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Expanding Conversations about Accessibility to Include Faculty

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Abstract

The past decade has witnessed increasing interest in attracting and retaining a more diverse workforce in science, technology, engineering, and mathematics (STEM) fields, including expanding the participation of women and racial-ethnic minorities and, in fewer cases, to people with disabilities. Despite the availability of a rich collection of published research on women faculty that has increasingly used an intersectional lens, these conversations rarely meaningfully address strategies to make faculty careers more welcoming and accessible to women with disabilities. Further, as the professoriate ages, there will be an increasing number of faculty with disabilities, and the pandemic has a disproportionate impact on many faculty with disabilities. In the coming years, there will also be faculty who have acquired disabilities as the result of long COVID.

This paper reviews existing research and known practices related to faculty with disabilities, as well as reports from people with disabilities and other stakeholders in an online community, and offers practical promising practices for increasing the participation of this marginalized and underserved group in STEM fields. The paper begins with a discussion of structural barriers that make faculty careers inaccessible and unwelcoming to people with disabilities and presents two approaches to access: accommodations and universal design. Both approaches are important for increasing the participation of people with disabilities in faculty careers. Given the relatively sparse literature on the topic, we encourage researchers addressing faculty careers to ask about disability in their work and to analyze disability-related data to increase our understanding of the issues impacting this population. Moreover, we offer departments and institutions strategies that they can take related to institutional and departmental policies related to accommodation requests, hiring practices, faculty evaluation, and other relevant areas; departmental culture; physical environments; collaboration and communication, and information technology. We conclude with recommendations to researchers and practitioners regarding the development of practices that will lead to increased engagement and success of women in faculty positions in STEM, as well as, given the relatively sparse literature on the topic, encouragement to researchers addressing faculty careers to ask about disability in their work and to analyze disability-related data to increase our understanding of the issues impacting this population.

Introduction

There is a rich collection of published research and practice regarding increasing the participation of women and racial and ethnic minorities in science, technology, engineering, and mathematics (STEM) fields. Research and practice regarding disability in academic settings has primarily focused on student needs, largely ignoring the underrepresentation of faculty with disabilities. A growing number of published research and practice focuses on the participation of women faculty in STEM. Much of it has emerged from projects funded by the National Science Foundation (NSF) under ADVANCE: Organizational Change for Gender Equity in STEM Academic Professions, a program that has been active for more than twenty years. NSF

ADVANCE has funded more than 200 projects promoting systemic change to enhance gender equity and inclusion for STEM faculty, hosted by postsecondary institutions, STEM collaboratives, and research organizations. However, project leaders and scholars rarely address policies and practices that impact how welcoming and accessible faculty careers are to people with disabilities.

This area of study and practice is particularly important as the number of faculty with disabilities steadily increases as the professoriate ages and due to the COVID-19 pandemic. The number of new faculty with disabilities is also expected to increase because greater numbers of individuals with disabilities are graduating with PhDs in STEM and are thus potential candidates for joining the professoriate [1]–[3]. Because students benefit from role models who reflect their own identities—as well as from exposure to instructors and mentors with diverse backgrounds—it is worthwhile to cultivate a diverse faculty, including disabled faculty [4]. People with disabilities benefit from meeting or learning about role models and mentors that have navigated issues surrounding accessibility and accommodations in education and employment settings [5], [6].

The AccessADVANCE project was funded in 2020 through the ADVANCE program at NSF (Awards HRD-2017017, HRD-2017054) as its first disability-centered grant. *AccessADVANCE* takes an intersectional approach to increasing the participation and advancement of STEM faculty with disabilities in recognition that a person's disability status does not exist in isolation from their gender, race, ethnicity, age, and other social identities. *AccessADVANCE* leaders explicitly recognize that people with disabilities define a marginalized group that intersects with all other identity-defined groups. People who belong to multiple marginalized groups are impacted in unique ways by the intersection of these characteristics. Some women in STEM, however, have reported that their disability status seemed to have a greater impact than other identities on their success [7].Although disability prejudices and environmental barriers frequently hamper academic and workplace success, *AccessADVANCE* also recognizes that identifying as disabled can also bring benefits such as including membership in a community with shared experiences, needs, and sociopolitical power. Because people with disabilities bring "a complex blend of human experience [8]," they bring vital and creative perspectives and skills to the workforce pool in the same way that other minoritized voices do.

AccessADVANCE's intersectional approach regarding disability status is consistent with the vision of the 2023 Collaborative Network for Engineering and Computing Diversity Conference to engage "all underrepresented groups... including [those] based on gender (including gender identity and gender expression), race and ethnicity, disability, veterans, LGBTQ+, 1st generation, and socio-economic status." The experiences of a person with a disability are impacted by the other identity groups to which they belong. Further, the *AccessADVANCE* team embraces a social model of disability by recognizing that the disadvantages associated with disabilities are less a function of how an individual shows up in the world (e.g., with a "medical diagnosis") and more a function of how some policies, practices, and social systems are not designed to be inclusive of everyone. For example, a person using a wheelchair or scooter is disabled by the absence of working elevators; an individual who experiences social anxiety may be overwhelmed by expectations for behaviors commonly associated with collegiality; and someone whose sensory processing speed does not match conventional timeframes may be judged as unengaged or abrasive. *AccessADVANCE* leaders also recognize that individuals may identify as

disabled based on non-apparent conditions that may vary across time and environmental conditions.

In this paper, *AccessADVANCE* leaders summarize structural barriers experienced by faculty with disabilities and recommendations for systemic improvements for STEM departments gleaned from a literature review and direct reports from disabled academics and other disability equity stakeholders. We share publications, resources, and activities devised by the *AccessADVANCE* program that serve to make STEM academic departments more welcoming and accessible. These resources cover important conditions for leveling the playing field for potential and current women faculty members that include those related to application processes, onboarding practices, campus culture, physical spaces, online resources, tenure and promotion processes, and the availability of reasonable accommodations.

Throughout this paper, you will find both person-first (e.g., person with a disability) and identity-first (e.g. disabled person) language. Not surprisingly, members of disability communities have diverse opinions regarding preferred language [8]–[10]. As concluded by Burgstahler [11, p.4], "rest assured that, if one person says *everyone* in a group of individuals with a specific disability prefers certain terminology, that statement is almost certainly wrong." In *What Can a Body Do? How We Meet the Built World*, Hendren encouraged readers, "...instead of fixating on getting the terms right, locate your energy and time toward seeing your own life, no matter its embodied state, as intimately tied to the strong work of disability advocacy [12, p.6]." *AccessADVANCE* leaders embody this philosophy in our work, advocating for disability inclusion and equity rather than focusing on linguistics.

Structural barriers that make STEM departments unwelcoming and inaccessible to faculty with disabilities

The popularity of STEM positions is growing at a rate more than double that of other careers [13], and STEM practitioners are increasingly recognizing the need to prepare, recruit, and retain workers from all backgrounds, including people with disabilities [14]–[16]. A STEM career can offer numerous benefits to individuals as well as to society; however, although employment in STEM occupations in the United States has burgeoned by nearly 80% over the past 30 years [17], white nondisabled workers are overrepresented in STEM workforces [18], [19]. One study declared that "there are ~75% fewer individuals with disabilities represented in the STEM workforce than in the general population [20];" others assert that "[a]chieving full inclusion for people with disabilities in STEM is a matter of national security, economic prosperity, and equity [21]."

Although there is scant research on the challenges facing STEM faculty with disabilities, there is a growing body of research on the experiences of STEM graduate students with disabilities. Students sometimes find that the accommodations that they were granted by their institutions in their undergraduate studies do not provide them with adequate access in graduate school and beyond [21], [22]. Because graduate education differs from undergraduate education, graduate students with disabilities have different access needs, which institutions often do not properly meet. Because graduate students and faculty members participate in similar research activities, it is likely that faculty members have similar unmet needs. Furthermore, in order to be successful,

graduate students with disabilities often perform extra work and take on emotional burdens to navigate academia [22], [24], [25]. Faculty likely face similar burdens [26].

In 2019, only 10.5% of doctorate holders with disabilities employed in universities and four-year colleges were tenured [1, Table 9-31]. Achieving tenure in STEM disciplines, especially in research intensive institutions, requires consistent, high levels of research productivity, significant external research funding, full-time appointments, work that consistently extends to evenings and weekends, and frequent networking and presentations at conferences. Meeting these expected work patterns and outputs are challenging for some faculty with disabilities [26]. STEM academic positions often require substantial needs for laboratory space and instrumentation, along with startup funding that often comes with timeline constraints, all of which can pose particular challenges when disabilities are not considered in the design and implementation of the workplaces. Furthermore, despite decades of research that has addressed increasing diversity among STEM faculty, very little work has addressed accessibility and equity for disabled faculty. Conference participation poses challenges for some faculty with disabilities ranging from access to spaces, accessible technology, sign language interpreters, extra travel expenses, and appropriate food [27]. Further, communication and networking with other participants can be difficult to navigate for faculty who have physical disabilities and/or are neurodiverse. In fact, physical labor demands of research in STEM disciplines have led some faculty with disabilities to move to other disciplines, such as science education [28].

In the US, our collective responses to the COVID pandemic have demonstrated that swift institutional transformation can be achieved when the motivation is sufficient. While the speed and scope of adaptations made may have been laudable and effective in many situations, many institutions are embracing a “return to work” that problematically erases gains for disabled students and workers [29], [30]. While some people were presented with barriers—e.g., the inaccessible design of technologies and the products they create (e.g., PDF documents, videos)—when they had to work from home, others experienced unprecedented access to education and employment during the pandemic, and are now being stripped of that access. Opportunities to teach, attend conferences, and participate in departmental and campus activities online increased the productivity of many people with disabilities. Moreover, perhaps 15% of those exposed to the virus are experiencing ongoing effects [31], and long COVID can manifest as a disability under the ADA [32] that requires reasonable accommodations from postsecondary institutions [33].

The following experiences reported by *AccessADVANCE* participants illustrate structural barriers that can make academic careers unwelcoming and inaccessible to some women with disabilities and offers suggestions for ways to mitigate these issues [34, p. 1]:

- A senior graduate student who is blind often encounters journal articles, review processes, and submissions processes that are inaccessible to her. She faces delays in securing accessible articles and requires the help of sighted colleagues to prepare and review articles. Increasing the awareness and skills of organizations who create inaccessible processes and products could reduce the need for such accommodations.

- The productivity of a faculty member in computer science is reduced as well as her ability to travel when her health-related disability flares up. A tenure and promotion

process that takes into consideration disability-related issues, such as one that extends the deadline for earning tenure, helps her move down a successful career path.

- A faculty member who is quadriplegic requires accessible lab space equipment and has difficulty traveling, but has participated in conferences remotely using a telepresence robot. Institutional support and funding for designing an accessible lab and shipping the robot has allowed her to be successful.

- A faculty member with a disability reported that funding for accommodations was expected to come from her own grant and departmental budgets. This led to reluctance on the part of her department chair to provide accommodations. Centralized funding for accommodations, and clear institutional policies that highlight the availability of this funding, could better support faculty that need accommodations.

- A faculty member finds that the burdens of disclosure, requesting accommodations, and being asked to ensure that departmental activities are accessible require too much time. Ensuring that departmental staff are knowledgeable about accessibility and proactively consider accessibility has alleviated some of this burden.

- A faculty member acquires a disability after receiving tenure. She hides her disability from others, spending significant time accommodating herself without asking for external support. The experience opened her eyes to accessibility issues she had not previously considered. She found that speaking allowed her to help other faculty navigating similar issues.

Welcoming, accessible, and inclusive: Design with people with diverse abilities in mind, then adapt as needed

Next, we offer strategies for institutions to create welcoming and accessible structures, spaces, and processes that are inclusive of faculty with disabilities. A checklist developed by *AccessADVANCE* provides institutions with a comprehensive set of strategies that can be systematically implemented to design and enhance institutional structures, policies and practices.

As a good first step for addressing the underrepresentation of disabled talent in academic STEM positions, departments should review policies, resources, and communications associated with the department and adjust them to ensure that they address the needs of disabled faculty. There are many examples and resources to help update departmental language and procedure; examples include

- giving guidance to all faculty about how to request disability-related accommodations,

- focusing on systemic changes like making labs, buildings, and websites accessible to people with a variety of disabilities, rather than retrofitting them when a faculty member with a disability arrives, and

- adopting a culture that expects online meetings to be captioned rather than require faculty members to request them as an accommodation.

Such changes need to be institutionalized in order to be preserved long-term.

Institutions have shown their capacity to change swiftly as campuses moved classes and meetings online due to the COVID-19 pandemic. As the pandemic waned and institutions have shifted back to in-person operations, many people with disabilities have lost access. Attending meetings and teaching classes remotely have benefited people with disabilities who are at higher risk for COVID or other infections, those for whom traveling to campus puts a stress on their bodies, individuals that have lengthy commutes on public transportation, or those for whom social interactions can be draining. It is important to determine the beneficiaries of online practices and consider integrating them in a post-pandemic world.

The work of *AccessADVANCE* is predicated on a blend of two approaches to improved accessibility to STEM academic workforces:

1. Apply universal design (UD) principles to policies, practices, technology, resources, and services to ensure that they are accessible and inclusive by considering the needs of people with a wide range of abilities, learning styles, interests, and other characteristics.

2. Provide reasonable accommodations as needed.

Universal design (UD) is defined as "the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design [35]." UD goes beyond addressing the needs of people with disabilities to create campus offerings that are not designed only for the average user, but also for those with a wide range of races, ethnicities, native languages, cultures, gender identities, ages, and other characteristics [36]. Universally designed products and environments are intentionally created to be accessible to, usable by, and inclusive of everyone. Both proactive (UD) and reactive (accommodations) approaches to access, applied dynamically and in tandem, have an important role to play in the process of increasing the successful participation of people with disabilities in faculty careers.

After conducting a literature review and consulting with disabled and nondisabled faculty and other stakeholders, the *AccessADVANCE* project applied UD principles and accommodation best practices to create a checklist of questions to highlight some actions departments can take as they make their offerings more accessible and inclusive of faculty members with disabilities. They are organized under six subcategories. In table 1, column one lists a category and general guideline and column two provides an example in that category [34].

Table 1: Policies, Guidelines, and Examples of Universal Design Practices

Policy and Guidelines	**Example of Potential Practice**
Policies and Evaluation Ensure that diversity, including disability, issues are addressed in all policies and evaluations regarding your offerings.	Does the department and campus ensure that new hires and other faculty are aware of the workplace accommodation process? Is the process clearly explained on faculty and public websites? Does this information include examples of accommodations provided?

Department/Campus Culture Consider disability issues as you plan and evaluate your facilities and offerings.	Do campus or departmental diversity, equity, and inclusion (DEI) initiatives address issues relevant to faculty members with disabilities?
Physical Environments Ensure physical access, comfort, and safety within an environment that is welcoming to visitors with a variety of abilities, racial and ethnic backgrounds, genders, and ages.	Are there policies and procedures to ensure that accessibility issues are addressed when facilities are constructed or remodeled and when furniture and equipment are procured?
Support Services Make sure support staff are prepared to work with all faculty, including those with disabilities.	Do staff members know how to respond to requests for disability-related accommodations (e.g., sign language interpreters)?
Information Resources and Technology Ensure that publications and websites welcome a diverse group and that information is accessible to everyone. Make sure accessible technology is available to faculty with disabilities.	Do departmental and campus web pages adhere to accessibility guidelines or standards adopted by your institution or your department? For information about designing accessible websites, consult W3C's Web Content Accessibility Guidelines.
Accommodations Put systems in place to ensure reasonable accommodations are available to faculty.	Are accommodations approved and funded efficiently through a central institutional unit and budget so departments avoid the appearance that individual faculty members with disabilities are a financial burden?

Once you apply some of these practices, consult with people with disabilities on your campus or disability services for additional ideas specifically relevant to your campus culture, policies, and practices; refine your policies and procedures based on input and feedback from people on your campus. In academia where perhaps the vast majority of faculty identify as nondisabled [37] and people with disabilities often do not have knowledge of the needs of people with other types of disabilities, it is important that people developing and implementing departmental and institutional policy and practices intentionally create opportunities to hear from and work with disabled colleagues and the disability community.

On climate surveys, event evaluations, exit interviews, and evaluation reviews—ask about the experiences of people with disabilities. Given the relatively sparse literature on the topic, we

encourage researchers addressing faculty careers to ask about disability in their work and to analyze disability-related data to increase our understanding of the issues impacting this population [18], [21], [38]. It is not enough to just collect the data; it needs to be analyzed and conclusions drawn from it [39]–[41].

Not only is it important to carefully consider which data are collected, but it is also crucial to apply a human-centered data science lens regarding how those data are collected, analyzed, and shared [42]. A human-centered data science lens recognizes that, because all science is conceptualized and applied by humans, biases infuse all stages of scientific investigations. Swenor notes that "[d]isability, like race, ethnicity, and gender identity, is a social construct" and argues for "a 'disability data justice' approach" to collect information with the express purpose of supporting disability equity [43, para. 5]. All biases, including disability biases, are pervasive and people who do not experience disability are likely to be unaware of the impacts of those biases. Thus, it is crucial that the experiences and perspectives of disabled colleagues are present for all phases of efforts to address accessibility and disability discrimination, perhaps especially including initial stages in conceptualizing research and demographic questions.

Approaches to improving departmental and institutional culture with respect to people with disabilities is to provide disability-focused professional development opportunities to support the knowledge and skill-building necessary to the development of accessible and welcoming workplaces. Given that the majority of any given workplace is populated with individuals who identify as nondisabled, it is crucial to offer training that increases knowledge and awareness regarding disability. Importantly, such training must be grounded in the experiences and perspectives of disabled people. Of course, a 'disability perspective' is no more monolithic than any other identity category, and a plurality of disability perspectives are centered in all *AccessADVANCE* efforts.

Progress of the *AccessADVANCE* Project

AccessADVANCE provides a central clearinghouse of resources dedicated to specific accessibility practices and by providing guidance regarding how institutional policies and practices can be transformed to advance disability equity [44]. *AccessADVANCE* project leaders continue to expand an online knowledge base, cultivate an online asynchronous community of practice (CoP), consult with institutions and organizations about accessibility practices, and offer virtual panel presentations, webinars, capacity building institutes, and seminars that included both a year-long format and a four-session series presented over a one-month period. During a capacity building institute (CBI) in May 2021, a group of nationally representative participants shared challenges and solutions regarding the recruitment and participation of women with disabilities in ADVANCE activities and STEM careers [45]. Via webinars, *AccessADVANCE* has offered training related to institutional practices, remote work, and other related topics and shared via the CoP weekly updates on current disability-related topics in national and global news both inside and outside of academia.

Additionally, two series of local online seminars were provided at a partner institution including one series that was offered monthly across the full academic year (Sept–May, 2021–2022) and one four-seminar series offered within one month. As noted above, representation does matter. To align seminars with the experiences, views, and talents of disabled people, one seminar

co-facilitator identified as a member of the disability community and the other as an advocate for disability equity and allyship. Further, the vast majority of seminar content was intentionally selected to be authored by people who identify as disabled and who represented a broad and intersectional set of disability experiences and perspectives.

The year-long seminar series, *Intersections of Disability and Academic Faculty*, considered concepts of disability and ableism from the perspectives of faculty who identify as part of the disability community. Questions and topics included the need for nondisabled people to listen to and believe disabled people; ways that ableism, racism, sexism, and other discriminations are interdependent; and actions each of us might take in our offices, departments, colleges to promote disability justice. The seminar series started in September 2021, with invitations sent to faculty, staff, and graduate students, and 12 final participants signing up. Attendance was mixed, though most were able to attend a majority of sessions. Eleven of the 12 responded to an anonymous survey requesting feedback about their seminar experience; the data from one respondent was removed from the current analysis due to response inconsistencies (e.g., on an item asking if participation increased general knowledge of ableism the response was "Strongly Disagree," however, in an item asking them to rate the change in awareness around ableism, they indicated a positive change of 5 points (from 3 to 8) on a 10-point scale).

The ten respondents included 3 faculty; 4 staff; 2 grad students, and 1 preferred not to answer. Three respondents (30%) identified as disabled (1 faculty, 1 staff, 1 graduate student). Participant feedback indicated that 100% of respondents Agreed or Strongly Agreed that their participation in the seminar had left them better prepared to promote a more equitable campus climate for disabled faculty, staff, and graduate students, and had resulted in increased personal commitment and motivation for addressing ableism and disability equity on their campus. Responses were slightly mixed when participants were asked about their knowledge and understanding of disability discrimination and the impacts of ableism in academic workplaces, with one respondent who identified as disabled indicating that they had not experienced any changes as a result of their participation. Thus, although 90% of participants did endorse increased knowledge and understanding of disability discrimination and the impacts of ableism in academic workplaces, it is noteworthy that 7 of those 9 (78%) did not identify as disabled. This finding suggests that it may be valuable to identify additional pathways for meaningful professional development engagement for disabled colleagues. Overall, the feedback does indicate that providing disability equity professional development opportunities made important differences in three fundamental aspects of allyship for equitable outcomes: knowledge and understanding of inequities, skills/preparation for promoting equity, and personal commitment and motivation to work for equity.

The four-part *Disability Equity and Advocacy* seminar series convened campus faculty, staff, and graduate students interested in disability equity and advocacy regarding women with disabilities in faculty careers in order to promote campus members' sense of belonging/inclusion, knowledge of disability as a diversity characteristic, and disability equity advocacy skills. In addition to providing disability-focused professional development sessions, the co-facilitators collected data to inform campus disability policy and practice and invited participants to continue engagement as a local campus network of faculty, staff, graduate students interested in disability equity and advocacy.

There are numerous online resources available to support groups and organizations in developing and/or honing specific accessibility practices. Topics include hosting conferences [46], recruiting and retaining a diverse workforce [47], [48] and monitoring legal requirements [49]. Such resources are valuable and provide a vital and dynamic supply of current information and training materials. However, if your organization has not yet explicitly identified disability as a key aspect of diversity, equity, and inclusion efforts and prioritized accessibility, it may be beneficial to take time to review your institution's mission, vision, and values through the lens of disability. Addressing the institutional practices that perpetuate ableist discrimination is also certainly key, and this is the foundational strategy of *AccessADVANCE*.

Conclusion: (Continue to) question

*Access*ADVANCE recommends institutions to implement Universal Design principles inclusive of people of diverse abilities and needs; collect and analyze information on the experiences and perspectives of faculty with disabilities; offer professional development and skill building around accessibility and disabilities; utilize *Access*ADVANCE checklist for accessible policies and procedures; respond to ongoing impact of COVID; and provide centrally funded and processed accommodations. Because each institution and department will have a unique history and constellation of needs, we have synthesized the input received in the form of questions that can be used to assess where your workplace is in regards to a wide variety of accessibility practices. The checklist in *AccessADVANCE's Equal Access: Making STEM Departments More Accessible to and Inclusive of Faculty with Disabilities* expands on the items listed in Table 1 and can assist you in determining where accessibility has already been designed in your settings and also identify where more work is required in order to make your department welcoming, accessible, and inclusive, especially with respect to disabilities [34].

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