

Community heightens attention to accessibility for physicists with disabilities

Fostering participation benefits the whole field, note proponents.

“My disability affects my work every day, in every conversation,” says Michele Cooke, a geosciences professor who studies fault mechanics at the University of Massachusetts Amherst. Cooke has been part deaf since before she could speak. For her, a pivotal moment was when she realized that her peers in college were learning more than she was. “I didn’t know what I didn’t know,” she says. She began using assisted-listening devices and advocating for herself.

Brandon G. Villalta Lopez, a double major in physics and neuroscience at Bates College, realized late in high school that he was autistic. Ever since, he has disclosed that information to his professors and arranged his time and the way he interacts with people to optimize his performance and well-being. He’s also become an advocate for diversity, equity, inclusion, and accessibility in STEM (science, technology, engineering, and mathematics): At the January meeting of the American Astronomical Society, he was a panelist on a community-initiated session on neurodiversity.

Although the STEM community has for years talked about and tried to increase representation of women and other marginalized groups (see, for example, *Physics Today*, February 2020, page 20, and July 2021, page 20), disabilities have largely been absent from the discussion. Data are sparse on people with disabilities in STEM, but surveys by NSF, the Statistical Research Center of the American Institute of Physics (AIP is the publisher of *Physics Today*), research groups, and other sources suggest that from 10% to 30% of STEM researchers and students identify as having a disability. That includes deafness, blindness and low vision, and mobility conditions; chronic illnesses; some forms of neurodivergence; and mental health illnesses.



NEURODIVERSITY IN ASTRONOMY was explored at a well-attended session at the January meeting of the American Astronomical Society in Seattle, Washington. The panel members—(from left) Hannah Fritze, Jessica Schonhut-Stasik, Brandon G. Villalta Lopez, and Samantha Johnson—aim to continue to work for acceptance and accommodations in science.

Scientists with disabilities have always had to craft their own solutions to barriers they’ve faced working in environments structured to favor nondisabled people. They have had to self-advocate by asking for devices such as high-brightness computer screens, specific meeting or teaching times, and other accommodations. And they have received inconsistent access to accommodations from host institutions. To a great extent, physicists with disabilities still have to overcome workplace barriers individually, but efforts to improve accessibility on wider scales are beginning to gain traction. The STEM enterprise, including individuals, educational institutions, professional societies, and national agencies, is taking a closer look at what it can do to be more inclusive.

Work-arounds

Jochen Guck is a director at the Max

Planck Institute for the Science of Light in Erlangen, Germany. A car accident left him paraplegic when he was 17. The main barriers he’s had to face in his professional life, he says, have been maneuvering around labs and protecting his eyes: In his wheelchair, his eyes are level with lasers on optical tables. When he arrived for graduate studies at the University of Texas at Austin in 1996, the physics building didn’t have a wheelchair-accessible bathroom; workers crafted a makeshift solution for him.

Conserving energy is important for scientists living with many types of disabilities. Amy Robertson, who has had juvenile arthritis since she was two, earned her physics PhD at the University of Washington in 2011. She is now a research professor of physics at Seattle Pacific University, where her primary research topic is structural oppression in

physics. She never wanted a tenure-track position, she says, because of the “grueling pace” and consequent inaccessibility for her as a chronically ill physicist. Instead, she supports herself and her students through grant money. “I chose this because a full-time job is not sustainable for me,” she says. On soft money, she adds, she can set her own schedule, and the university benefits from the overhead her grants bring in.

A few years ago, Cooke started tracking how much time she spent listening to people and rating how tired she was. She has since limited how many hours a day she teaches or participates in meetings, and she has become more patient with herself. “Collecting data gave me some peace and helps me combat internalized ableism,” she says. Still, the listening fatigue causes tension for Cooke. For example, she is giving extra consideration to whether to step into broader leadership roles, something she has been encouraged to do and is interested in.

Ian Shipsey, a particle physicist who chairs the physics department at the University of Oxford, became deaf because of treatment he underwent for leukemia while a postdoc working on the CLEO particle detector at Cornell University in 1989. He had already accepted a position as an assistant professor at Purdue University, or he doesn’t think he “would have been offered a job in academia,” he says. Because of his department’s assumptions that his deafness would hinder his ability to communicate with students, he was not assigned to teach—until he had to in order to go up for tenure. He took a personal approach: He told his students he was deaf and that he didn’t know them well enough to lip-read. He devoted the first class to questions about the course material, introductory astrophysics. The students posed them in writing. “That broke the ice,” Shipsey says. “The students gained confidence to ask questions, and we got along well.”

Shipsey also “avoided going to coffee hours because it was too difficult to understand people. And it was extremely embarrassing for hearing people—they often gave up trying to be understood.” He eventually got a cochlear implant. Suddenly, he says, colleagues sought him out. But the pressure to use cochlear implants—and other devices that assist disabled people—can be controversial:



JOCHEN GUCK, a biophysicist, explains concepts to group members from his wheelchair. He is a director at the Max Planck Institute for the Science of Light in Erlangen, Germany.

Some people object to the implication that a disability is a deficit to be cured.

Noninclusive settings

Scientists with other disabilities are also deterred from participating in informal networking events. Villalta Lopez, like many autistic people, doesn’t feel comfortable with unstructured conversation. And the typical arrangement of people standing around during social times at conferences and seminars is inaccessible for people who cannot stand at all or for long periods.

Conferences can be thorny for many people with disabilities for other reasons too. Travel and lodging can be tricky, and on-site setups can pose difficulties. Often institutes insist employees make purchasing decisions solely on the basis of cost, without consideration of other needs. Guck notes that conferences in remote locations and historic buildings are often not equipped for wheelchair access. Robertson says that despite the extra cost she always books a single room so she can set up accommodations to manage her pain.

Keivan Stassun is a professor of physics and astronomy at Vanderbilt University. He had noticed students in his group becoming agitated because of sensory overstimulation when people were interrupting each other. “Traditionally, I would have thought such interactions were a sign of a vibrant, healthy interaction,” he says, “but for some members of my team it caused physical shutdown.” He asked

his group members what they needed to participate and in response “made it possible for any group member to participate remotely in the weekly two-hour meeting,” he says. “That way, they could turn off the lights, sit in comfy chairs, or do whatever they needed to feel comfortable participating. This was before COVID.” About a quarter of his students are autistic, he adds.

Jessica Schonhut-Stasik is studying galactic archaeology for her PhD in astronomy with Stassun. Since realizing as an adult that she is autistic, she says, “I’ve learned a lot about myself, and my productivity and self-esteem have skyrocketed.”

“There are some incredible strengths” of autism, Schonhut-Stasik continues. Many autistic people have a heightened ability to focus. “If we are stimulated but not hyperstimulated, we can work for hours and hours.” Some autistic people are exceptionally good at pattern recognition, outlier detection, and classification, notes Stassun. Those skills are extremely valuable “in this era of data-intensive science.”

Structural change is slow

The Americans with Disabilities Act of 1990 addresses some barriers to participation in the scientific enterprise, but many remain. (See “ADA at 30: Scientists urge efforts beyond compliance,” *PHYSICS TODAY* online, 3 August 2020.) To a large extent, individuals with disabilities still have to advocate for themselves. The

Selected resources

- ▶ *The Mind Hears: A Blog by and for Deaf and Hard of Hearing Academics*, <https://themindhears.org>
- ▶ American Chemical Society Inclusivity Style Guide, <https://www.acs.org/about/diversity/inclusivity-style-guide.html>
- ▶ The American Society for Cell Biology, "How to make scientific figures accessible to readers with color-blindness" (2019), <https://www.ascb.org/science-news/how-to-make-scientific-figures-accessible-to-readers-with-color-blindness>
- ▶ K. A. Assamagan et al., "Accessibility in high energy physics: Lessons from the Snowmass process," <https://arxiv.org/abs/2203.08748>
- ▶ E. Grieco et al., *Diversity and STEM: Women, Minorities, and Persons with Disabilities 2023*, Special Report NSF 23-315, National Center for Science and Engineering Statistics (2023), <https://ncses.nsf.gov/pubs/nsf23315>
- ▶ *Increase Investment in Accessible Physics Labs: A Call to Action for the Physics Education Community*, Committee on Laboratories Accessible Physics Labs Task Force Report, American Association of Physics Teachers, https://www.aapt.org/aboutaapt/organization/upload/white_paper_on_accessible_labs_endorsed.pdf
- ▶ Frist Center for Autism and Innovation, <https://www.vanderbilt.edu/autismandinnovation>
- ▶ M. Sukhai, C. Mohler, *Creating a Culture of Accessibility in the Sciences*, Academic Press (2016)
- ▶ L. L. Piepzna-Samarasinha, *Care Work: Dreaming Disability Justice*, Arsenal Pulp Press (2018)
- ▶ A. Wong, *Disability Visibility: First-Person Stories from the Twenty-First Century*, Vintage (2020)

physics community needs "to change our culture such that the default is for everyone to understand that accommodations are available and to habitually provide them as an integrated part of our professional lives," says Elise Novitski, a neutrino physicist at the University of Washington.

Campuses, professional societies, and funding agencies are paying increasing attention to disability accommodations. A growing number of students have official accommodation plans that allow them extra time on tests, quiet locations for test taking, or other measures intended to remediate inequities. A few colleges extend such accommodations to any student who requests them, even if they don't have an official diagnosis—which can be expensive to obtain. Some faculty members report being more flexible with such accommodations. Bethany Wilcox, a physics education researcher at the University of Colorado Boulder, says the pandemic shifted her perspective: "Suddenly nobody felt fully functional. I am now much more willing to accommodate students' needs. I have made changes that I previously resisted."

In 2018 Vanderbilt University opened the Frist Center for Autism and Innovation. Based in the school of engineering, the center focuses on bringing the strengths and talents of neurodivergent scientists and engineers to the workforce. It offers coaching in social communication, develops virtual-reality environments for neurodivergent individuals to practice interviewing for jobs, and works with potential employers. It has helped

dozens of individuals get "really good, highly technical, good-paying jobs," says Stassun, the center's director.

It's often unclear who should pay for remedies—a faculty member's grant, some campus entity, or the state or federal government, says Paul Goldbart, a condensed-matter physicist at Stony Brook University who gained insight into campus accessibility issues during his leadership roles at several universities. Some accommodations would be straightforward, such as setting up chairs for people to talk with speakers after presentations, installing soap and towel dispensers lower on bathroom walls, or making sure door-opening switches work. But things like infrastructure adjustments, sign-language interpretation, and captioning of talks or lectures are costly. "Campuses ought to have a well-advertised budget for providing accommodations," Goldbart says.

Researchers can request accessibility funding when they apply for grants from some foundations and federal agencies. "If that became more common, it would improve the situation for people with disabilities," says Novitski. "And it's a way for applicants to demonstrate effort on diversity, equity, and inclusion, which many funding agencies require."

Novitski served as accessibility coordinator for Snowmass, the community planning exercise for particle physics, which was held last summer in Seattle, Washington (see *PHYSICS TODAY*, October 2022, page 22). "Accessibility for disabled people is entirely sufficient to justify the effort of providing accommodations,"

she says, adding that people who don't consider themselves disabled also often appreciate the accommodations. Many people benefit from captioning and from the use of color or pattern schemes designed to assist color-blind viewers. Setting up multiple coffee and snack stations at a conference makes the lines shorter for everyone, not just for those who can't stand for long times. Offering QR codes to download presentations is helpful to anyone who may miss a talk or have difficulty following for hearing, attention, language, or other reasons.

Beyond such general measures, it's important to give people the chance to request specific accommodations, says Novitski. "It's not one-size-fits-all."

Beth Cunningham notes that the American Association of Physics Teachers, of which she is CEO, has codified many accessibility measures for conferences and events and is creating a road map for improving accessibility. The association's activities are part of a broader movement among professional societies, she says.

In early June, the National Academies of Sciences, Engineering, and Medicine is hosting a workshop, *Beyond Compliance: Promoting the Success of People with Disabilities in the STEM Workforce*. Maria Lund Dahlberg, acting director for the National Academies' Board on Higher Education and Workforce, is co-organizing the workshop. She says, "Nothing inherently prevents people with disabilities who want to do science from doing it."

Toni Feder