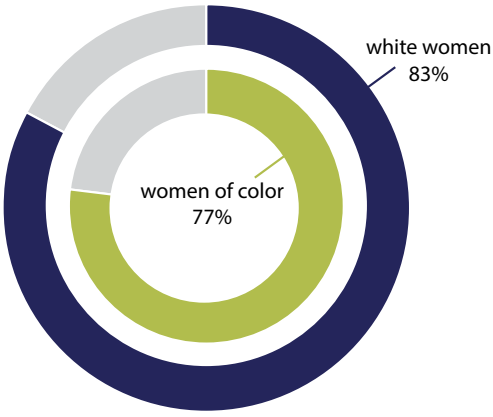
AWIS Leadership Survey

Across each of the cases presented above, similar trends hold across sector: women are earning STEM credentials but are not being recruited or retained through leadership positions. A commonly held belief about the cause of this trend is that women, especially women with children, simply are not interested in these positions. However, research does not support this belief. In fact, our 2019 AWIS Leadership Survey of 125 women among AWIS members across sectors shows 75 percent are currently in leadership roles or have served as leaders in the past and 19 percent aspire to leadership positions. These individuals have STEM degrees primarily at the master's and doctoral level across 48 different subfields of STEM. Those currently or formerly in leadership roles have held positions of Dean, President, Executive Director, Provost, CEO, Chief Scientific Officer, and more.

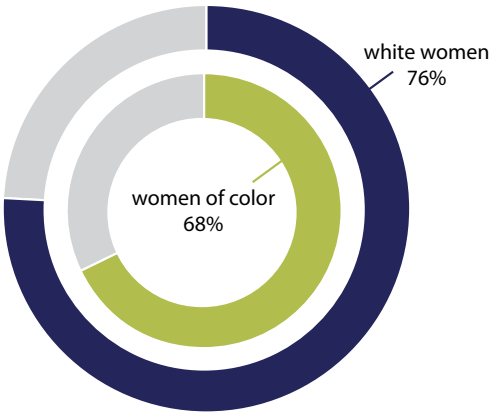
How, then, do we explain these barriers? Rather than a lack of interest, our survey shows that a host of cultural issues undermine women's leadership pursuits. For example, more than half of the women who participated in our survey have regularly experienced the following microaggressions and biases related to their competence and merit:



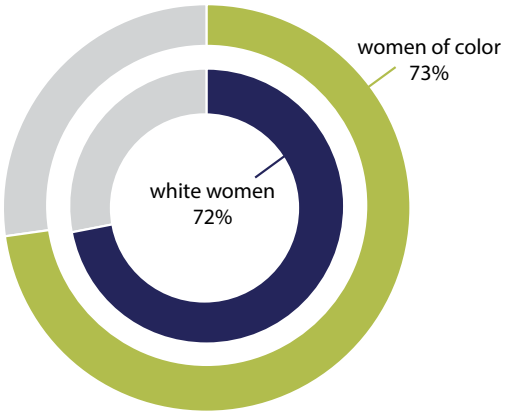
had their judgment questioned in their area of expertise



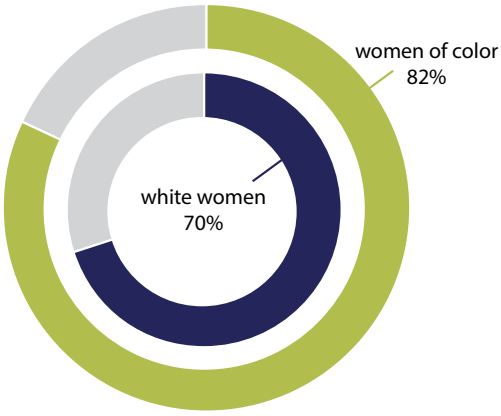
work harder than others to prove themselves



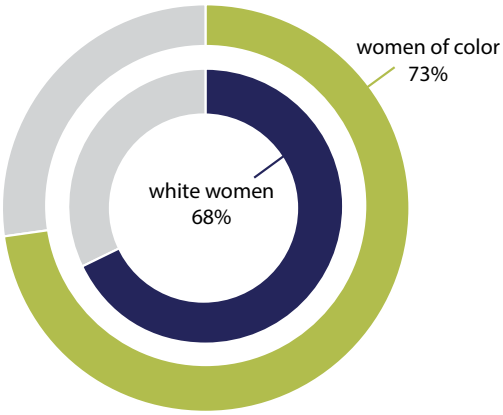
have had to provide more evidence of competence than their peers



have have others explain things to them in their area of expertise



have been assumed to be more junior than they are



have had their accomplishments or ideas credited to someone else

"As a young female in a field of older men, I am paid less than my peers for the same work, often not taken as seriously, and criticized for being strong-willed in a way that would not occur for most men. Despite being one of the more senior employees now in my work group I am still at the same role I was when hired over four years ago."

- Survey Participant

Pervasive organizational culture issues undermine women's leadership pursuits.

"[My experiences] have been mentally challenging and, when not on my guard, very hurtful. [For example,] I was a new hire [in a] meeting with upper management. I pulled out my notepad to take notes [for myself] and [the VP] says out loud, 'you can take notes for me as well, our secretary.' That was demeaning, insulting, and degrading and when he and the room saw that I didn't find it funny, the laughter stopped with an awkward 'I'm sorry' but not sorry attitude because they all shrugged it off as if I, the only African American woman in the room, never counted."

- Survey Participant

Notably, women of color are significantly more likely to face assumptions that they are more junior or have less experience than they do and to have someone else take credit for their ideas. In essence, women are not able to simply do their jobs. They must spend extra time and effort justifying their existence and navigating microaggressions and biases, which add up over time and contribute to talent attrition.

In addition, more explicit equity issues surfaced in terms of opportunity and evaluation. Nearly half of all women feel like they are not receiving the same opportunities for growth and development as their peers. Only a third of white women and half of women of color believe that merit is determining who gets the best opportunities. Only 57 percent percent of white women and half of women of color are being offered valuable and relevant leadership opportunities.

Roughly 45 percent of all women experience a different evaluation process than their peers and more than three-quarters believe their identities impact how others evaluate them. More than 40 percent experienced tokenization and have only been offered leadership roles related to diversity and inclusion rather than their area of expertise. These positions, while technically leadership roles, rarely hold significance in promotion and tenure cases only adding to the service load of marginalized employees. As our respondents illustrate, there is a clear distrust in the level of fairness in leadership opportunity and evaluation.

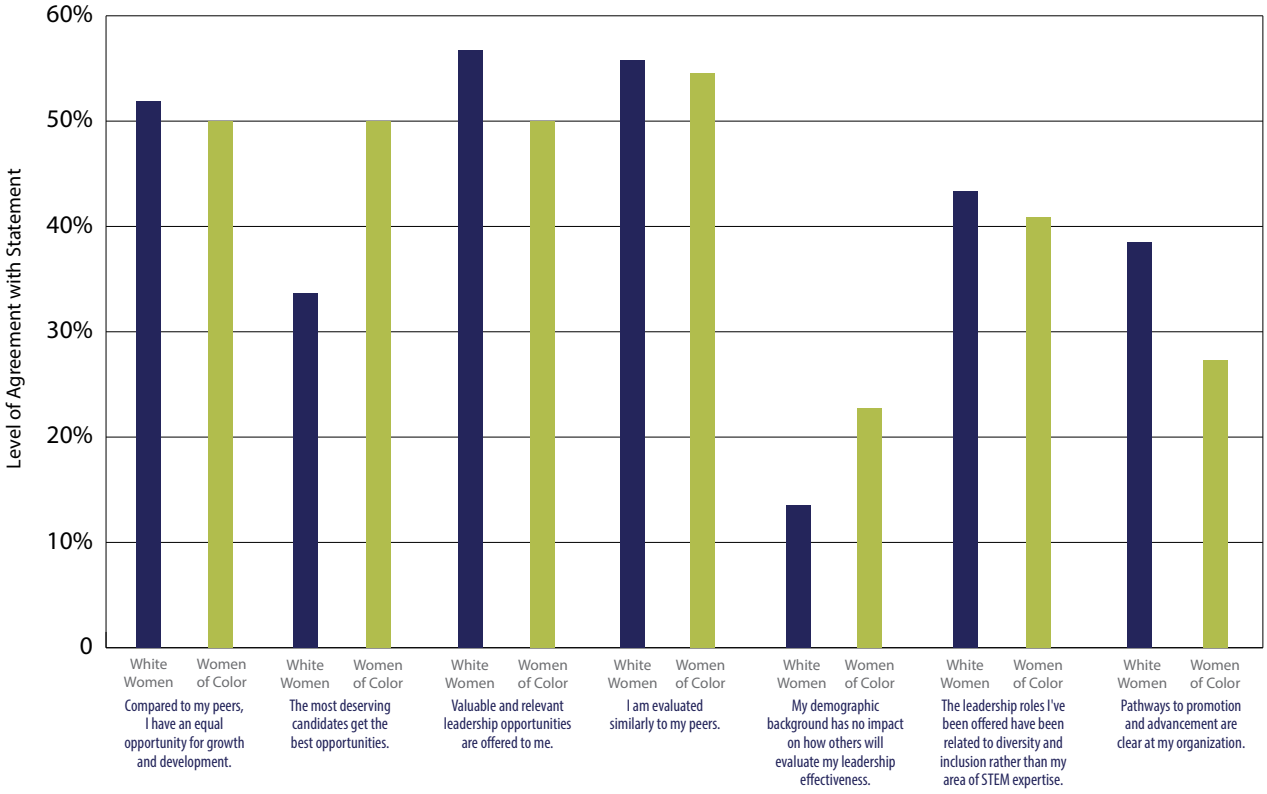
"I have found that I am not approached about the most senior level leadership positions. I have also experienced harassment (both sexual and non-sexual) through the course of my career. More recently, I was subjected to bullying by more supervisor, and the lack of willingness of senior leadership to adequately address the situation led me to leave my position for a lower-ranked position in order to escape the situation."

- Survey Participant

"I had a leadership role between the ages of 28 and 33, but I looked like a college or grad student. Only through the support of my boss, a male, did people take me seriously."

- Survey Participant

AWIS Members' Experience with Leadership Opportunities and Evaluation, 2019



> "I have missed out on mentoring, both peer and senior leader mentoring. I see men routinely learning from those senior to them but I'm left out of conversations."
>
> *- Survey Participant*

Transparency, or a lack thereof, plays a prominent role in this distrust. Only 39 percent of white women and 27 percent of women of color experience clear pathways to promotion and advancement at their organizations. In tandem with microaggressions and bias about their competence and merit, opacity in leadership pathways result in women not being identified or supported as leaders.

Across sectors, women are regularly told to "lean in" and embrace leadership opportunities in their STEM careers. However, as this report illustrates, even when women are actively seeking and participating in leadership development opportunities and serving as leaders, their organizational cultures undermine these pursuits. Rather than placing the responsibility for diversifying organizational leadership primarily on women, AWIS research shows many ways organizations need to step up and transform their STEM leadership cultures.

Transforming STEM Leadership Culture

Knowing the systemic inhibitors to diversity in leadership in our organizations is an important first step in building inclusive leadership cultures. Here are some additional ways organizations can remove the barriers detailed in this report:

1. Broaden your network.

When conducting leadership searches, organizations often miss out on talented leaders because the networks they use for outreach are ineffective and driven by homophily. Taking time to assess and broaden your network helps ensure a diverse and skilled candidate pool[8].

2. Re-think your leadership evaluation.

Processes for promotion and evaluation must be transparent, applied consistently, and based on evidence, not bias. Creating clear and consistent evaluation criteria and ensuring reviewers applying them are trained in anti-bias will lead to more equitable and diverse leadership outcomes. These steps to align criteria with needed skills also help mitigate tokenism in leadership assignments.[9]

3. Learn from your employees

Organizations can learn a lot from their employees about the leadership opportunities they want, the experiences they have had, and how current policies and processes affect them. Taking the time to incorporate a diversity of employees' views helps update offerings, policies, and processes and contributes to a sense of employee belonging and inclusion.[3]

4. Offer leadership development opportunities

As our survey shows, employees are actively seeking opportunities to develop their leadership skills. Offering employees a variety of avenues for leadership development, whether in-house or in the local community, meets their needs and builds the organizational leadership talent pool.[9]

5. Evenly distribute and recognize service work

Women, especially women of color, unevenly carry the bulk of the service workload in their organizations, particularly diversity and inclusion work. This labor is often undervalued and unrecognized and rarely contributes to promotability. Organizations should more evenly distribute the service workload across all employees and recognize the valuable role it plays in leadership development, for example, by incorporating it into the evaluation process more substantially.[10, 11]

6. Address microaggressions and biases

Microaggressions and bias in organizational culture undermine collaboration, fair evaluation, and the utilization of expertise for innovation. Training employees on microaggressions and bias in a way that builds shared responsibility for respectful workplaces and contributes to inclusive leadership cultures incorporates these values into the daily fabric of your organization, rather than viewing them as something separate.[12]

7. Cultivate accountability

Organizations that hold themselves accountable for disparities in leadership and the underlying cultural issues at play are more successful at implementing change efforts. Accountability means acknowledging where things are not going well, taking responsibility for them, and demonstrating active and visible steps to meet the commitment to equity and inclusion.[3, 9]

8. Communicate

Transparent communication about pathways to leadership roles, the reasons decisions are made, and how promotion processes are applied not only creates a greater sense of awareness of available opportunities, but also builds trust that decisions are made, and opportunities are offered fairly. Transparency also helps organizations hold themselves accountable.[3, 9]

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Acknowledgements

We would like to express our gratitude to Dr. Jennifer Blum for her biotechnology initial public offering data analysis efforts; Maria Ibañez and Jossie Flor Sapunar, from the AWIS Communications team, for their editorial and production oversight on this report; Alan Chewning and Andrea Lucy, from the AWIS Membership team, for conducting survey outreach to our members; and all of the AWIS members who participated in the survey and shared their valuable experiences with us. Thank you also to Selena Robleto of Red Velvet Creative for the design of this report.

About AWIS

The Association for Women in Science (AWIS), founded in 1971, is the leading organization that advocates on behalf of women in science, technology, engineering, and mathematics (STEM) to achieve business growth, social change, and innovation. We are dedicated to driving excellence in STEM by achieving equity and full participation of women in all disciplines and across all employment sectors. AWIS has helped guide Congress, the United Nations, pharmaceutical, biotech, institutions and other professional organizations on decisions and best practices to achieve gender diversity and positive system transformation in STEM. AWIS is a global network with 80 grassroots chapters and affiliates connecting more than 100,000 professionals in STEM with members, allies and supporters worldwide. Learn more about the contributions of AWIS at www.awis.org.

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