



Federal report shines light on historically underrepresented groups in science

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Academic science is much more diverse than it was a generation ago, even if it still has a ways to go. That's according to a [new report](#) ^[1] on women, minorities and people with disabilities from the National Center for Science and Engineering Statistics at the National Science Foundation.

The share of academic jobs held by female doctorates in science, engineering and health fields increased from 26 percent in 1999 to 39 percent in 2019. Underrepresented minorities hold more of these jobs now than in 1999, but their share -- 9 percent -- is still "considerably less" than their share of the population, according to the NSF. By comparison, underrepresented minorities make up one-third of the U.S. The share of academic scientists with one or more disabilities also increased over the same period, to 9 percent. Their share of the general population is about 11 percent.

Numerous equity and inclusion advocates within the sciences said they welcomed the NSF's report, which helps shed light on historically excluded groups within the sciences, particularly on one understudied group: scientists with disabilities.

Lindsey Malcom-Piqueux, assistant vice president for diversity, equity, inclusion and assessment at Caltech, said she downloaded the report as soon as it posted to better inform her own work. She said she's always careful to frame that work as not just DEI -- diversity, equity and inclusion -- but IDEA, for inclusion, diversity, equity and accessibility.

Too often, she said, disability is left out of conversations about diversity. And when it is included, she said, those efforts are often compliance based, to address accessibility laws. Instead, Malcom-Piqueux endorsed a proactive approach to including scientists with disabilities. This week, for instance, Caltech is hosting as part of its Diverse Minds seminar series astronomer Wanda Díaz-Merced. Díaz-Merced, who lost her sight in her 20s, works at the European Gravitational Observatory in Italy on sonification of astrophysical data.

"There are really unique perspectives and contributions that people from diverse backgrounds make, and that people with disabilities make and bring to their work," Malcom-Piqueux said, urging institutions to employ disability experts within their diversity and inclusion programs. Education and building awareness of scientists with disabilities is another part of the puzzle.

Of course, Malcom-Piqueux said, "we can't lose the compliance piece. That is really important -- but it can't just be that."

The federally funded Survey of Doctorate Recipients, on which the new NSF report is partially based, asks respondents about their degree of difficulty seeing with glasses, hearing with a hearing aid, walking without assistance, lifting 10 pounds or concentrating, remembering or making decisions. Those respondents with moderate or more difficulty with any of these activities are considered disabled.

Assets vs. Deficits

Interestingly, Ph.D.s who reported at least one disability were tenured at a higher rate than those without a disability. The report attributes this at least in part to faculty aging, with many older academics reporting age-related reductions in sight or hearing: 9 percent of scientists over 40 have a disability, according to the report, compared to 5 percent under 40.

Yet some younger academic scientists with disabilities say their diversity of thought or experience has made them more astute scientists.

Skylar Bayer, an assistant professor of biology and aquaculture at Roger Williams University who has written ^[2] about how having a disability makes her a better scientist, and co-creator of a forthcoming book on how scientists navigate health, research and bias, said Monday that she agreed there “has not been as much focus on persons with disabilities in STEM as there has been on women and minorities -- probably even less so on the intersection of those groups with disabilities.”

Bayer, who has a heart condition that ended her scientific scuba-diving career and has made her at high risk for severe COVID-19, said she and her book collaborators would probably also agree that “those with disabilities in STEM are incredibly creative problem solvers. And I think that is exactly who we need working in STEM fields to help solve our most complicated problems in science.”

When Bayer had to stop doing research deep underwater but still needed to complete her Ph.D., for example, she threw herself into project management. That built up her skills in preparation for being a principal investigator in the lab.

“I had at least one good mentor who helped me focus on what I could do instead of what I couldn't,” she added, “and that made all the difference.”

Challenges Remain

This is not to understate the challenges disabled scientists face inside and outside academe. Among scientists and engineers with at least a bachelor's degree, about 10 percent of women and about 9 percent of men are not working due to a chronic illness or disability, according to the study. Scientists and engineers with a disability have a higher unemployment rate than do non-disabled peers and a higher unemployment rate than the overall U.S. unemployment rate, as of 2019.

Among employed scientists and engineers with disability, a smaller share worked in science and engineering or related occupations than those without a disability. The share of employed scientists

and engineers with a disability who had supervisory status at work was similar to that of those without a disability, however.

Ph.D.s working in science and engineering fields in 2019 had a lower disability rate than those in non-science and engineering fields. Yet a larger proportion of those with a disability than those without reported that their primary source of financial support in their graduate programs was personal, family or, especially, loans. A smaller proportion of Ph.D.s with a disability than those without reported having received research assistantships, traineeships or internships, or having fellowships, scholarships or grants.

“These findings indicate that scientists and engineers with disability differ from those without disability across a range of measures,” the report says, citing their higher unemployment rate as one example. “Further investigation is planned into the educational attainment and employment of those with disability and their career paths to better understand their representation in the U.S. [science and engineering] enterprise.”

Bayer said that accessibility is a “huge part of how science could be more welcoming,” and that the pandemic -- which limited her own activities -- has nevertheless demonstrated that remote access for many jobs and degree programs is possible. Health care is another aspect of accessibility, she said.

Other Findings

While gender diversity within science is growing, male Ph.D.s still outnumber their female counterparts across academic positions, according to the study, as of 2019. That year, women made up about 36 percent of both the research faculty and teaching faculty, for instance.

Of all science, engineering or health Ph.D.s working at colleges or universities in 2019, 47 percent were tenured, and an additional 15 percent were on the tenure track. More men had tenure than women, and white scientists had the highest rates of tenure, compared to underrepresented minorities and Asians.

With respect to how their work relates to their doctoral degrees, a slightly higher share of academic women than men said it was closely related: 39 percent and 37 percent, respectively. One-third of men and women had found jobs outside academe that related closely to their degrees.

Ph.D.s who were employed full-time reported earning a median salary of \$119,000 in 2019. Gender disparities emerged both inside and outside academe. Men in tenured or tenure-track positions reported making \$110,000 and women \$95,000. Men working in the private sector reported making \$150,000 and women \$122,000.

The report pays particular attention to early-career scientists transitioning from graduate school to jobs. Of the 73,850 science, engineering and health students who earned doctorates, medical degrees or the equivalent in 2016 or 2017, about 2 percent were unemployed and looking for work in 2019.

Looking at the first 10 years of early-career scientists' employment arcs, 26 percent of all those employed in federally funded research and development centers, or U.S. colleges and universities -- excluding affiliated medical schools and centers -- held a tenure or tenure-track position as their first job, with similar shares across racial and ethnic groups. Black scientists were least likely to have first worked as a postdoc. Temporary visa holders were most likely to hold a postdoc as a first job.

Many scientists, of course, have more than one underrepresented identity, and the report notes this in a lengthy section on intersectionality. In 2018, the most recent year for which these data were available, for instance, women from underrepresented minority groups earned more than half of the science and engineering degrees awarded to their respective racial and ethnic groups at all degree levels, from bachelor's degrees to doctorates.

The primary purpose of the NSF's report, updated every two years, is to paint a statistical portrait of women, minorities and people with disabilities in science and engineering, so it doesn't come with recommendations. The NSF acknowledges that its findings are nevertheless relevant to policy makers and program managers.

Other key takeaways from the report include that more women than men were enrolled in college in 2018, and that the share of Latinx undergraduate students increased from 2016 to 2018, while the share of Black students declined over the same period. Among science and engineering graduate students during that time, Latinx representation increased and Black and American Indian representation remained the same.

Both the share and number of science and engineering degrees earned by underrepresented minorities increased over the past decade, according to the report. Historically Black colleges and universities have a significant role in preparing Black students for doctoral programs, as well, the report says, with 23 percent of new doctorates between 2015 and 2019 having earned their bachelor's degree at an HBCU.

Women earned about half of bachelor's degrees in 2018, 45 percent of master's degrees and 41 percent of doctorates. Women were most represented in psychology, biological sciences and agricultural sciences and the least represented in computer sciences and engineering.

The unemployment rate is lower overall for scientists and engineers than for the U.S. labor force, the report also found. But, again, scientists and engineers with one or more disabilities had an unemployment rate greater than that of the U.S. labor force.

Improving Accessibility

Joey Ramp, CEO of the disability access firm Empower Ability Consulting and a neuroscience research affiliate at the Beckman Institute for Advanced Science and Technology at the University of Illinois at Urbana-Champaign, said that people without disabilities often set limitations on students and others with disabilities that don't "align with the reality" of their capabilities.

“Implicit bias is human nature,” she said. Consequently, students’ exclusion from scientific opportunities may begin when they’re undergraduates and dissuaded from pursuing STEM majors. Ramp, whose service dog, Sampson, helps her navigate the symptoms of traumatic brain injury, said she’s mentored many students with differing disabilities who were told by faculty members they couldn’t “keep up” or that they were asking for “favors” when they were requesting accommodations.

When this happens, scientists with disabilities lose out -- as does science, Ramp said. “Academia benefits from a more diverse workforce.”

Caroline Solomon, professor of biology and director of the School of Science, Technology, Accessibility, Mathematics and Public Health at Gallaudet University, who is deaf, said scientists with disabilities remain a “very understudied area” but that things are changing, albeit slowly.

In any case, she said, “I really think my deafness has made me think about things in different ways than my colleagues do, as I see things more visually and bring a new and fresh perspective to discussions.”

Faculty ^[3]

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Links

[1] <https://nces.nsf.gov/pubs/nsf21321/>

[2] <https://blogs.scientificamerican.com/voices/our-disabilities-have-made-us-better-scientists/>

[3] <https://www.insidehighered.com/news/news-sections/faculty>