We need to address ableism in science

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ABSTRACT In science, technology, engineering, and mathematics (STEM) fields, disabled people remain a significantly underrepresented part of the workforce. Recent data suggests that about 20% of undergraduates in the United States have disabilities, but representation in STEM fields is consistently lower than in the general population. Of those earning STEM degrees, only about 10% of undergraduates, 6% of graduate students, and 2% of doctoral students identify as disabled. This suggests that STEM fields have difficulty recruiting and retaining disabled students, which ultimately hurts the field, because disabled scientists bring unique problem-solving perspectives and input. This essay briefly explores the ways in which ableism—prejudice against disabled people based on the assumption that they are "less than" their nondisabled peers—in research contributes to the exclusion of disabled scientists and suggests ways in which the scientific community can improve accessibility and promote the inclusion of disabled scientists in academic science.

INTRODUCTION

When I was a teenager, I was diagnosed with a chronic illness and disability. Throughout my education, various mentors told me it was in my best interest to separate my disability and required accommodations from my identity as a scientist. It took having emergency surgery during my first semester of graduate school—nearly 10 years after my diagnosis—for me to realize this was not only unsustainable, but a prime example of ableism. This realization prompted me to look for disabled mentors in the scientific community for support and suggestions on how to deal with the ableist notions in academic science. It was difficult to find other disabled scientists to connect with, particularly those pursuing research careers in my field of interest, which made me feel alone. But despite how it felt, I am not alone, as nearly 10% of employed scientists identify as disabled (National Science Foundation, 2019; U.S. Department of Education National Center for Education Statistics, 2019; University of Delaware Science and Engineering Leadership Initiative, 2020). While having disabled mentors is important, the responsibility of recruiting, retaining, and supporting the success of disabled researchers belongs to all of us, and to do this we must examine and address the ableist practices in academic science.

HOW DOES ABLEISM CREATE UNIQUE CHALLENGES FOR DISABLED SCIENTISTS IN ACADEMIA?

Disclosure

Though disclosing a disability is a choice, receiving accommodations requires disclosure, which means many disabled people have to decide when and to whom they disclose their disabilities. For students and faculty alike, disclosing a disability on an application comes with the fear of rejection based on biased stereotypes that cause people to equate disability with being unprepared, incapable, or a liability (Brown, 2016; Thurston et al., 2017). Disclosing a disability on a grant application might impact funding capability, because there may be a misconception that disabled scientists are unable to do rigorous or impactful work like their nondisabled peers (Swenor et al., 2020). On the other hand, waiting to disclose a disability until after you get a position can raise suspicions or lead to a new employer feeling duped when arranging accommodations. Furthermore, the process of disclosing can be exhausting (Brown, 2020); it can come with the pressure of needing to prove you are both capable of doing your work and "disabled enough" to need accommodations. In the sciences, disclosure of certain disabilities or chronic illnesses can also come with fielding unsolicited medical advice from colleagues.

Accommodations

Access to accommodations is challenging and the implementation process is painfully slow. Requests for accommodations can be met with hesitancy because accommodations are sometimes perceived as giving disabled people an advantage over their nondisabled peers, despite the fact that accommodations are merely adjustments to work environments that make it possible for a disabled

person to perform tasks related to his or her job function. For disabled researchers at academic institutions, there are other unique challenges in getting adequate accommodations (Finesilver *et al.*, 2020). Because accessibility offices at universities tend to focus on undergraduate students, they often do not have protocols that address accessibility concerns in the laboratory, leaving graduate students to navigate a convoluted process. This can be further complicated for graduate students who rely on support from their advisors, as there is the added uncertainty of whether the university or the advisor is responsible for financing certain accommodations. Like graduate students, faculty face additional challenges securing accommodations, stemming from the fact that accessibility offices at many universities are student-centered (Finesilver *et al.*, 2020). As a result, individual departments generally implement accommodations for faculty, making it difficult to identify who to disclose to, often resulting in faculty having to disclose personal health information to many people (Griegly, 2017). Furthermore, though anyone can acquire a disability at any time, not having access to a streamlined accessibility office creates an additional obstacle to faculty members who acquire a disability during their employment receiving appropriate accommodations in a timely manner (Perry, 2016).

Mentorship

There are programs that use mentorship initiatives to increase the participation of disabled people in STEM, particularly at secondary– and post secondary–education levels (Washington University DO-IT, 2020b), but these programs are not widespread and not always sufficient to meet continued career development needs of disabled scientists. Many of these programs focus on student persistence in STEM fields and graduation outcomes, which means they do not necessarily include continued or field-specific mentorship for disabled students who pursue graduate education after program completion (Gregg *et al.*, 2016). This poses a challenge for the retention of disabled scientists, as it is well acknowledged that mentorship plays a crucial role in scientific training (National Academies of Sciences, Engineering, and Medicine; Policy and Global Affairs; Board on Higher Education and Workforce; Committee on Effective Mentoring in STEMM 2019, 2019a), and that mentorship is most effective when mentees can see themselves in their mentors (Puritty *et al.*, 2017). Effective mentorship for disabled scientists must go beyond the scope of these programs (National Academies of Sciences, Engineering, and Medicine; Policy and Global Affairs; Board on Higher Education and Workforce; Committee on Effective Mentoring in STEMM 2019, 2019b), including access to disabled mentors, as nondisabled mentors cannot always foresee or address certain challenges that come with being disabled in academic research. Furthermore, there are few spaces in the scientific community that center on the experience of disabled scientists, and those that do exist are overwhelmingly white, straight, and cis-gender spaces that neglect to address the intersection of the disabled identity with race, gender, sexual orientation, and class. Even worse, spaces meant to support these other social identities that have been historically excluded in science often inadvertently exclude their disabled members. This creates additional barriers for multiply marginalized disabled scientists to get the support and mentorship they need for success within the community.

HOW CAN THE ACADEMIC COMMUNITY ADDRESS ABLEISM IN SCIENCE?
Educate yourself

Make time to learn about different types of disabilities, accessibility solutions, and the ways in which disabled people frame the disabled experience. This can mean engaging with the field of disability studies by reading papers that examine social and cultural aspects of disability (Meekosha, 2011; Oliver, 2013) or following the work of disability activists (Brown, 2020; Girma, 2020; Disability Visibility Project, 2020; Rooted in Rights, 2020). Make an effort to engage in scholarship written by disabled people, as their understanding of ableism and the needs of the disabled community is more acute than that of nondisabled writers. Recognize that disability is diverse, not always visible, and that no two disabled people experience disability in the same way. Get comfortable with the idea that disabled is not a bad word. It is a broad definition that includes impairment, activity limitation, and participation restrictions (Centers for Disease Control and Prevention, 2020). Moreover, "disabled" is a descriptor that many in the community prefer over person-first language—a form of linguistic etiquette aimed at avoiding bias by emphasizing a person's individuality ahead of their diagnosis or identity (ex. person with disabilities)—and other euphemisms such as *differently abled*, *handicapable*, or *special needs* (Ladau, 2015; Gernsbacher *et al.*, 2016).

Next, begin to critically interrogate your environment and identify spaces that are inaccessible and practices that can be ableist. Use these reflection questions as a starting point for thinking about and improving accessibility.

Think about your lab space. Could a disabled scientist get into the lab and use the necessary equipment? This includes making sure walkways are clear enough to navigate with a wheelchair, crutches, or cane and having options to sit or stand at workstations.

Are the classes that you take or teach accessible to students with learning disabilities? Long blocks of text on syllabi or slides can be overwhelming for students with attention deficit disorder (ADD) or dyslexia. Find ways to keep information concise by using bulleted lists with sans serif fonts (Washington University DO-IT, 2020a).

Are the seminars that you attend accessible for those with hearing loss? Are there enough accessible labs in your department so that a disabled graduate student could arrange the required number of laboratory rotations? Does the promotion process at your institution consider the needs of disabled faculty?

Improve accessibility

Scientists should be taking action to make accessibility a default rather than an afterthought. Improving accessibility must happen in all the spaces where science is taught, conducted, and discussed, which means inclusion strategies will look different at different levels. One of the ways this can be accomplished is by making practices the default that are often implemented only as accommodations.

In the classroom, we can make learning more accessible by incorporating principles of Universal Design, an educational framework that creates learning environments that are built to accommodate differences in learning (Burgstahler, 2009). This means providing various formats for your students to engage with content, activities, and assessments, setting flexible due dates for assignments, removing absence penalties, and allowing students to participate remotely if necessary. Presentations should use colorblind-friendly colors with high contrast to be inclusive of those with vision impairments. All prerecorded lectures and materials should be captioned or have a transcript available.

In the laboratory, we can start to improve accessibility by providing disabled scientists with ergonomic pipettes, ergonomic chairs for bench work, adjustable footrests under benches, adjustable height workstations, and anti-fatigue mats. These suggestions will not accommodate every disabled researcher, but they are a good

start to support disabled scientists and signal that there is a space for them to participate and succeed in research. Consult resources that provide more exhaustive examples of both policies and materials that can make any work environment, including laboratories, more accessible (Job Accommodation Network, 2020).

As a collective scientific community, we must work to ensure that research done by disabled scientists is recognized, and that there are spaces that center on the voices and experiences of disabled scientists at conferences, workshops, and events. In a postpandemic world, we can ensure that disabled scientists are included by continuing to offer remote access to conferences and workshops. In addition, at these hybrid events, accurate captioning for talks must become standard! While the pandemic has had a disproportionate impact on disabled scientists and their ability to conduct "business as usual," it has also highlighted the relative ease with which accessibility measures can be implemented. Continuing and expanding these accessibility efforts is crucial for the inclusion and participation of disabled scientists. One way to ensure that events are actually accessible for disabled scientists who attend them is by asking for their feedback after the events and using it to improve the next conference. However, accessibility goes beyond events. We also need to ensure that websites for everything from journals to professional societies are accessible by using screen reader–friendly formatting, adding alt text to images, and creating accessible forms (Web Accessibility Initiative, 2021).

Include disabled perspectives

Most importantly, actively seek input from disabled scientists with diverse disabilities and diverse social identities and compensate them for their role in diversity, equity, inclusion, and accessibility initiatives. Creating a more diverse research community is crucial for the advancement of scientific discovery and will require change at many levels in academia. Much of the current diversity, equity, and inclusion work focuses on student recruitment and faculty hiring, but there are scientists at other levels that are largely not considered in inclusion and accessibility initiatives. We must broaden our considerations to include undergraduate and graduate recruitment and education, faculty hiring and promotion, and the recruitment and retention of technicians and research specialists. Though input from disabled scientists is essential for these efforts, this is not just the work of scientists from disabled or other historically excluded backgrounds; it must be the work of the scientific community as a whole.

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MEET THE AUTHOR

Image description: Headshot of a smiling young student with long red hair in front of oceanside buildings.

I am a PhD student studying cell adhesion at Emory University and am a proud alum of Florida State University, where I received my bachelor's degree. As a scientist, I strive to model behavior that promotes the development of more inclusive research and educational environments.

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