Focus on diversity

Technology opens new worlds of opportunity to blind and visually impaired techies

Internet access, screen readers, specialized software and improvements to older technology help level the playing field

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Chris Danielsen.

Andy Rebscher employs his "thirty years of experience and problem-solving" as chief engineer for three radio stations in Maine owned by Citadel Broadcasting of Las Vegas.

EE Gerald Weichbrodt helps General Motors learn how customers use their vehicles.

"Three types of assistive technology have allowed the blind to become fully mainstreamed," says Chris Danielsen of the National Federation of the Blind (NFB, www.nfb.org, Baltimore, MD). One is the Kurzweil-National Federation of the Blind reader, a handheld device that scans printed documents and reads them back in synthesized speech. Another is powerful screen-reading software like Window-Eyes or JAWS for Windows, which translate text on a computer screen into Braille or audio. The third is electronic note-takers like BrailleNote or PacMate, which work like the PDAs used by sighted people.

"Helpful as this technology is, it does not get us all the way there," notes Danielsen, who is blind. "We also need training, and we need opportunity. Many employers still have low expectations of what we can achieve."

This past July the NFB put on a "Youth Slam" for more than 200 blind and visually impaired young people. It was one of the largest events of its type ever held, Danielsen says.

The four-day conference at Johns Hopkins University (Baltimore, MD) took a giant step toward showing the kids what training and opportunity can achieve. It introduced them to careers in science and technology through workshops led by blind scientists and engineers.

The five blind or visually impaired techies in this article have taken assistive technology, made it their own, and employed it to help them carve out meaningful careers.

Andy Rebscher is a chief engineer for Citadel Broadcasting

"I first thought I might work on the musical production side, since I used to play guitar at tourist joints," says Andy Rebscher. But he realized early on that there was more opportunity in broadcast engineering.

Rebscher has been close to totally blind his whole life. He grew up in upstate New York immersed in radio and music. That led him to a job broadcasting live music at a local radio station, and on eventually to a job as a broadcast engineer at a small station in Rome, NY.

After graduating from Syracuse University (Syracuse, NY) in 1978 with a degree in production and technology of recorded music, Rebscher says he "fell into" engineer and chief engineer jobs at a series of radio stations. His present knowledge of broadcast technology "comes from thirty years of experience and problem-solving," he says.

Rebscher moved to northern Maine eighteen years ago. For the last seven years he's been chief engineer for three radio stations in Presque Isle owned by Citadel Broadcasting (Las Vegas, NV). Citadel owns some 177 FM stations and sixty-six AM stations nationwide, and creates and distributes programming to more than 4,000 ABC network affiliates.

Rebscher is responsible for installation and maintenance of his three stations' computer networks and transmitter equipment. "There was a time in the not so distant past when there was no way that they could have consolidated three radio stations as they have, and no way one guy could maintain it as I do," he says.

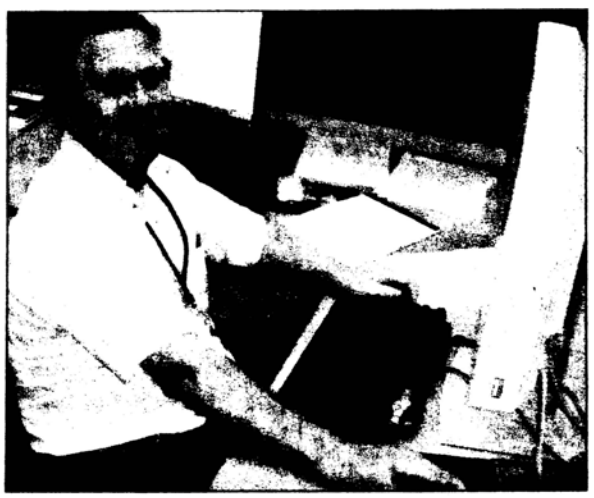
Recently he was heavily involved in designing a new broadcast facility and supervised much of its construction from the ground up. "That was major for us. We wanted a place with better presence downtown. Everything was done at once, including all the modifications. It's a better facility than many you will see around," he declares with pride.

Rebscher has installed Window-Eyes screen reading software on all the computers he works with. That lets him do most of his work without assistance. To test components and circuits he uses a handheld device made by NexxTech; except for its electronic voice readout, it's the same device that sighted engineers use.

He also uses a Braille'n'Speak, which features a Braille keyboard and speech output, "like a blind man's PDA." And finally, he accepts the help of colleagues and an assistant who comes in a few hours a week "to be the eyes for jobs that require sight."

"I'm really just an ordinary person," Rebscher says. "When you grow up blind you learn to adapt to the life you have and the

Dr Aaron Bangor, on the human factors engineering team at AT&T research, studies the interaction of people and technology.



Senior programmer Wolfie Schneiter writes accounting programs and generates data analysis reports for ITT.

"Computers have helped the conduct of business for sighted people, and people with disabilities have benefited too."
– Dr Aaron Bangor, AT&T

things around you. You can either sit around or go accomplish something for yourself."

AT&T's Dr Aaron Bangor does human factors engineering

Aaron Bangor, PhD, is a certified human factors professional who studies how people interact with technology. His goal is to make the technology more user-friendly. "I've always been fascinated with how things are designed," he says. "Growing up legally blind, the barriers I faced were things that were designed for people with normal vision."

Long before he ever heard of human factors engineering. "I intuitively wondered why things were not designed for different kinds of people," he says. It's better now: "Today's technology tends to be designed around the needs of human beings, rather than expecting the users to adapt to the technology."

For the past seven years Bangor has worked in the AT&T research labs in Austin, TX with the human factors engineering team, a group that tests the usability of many of the company's product designs. "Even people you would classify as 'normal' operate within a range," he explains. "Situations in life can change your ability to do things. Just try to dial your cell phone on a cold day with your gloves on!"

The human factors team's work currently focuses on a dozen investigations, including how easily customers can navigate AT&T's website to pay bills, or contact customer service to order new products.

"We bring in members of the public, including people with disabilities, during the early design stages of a product, and we give them a task to do. For example, we might ask them to order DSL service through the website using the automated customer care center.

"We see how long it takes them to pay a bill. Is it quick and easy or long and frustrating? We try to find out what's needed, and that's what the redesign is based on."

Bangor's vision loss came at the age of five when juvenile rheumatoid arthritis caused cataracts and inflammation. He was still able to attend public schools in Montgomery County, MD, and complete degrees in IE and economics at Virginia Tech University in 1996. He earned a masters there in 1998 and his PhD in human factors engineering in 2000.

Both his parents were teachers, Bangor says. "They would accommodate me, but they did not limit me."

For his work at AT&T, Bangor uses Windows to enlarge text and reverse it to white on a black background to make it easier for him to read. He also uses a closed-circuit TV and camera that can transmit enlarged images onto the screen.

"Technology has been a positive thing for people with visual impairments," Bangor says. "Computers have helped the conduct of business for sighted people, and people with disabilities have benefited too."

Oracle's Darryl Presley is a tech staff member for server technologies.

Gerald G. Weichbrodt, senior project engineer, develops software for GM

For the past twenty-two years Jerry Weichbrodt has been helping General Motors Corp (GM, Detroit, MI) study how customers use their vehicles. He's been with the company since he graduated from the University of Illinois with a BSEE in 1985. "I came up with my class for a plant

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trip at the company, and we liked what we learned about each other."

Weichbrodt, who is totally blind, says he's always been fascinated by electronic gadgets and his parents encouraged him to follow his interests. He has experimented with and used a lot of assistive technology over the years.

In college he had a device called an opticon, no longer in production. "It was a box about the size of a cassette player with a camera, and you could run it along the printed page. It let you feel the print, either as Braille or as raised letters."

The university gave him access to an early desktop computer with a screen reader and speech synthesizer. "It had some bugs in it, but it gave you speech."

Technology was beginning to accelerate by the time he joined GM. He worked on developing boxes that could process signals collected from a vehicle. He began with a device that produced raised line drawings of schematics, and it evolved to reproducing drawings from a computer screen.

The work he does for GM today involves creating software to collect information on everything from driving speed and the weight of luggage in the car to how often the retractable cup holder is used. His software converts that raw data to a readable format.

For this work, he employs a talking screen-reader and a Braille notetaker that also has speech capability.

Weichbrodt has a thirty-five mile commute to his job in Livonia, MI. He may carpool with co-workers, or work at home on a laptop. "I have a home hookup to our network that's just like being in the office," he says.

Coworkers and the GM customers Weichbrodt interacts with are often surprised to learn he's totally blind. "They think I have some degree of vision, but I don't," he says.

"The main thing for me is to push to the limit. That way I find out what the limits really are, and they're changing all the time!"

Wolfie Schneiter is a senior programmer with ITT

Wolfie Schneiter has worked at the Van Nuys, CA location of ITT Corp (White Plains, NY), a global engineering and manufacturing company,

Wolfie Schneiter.

for more than three decades. "I began back when the computer industry was called 'data processing,'" he says. A lot has changed in the industry since those days. Schneiter, who has low vision as a result of cataracts as an infant, has adapted.

He was born in Switzerland. His family moved to Canada, and then to the U.S. when he was seven years old.

From elementary school through high school he sat in the front of the room close to the blackboard, and he had a few recorded books. "Other than that, I never used any special equipment," he reports.

He attended Los Angeles Valley Community College for his 1971 degree in business data processing. He also took a computer training program that the state of California runs for people with vision-related disabilities.

The training paid off. He found that companies were eager to talk to people with his kind of training, and he went to work for ITT in 1974.

Over the years he's been a programmer and analyst involved in a wide range of ITT's activities. Today he spends much of his time writing programs related to accounting, and generating reports to assist in data analysis.

His assistive technology is simple: an oversized monitor, large fonts and extra-bright overhead lighting. "I wouldn't want to be treated as special," he says.

Darryl Presley: member of tech staff at Oracle

Darryl Presley.

Darryl Presley works for Oracle (Redwood Shores, CA), where he's a consulting member of technical staff for server technologies. His limited vision has not limited his achievements or his enjoyment of life. Though legally blind, he travels with colleagues on company business. On weekends he scuba dives using a special prescription dive mask. He carpools to work or takes the train. His wife takes him to the train station and he walks the last four blocks to the Oracle campus without a cane.

Presley benefited from the support of a mentor in high school. "It was awesome. My mentor was a resource teacher who was visually impaired himself. He was living the same kind

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of life that I'm living now, and he made sure that those of us who were vision-impaired got what we needed."

His mentor suggested a career in computer technology. Presley graduated from San Diego State University with a degree in computer science and math in 1988.

In college he assisted at the computer science lab and helped other students with programming work. He was also a student contractor at a research lab for the Naval Ocean Systems Center (San Diego, CA). "I was building applications in school and getting to use them in a real environment," he explains.

Oracle hired Presley in 1989. "They asked me what I needed to do my job, and they bought it for me," he says with appreciation.

His job at Oracle is helping customers design systems that are highly available and failure-tolerant. "We help configure and build systems that stay up regardless of any system failure or disaster," he explains.

He uses the Ai Squared ZoomText screen magnifier and reading programs. ZoomText, he notes, "zooms in wherever the mouse moves, or I can block text and have it read to me.

"For a long time most of the technology for the visually impaired was quite bulky," Presley reflects. "Today I can have ZoomText running on my laptop, and I don't need any other device."

Presley believes his work has made the company more aware of the needs of techies with limited vision. Oracle's HR department often refers employees with vision problems to Presley for advice, and he's spoken to co-workers across the country and around the world.

"We're a small community," he says. "It's especially hard for people who had good sight and lost it. I try to relate to them and do as much as I can.

"I provide them with technical guidance through e-mail or phone. The company has been very accommodating in getting people what they need." *D/C*

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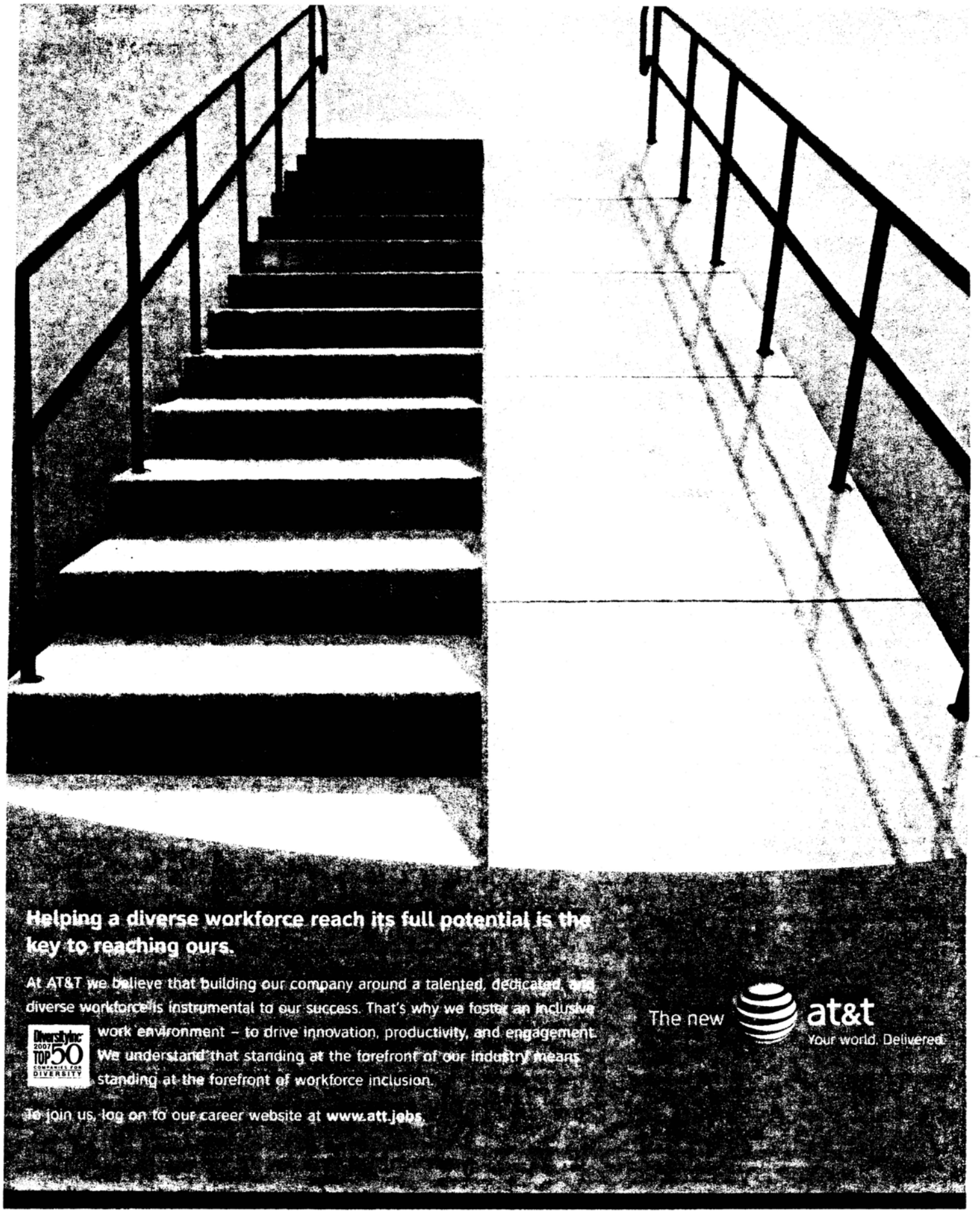
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