Impact of Interior Design on Autistic Adults and Children

A Look at How the A+D Community is Developing Environments Suitable for People with Autism





LAMIN-ART

Overview

Think of how you experience the world—it's through touch, smell, and sight. Now imagine each of those senses were heightened, so when you walked into an unfamiliar space, it was like walking into a sensory minefield. For people born with autism, walking into a room that isn't designed thoughtfully can further challenge—or at times hinder—their ability to interact or relax in a space.

Autism spectrum disorder (ASD) is the fastest-growing disability in the U.S., according to the Centers of Disease Control and Prevention (CDC) as of 2008. According to the CDC, about 1 in 68 children have been identified with autism in 2014—a rate that rose from 1 in 88 in 2012.

Because autism is becoming more widespread, it's all the more important for the design community to be cognizant of the way autistic children and adults perceive the world. As a result of the rapidly growing awareness of autism in the A+D community, a new segment has emerged: Autism Design.

"Autism Design is a deeper specialization of interior design around a special needs population."

-Randy Fiser, CEO, ASID

"The approach to Autism Design is similar to designers that specialize in universal, human-centric, or active design," says Randy Fiser, CEO of the American Society of Interior Designers (ASID).

Built on a foundation of principles that focus on the effect design has on perception and behavior, Autism Design has transformed from a design trend to a movement—specifically in commercial spaces like hospitals, education environments, and more.

"Design continues to advance through specialization and research, and the ability for designers to positively impact people's lives is growing," Fiser says. "We know that the need for design that takes into account people with autism is there, as 1 in 68 individuals is born with autism."

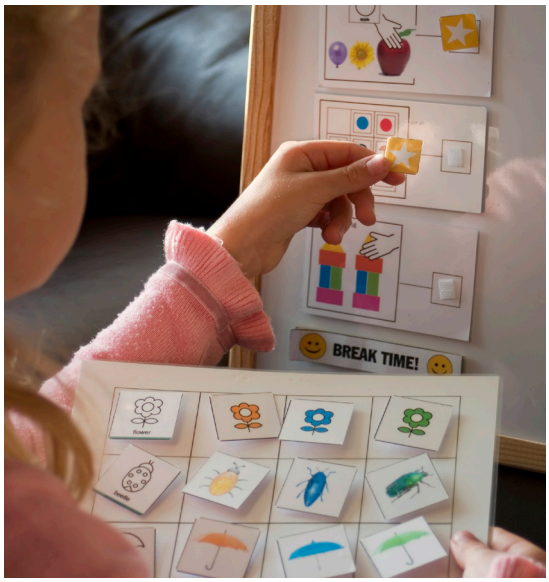
This white paper will discuss the importance of autism design, as well as reveal design goals and guidelines to successfully achieve a soothing and stimulant environment that enables autistic individuals.

Understanding Autism

Before designers can fully grasp Autism Design, they must first understand **autism: a complex developmental disability that can cause social, communication, and behavioral challenges**. The best way is to understand its effect on perception and behavior.

Autism includes several conditions that used to be diagnosed separately: autistic disorder, pervasive development disorder, and Asperger syndrome. Now, each diagnosis is defined under the umbrella of Autism Spectrum Disorder (ASD).

Autism occurs in all racial, ethnic, and socioeconomic groups, and it's nearly more than five times more common among males than females (the reason for the wide disparity is still unknown). Often indiscernible by appearance, individuals with autism have difficulties with social, emotional, and communication skills. They may repeat certain behaviors and might not want to change their daily activities.



Autistic individuals also have different ways of learning, paying attention, and reacting to their surroundings. For example, autistic people might make very little contact with someone who they're interacting with. Or they may fall into a habit of having one-way conversations (speaking *at* someone) rather than two-way conversations (speaking *with* someone).

Impact of Design

Many architects and designers have become more mindful of these traits when designing and building interior environments, but it's easy to focus on creating interiors based on the limitations and dislikes of autistic children and adults. However, taking such a negative approach is tremendously misguided.

Instead, it's crucial for designers and architects to find a more positive balance when designing, being mindful of the things that may limit or challenge someone with autism while focusing on elements that enable, soothe, and stimulate them.

"A designer who creates interiors for people with autism has taken the best of their training and applied it to the world of an individual who experiences life and space in a very special way."

-Randy Fiser, CEO, ASID

For example, many designers create multi-sensory environments that utilize lighting, sounds, texture, colors, and smells to create a soothing, therapeutic environment for people with autism.
"The process takes into account the visual, tactile, and audible elements that make up an interior and applies it to the way the person with autism experiences that space," Fiser says.

For instance, some autistic people are great visual learners. Architects and designers can enhance an autistic person's ability to learn by incorporating visual design strategies throughout an interior environment, such as textures and colors, which help transition users of the space from one area to another throughout the day.

Architects need to also be mindful that not all people with autism are the same. The needs of autistic people vary across the board, especially when it comes to those in different age groups. It's a big reason why ASID partnered with John Wiley & Sons to create an E-book Design Shorts series that focuses on three life phases for people with autism:

- *Interior Design for Autism from Birth to Early Childhood*
- *Interior Design for Autism from Childhood to Adolescence*
- *Interior Design for Autism from Adulthood to Geriatrics*

The books in the series impart expert knowledge that interior designers need to successfully design for people with autism. All three books were written by A.J. Paron-Wildes, regional architectural and design manager at Allsteel—headquartered in Muscatine, Iowa.

Paron-Wildes, who has a son with autism, has researched best principles on designing for autistic people and has identified ways to eliminate barriers for people with special needs to help make them more successful in their lives. She has worked on hospitals, homes, and other developments for people with autism.

Discovering Autism Design

Design Intervention

As stated previously, until the turn of the century, there were virtually no research studies done on Autism Design. Magda Mostafa, an associate professor at the construction and architectural engineering department at The American University in Cairo, set out to change that and began working on raising awareness about the subject.

In 2008, she published one of the first studies on Autism Design titled "An Architecture for Autism: Concepts of Design Intervention for the Autistic User." The primary goal of the research was to develop a preliminary framework of architectural design guidelines for autism. As a result, Mostafa created a "sensory design matrix," which organized the relationship between sensory characteristics of a built environment and the sensory issues linked to autistic individuals.

The "sensory design matrix" matched architectural elements with autistic sensory issues and was used to generate suggested design guidelines. Each architectural attribute (proportion, scale, symmetry, color, lighting, and texture) was evaluated with respect to its ability to respond to various autistic sensory needs. The design tool acted as a generator of architectural guidelines, where autistic people's needs were inputted as a sensory profile and a group of architectural guidelines were matched for each person in environments like homes, schools, and academic centers.

The study was meant to provide a basis for the further development of autistic-specific design standards and take the first step toward developing more conducive environments for autistic individuals.

Something as simple as being consistent with furniture arrangements in classrooms can provide visual cues to condition an autistic child to expect and settle easily to the task at hand. That can extend to the sequencing of activities and functions outside of the classroom to the building as a whole. This would involve developing designs emphasizing order, sequence, and routine. Activities could be arranged to follow a schedule, and be clearly visually

and spatially defined. The sensory coherence could help student temperament, improve performance, and cut down on calming down time at the start of each session.

Guideline to Design

In 2009, Dr. Sherry Ahrentzen and Dr. Kimberly Steele published a research study titled "Advancing Full Spectrum Housing: Design for Adults with Autism Spectrum Disorder."

The report introduced housing providers, architects, developers, planners, public officials, and others involved in the residential development industry to conditions and aspirations of adults with autism. The end result was a new approach to how the A+D community could provide, design, and develop homes for autistic people.

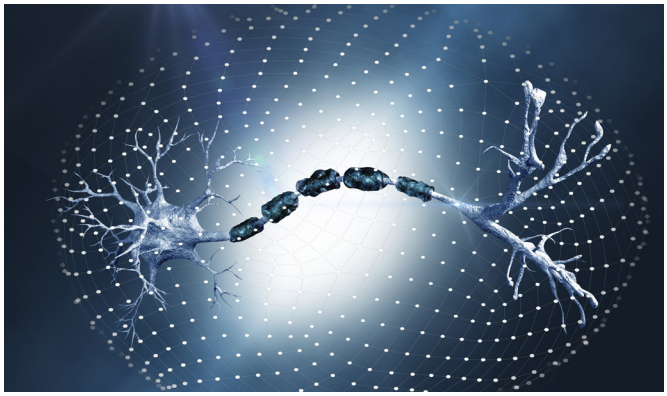
Ten resident-based design goals were established:

1. Ensure safety and security
2. Maximize familiarity, stability, and clarity
3. Minimize sensory overload
4. Allow opportunities for controlling social interaction and privacy
5. Provide adequate choice and independence
6. Foster health and wellness
7. Enhance one's dignity
8. Ensure durability
9. Achieve affordability
10. Ensure accessibility and support in the surrounding neighborhood

"The goals are not idiosyncratic choices," says Ahrentzen, Shimberg Professor of Housing Studies at the University of Florida, and previously Associate Director for Research, Policy, and Strategic Initiatives at Arizona State University. "They derive from research, expert, insight and experience to date. Experts include not simply health and support professionals, but also those on the spectrum who have reflected on and communicated about essential aspects of well-being, difficulties, and aspirations in the places they live."

The 17 design guidelines (listed below), as defined by Steele and Ahrentzen, were created with the understanding that not all of the elements are required for an interior environment to be successful. Rather, the intention is to use them as a foundation and guide to identify design elements that will best address the specific needs and aspirations of people with autism.

"Each of the design guidelines is associated with a quality of life design goal to assist people with autism, designers, family members, and others understand how a particular design element addresses a particular issue," says Steele, Consultant at Environmental Design Research + Consulting, and previously Associate Professor at Herberger Institute School of Architecture. "For example, a person with significant sensory concerns would be able to learn what design factors affect sensory sensitivities and select those areas of the environment for special attention."



Within the study, Ahrentzen and Steele also unveiled a diversity of residential accommodations that collectively respond to the spectrum of individuals with autism. The accommodations varied by residential building type, resident occupancy of dwelling unit, resident occupancy of residential complex, and types of residential and care support.

"While the goals and guidelines were developed for housing, they definitely apply to commercial and public spaces," Ahrentzen and Steele say. "However, once again, context is important to consider in designing places that are not only suitable but strive for advancing aspirations of occupants—it's not simply a point-blank translation from one setting to another."

Using all of those characteristics, Ahrentzen and Steele identified nine sites spread throughout California, Arizona, Colorado, Massachusetts, and Kansas that demonstrated the residential accommodations that are considered "best practices." Some of the sites included are Lincoln Oaks (Fremont), Casa de Amma (San Juan Capistrano), and scattered site residences in San Jose developed by Hello Housing—all of them based in California.

In their forthcoming book titled *At Home with Autism*, Ahrentzen and Steele identify additional environments specifically designed for people with autism throughout the U.S. and Britain, including locations in New York, New Jersey, Massachusetts, Oregon, California, Washington, Arizona, and Kansas.

Autism Design Guidelines

"Each of the design guidelines is associated with a quality of life design goal to assist people with autism, designers, family members, and others understand how a particular design element addresses a particular issue."

- Kimberly Steele, Consultant at Environmental Design Research + Consulting

1. **Neighborhood**
   Selecting the right neighborhood and site is a critical first step in developing housing for people with ASDs. Issues to consider include access to amenities and transportation and the potential for residents to be integrated into existing community.

2. **Floor Plan Strategies**
   Space planning should encourage choice, autonomy and independence for residents. Attention to connectivity within the floor plan and its impact on wayfinding will lead to a more effective use of all household spaces.

3. **Outdoor Spaces**
   Secure, shaded outdoor areas offer opportunities for residents to tend gardens and socialize.

4. **Living/Community Rooms**
   Living rooms should provide residents with a variety of options.

5. **Kitchens**
   Provide ample counter space to accommodate multiple users and independent living aides (e.g. computers) facilitates residents' success and satisfaction.

6. **Hallways, Stairs, and Ramps**
   Treat these as opportunities for socializing; provide seating space.

7. **Bedrooms**
   Individual bedrooms with en-suite bathrooms, adequate storage, and a desk provide residents with privacy and dignity.

8. **Sensory Rooms**
   Providing a separate room that allows residents to control the atmosphere leads to decreased stress and anxiety.

9. **Bathrooms**
   At least one bathroom per unit should be fully accessible to accommodate residents with varying levels of mobility.

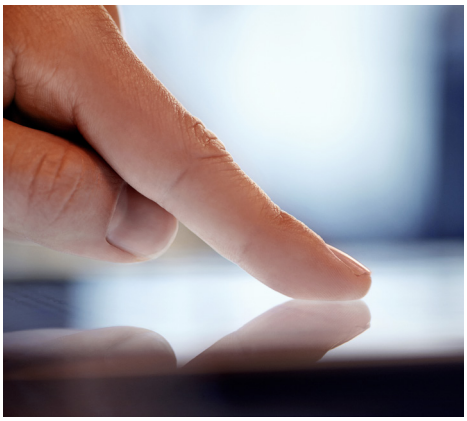
10. **Laundry Room**
    Each unit should include a bright laundry room with a large folding area and accessible appliances

11. **Technology**
    Technology should be unobtrusive, easy to use and modify, and fail-safe; it should enhance resident independence and support staff. Privacy issues must be considered before selecting any monitoring technology. In-unit security support systems must also be available for staff.

12. **Visual Cues**
    Individuals with ASDs often experience attention difficulties and stimulus overselectivity. Ameliorate this by keeping visually distracting elements to a minimum. Opt instead to employ appropriate visual cues that assist residents with daily activities.

13. **Ventilation**
    Adequate ventilation reduces unwanted smells that can negatively affect individuals with hyperreactive (extremely sensitive) sensory processing.

14. **Lighting**
    People with autism often experience visual perceptual problems that are exacerbated by lighting conditions. A range of lighting options should be provided with the optimal environment featuring nonglare surfaces, no-flicker bulbs, and lots of natural light controlled by window blinds or other coverings.



15. **Materials**
People with autism often have underlying health issues that are exacerbated by environmental chemicals. Prevent chronic exposure to indoor air pollutants by selecting durable, nontoxic building materials and finishes. Durability is also a concern.

16. **Acoustics**
To accommodate aural sensitiveness, ambient noise levels should be reduced as much as possible. Building systems and appliances designed for quietness should be selected and sound-proofing insulation in ceiling and walls should be increased.

17. **Appliances and Textures**
Safety controls on appliances are essential since people with autism often experience inattentiveness, high pain thresholds, and the inability to recognize problems. Durability, quietness, and ease of use also are important.

Autism Design in Action

Sweetwater Spectrum

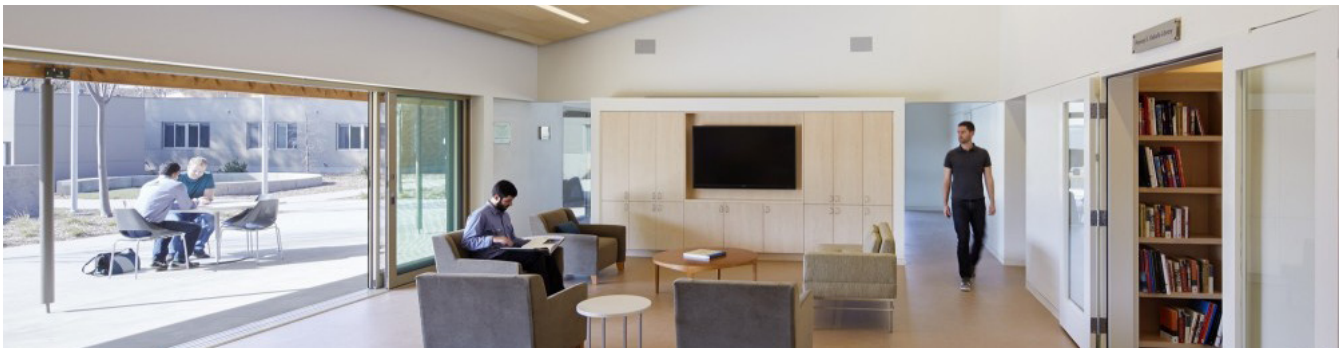
The first development to closely follow the template developed by Ahrentzen and Steele was the Sweetwater Spectrum, a residency for adults with autism. The $10.4 million project opened in January of 2013 in Sonoma, Calif., and houses 16 people in four 3,250-square-foot, four-bedroom, five-bathroom homes near a picturesque downtown location.

Autism Design in Action

Sweetwater reached out to Leddy Maytum Stacy Architects (LMSA), a San Francisco-based firm, to design the development. With a focus on stability and familiarity, the residents that live in Sweetwater are able to enjoy the calming waters of a therapy pool, work in organic gardens, and engage in cooking classes, art, exercise, and music.

The physical environment for people with autism is extremely important, given that they are often very sensitive to outside stimuli. Sweetwater has been designed with special considerations to minimize visual stimulation, ambient sound, lighting, and odors. The spaces are designed to be simple and predictable. Durable materials have been used throughout the property. Individuals are allowed and encouraged to customize their personal living spaces to accommodate their preferences and particular needs.

The community was built to allow autistic people to reach their potential, live life with a purpose, and adapt to the world. Sweetwater is seen not only as a new and innovative concept, but also as a model that can be introduced in communities throughout California and around the nation.



Autism Design in Action

The COVE

Another expert at the forefront of autism design is Kijeong Jeon, professor at California State University, Chico.

In 2008, Jeon designed the COVE (Community Opportunity for Vocational Experience), California Vocations' patient care facility for people with autism or other mental disabilities. The facility opened in Paradise, Calif. in response to California Vocations' desire to have a base site and treatment center for the COVE day program.

Autism Design in Action

The building exposes its residents to soothing and stimulating environments that were designed using research, observations, and interviews Jeon conducted with individuals involved or afflicted with autism. What he found is using **lighting effects**, **color, sounds**, **music**, and **scents** help deliver stimuli to various senses for autistic people.

"Autistic people are also interested in repetition. For instance, they love the repetitive sounds from use of water, which can relate to their senses."

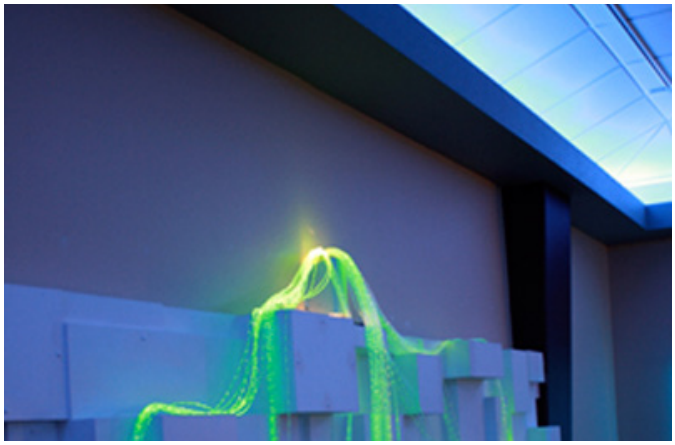
-Kijeong Jeon, professor at California State University, Chico

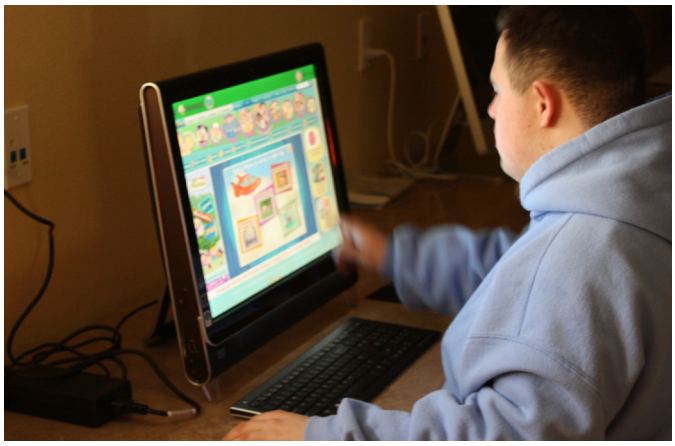
In the COVE, there are three main rooms designed to stimulate the senses: a **main sensory room**, a **quiet room (called the "pink room")**, and a **computer lab**. The main sensory room features elements meant to give autistic people an added sense of **security**, including subdued lighting, fiber-optic lights, bubble tubes that resemble lava lamps, and pilasters along the edges of the room.

When an autistic person has a violent episode or other breakdown, they are guided to the quiet room (also known as the "pink room"), which features pink and violet colors that help soothe someone with autism.

"When we designed the pink room, we needed to be aware that certain light sources are not appropriate for people with autism," Jeon says. "No color study has been conducted yet but from my personal experience, pink and violet have worked best to soothe and stimulate the right senses."

The computer lab contains touch screens, which are intended to help autistic individuals be more active. For example, they have the option of playing with a virtual fish tank, which gives them a chance to interact and respond to the fishes. A high level of interaction with sensory elements that aim to stimulate has worked well at the COVE and is extremely popular among the autistic users.





Scaling Autism Design: A Look Ahead

Urban Autism Design

Elizabeth Decker, a graduate from Kansas State University with a Master of Landscape Architecture degree, developed a toolkit for her master's research report in the hopes of helping designers and planners make cities more inclusive of adults with autism.

Decker's younger brother Marc, who has autism and is approaching adulthood, originally inspired her research. With the expectation that Marc will live semi-independently, Decker wanted to know more about autism so that she could help him—and other autistic adults—succeed in the world in a more independent way.

To function semi-independently as adults, the National Institutes of Health (NIH) has identified six needs for adults with autism: **vocational training**, **life skills**, **mental and physical health support**, **employment**, **public transportation**, and **public housing**.

After conducting a literature review and interviewing autistic adults to better understand their needs in an urban environment, Decker discovered three critical needs that need to be addressed on a larger scale:

1. **Public transportation**
2. **Training services**
3. **Access to healthcare**

Using that research, Decker designed an urban landscape to identify and address those particular needs—in addition to the needs listed by NIH. Nashville, Tenn. was used as a test city, which offers residential services, one of the best job markets in the nation (ranked No. 6 in Forbes' "The Best Cities for Jobs 2014" list), good public transportation, and the Vanderbilt Kennedy Center, which offers services like family workshops to people with autism.

Decker developed 3-D models of the city that included designs for more affordable housing locations, healthy food areas, and vocational training facilities. And to offer sensory relief from urban conditions, she proposed preserving and strengthening green space in the downtown area. She also addressed employment for autistic adults by identifying job opportunities throughout the city.

Even though Nashville was used as Decker's test city, her research can be easily applied to other cities around the country.

Conclusion

Autism Design has grown by leaps and bounds in the A+D community in recent years.

"As ASID and professionals specializing in this type of design service increase consumer understanding, the demand will increase," Fiser says. "ASID is committed to advancing research around designing for autism and other special needs populations, and providing designers with valuable knowledge and skills to deliver services to their clients."

And as communities like the COVE in Paradise, Calif., and Sweetwater Spectrum in Sonoma, Calif., become more commonplace, it is evident that autistic design will continue to be a major focus among designers and architects—even growing into a larger movement to design cities around these special needs.

"As awareness of the condition grows, efforts to accommodate people on the spectrum should grow as well," says Ahrentzen.

"Several new residential developments designed specifically for adults with autism are bringing increased attention to how design can be a positive factor."

-Sherry Ahrentzen, Shimberg Professor of Housing Studies at the University of Florida

As Ahrentzen and Steele stated earlier, not only can Autism Design apply to housing developments, but it can be used in commercial and public spaces as well. In an interview with *ASID ICON* magazine, Paron-Wildes says this is a trend that's becoming more and more prevalent in the A+D community.

"It is amazing to me how applicable what I have learned is to the general population," Paron-Wildes says. "The general public does better from designing more universally."

Key Takeaways

- ~1 in 68 children is identified with autism.

- Architects and designers have become more mindful of building spaces, like multi-sensory environments, that are therapeutic for people with autism.

- Architects need to also be mindful that not all people with autism are the same. The needs of autistic people vary across the board, especially when it comes to those in different age groups. It's a big reason why ASID partnered with John Wiley & Sons to create an E-book Design Shorts series that focuses on three life phases for people with autism:
  - *Interior Design for Autism from Birth to Early Childhood*
  - *Interior Design for Autism from Childhood to Adolescence*
  - *Interior Design for Autism from Adulthood to Geriatrics*

- In 2009, Sherry Ahrentzen and Kim Steele developed a new approach to how the A+D community could provide, design, and develop homes for autistic people by publishing a study that includes 10 design goals and 17 design guidelines.

- In 2008, Magda Mostafa published one of the first autism design studies titled "An Architecture for Autism: Concepts of Design Intervention for the Autistic User."

- In 2008, Kijeong Jeon designed the COVE (Community Opportunity for Vocational Experience), California Vocations' patient care facility for people with autism or other mental disabilities.

- The first development to closely follow the template developed by Ahrentzen and Steele was the Sweetwater Spectrum, a residency for adults with autism that opened in 2013.

- This year, Elizabeth Decker developed a toolkit for her master's research report in the hopes of helping designers and planners make cities more inclusive of adults with autism.

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