CHAPTER

1

The Current State of Women of Color in Tech

It is probably no surprise to you that there is a lack of women in technical careers within the United States. If you performed a general web search on "women in technology," you will find numerous articles, studies, podcasts, and more that point out this deficiency. In a 2019 study from the National Center for Women and Information Technology (NCWIT), the number of women in computing professions has remained relatively stagnant at 25 percent since 2007. While tech companies have made great strides in increasing the number of women in technical roles, it's disappointing considering that women make up nearly 60 percent of the total US workforce. What does not get reported, or at least not very often, is the lack of women of color in technical roles.

The Realities

In the NCWIT study, it denoted that the percentage of African American/Black women in computing professions has increased to 12.9 percent in 2017. This is wonderful in many ways, as the numbers were considerably lower for many years, but there has been a *negative migration* of women in general occurring at some top tech companies. That means that more

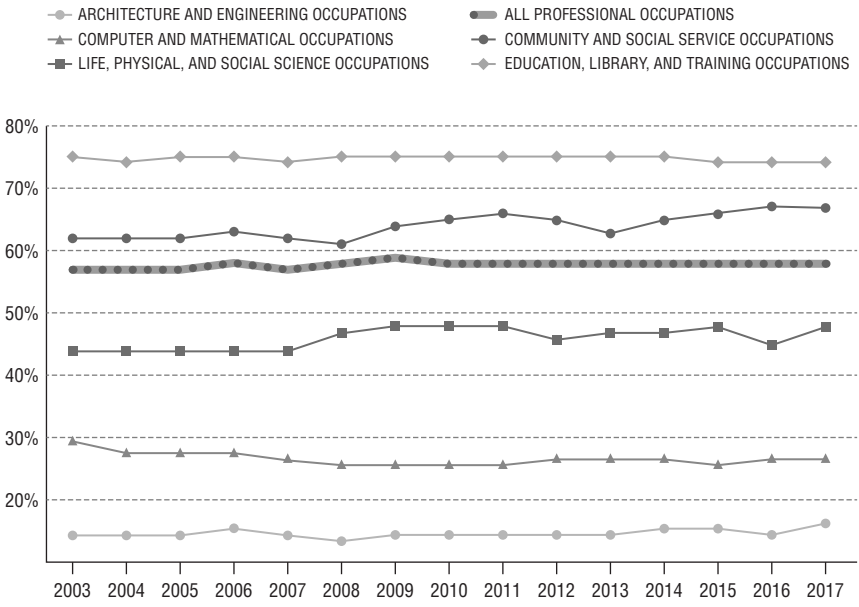

Figure 1.1: Percentage of computing occupations held by women 2003–2017

Source: NCWIT, Computing Workforce, 2019

women are leaving tech companies and careers than staying in them. The Figure 1.1 details the fluctuations of women in the computing professions from 2003–2017.

The Equal Employment Opportunity Commission reports that women only held only 26 percent of computing roles in 2013, a 9 percent decrease from 1990. The breakdown by race is also dismal, as shown in Table 1.1.

In a study of the career and economic progress of minorities in top technology companies by the Ascend Foundation, the number of Black women in technical professions declined by 13 percent over a 12-year period.

Many professional programs exist that aim to educate, nurture, and ultimately keep young women of color in technical careers. Who is it that developed these programs? Colleges and universities? Tech companies and the people within the industry? The answer is all these entities have invested a great deal of time, money, and manual effort to bring more diverse, female talent into technical ranks. Some programs focus on young women as early as elementary school, while others provide educational opportunities, career guidance, and mentorship in college or in the early stages of their professional careers.

Table 1.1: Diversity Challenge by Cohort

TALENT CHALLENGES	ATTRACT AND RETAIN TALENT	
COHORT	CHANGE PROFESSIONAL WORKFORCE FROM 2007 TO 2015	PERCENTAGE OF PROFESSIONALS IN 2015
White men	31% growth	32%
White women	10% growth	11%
Black men	15% growth	1.2%
Black women	13% decline	0.7%
Hispanic men	32% growth	3.1%
Hispanic women	11% growth	1.7%
Asian men	46% growth	32%
Asian women	34% growth	15%

Source: The Ascend Foundation

What's Going On?

While this awareness and the many resources available are wonderful, the lack of women of color in technology continues to persist. Many have said that the problem is that young women in general are not encouraged to pursue science, technology, engineering, or mathematics (or STEM) careers in early in their lives. Others have said that young women of color often don't have access to academic opportunities or resources that will help them develop critical skills necessary for these careers. And others have said that tech workplaces are not cultivating diverse and inclusive environments where women of color feel welcome.

I believe it's all of these things, and much more. Essentially, women of color are "funneled out" of technical careers, starting from early childhood. Although many girls exhibit a natural curiosity and talent for STEM subjects early on in their lives, this curiosity may become diminished over time due to cultural factors, lack of resources, and many other factors.

Early Childhood

The number of young girls interested in STEM fields and activities starts to diminish in early childhood. This can be due to lack of active encouragement in their home and school environments, and the lack of role models who look like them in STEM fields in their lives.

Young girls, particularly those growing up in minority or foreign-born households, are more likely to be encouraged to perform gender-normative activities like playing with dolls or playing "house" and to be encouraged to take on caregiving responsibilities (like babysitting) rather than explore robotics or programming.

Even if girls can invest the time in these interests, parents may not be as supportive as they could be, as they believe that this could be a passing "tomboy" phase they are in, where they are engaging in behaviors and activities that are (perceived to be) normal only to boys. Parental support may be superficial or even contradictory. And some girls are just shamed outright for not conforming to what it means to be a "girl" by their culture and society's standards.

I remember volunteering at a girls-in-STEM career fair years ago—a young Hispanic girl approached the table along with her parents. She was looking intently at the Raspberry Pi that was sitting on the table but hadn't said a word for a few minutes. I eventually asked her if she had any questions about the Pi and how it worked. As I began to explain, she started to warm up and ask more questions. At one point, she stopped herself because she thought she was getting too "geeky." I said, "Not at all"—I loved the enthusiasm and told her that this was a safe space to geek out!

Her parents, on the other hand, were not beaming with enthusiasm. In their defense, all-day career fairs can be energy- and time-consuming. But in general, they didn't appear to share in their daughter's excitement—not that they themselves needed to be interested in computing, but rather they didn't appear to share their daughter's enthusiasm in a possible career fit. When we were done talking and she shared what she had learned with them, they nodded appropriately, thanked me, and then quickly proceeded to another booth. As they moved, it almost appeared that the girl went back to a "shell-like" state, and her enthusiasm had gone away.

Another instance—again while volunteering at a girls-in-STEM event, this time geared toward young Black girls—was when I was watching one of the young girls interact with her mom. There was a break in the program, so she came over to give her mom a hug and kiss. As she ran off, the mother shook her head and said that while she loved her daughter, she was "special" for liking this sort of thing. From her tone,

you could tell that she was implying something negative, as if there was something inherently wrong with her daughter having this interest. Studies have indicated that parental influence, encouragement, their own educational levels, and support are major factors in whether a student, male or female, chooses a STEM education or career. Parents who themselves have not studied STEM or are in those careers themselves may not strongly advocate or support their daughters pursuing those paths.

Even in the most supportive of households, however, parents' own feelings and attitudes on gender "norms" (behaviors and attitudes that they consider "normal" for each gender) may influence the degree of support they offer to their daughters. Parents are likelier to support their daughters doing well in their overall studies than directly suggest they pursue STEM education and careers. This may be due to their own perceptions of what they believe women can and are able to do. Parents may not realize that they are engaging in behaviors and patterns that may discourage young women.

Young Black girls who have low parental involvement, as well as less-than-ideal social and economic conditions in their homes, are even less likely to pursue STEM in college—assuming they are even able to go to college.

Primary, Middle, and High School

As girls of color begin school, the number who sustain an interest in STEM may continue to drop. On top of low parental involvement and support, girls in general may not be actively encouraged by their friends, teachers, or school faculty to take STEM classes or participate in STEM after-school activities.

This assumes that STEM classes and activities are even offered in their school or local community. Although as a society it seems we've placed a premium on STEM education, there are still many places in the United States that are "STEM deserts" or a lack of schools that offer STEM education that prepares students for college-level work and careers. According to *Education Week*, STEM deserts are likelier to exist in high-poverty schools (schools where 75 percent or more of the students are eligible for free lunch and breakfast). Almost half of these schools have large Black and Hispanic populations.

This lack of encouragement and access can lead girls to form and hold limiting, confidence-destroying beliefs that these subjects are too hard for them or not meant for them.

For the girls who do stay in STEM classes, they may be picked on or bullied by their male peers—and their teachers. Teachers' own gender and/or racial biases may creep in during classroom lessons, causing them to call on girls less to answer questions in class or even belittle them in front of other students. Bullying or mean behavior from both teachers and peers can compound any doubts and fears girls may have about their abilities.

In my seventh-grade algebra class, I remember getting back an exam from the teacher, where I received 98 out of 100 points. Written next to the score was not a "Great job" or something similar—it was the word "Careless" in very big red letters.

After class, I asked what I had been "careless" about. The teacher commented that I had forgotten to add a negative sign in my answer to one of the equations, in which he took away two points from my overall grade. He continued to say that I needed to not make such careless mistakes if I want to be "any good at math" and that I should review my work more closely.

I was surprised and crushed. I thought 98 was a pretty good score, especially since algebra (and mathematics in general) was a subject where I needed more help and study time with than other subjects. I was proud of myself, as I really worked hard to do well on that exam, and yet when I left the classroom, I didn't feel good at all.

At home, parents or guardians who don't quite grasp the subject matter, or find the value in it, may not offer meaningful or constructive help when needed. Many parents have reported that they have difficulty helping their children with homework, especially in math and science subjects. Although some may have the means to hire tutors or put their children in remedial courses, many may not. For households that are economically disadvantaged, tutoring is a luxury they cannot afford.

Parents may not be aware of free educational resources that can help their children, or they may not know where or how to locate these resources. For one-parent households, parents juggling multiple jobs, or parents supporting other aging or ill family members (often situations present in households of color), there may be a lack of both money and time. Students may try to find or put together solutions on their own to get the help they need or, because they have lack of guidance, may not get any help at all.

College

As young women of color get ready to attend college, they are often at a financial, academic, and general support disadvantage compared to their white peers.

Despite the belief that there are many scholarships for students of color, they are hard to get and are not a given, as there could be hundreds of qualified applicants that a scholarship committee can choose from and they often require copies of academic transcripts, recommendations, minimum test scores on the SAT or ACT, and essays for consideration. Pulling together an application for just one scholarship can be very time-consuming (remember, they still have to go to class and apply to colleges, too), and the expense of transcript fees can add up.

In addition, students of color receive *less* private scholarship money overall than their white peers. Per a 2011 study published by the popular financial aid websites Fastweb and FinAid.org, although white students represented only 62 percent of the overall population of American colleges and universities, they received 76 percent of the overall private merit institutional aid and grants. This is likely since white students may satisfy GPA requirements, as well as participate in extracurricular activities that are of interest to sponsors, versus students of color. While colleges and universities do have need-based financial aid programs that include grants, college aid officers may include a significant number of loans to offset the costs.

Speaking of loans, while many students are eligible for lower-cost federal loans, most young women of color may have one or more part-time jobs to subsidize both their education and their basic needs, as federal-loan funding is limited, and they may not be able to obtain private student loans or rely on relatives. In a study by the National Association of Education Statistics, 85 percent of Black and American Indian/Alaska Native students and 80 percent of Hispanic students received any type of grant. Additionally, 72 percent of Black students received any type of loan—more than any other racial group.

Academically, young women of color may not be adequately prepared for the rigor of some foundational college courses. As mentioned earlier, many US public schools lack college prep–level STEM courses, increasing the likelihood that young women of color haven't gained the knowledge and skills needed to prepare them for college-level courses, let alone courses in STEM.

Coupling this with a professor's biases, a lack of meaningful support at home or within their community, and few to no peers with whom they can identify in their academic programs, many young women of color struggle to get through their programs. In a study by the College Board, of the total number of female students who entered STEM academic program in the United States in 1995 (a low 15 percent), only 4 percent graduated with a four-year degree, indicating that they may have

decided to change paths during that time. For the total number of Black students (21 percent), only 3 percent of graduates finished with a four-year degree in STEM.

This makes these young women likelier to take longer to complete their programs, switch to a non-STEM major, or drop out entirely.

The Workplace

For women of color who do make it into a technical career, the workplaces they enter may not be completely welcoming or made with them in mind.

The most problematic workplaces for people of color are the ones that have low representations of people of color in general. For the few present, they are usually in low-level, nonmanagerial positions—positions that require more routine, have less complex actions, tend to pay lower, and have limited opportunities for advancement. You would typically find most of these types of positions in administrative support, facilities management, operations, and customer service.

Almost all employees of color, regardless of their function within an organization, have to deal with *explicit bias* (when someone engages in direct verbal or physical harassment against you based on their held beliefs and attitudes) or *implicit bias* or *microaggressions* (when someone is not conscious enough to recognize that their behaviors and attitudes are harmful yet exhibits them anyway). According to Deloitte's 2019 State of Inclusion (a survey conducted at companies with more than 1,000 full-time employees), 63 percent of African American respondents and 46 percent of women respondents reported experiencing bias at least once within a year from which the survey was taken.

Years ago, at a previous employer, I remember coming to work the day after Christmas. A few minutes after I got settled for the workday, one of my white, male colleagues approached my desk. He asked why I was in the office, to which I replied simply (although baffled) that the office was open. He then replied, "But it's Kwanzaa. Did they make you come in to work today?"

I did not know how to respond. On the one hand, you can argue that the colleague meant no harm and was concerned that my civil liberties were being violated. Yet, it can also be perceived that he was making a slightly racist observation because I was the only Black person in the office. In the interest of ending this episode quickly and without incident, I simply said I don't celebrate Kwanzaa.

This seemingly floored him—how could I not celebrate Kwanzaa? How could I not be knowledgeable about Kwanzaa? From there, he felt it his

"duty" to inform me of the background and importance of the holiday by coming back to my desk, at least five more times throughout the day, to tell me why and how Kwanzaa is celebrated.

When I tell this story to friends and others, it's usually in a humorous "Really? Seriously?" tone. But in retrospect, there were many things wrong with this interaction, and because I was a minority in every sense of the word at that place, I did not feel empowered or safe talking about this with Human Resources or with anyone else seriously. When I was let go from the company due to financial budget cuts, I was secretly relieved to never go back there again.

Tokenism, or when someone is hired more for the sake of appearances than whether the organization believes in your abilities, also occurs. This is likelier to happen in organizations that employ affirmative action in their recruiting and hiring methods or look to achieve certain placement goals in hopes of increasing diversity in certain positions.

Affirmative action generates a ton of debate; many argue that race and gender should not be considered in hiring decisions. Only the person who is most skilled at the job should be hired. Yet, as a society, we have collectively more or less agreed that women and people of color have been disadvantaged as soon as they could enter the American workforce and do not have access to the same opportunities that white males do, and therefore, accommodations need to be made for an equal playing field.

As someone who had been told by another previous employer that I was an "affirmative action hire," I can't tell you how belittling and humiliating it feels. While I was doing well in my job and had gotten along with my white male colleagues for the better part of two years, it hurt to learn that I wasn't their first, second, or even third choice and that the only reason I got the position was that Human Resources intervened and insisted that I be hired.

Then, there are the issues of pay and advancement. Historically, women and people of color have made less than their white male counterparts. For every dollar earned, women of color average 64 cents for every dollar a man makes. For Black women, they earn 61 cents for every dollar. It sadly is not much better in technical professions. Men are offered more pay for the same role that a woman takes 60 percent of the time; Black women averaged 89 cents for every dollar their white male counterparts made.

It should not be surprising that women of color are leaving tech jobs. The *Tech Leavers Study*, a study by the Kapor Center for Social Impact, highlighted that the experiences of women of color are dramatically different than their white peers. Thirty percent of women of color respondents claimed that they were passed over for promotions, and 24 percent

reported being stereotyped. Thirty-six percent of the women of color cited unfairness as their primary reason for leaving their jobs.

Seventeen percent were subjected to what is called the *cross-race effect*, where they were mistaken for another person of the same race or gender. Although these interactions may be unintended, people who commit these mistakes (usually someone who is not of a person of color) downplay just how harmful and offensive these blunders can be to the person on the receiving end. It can solidify that they are not seen as a person to be valued or respected.

This is not to say that this path (or these experiences) is true for every woman of color. Every woman's path to tech is remarkably different. Some women have fully supportive environments and communities from the time they're born. Others transition into tech after having worked in completely different fields.

But when we examine the entire pipeline of bringing women of color into tech, it's clear that there are significant "leaks" in the pipes. It's clear that women of color are challenged at almost every stage of their journey, and the likelihood of their success is small. Just as there is no single reason for the lack of women in color in tech, there is also no single fix to this complex problem.

Why You Should Be Here

I realize that the picture I have painted so far is a bleak and depressing one. You might be asking yourself why on earth I would subject myself to a field that has typically been non-welcoming to women of color and the support structures are iffy, at best.

For all the negative news and statistics, there really is no greater time for us to be here. I'd like to share with you why by sharing my journey to tech.

My Journey to Tech

Prior to starting my technology career, I was in an entirely different profession and industry. For many years, I worked in mostly administrative and support positions within the financial services industry. My duties were wide ranging and diverse—they ranged from answering telephones, greeting guests, and ordering office supplies to coordinating travel for managers and reconciling invoices.

I was good at my job. My managers and colleagues complimented me often on how hardworking and committed I was to my job, and I was well liked. My pay and benefits were good, I received modest raises, and I enjoyed relatively good job stability, meaning I didn't think that I'd lose my job due to a company not performing well financially.

As good as all of that was, I didn't enjoy my work—at all. Those types of jobs are negatively described as being in the "pink-collar ghetto." Jobs like these are primarily held by women, had mostly routine and, well, boring work to be done, and had limited pay-increase potential or advancement opportunities. In administrative support roles and similar, you have little control in how you perform your work and the type of work you get to perform.

I also did not enjoy the industry. Like the tech industry, sadly, women of color are a minority in financial services. While careers in financial services can pay well, they can also be stressful. There are many rules and regulations that companies in this industry must follow, and in some ways, this limits the amount of creativity one can have in approaching their job.

I mistakenly kept changing jobs, thinking that it was the pay, culture, or some other outside factor that was contributing to my career unhappiness. At some point, I had to stop and ask myself, "Why am I doing the same thing over and over again, expecting a different result?" Why was I sticking to a career path that was not serving me well? Why was I trying to conform to an industry that I had no interest in and in roles that were only going to make me miserable in the end?

It was after my first year in my last admin/financial services job where I had to stop and deeply examine where my interests were, what I wanted and needed out of my career, and where I ultimately wanted to grow. The tech field was always something I had given some thought to but never really fleshed out. I knew that I was always drawn to technology; I always took apart my parents' appliances (much to their annoyance) to see how they worked. I always loved playing on the computer to see what I could do with it, as well as keeping up to speed on technology news.

But I thought to myself, "Was interest alone going to help me land a tech career?" My math and science grades were so-so, and up to this point, I had no formal technology training of any kind. And what kind of options did I have? Was becoming a coder the only route I could take?

The answers to these questions were not going to come overnight or easily. For many months, I thought about my interests, strengths, weaknesses, and goals. I thought about what I knew that I could already bring to the table for an employer, as well as what I needed to learn. I thought

about the time and money investment it was going to take. I researched, networked often, and revised my plans repeatedly as needed.

I ended up going back to school while working. I ended up studying a field that gave me a broad overview of information technology, while allowing me to refine my communications skills at Northwestern University. I used much of my vacation and holiday time from work not only to study but to attend conferences, interviews, boot camps, and the like. I did homework during lunch breaks or before the start of a full workday, only to go to class for several hours in the same evening. I did volunteer work whenever possible to apply and strengthen the technical skills I learned in the classroom. I had to juggle family obligations, while also missing out on events with friends and family, and while I was financially in a better position than others with similar situations, funds were still extremely limited. I was lucky if I got six hours of sleep in a given evening, and to say that I was tired was a huge understatement.

I did this for about three years before starting my current job in technology. Was it hard? *Absolutely*. I'd say that my journey into tech was one of the top five hardest things I've ever had to do in my entire life. Was it worth it, and would I do it again? Yes, and yes, with a few changes.

I now get to work with some of the latest, emerging technologies. Instead of following orders without input, my thoughts and contributions are sought after and welcomed. I get to help clients make meaningful technology decisions that will impact their business. I have met some wonderful people who serve as mentors, colleagues, and lifelong friends. I've had great opportunities to share my experiences, mentor people, and travel all over. Finally, the salary for my first tech job was *double* that of my highest-paying administrative job, and I have far more ways that I can advance my career than had I stayed an office manager or a client service representative.

My work can be challenging, and yes, sometimes both my race and gender can make some of those challenges feel more pronounced. But this is the first time in my life where I can honestly say that I am engaged with my work in a meaningful way. I feel that I have a fulfilling career versus having a soul-crushing, dead-end job.

It's (Slowly) Getting Better

It's important to keep in perspective that many great strides and efforts have been made to make tech open to everyone who wants a seat at the table. Although increasing the diversity in tech workplaces may not be progressing as quickly as we'd like, we have come a considerable way

since, perhaps, 50 or 60 years ago. In our society, we are having the hard conversations with one another surrounding gender, race, equity, and fairness. We're looking at the undeniable figures that indicate the work that's yet to be done. We're continuing to do the things that we do well and either tweaking what we need to improve or getting rid of ideologies or practices that are hindering making tech hospitable for all.

Support

Women of color have more professional organizations that provide career support than ever before. These organizations offer educational opportunities, networking events, and project collaboration. Here are a few that currently exist:

- **AnitaB.org:** Perhaps one of the largest women in technology professional organizations in the world, AnitaB.org (named after famed computer scientist Anita Borg) offers events, podcasts, and mentoring opportunities for all women in technology. It is the organizer of one of the most popular women in tech conferences, the Grace Hopper Conference, and it seeks to have 50/50 male/female representation in tech by 2025.
  `www.anitab.org`
- **Black in AI:** This organization seeks to increase the level of participation of Black people working in or studying artificial intelligence.
  `blackinai.github.io`
- **International Consortium of Minority Cybersecurity Professionals (ICMCP):** ICMCP seeks to address the dual issue of increasing the presence of people of color and women in the cybersecurity field. The organization offers training and mentoring programs, as well as scholarships to study cybersecurity in two-year or four-year colleges.
  `www.icmcp.org`
- **IT Senior Management Forum (ITSMF):** ITSMF's aim is to increase the number of Black professionals in senior technology positions. ITSMF offers the EMERGE Academy, a one-year intensive leadership program to help mold women of color into future technical leaders.
  `www.itsmfonline.org`

- **Code2040:** This nonprofit works to provide educational, social, and economic support to Black and Latinx people to fully participate in this new tech economy. Its Early Career Accelerator Program (ECAP) gives training and mentoring to professionals early in their tech career, while its Fellows program give current computer science students a nine-week immersion experience with a local area tech company.
  `www.code2040.org`
- **CompTIA's Advancing Diversity in Tech and Advancing Women in Tech Communities:** Both virtual communities aim to narrow the gap of the representation of women and people of color in tech. Members can access educational resources and attend local area networking/educational events.
  `www.comptia.org`

This is not a comprehensive list of all the resources out there—there are many, many more. This is rather to point out that numerous communities exist for you to find help, guidance, and support when and where you need it.

Number of Job Opportunities

Technology is a part of just about every business and educational and governmental institution. Organizations need people who have the technical skills to meet these needs. Table 1.2 shows just a sample of tech jobs that are projected to have the highest growth and most new jobs.

Table 1.2: Projected Growth of Selected Technology Jobs

JOB TITLE	NUMBER OF JOBS IN THE UNITED STATES, 2016	PROJECTED GROWTH FROM 2016–2026
Software developers	1,256,200	24%
Information security analysts	100,000	28%
Computer and information systems managers (includes project managers)	367,600	12%

Source: Bureau of Labor Statistics—Occupational Outlook Handbook

Pay

Tech jobs have the potential to pay extremely well (Table 1.3). While what you're paid can be affected by where you live inside the United States, your level of education, and your experience level, tech jobs boast higher salaries than non-tech jobs.

Table 1.3: Median Salaries of Selected Technology Careers

JOB TITLE	2018 US SALARY—LOW	2018 US SALARY—HIGH
Software developer	$61,660	$161,290
Web developer	$37,930	$124,480
Information security analyst	$56,750	$156,580
Systems architects	$54,360	$142,220
Systems administrators	$50,990	$130,720
Computer and information systems managers (includes project management)	$85,380	$208,000
Sales engineers	$58,430	$165,330
Computer and information research scientists (includes data scientists)	$69,230	$183,320

Source: Bureau of Labor Statistics—Occupational Outlook Handbook

It's Fun

Who says that work can't be fun? Tech is one of the few career fields that allows you to utilize creative-thinking skills to solve problems and create innovative solutions.

Take the fashion industry as an example. Technology has lowered the barrier of entry in creating designs and putting them out into the market. In the past, people who created and sold their own clothing and accessories needed access to physical retail space, access to tools and people to manufacture pieces quickly and in large quantities, and ways to ensure that products reached customers when they wanted them.

These are not small undertakings—this requires a lot of human and financial capital. But with technology, designers can now open online stores to sell their products directly to consumers at a fraction of what

a physical retail space would cost. Robotics, which are being used by newer designers, can produce more custom pieces quicker than human hands ever could. Inventory-management and customer-engagement software, when used together, can forecast the customer demand for certain pieces, as well as ensure that there is enough inventory to meet the demand.

One of the things I enjoy about my profession, technical sales, is that I can use technology as a tool to help clients solve business problems. Because these problems don't follow a "one answer fits all" path, I can use both technology and a healthy degree of creativity to help clients get to their desired result. It's a lot of fun when you're drawing out sketches or wireframes of what the client is envisioning, and it's doubly rewarding when your efforts help them to be successful.

Opportunities to Help Others

Being a present and visible woman of color in tech can help give hope to young girls of color. Becoming a tech volunteer or mentor can have many positive effects. For you, it enhances your leadership, teaching, and communication skills, as well as refines your existing tech skills (or teaches you new ones!).

For young girls, they can interact with positive role models that look like them or grew up in situations like theirs. Many girls don't have the good fortune to interact with women who look like them or grew up in similar backgrounds and are current technical practitioners.

As girls of color get older, the idea of a nonwhite female software engineer or data scientist doesn't seem like a weird or foreign concept. They know that women of color in these fields are common and not an exception or anomaly. They can be confident that those career fields are accessible and possible for them.

We Need You!

Simply put, we need more diverse representation at all levels to address the current technological challenges our society is facing as well as future challenges.

In the case of artificial intelligence (AI), businesses are using it more, through chatbots and other means, for low-level tasks—tasks that they believe are repetitive and do not generate a lot of money for them. By automating many of these tasks, and not requiring a lot of human interaction, businesses can save money on overhead costs, salaries, and more.

That's great for the business, but that isn't exactly great for everyone. Let's take the example of someone applying for a business loan at a traditional bank or lending institution. If a person applies and is, let's say, rejected or offered a higher interest rate than what they expected, a person can speak directly with a lending officer to find out why they took that course of action and could potentially negotiate or compromise to reach agreement.

If a bank or lender uses an AI interface alone to process a loan application, the process to approval or rejection may happen faster. But, if the development team behind the AI application inadvertently programs their own gender and race biases, applicants from specific demographics may experience higher rates of rejection or discriminatory actions than others. As the process is automatic, rarely is there a human being that you can speak to in order to contest or change the decision.

Development teams at these financial institutions, who are likely to be white and male, may not realize that they are entering their own biases when building algorithms to determine whether an applicant should get a mortgage. They may tend to have the same background, experiences, and ways of thinking that may put people who are outside of this scope at a severe disadvantage. Women and people of color are at a distinct disadvantage.

Where major financial decisions are involved, like buying a home and trying to start a business, women and people of color have had a historically difficult time obtaining funding and getting it a low rate. Women-owned companies receive 33 percent loan approvals in comparison to those that are male owned, and those that are people of color get far fewer approvals. In 2017, Black-women-led start-ups were only able to raise .0006 percent of the venture capital they needed for their business (not even a full percent!). Independent decision-making AI systems that have biased algorithms have the potential of making this situation much worse.

One of the best and most effective ways to combat this and to ensure that systems are designed properly is to have diverse development teams, made up of people who come from different educational, economic, and social backgrounds. This ensures that AI systems are designed to serve a wider population, not just a select few.

Tech Career Misconceptions

Technology is a wide and vast career field, and one person's pathway to a tech career is highly unique. There's no one true path to tech. These are just a few widely held misconceptions on getting a tech career.

Tech Careers Require Constant, Hands-On Programming

There's a constant, widely held belief that one must study programming, and excel at it, or become a coder or programmer to have a successful technical career.

It's not true. Understanding programming and knowing how to code in languages like Python, JavaScript, and Java are good skills to have, as it can enhance your understanding of computational thinking (how to break down problems in a way that computers can solve them), help your own problem-solving abilities, understand how applications work, and help you understand how coders and programmers approach problems (you'll be able to speak their language). Taking a programming course or two just for your own knowledge is highly encouraged.

However, it doesn't mean that programming or coding is your only way into tech—especially if you end up not loving it. As you'll find going throughout this book, it's often *soft* or nontechnical skills, like communication, problem solving, and critical thinking, that are perhaps more important than programming.

If you enjoy programming or coding, that's great—keep it up! If you don't, that's okay too!

All Tech Careers Require a Four-Year Degree

Depending on the field, having hands-on, demonstrable professional experience is more valued than an academic degree. Many major tech employers are putting more focus on candidates having experience or certain skill sets, as a traditional four-year bachelor's degree isn't a clear indicator of how well a candidate will do in a job, or even a guarantee that they will do well.

There are different ways to acquire knowledge, skills, and experience. Internship or co-op experiences, apprenticeships, boot camps, hackathons, online courses, volunteer work, and self-study are just a few options that are available and should be explored in addition to a college education.

All Tech Careers Require Studying Computer Science, Computer Engineering, or Another Specific Field

If you decide that a traditional undergraduate degree is the way for you to go, computer science and engineering are not the only paths that you can take. People who are in technical professions have degrees in fields such as mathematics, business, information technology, and even liberal arts.

A computer science or computer engineering degree could place you closer to certain job opportunities and allow you to move into other roles during your career. If you are contemplating a career as a software developer or in artificial intelligence, this might be the more appropriate route.

But when selecting a college major or concentration, you'll want to think about what your overall interests and career goals are and how a program you're considering will best serve those needs. As a possible alternative, you could take computer science or computer engineering as a minor to supplement another course of study. This way, you can explore the field while not committing to a full-blown course of study.

Computer science and computer engineering (CS/CE) programs are not easy nor are they cheap. You will more likely be able to ride out the difficult parts of a CS/CE program and complete it if you enjoy what you're learning, enjoy rigorous learning paths, and are able to bounce back after academic setbacks. You may find it difficult to stick with a CS/CE program if you're doing it for other reasons, like it looks good on your resume.

This is, sadly, not to say that you won't experience "tech elitism" from others. I find that this is more prevalent in software development circles, where those who did complete CS/CE programs in well-regarded colleges and universities try to minimize the education, contributions, and backgrounds of those who studied at "lower-tier" CS/CE schools or coding boot camps. However, you should not allow other people's narrow-minded perception influence what education you pursue. It's usually people who are insecure, are mean-spirited, and have close-minded views that exhibit those types of behaviors and attitudes.

All Tech Careers Pay a Ton of Money

While tech careers can pay more than other careers, you shouldn't approach it with the expectation that you will be making a six- to seven-figure salary right at the start. As you saw in the previous discussion of pay, the low- and high-end salary figures for different types of tech jobs can vary greatly.

A friend once told me that they had a friend who was making nearly $300,000 as a developer for a top technology company in San Francisco. Very impressive indeed.

But after asking a few more questions, I discovered that the friend who is receiving this salary had nearly seven years of professional, hands-on development experience and had many professional certifications under

their belt. This made the story more believable versus this being someone who was commanding that kind of salary right after completing a four-year degree or coding boot camp.

Also, certain types of tech jobs will pay more than others due to overall demand. For example, as cloud computing becomes more of the standard for businesses, the need to have dedicated employees to handle and maintain physical hardware is decreasing. Those businesses now need employees who thoroughly understand computer networking and how computers talk to one another over short/long distances versus someone who maintains desktop computers.

As we discussed earlier, as businesses have begun to integrate artificial intelligence in their operations, they will need people who have a firm understanding of data science, machine learning, natural language processing, and more. People with these skills will likely be making more, as there aren't as many people trained in these areas.

Finally, in addition to your education and experience, where you live will influence what you can command salary-wise. Cities that have a higher cost of living, like San Francisco and New York, tend to pay higher salaries than places in less populated, more rural areas. In 2018, the average tech worker salary for the San Francisco area was $113,629, compared to Baton Rouge, Louisiana, at $69,212.

That's not to say that major cities are the only places you can go to be paid well as a tech professional. Many professionals are leaving San Francisco and New York due to how expensive it is and are heading to growing tech cities like Nashville, Tennessee; Provo, Utah; and Cleveland, Ohio—cities that all experienced significant growth in tech jobs from 2017 to 2018 (more than 7 percent and up).

We will discuss how to negotiate salary in a later chapter, but keep in mind that you may only be able to negotiate for a limited amount in certain situations.

Tech Careers Exist Only at Top Tech Companies

One common myth is if you are not working at one of the well-recognized technology companies, like Google or Amazon, then you are not really in a tech job. Not so. All kinds of businesses, in many different industries, have tech jobs and need tech professionals.

Let's look at banks and major financial institutions as an example. Knowing that their customers want access to their financial information 24/7, with the ability to securely perform basic transactions any time, all

the time, banks and financial institution realize that they need to make significant technology and talent investments to meet these demands.

To build a customer-facing mobile application, you'll need to assemble a team that not only knows how to program an app for a mobile device and deploy it on a cloud-based platform (so that the app is always accessible to the customer), but also has a thorough understanding of information security (so that customer information is secure at all times) and deep knowledge of the regulations that US-based financial institutions must comply with.

Finding people who have these skills and have a good grasp of the business environment and imperatives is difficult, which is why banks and financial institutions invest a ton of time and money on recruiting and pay highly competitive salaries.

Simply put, you want to look for a position that will provide the experiences you want to have and the skills you want to acquire—some of the best tech jobs may be right in front of you in a "non-tech" company.

Tech Careers Are Only for People with Certain Backgrounds, Grades, Etc.

This is not true at all. Your background, grades, and other qualities will limit you only to the extent that you allow them to limit you.

Some of the most famous tech professionals and innovators came from non-tech backgrounds, didn't complete school, and had terrible grades. Microsoft founder Bill Gates, Facebook founder Mark Zuckerberg, and Bloomberg founder Michael Bloomberg are just a few, more well-known examples of people who achieved success despite failure, didn't complete their formal education, or came from a non-tech background.

But there are so many others—people of color—who are thriving in tech despite not having a "traditional" tech background. People like Esosa Igodharo, who left a financial services career to launch Cosign, a successful social-media shopping app. Or Porter Braswell and Ryan Williams, professionals with business backgrounds, who launched Jopwell, a great site that aims to connect more people of color to career and educational opportunities with major employers, including those in tech. Or Amanda Spann, who has built several successful tech app start-ups like tiphub but had a marketing background and knew that she loved technology but also knew that coding every day was not what she wanted.

I don't have what would be described as a "traditional" tech background. As I mentioned, I was in a completely different role and industry before

arriving in tech. Even when I went back to school, I studied communications and information technology (not computer science) and was told, more or less, I should not "quit my day job" as evidenced by my grades for my programming projects (they weren't terrible but certainly nothing to brag about). Despite that, I was still able to find my path and transition into a tech career.

I believe that the following qualities are crucial when embarking on a tech career:

Confidence: Above all else, you must believe you can attain and be successful in a tech career. If you can't believe that you will be successful at a tech career, you're almost putting yourself in a self-fulfilling prophecy to fail.

Having self-confidence may be one of the most difficult things to attain and maintain. While sometimes things happen to shake your self-confidence briefly, like a bad grade or work evaluation, I believe that for women of color, it is a bit harder because there may have been many times when they were made to feel they were in some way "inferior" by their communities, educational institutions, and workplaces, and perhaps, not deserving to feel confident. A misinformed comment here, a damaging comment there—over time, these microaggressions add up and feed into the belief that "I'm not good enough."

You are not only good enough, you're more than that. You are smart, are talented, and deserve a great career, whether in tech or another industry. You deserve to be confident in yourself and your capabilities. As you go through your journey, always remember this in your mind and your heart. Believe in your success wholeheartedly and unflinchingly, even on the days when it may the hardest to do so. Thinking anything otherwise may lead to a self-fulfilling prophecy destined for failure.

Self-motivation: This is your journey. You will have advice and help along the way, but no one can force you to act in your best educational or career interests. You must hold yourself accountable for your actions (and inaction). While there may be many things outside of your control, how you choose to act and respond to a situation is in your control.

Perseverance: You must be able to find the strength within to push through tough, and sometimes unfair, situations. While it isn't fair that women of color must work exceptionally harder to obtain tech

jobs, as well as respect and equal pay, you need to be able to continue your path as obstacles and hardships are presented.

To get where I am now, I had to deal with minor setbacks—a disappointing project grade, multiple job rejections, and the like. I also had to deal with more pressing things, like caring for an ill relative or figuring out how to continue my education while rent and other obligations needed to be paid.

I've also had to deal with the stuff that just, well, isn't right. Sometimes at past jobs or at school, people make direct and unkind remarks about the texture of my hair or the color of my skin. I've had people avoid taking me seriously at work because they assumed that I was on the "mommy track," meaning likely to take maternity leave and not return to work afterward. I've had male peers and colleagues talk down and "mansplain" things to me, as they assumed that I wouldn't be able understand a complex concept.

I have, unfortunately, had these and many more crappy things happen to me not only as a result of my race and my gender, but just life in general. While I took action and fought back in situations where I believed I could, ultimately I had to keep moving to achieve my goals.

I hope that you don't encounter experiences like this. I hope these experiences are nonexistent or few. Always keep in mind what your end goal is and what your goal is to move forward. Do not let experiences like this rob you of your momentum or power.

A commitment to continuous learning and improvement: Tech changes rapidly and at an exponential rate. Technologies, programming languages, ways of doing things, etc., can change rapidly and with little warning. Only those who put in the time and effort to continuously improve their skills and learn new ones tend to be successful in their tech careers.

Patience: Learning new skills, especially ones that you may initially struggle with, takes time. Often, you may not grasp material quickly, or at all. You must be willing to embrace a long-term approach to your skills development. Shortcuts rarely, if ever, will give you what you need.

Embracing failure and avoiding perfection: Successful people in tech know that perfection is a myth and can be a barrier to action and personal and professional growth. If you are always waiting for the right moment to present a pitch or start a project, you run the risk of never actually doing anything!

Although experiencing failure is not a wonderful feeling, it is better to experience this early on so that you can learn from mistakes and improve quickly.

Prioritization and time management: There are only so many hours in the day; you must be able to prioritize what is important to you and firmly commit to how you spend your time. While you should always incorporate downtime and rest in your day (self-care is a must!), you may need to choose between studying or going to a party, attending a school networking event with complete strangers or hanging out with your friends, or thoroughly preparing for a technical interview or playing video games.

Only you can determine what is important and should be a priority, as well as how much time you can and should devote to any one activity. Time management and task prioritization are skills you need in just about all aspects of your life.

Resourcefulness and tenacity: You may need to find people and resources to help you. Knowing how to find these resources without much direction or guidance will help you immensely. And when you hit a brick wall, do you give up, or do you find another path or way forward?

A common refrain that I hear from people, entry-level and experienced professionals alike, is "Someone should have told me," and it is usually in relation to their school not telling them the exact classes to take or an employer not telling them explicitly that they should be studying up and improving certain skill sets.

While I can agree with this complaint to some degree, I largely hate when it is said. Your career is your responsibility, and with that, the responsibility lies with you in understanding where you should be spending your time, even if your school, employer, or otherwise is not proactively providing the information. If you find that you're not getting the information you need, ask. Ask as many people and as many times as you need to get the information you need to make informed decisions.

You will come up against many obstacles. Those who take setbacks as temporary rather than permanent ones, and keep trying, are likelier to reach their goals.

A willingness to work beyond "normal" hours: Our society has become conditioned to expect products and services to be available and working 24/7. While technology has automated many

functions and reduced the need for humans, humans still need to be available should things not be working properly or if disaster strikes.

It isn't uncommon for software engineers at top tech companies and critical industries (e.g., financial services, insurance, retail, etc.) to work 60- to 90-hour workweeks. Some tech jobs may not be as demanding and subscribe to a regular 40-hour workweek, but there may be times where your day will end well beyond "quitting time."

Creating a Blueprint

We've pointed out that the level of participation of women of color in tech is underreported when there's a larger discussion of the lack of women in tech overall. The reason why this is important to point out is because of a concept called *intersectionality*. Intersectionality describes that while people may be of the same gender, how they experience the world is influenced by their race, ethnicity, age, sexual orientation, and other factors.

The experiences of women of color at home, in their schools, and in their workplaces are different—sometimes significantly—than those of their white peers. They are likelier to face more negative social interactions than those of their white peers and have lower self-esteem. They are less likely to have access to certain educational or professional opportunities as well.

With that in mind, the standard career advice in popular books, blogs, and social media platforms does not address the unique challenges and needs of this community. For example, many people loved Sheryl Sandberg's *Lean In* when it was released in 2013. Many felt that Sandberg had adequately addressed the roadblocks women were having in gaining leadership positions in their organizations, and offered good, practical advice on how they can move their careers forward.

The central problem with the book, which Sandberg herself later acknowledged, is that it assumed that the reader had certain privileges that many women of color do not have: completely supportive households that don't require much of their time and attention, work cultures that allow expression of their thoughts without fear of being fired or held back, and access to career mentors to help them become stronger leaders. This lack of understanding of where the reader may be coming from and experiencing caused much of Sandberg's advice to ring hollow for women of color.

The challenges women of color face in landing a tech job are unique and great in number. In this book, we will address many of these challenges, whether you are just starting out on your career journey or you are transitioning into a new career after years in another role or industry. We'll be covering subjects such as these:

- Finding your tech path—What tech career would best serve your strengths and interests?
- Building and growing a supportive network—Finding your "tribe."
- How to gain skills—How do you prepare to get these jobs?
- Demonstrating your skill in resumes, interviews, and social media.
- Coping with difficulties in your personal, academic, and work lives.

With that, let's get started on your journey into tech!

Summary

- While seeing an uptick in the number of women of color in tech than previous years, many women of color are also leaving the field as well.
- No one factor alone is contributing to the lack of women of color in tech and why they may be leaving; there's a confluence of social, economic and cultural issues that are contributing to this persistent scarcity.
- Despite these negative statistics, women of color are not just surviving, but thriving, in tech. Tech opportunities are plentiful, pay well and give you opportunities to be creative (and hopefully have fun in the process).
- There are many pathways to get into tech; and there are many diverse tech fields one can get into. There's no one "right" way to get in to tech.