CAREER FEATURE | 09 February 2026 | Correction 11 February 2026

My mission to make life more user friendly for the disability community

Inventor Josh Miele says that accelerating change requires uprooting social attitudes about blindness and other disabilities.

By Laurie Udesky

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Josh Miele explains the nuances of a tactile map of a Bay Area Rapid Transit station. Credit: Laurie Udesky

Working scientist profiles

This article is part of an [occasional series](#) in which *Nature* profiles scientists with unusual career histories or outside interests.

Fifty-seven-year-old Josh Miele is a blind scientist, an inventor of adaptive technology and a 2021 MacArthur Foundation 'genius' fellow. In the 1990s, as an undergraduate and graduate student at the University of California, Berkeley (UCB) — before GPS use

was commonplace – Miele could be seen around town climbing up street signs and feeling the embossed letters to work out which street he was on when travelling in unfamiliar areas, all to the surprise of bystanders. "Some accessibility is just about getting things done, and some accessibility is about teaching others about how much of a pain in the neck it is to get things done," says Miele.

Structural biology for researchers with low vision

Miele was nurtured by his mother from a young age to buck the system. In his 2025 memoir, *Connecting Dots*, he recounts a visit to an art museum, during which his mother urged him to get up close to a sculpture and "feel it with his hands".

As he did so, he was mortified to hear his mother berating the museum staff for trying to deprive him of the hands-on experience. It was one of many instances of his mother making him "practise breaking the rules, thinking about when they needed to be broken and practising being visible, all of which are essential for me now", says Miele, a polymath whose pursuits have included physics and space-science studies, working on a Mars probe and doctoral work on the psychology of sound perception. All of which would set him up for a career in designing accessible technology. Miele met a reporter from *Nature*'s careers team at his neat, compact woodworking studio in Berkeley, where he goes "to get out of his head", carving chopstick holders and other things.

Outspoken start

Miele wasn't born blind – a neighbour attacked him with acid when he was four years old, blinding and badly burning him. He reflects in his memoir that his young age probably protected his outlook: "I had a life to enjoy, and I couldn't let being blind and burned prevent it."

Instead, the incident forced him to begin engineering the world around him in his neighbourhood of Brooklyn, New York City, to make it work for him. He felt around his home to map it out, built a map of his neighbourhood in his mind and took apart radios and household appliances to understand how they worked. Miele used the echo of the sound his roller skates made to help him steer clear of objects that he might crash into while zooming down the pavement in front of his family's house. At age 12, with a friend's mother dictating instructions, he coded his first computer program, commanding an early home computer to count on screen from one to ten. In secondary school, inspired by the 1983 film *WarGames* "about a computer hacker guy with a talking computer" and with the help of his Braille teacher, Miele set up a speech synthesizer as a rudimentary screen reader on his home computer.

Several years later, during his physics undergraduate degree, he helped to update the features of outSPOKEN, a software for people with low vision or who are blind that reads aloud what is displayed on a computer's graphical user interface. The Mac version was originally released in 1989 by Berkeley Systems, a small, local software company.

Miele got the job through his connection with Marc Sutton, whom he describes as "a laid-back blind hippie". They met in The Cave, the basement of a UCB library in which blind students congregated to use Braille machines and other accessible equipment, talk about disability rights and learn from each other. Miele says that students worked and played hard at all hours in The Cave.

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His interactions with The Cave cohort and the wider disability-rights community marked a turning point for Miele. Before UCB, he says, "I didn't think of myself as being part of a disability community. Why would I?" There weren't any positive portrayals of blind and

disabled people, in general, he says. With his new-found peers, he quickly realized that "we all deal with other people telling us that we can't do stuff, building things that we can't use and marginalizing us intentionally or unintentionally".

A long-term friend and colleague of Miele's who is also blind, UCB English professor Georgina Kleege, says that outSPOKEN was the first screen reader she ever used — although she didn't know Miele at the time. "It changed my life. It made my life possible, because it meant I could use a computer," she says.

In 1993, Miele pursued an internship at NASA's Goddard Space Flight Center in Greenbelt, Maryland, indulging his childhood interest in rockets and outer space. There, he helped to develop software to calibrate optical sensors aboard the Mars Observer probe that launched in 1992. But the spacecraft disappeared before it entered Mars' orbit.

Deeply disheartened, Miele felt like physics was no longer the right place for him. Once back in Berkeley, he realized that building accessible technologies "was probably the most value I could add", he says. "I knew that it would be fun. I knew it would be interesting. I knew that there was plenty of work to do." So, he put his undergraduate studies on hold to work full time at Berkeley Systems.

Quick-fire Q&A

Josh Miele enjoys playing music. Credit: 2016 Barbara Butkus

Why did it take 10 years for you to finish your undergraduate degree?

Because I find classwork really unsatisfying. I am motivated by doing things that make a difference in people's lives. I'm always thinking about problems that people with disabilities have and I learn about new technologies as they come along. Sometimes things come to me in the shower.

Who are your greatest influences and mentors?

My stepfather, a geophysicist, was one. He was incredible at explaining things to me. For example, when I was young, he laid out two ropes on a table for me to feel to explain the difference between the wave height and wave density of AM and FM radio frequencies. Science-fiction writer Ursula Le Guin is another, because she wrote and thought about people in unusual ways. And she's a master of the pencil sketch with words.

What drew you to playing guitar and being in a band when you were younger?

I love music and enjoy performing. And I wanted to be cool. As young kids, aged 13–14 years, we formed a band called Child Labor. It was a play on 'Men at Work', a group that was popular at the time.

A fresh direction

Eventually, Miele realized that he needed to return to UCB to finish his bachelor's degree and did so in 1997. He'd already completed his physics requirements and spent his last semester taking courses in music appreciation, disability studies and psychology.

In 1998, he began his PhD in psychoacoustics and cognitive psychology at UCB. "I wanted to study ways of using non-speech sounds, including 3D immersive audio, to

present information for screen-reader users, to speed up those interactions," he says. For instance, he explains, imagine a screen reader reading out information in the top-left cell of a spreadsheet or table and it sounding like the voice was coming from the left and above the user. "It's more efficient and intuitive than having the speech say 'top-left cell'," he says.

That same year, he started an internship at the Smith-Kettlewell Eye Research Institute in San Francisco, California. There, he worked on the data-analysis software MATLAB, to make it accessible to blind people. His Smith-Kettlewell stint evolved into a 19-year relationship, both during and after his PhD.

The institute's environment "was incredibly flexible and accommodating", says Miele. "It was also one of the few research institutions in the world that valued the kind of accessibility technology research programme that I wanted to build." His proudest work included developing a way for blind and partially sighted people to print embossed, or raised, tactile street maps for any US location – to get a full picture of a neighbourhood or address through their fingers. Miele started the project, called [tactile map automated production](#) (TMAP), in 2003 as a postdoc at Smith-Kettlewell.

For it, he repurposed coding that he had developed for his graduate work, which enabled him to print research charts and graphs in Braille. He applied the program to data from geographical information systems (GIS) freely available through the US Census Bureau. Other people had used GIS to create tactile maps, Miele explains, but these required visual interfaces. "They were sighted people making maps for blind people."

Josh Miele (standing) teaches a participant at a Blind Arduino Project workshop; he launched this series of maker gatherings in 2015. Credit: Jean Miele 2026

TMAP enabled blind people to create a Braille printable map at the scale and location of their choice and on their own. "This revolutionized the availability of tactile street maps for blind travelers," noted a Smith-Kettlewell announcement in September 2021 (see go.nature.com/3zabzja).

Steve Landau is a close friend and frequent collaborator of Miele's and the founder and president of Touch Graphics, an accessibility technology company in Newark, Delaware. The firm specializes in products that convey spatial information through touch. He has wrestled with Miele over the usability of the firm's assistive technologies. Landau says that Miele can be blunt and has frequently "burst his bubble", explaining why something he proposed won't work.
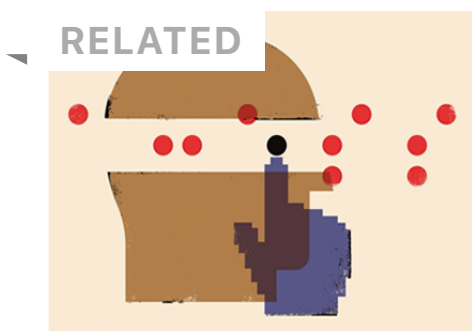
These tools help visually impaired scientists read data and journals

Landau worked with Miele on creating a digital version of TMAP known as the Talking Tactile Tablet (TTT). One disagreement centred on how people would use screen touching on the tablet. As a sighted person, Landau explains, he was overlooking the complex ways in which blind people swipe and rotate their fingers on surfaces. "I needed to be schooled to make the device as intuitive as possible."

The TTT enabled users to print an embossed map to overlay the tablet's screen. Then, by tapping a map area, the tablet would spit out spoken information, such as street names, the number of traffic lanes, the direction of traffic and the location of pedestrian crossings. The handheld tablet worked well even for people who don't know Braille, Landau explains.

Miele also designed tactile maps for the San Francisco Bay Area Rapid Transit system (BART). Users can touch the maps to learn the layout of stations and details about

whether an escalator is going up or down, he explains, as he runs his hands over a printed embossed page to describe it. Before tactile BART maps, says Miele, "you just had to bumble around until you found what you were looking for, or get somebody to help you".

Accessible futures

Between 2003 and 2009, Miele's work at Smith-Kettlewell included creating an audio, tactile periodic table using a smart pen. "You could tap on Cu, and the smart pen would say 'copper'." Subsequent taps would tell you about atomic number, atomic mass and melting point, he explains.

Starting in 2011, Miele began working on [YouDescribe](#), a platform that allows blind consumers to listen to crowdsourced audio descriptions of what is happening in a YouTube video or a film without infringing on copyright. Smith-Kettlewell senior scientist James Coughlan considers YouDescribe Miele's greatest achievement there. "The fact that it was crowdsourced from the very beginning was very powerful," he says, because it avoided the need for fundraising.

In 2015, Miele's passion for democratizing access for people with no or limited vision led him to launch a regular maker gathering known as the [Blind Arduino Project](#). It brings together blind and partially sighted students and hobbyists with teachers such as him, as well as sighted students to create devices and robots.

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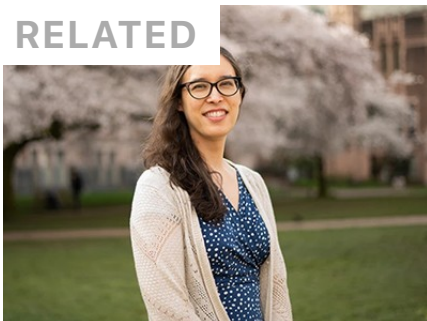
The project is also about empowering young blind people to make their own choices. When Miele asked a bunch of blind 12–15-year-olds during a workshop how many were on their school's robotics team, "none of them spoke up". So, he put together a three-day workshop to quickly upskill them.

"Not every blind kid has to be a techno nerd," he says. "But the decision should be theirs."

His advice to blind or visually impaired researchers: "Don't get pigeon-holed into accessibility. The world will want to push you in that direction." Instead, he advises to keep your options open — unless accessibility is a passion, as it has been for him. He also suggests connecting with the broader blind community, which can help with invaluable advice. "There's power in numbers, and if you are on your own, you'll be reinventing the wheel."

In 2019, Miele left Smith-Kettlewell for Amazon Lab126 in Sunnyvale, California, where he is a principal accessibility researcher. The move came, in part, because he was exhausted by the grant-application process. "The grants were getting smaller, the reporting requirements more onerous," he says. "I wanted to do what I love and have more impact." His work involves making Amazon technologies, including the virtual assistant Alexa and Fire TV and Prime Video streaming services, more accessible to the disability community. But even more important, he says, is his work mentoring design teams, so they better understand "what needs to happen in order for something to be accessible".

In 2021, Miele won a MacArthur Fellowship, also known as a genius grant. It allowed him to write his memoir to raise awareness about blindness and disability. And he has been able to reduce his hours at Amazon, so that he can develop a disability studies curriculum for engineering and design undergraduates. "If we can teach students about disability and accessibility in an effective way, we will shift their ability to make really significant impact when they graduate."

He has also formed a non-profit organization, the cheekily named Center for Accessibility and Open Source, or CAOS (pronounced 'chaos'). CAOS aims to promote

global digital equity by making low-cost accessible tools available to everyone.

Reflecting on his career in accessibility innovation, Miele says: "We're making great progress, great things are happening. But ableism is alive and well. Where we are now is much better than where we were in 1990 or 1980 or 1950, but we have a long way to go."

UPDATES & CORRECTIONS

Correction 11 February 2026: This Career feature misstated the timing of GPS invention and misnamed Josh Miele's 2025 memoir.

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