

LGBTQ People in STEM

With its history of excluding women, and especially in the US, racial minorities, it should come as no surprise that LGBTQ individuals are also under-represented in STEM fields. While data is somewhat limited, a 2015 study found that about 3.1% of non-STEM-related federal agency employees were LGBT, fairly close to the national percentage of 3.4%. Meanwhile only 2.7% of STEM-related federal agency employees were LGBT. Like other minorities, LGBTQ people do not fit within the traditional heterosexual white male narrative of STEM in the US. However, sexual identity can be more complicated than race or gender. Often, it is invisible in academic or professional settings, and its intersection with other identities creates many unique kinds of LGBTQ people, some whose other identities should give them advantages in entering these fields. Additionally, the concept of sexual identity itself, compared to race and gender, is relatively new. This raises the question: In what ways are LGBTQ individuals excluded in STEM fields? Science, Technology, Engineering, and Math, for as long as they have existed in recorded history, have been dominated by men of privileged backgrounds. Only recently have women gained traction in these fields, and even still they remain a minority. As such, the culture of STEM fields tend to favor masculinity and devalue femininity, even when not specifically linked to biological sex. While women are already disadvantaged in STEM, this also creates a unique barrier for queer men, who are male but also seen as effeminate. With its history of excluding women, racial minorities, and people of lesser economic means, the STEM community's exclusion of sexual minorities falls in line with their typical behavior. These factors produce an

inhospitable environment for LGBTQ people studying STEM, in STEM academia and other STEM careers.

From the moment LGBTQ individuals decide to pursue a degree in STEM and set foot on campus, they encounter an uphill battle in a heterosexist environment. According to a 2018 study, LGBTQ students were actually more likely to engage in undergraduate research than their heterosexual peers, an act which signifies a stronger commitment to their area of study. It also corresponds with a 13.46% increased likelihood of remaining in STEM for the general population of students. However, LGBTQ students were 9.54% *less* likely to stay in STEM (Hughes 2018). This points to forces beyond the LGBTQ students themselves, both interpersonal and cultural, which drive them away from their chosen field of study. It may also indicate that these students feel a need to prove their worth in an environment that does not accept them. A 2011 study found that in the field of Engineering especially, LGB issues can be seen as “social” and therefore irrelevant to a highly technical, professionally minded student body (Cech 2011). Such a climate favors students within the sexual majority who don’t regularly worry about these issues and who are advantaged by the current system. Meanwhile, it dismisses and alienates LGBTQ students and their concerns. Women, racial minorities and ethnic minorities have and continue to face similar issues, with “white heterosexual men” (Cech 2011, 9) being perceived as the normative engineer identity in America. Any identity outside of this already affords scrutiny by the sole virtue of existing. Apart from simply not wishing to stay in a chilly or hostile environment, their experiences may motivate them to pursue other life paths, like teaching, social work, or activism (Langin 2018).

Of the LGBTQ students who do graduate with a degree in STEM, many go on to face even more friction in their work environments. Whether it be in academia, research, industry, or federal agencies, the STEM world is not particularly accepting of LGBTQ identities. According to a 2009 study, LGBT people often feel invisible because personal lives aren't discussed very much in their workplaces, and a heterosexual norm is assumed. Additionally, pressure is often exerted on these individuals to keep their identities hidden. Less often, they face direct hostility, typically in the form of derogatory remarks, jokes or other microaggressions. One interviewee was told "to be more conservative in appearance, not to bring her partner to department events, and not to adopt children" (Bilimoria et. al. 2009, 90-91). Such demands not only force an employee to conceal their personal life in ways that other employees would never have to, but may even force them to refrain from making personal life choices at the risk of losing their job. In absolutely no scenario would a cisgender heterosexual person be asked to make such a compromise. And, while that specific request may be rare, queer people are often asked to conceal and compromise their lives outside of work, all to keep their coworkers from being uncomfortable. In a 2015 study of federal agencies, it was found that LGBT professionals in STEM had significantly worse workplace experiences than their cisgender, heterosexual coworkers, with measures such as transparent evaluations, respect from supervisors, and support of work-life balance. Using the same measures, it was found that LGBT people in non-STEM-related agencies had generally more positive workplace experiences (Cech 2015). Discrimination is experienced by LGBT people in other fields, but within STEM, it is particularly pronounced.

Not all STEM fields are equally bad. In an interview, evolutionary biologist Jeremy Yoder states that he “[hasn’t] been aware of bias or career barriers resulting from [his] identity as a gay man” (Barres et. al. 2017, 3), and recognizes that this is because his own field tends to attract a more liberal crowd. In fact, all three participants, scientists, note that they personally haven’t met much friction at work for their LGBT+ identities, with one, Beth Montague-Hellen noting that her “butch/masculine identity has actually helped [her]” (Barres et. al. 2017, 2) in a male dominated field. All have experienced some challenges, and through their identities are aware of a larger problem, but have, in their fields, been able to avoid the level of discrimination that some face. According to a 2011 study where LGB students from Gold University were interviewed, it was observed that more technical fields tended to be less tolerant. Within Engineering, Biological and Chemical Engineering tended to be ranked as the most tolerant, being more scientific degrees. Meanwhile more industry-leaning degrees like Civil, Structural, Aerospace, and Mechanical Engineering (my own field) were ranked least tolerant. Electrical and Computer Engineering, as well as computer science, were ranked in the middle. Interestingly enough, these also roughly correspond to degrees with more women, with 35.4% of Chemical Engineering degrees and 42.1% of Biological/Agricultural Engineering degrees awarded to women in the US from 2017 to 2018. Meanwhile, only 25.9% of Civil Engineering degrees, 14.8% of Mechanical Engineering degrees, and 14.6% of Aerospace Engineering degrees went to women in those same years (Yoder 2019). It is possible that a larger composition of women make the less technical fields more liberal and therefore more tolerant of LGBTQ people, or perhaps these fields are more liberal and accepting to begin with, therefore attracting more women engineers and being more tolerant of LGBTQ individuals. Whatever the case may be, an

LGBTQ person's experience could vary wildly based on their field, institution, or even geographic location. STEM encompasses a wide range of studies and careers, all of which have their own individual intricacies.

As expected, experience is also not consistent among different LGBTQ identities. In the 2018 study mentioned earlier, it was found that male undergraduate students from the LGBTQ community were less likely to stay in STEM than heterosexual peers (.45 versus .54), while female undergraduates in the LGBTQ community were more likely to stay than heterosexual peers (.39 versus .32) (Hughes 2018). This could be because queer women are seen as more masculine, and thereby more accepted into STEM culture. However, even with this added boost, queer women still fall about as far behind queer men as they are ahead of straight women. So while a more masculine identity may be valued, it does not exempt a person from the implications of their gender. These women still face sexist and heterosexist discrimination, in school and in the workplace.

Undoubtedly a major reason that STEM fields lag behind on social matters, sexual identity being one of many, is their historical exclusion of women. Much of this stems more broadly from women's exclusion in higher education, but the history of exclusion goes even farther back. Math, one of the oldest STEM subjects, emerged in the form familiar to us today in ancient Greece with the Pythagoreans. Although there were female Pythagoreans, their leader, Pythagoras, and the overwhelming number of famous mathematicians, scientists, engineers and other people of STEM from antiquity and modern times have been men. This historical precedent pervades into modern times more than some might realize. For example, during the late 18th and 19th centuries, botany and chemistry were considered "unmanly" studies suitable

for aristocratic women (Simon 2000). Today, even as the number of women in STEM increases, Biological Sciences and Chemistry attract a lot more women than Physics and Computer Science. As discussed earlier, Biological Engineering and Chemical Engineering experienced similar popularity with women, and also increased tolerance for LGB students. This hints at a larger, more disturbing truth. Men, more specifically heterosexual men of privileged background, have historically designated certain areas of study for themselves, allowing women and other excluded groups entry to less favored spaces, but silencing or punishing those who enter others.

But surely, there is a way forward. More surely, there are methods that do not work. The silencing that so often occurs in STEM institutions, either implicitly, or when LGBTQ people are asked to actively police their actions, ignore the problem. Worse, they place the burden on these already marginalized people and force them into an unfair work dynamic where others are allowed to express their identities but they are not. In part, this trend is driven by a broader ideology called depoliticization, most common in engineering but present in other fields as well. Depoliticization, according to Erin A. Cech in a 2013 conference paper, is “the belief that “social” issues can and should be bracketed from the more “technical” aspects of engineering” (Cech 2013, 2). This largely comes from the idea that because STEM ostensibly strives for goals such as learning, invention, innovation, and other things not intrinsically tied to these “social” issues, it is separate from and not affected by them. However we have already seen that this is not the case. As Cech points out, “Workplace interactions are never completely about work” (Cech 2013, 5). Even with an attitude of keeping “social” issues out, their presence is revealed whenever someone speaks about their life in a way that LGBTQ people are not allowed to.

Further, the entire culture of STEM is built on thousands of years of cisgender, heterosexual male standards that benefit those people. Keeping issues silent will never fix them, and only favor the people already in power: white, cisgender heterosexual men.

Ultimately, the broader community must acknowledge that LGBTQ issues are relevant, even in contexts where personal and social issues are supposedly not. LGBTQ people are disadvantaged by pressure to stay silent, microaggressions, and an unwelcoming environment that has been formed with the sexual majority in mind. One step towards this is breeding a healthier culture of talking about life at work. There is a time for getting work done, but frequently, there is time to converse. The notion that speaking about personal life in the workplace is unprofessional, particularly when one's lifestyle is different from the norm, is a rule that tacitly benefits the majority. Ultimately getting more queer people involved in STEM will be the greatest help. With greater numbers, the rest of the community will be able to get used to their presence, and having more role models will help young LGBTQ people stay around to become part of the community themselves.

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