



**ABOVE:** GTRI researchers conduct evaluations for the Arthritis Foundation to determine a product's ease of use for arthritis patients. Among the products they've evaluated are medicine bottles.

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**Brad Fain,**  
GTRI senior  
research scientist

# Accessibility Analysis

*Researchers evaluate products' usability for people with disabilities and recommend design improvements.*

BY JANE M. SANDERS

**A** diving accident severely injured James Johnson's spinal cord seven years ago. He lost substantial function in all four limbs, but he gained a can-do attitude that is helping him and others with disabilities access home and office technologies.

Johnson offers his perspective on technology accessibility as an evaluator of office machines and electronics being tested at the Georgia Tech Research Institute (GTRI).

“It was an opportunity to provide my input,” explains Johnson, a sales and marketing manager in the outpatient pharmacy at Atlanta's Shepherd Center, a rehabilitation hospital. “I've come across some obstacles and had some ideas for solutions. So this was an opportunity to offer my ideas. I don't know if the designers followed through with my suggestions, but I've got a voice in the process.”

That voice is valuable to researchers in GTRI's Accessibility Evaluation Facility as they assess a variety of products based on the requirements outlined in Section 508 of the federal Rehabilitation Act.

“When we test products for accessibility, we conduct user testing and perform a checklist evaluation of the product based on technical standards for accessible design and sound human-factors design principles,” explains GTRI senior research scientist Brad Fain, who leads research in the facility. (Human factors design and engineering focuses on the interface between humans and machines.)

Research participants, recruited from the local disability community, perform a series of tasks with the products being tested. Researchers monitor participants' performance on these tasks. The results of this user testing and the checklist evaluation provide researchers with objective data about product accessibility.

“We can collect human performance data and provide it, along with our checklist evaluation results and design recommendations, to designers who can

make changes in products to make them more accessible to people with disabilities, as well as everyone else,” Fain says.

That concept is called universal design, and it makes a product accessible to as many different types of users as possible. “It is user-centered design,” Fain explains. “The user is at the center instead of the technology.”

One example of universal design is a cell phone created for the hard of hearing; it would also be useful to people talking on their phones in noisy environments. Another is a cell phone designed for the blind; it could be useful to people in situations where their visual attention is somewhere else, such as a person driving a car.

Universal design concepts, as well as federal standards, guide Fain and his colleagues as they evaluate products. They have examined items such as photocopiers, ATMs, cell phones, televisions, printers and scanners for customers, including Ricoh, Pitney-Bowes, the National Council on Disability, the Arthritis Foundation and the National Institute on Disability and Rehabilitation Research (NIDRR), a division of the U.S. Department of Education.

“The biggest problem we see is that designers often fail to consider that someone with a disability might use their product,” Fain says. Traditionally, industrial designers have not designed products with such users in mind, but that is changing because of Section 508 of the Rehabilitation Act, which requires that federal agencies purchasing electronic and information technology equipment consider accessibility in their purchasing decisions, he adds.

To assist designers and government officials with Section 508 compliance, researchers at GTRI and Georgia Tech's Center for Assistive Technology and Environmental Access (CATEA) created the Accessibility Assistant, an online evaluation tool available at [accessibility.gtri.gatech.edu/assistant/](http://accessibility.gtri.gatech.edu/assistant/). The

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work was done under a NIDRR grant to CATEA to provide technical assistance under the umbrella of Georgia Tech's Information Technology Technical Assistance and Training Center.

The Accessibility Assistant includes a comprehensive database of more than 400 accessibility guidelines that direct rigorous accessibility testing for various types of products. From this database, researchers customize a relevant checklist of guidelines for each product type.

Since new Section 508 standards became effective in 2001, more companies are producing equipment that they intend to be accessible to people with disabilities, Fain notes. GTRI researchers can provide objective evaluations — as well as suggestions for improvement — of these products for companies that seek that review.

Fain and his colleagues also conduct evaluations for the Arthritis Foundation to determine a product's ease of use for arthritis patients, who have upper and lower mobility issues, including difficulty grasping and lifting, as well as reduced sensation. GTRI is the sole independent laboratory authorized to test products for the Arthritis Foundation Ease of Use program. If a product passes testing and its manufacturer chooses to participate in the program, the company can use the Arthritis Foundation logo in its advertisements.

Researchers evaluate products based on an arthritis-specific set of accessibility guidelines, as well as user testing by people with the disease. Products evaluated to date include a garden sprayer, household cleaning tools, coffee packaging, self-injection and home medical care monitoring kits, gloves, pill bottles, juice containers, golf clubs and even beds.

Mary Simpkins, 60, suffers with arthritis and wants to help others cope with the disease. She is a frequent product tester for GTRI's

work for the Arthritis Foundation. Among the products she's tested were several different types of bottle tops.

"Usually, it's the shape of the bottle top that we're testing," she explains. "In one case, one shape was identical to another, but one of the two tops was easier to open because the plastic it was made of had a little different, softer feel to it. It was very astute of the company to experiment with different materials.

The details that researchers get from testers like Simpkins help GTRI do more than just evaluate products. "Anybody can evaluate a product," Fain says. "But we focus on collecting objective data and working directly with the designers of these products on how to improve them. We explain in detail how to solve the product accessibility problems that affect people with arthritis."

In the future, GTRI researchers hope to expand their accessibility testing to a greater variety of products, including home entertainment equipment that is not necessarily covered under any disability legislation, Fain adds.

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*ABOVE: In the Georgia Tech Research Institute's Accessibility Evaluation Facility, researcher Brad Fain and his colleagues assess a variety of products based on the requirements outlined in Section 508 of the federal Rehabilitation Act. Here, volunteer James Johnson, who uses a wheelchair for mobility, helps Fain assess a photocopier.*