



Advanced Inclusive Manufacturing: Accommodating People with Disabilities and an Aging Workforce

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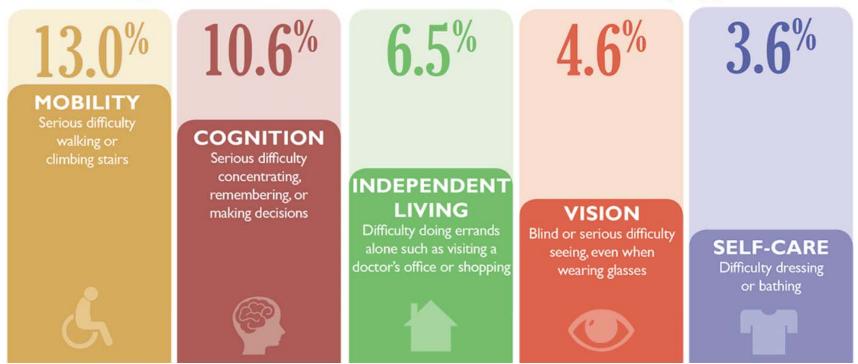
And

Rehabilitation Research and Development Service





Percentage of adults with select functional disability types*



https://www.cdc.gov/ncbddd/disabilityandhealth/infographic-disability-impacts-all.html



Some Sobering Statistics

- 22 percent of the general population has disabilities.
- National Center for Education Statistics show that about 11 percent of the undergraduates in postsecondary education in the United States have a disability.
- The National Center for College Students With Disabilities estimates that 4 percent of all faculty members have disabilities. University of California at Berkeley indicated that of 1,522 full-time faculty members, 24 — roughly 1.5 percent reported a disability.

http://www.chronicle.com/article/The-Neglected-Demographic-/240439?cid=trend_au&elqTrackId=a23899a300d74580a2ceb7527dcd7987&elq=7c2a824a04514908800549a5f030774c&elqaid=14558&elqat=1&elqCampaignId=6138



People with Disabilities Contribute to Diversity; just as other Minorities Do!

- Accommodations are not simply for people with disabilities; they are for the community, institution and employer.
 - Only 65 percent of postsecondary institutions offer students, faculty, and staff the opportunity to provide input on accessibility during project planning.
 - Only 64 percent conduct needs-assessment surveys pertaining to disability. These numbers show just how little institutions value the input of the people who know disability issues best — their own faculty members.
- Disability is an affirming identity: Disability must be a daily presence in classrooms, in communities, and in the workplace.
- The disability community is a cross section of American society, and the layered identities of people with disabilities offer an important lesson in intersectionality.



Role Model vs Professional Career

- Students with disabilities need role models with disabilities.
- Professors who have spent years lobbying for their own access (and that of others) can be proud of what they accomplished, but it comes at a cost.
 - William Peace, a disabilities-studies scholar and paraplegic, told The Chronicle three years ago, "I spend a lot of time hours and hours — advocating for myself."
- The task of having to advocate for yourself and others can be a thankless professional obligation.
 - This may be one reason so few graduate students with disabilities pursue professional careers in academe.





Empowering People w/ Disabilities

- Ensure human rights for people w/disabilities.
- Provide education and career opportunities for people w/disabilities.
- Create a brighter future.









Fulfilling the Promise: UN Convention on the Rights of Persons with

YAKITORI

By David Lammers

It's the thought that counts



We had flown across the United States and checked into the Sheraton Hotel in down-town Seattle. My three young children all started wailing for something to eat, prefer-ably a hamburger.

I was tired and needed a shower, but we trook the kids down the street and into a

ook the kids down the street and into a

took the kids down the street and into a Wendy's. To get the kids out of my hair, I asked my weary, pregnant wife to go find a table while I ordered food for all of us.

I carried two trays over to where my family was waiting. But the only place for me to sit was at a small table nearby. A man in a wheelchair was already sitting at one side of the table, eating a backed potato and drinking milk.

"Mind if I sit down here?" I asked.

"Go right shead."

The guy had a beard and wore an old tee shirt with a wheelchair mear on the front. Wy mind started turning.

The guy had a beard and wore an old tee shirt with a wheelchair racer on the front. My mind started tunning. "This is downtown Seattle. This guy is probably living on a stipend, in some rooming house. A baked potato is probably all he can afford, "I thought to myself. "Nice châdren you have over there," he said. He spoke with a confident voice. Pretty soon I felt comfortable enough with Rory Cooper to ask what had put him in a wheelchair. He had been living in West Germany, working as a translation—a certified translator, he told me. One day, while he was riding a bicycle, a bus ran over him. After he got out of the hospital, he went to California and got interested in electronics. He got his PhD in electronics engineering last year. Il is dissertation was in control theory, and now he is teaching at the University of California at Sacramento and developing controls that ease the fives of people in mento and developing controls that ease the lives of people in wheelchairs.

My munt mashed back to 1972. Working at a golf course outside of Boston, I was riding a bicycle to work carry one sunny Sunday morning when a German shepherd, sitting on the front porch of a mansion, spotted me. His ears stood straight up, and he tore across the lawn. Way behind me I heard a car go into a side. The dog grabbed my covernila at the ankles, and my 10-speed started to tople. The sliding car closed in. Work I bergin work.

toppie. The stading car closed in.
"It's over," I thought, forgetting Yogi Berrg's maxim.

Later, the doctor told me how lacky I was that my rear end had jammed into the car's passenger window without damag-

has jammed into the car's passeenger winnow winnout camag-ing my spiral columident while I talked to Cooper.

It thought of that incident while I talked to Cooper.

He said he was in Seattle for a big wheelchair race at the University of Washington. His wife, a German, was back home for a visit. He thanked us for the diamer company before he wheeled down the street to his hotel.

I promised myself never to judge someone again, and never I promised myself never to judge someone again, and never

I promised myself never to judge someone again, and never to feel sorry for myself again over some stupid little thing. Promises like that are more easily made than kept. I thought about Cooper again the other day. My wife was in a small maternity hospital, having given birth to a healthy begin gif a few days earlier. The lids started walling for something to eat, preferably a hamburger. After paying for the second extra cheeseburger, I com-After paying for the second extra cheeseburger, I com-

menced to worrying: "How can we take care of all of these kids? How much will it cost to send all of them to school?" And so on.

No bearded man wheeled in to ease my mind. But I re membered the man I'd met in a distant hamburger joint, and I felt a bit stronger. For a moment I thought about how lucky we are. I thought about how some people deal with adversity and strive for greatness.

With human beings, most of the time it's the thought that

counts, one way or another

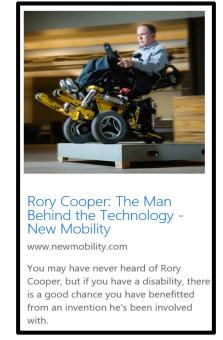


Importance of Assistive Technology

- Ensure people receive the most appropriate AT for them within their environment.
- Provide clinicians tools and AT users with the skills needed to achieve life-goals.
- Founded on solid scientific and clinical knowledge base.

















Research lab **offers job training** for wounded warriors

A joint research program between VA and the University of Pittsburgh that studies wheelchairs and related technology is now helping to train disabled Veterans for careers in machining.

The program is called Fabrication of Assistive Technology Program for Wounded Warriors. It's run by the Human Engineering Research Laboratories, a collaboration between the VA Pittsburgh Healthcare System and the University of Pittsburgh School of Health and Rehabilitation Sciences.

The program is being launched this fall with the help of a \$100,000 donation from Highmark Blue Cross Blue Shield.

Created by director Rory Cooper, PhD, and education and outreach project director Mary Goldberg at HERL, the program will prepare participants to pass a basic machining exam. The participants will also get on-the-job training at local companies, which could lead to permanent, full-time jobs.

To learn more about HERL, visit www.herl.pitt.edu. *

- **1. Shop supervisor Garret Grindle** shows Veteran Keniel Martinez how to smooth the burrs on a stainless steel plate.
- Veterans (from left) Keniel Martinez, Shawn O'Donnell, Artem Lazeckin, Gary Rethage, and Adam Benjamin Campbell listen to Garrett Grindle explain how to operate a drill press.
- 3. Veterans Michael Malloy and Keniel Martinez watch as Grindle demonstrates a task on the drill press.

Photos by Bill George







Fall 2013 17





AIM Theory to Practice















Inclusion of PwD and veterans

- Improve educational opportunities for people with disabilities for experiential and "hands-on" learning. Build a more diversified and creative workforce.
- Create, identify and disseminate accommodations proven to be successful.
- Change the culture of STEM education and workforce to be more inclusive.
- Incorporate the concepts of universal design into STEM classrooms and workplace to help drive innovation.
- Provide evidence to change policies for government agencies to reduce barriers such as income-caps for benefits that may preclude a student with a disability from receiving a scholarship or other benefits.





DISABILITY AND REHABILITATION: ASSISTIVE TECHNOLOGY, 2017 http://dx.doi.org/10.1080/17483107.2017.1300348



ARTICLE HISTORY

KEYWORDS

Barriers; facilitators;

disabilities: STEM

laboratory; postsecondary

education; students with

Received 4 October 2016

Revised 16 February 2017 Accepted 23 February 2017

REVIEW



Full-participation of students with physical disabilities in science and engineering laboratories

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ABSTRACT

Purpose: To conduct a literature review identifying barriers and facilitators students with physical disabilities (SwD-P) may encounter in science and engineering (S&E) laboratories.

Method: Publications were identified from 1991 to 2015 in ERIC, web of science via web of knowledge, CINAHI, SCOPUS, IEEEXplore, engineering village, business source complete and PubMed databases using search terms and synonyms for accommodations, advanced manufacturing, additive manufacturing, assistive technology (AT), barriers, engineering, facilitators, instructor, laboratory, STEM education, science, students with disabilities and technology.

Results: Twenty-two of the 233 publications that met the review's inclusion criteria were examined. Barriers and facilitators were grouped based on the international classification of functioning, disability and health framework (ICF). None of the studies directly found barriers or facilitators to SwD-P in science or engineering laboratories within postsecondary environments. The literature is not clear on the issues specifically related to SwD-P.

Conclusion: Given these findings, further research (e.g., surveys or interviews) should be conducted to identify more details to obtain more substantial information on the barriers that may prevent SwD-P from fully participating in S&E instructional laboratories.

➤ IMPLICATIONS FOR REHABILITATION

- Students with disabilities remain underrepresented going into STEM careers.
- · A need exist to help uncover barriers students with disabilities encounter in STEM laboratory.
- Environment
- Accommodations and strategies that facilitate participation in STEM laboratory environments are
 promising for students with disabilities

Science, technology, engineering and mathematics (STEM) fields are at risk of being unfilled due to lack of trained professionals. By 2018, 92% of STEM jobs are expected to require post-secondary.

In 2014, section 503 of the Rehabilitation Act of 1973 was amended to require employers to be intentional in hiring and retaining individuals with disabilities [12]. Regulations based on the Rehabilitation Act of 1973 and the Americans with Disabilities

Journal of Applied Rehabilitation Counseling

Evaluating and Modifying an Advanced Manufacturing Curriculum for People with Disabilities

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Abstract: People with disabilities (PwD) are two times as likely to be unemployed as the general population and are particularly not well represented in advanced manufacturing (AM) fields. This study, which features the Advancing Inclusive Manufacturing (AIM) program located at a large University in the Northeast, serves as one approach to empowering PwD by teaching them the skills needed to be successful in an advanced manufacturing (AM) career. The program components help participants identify strengths and build self-advocacy to progress to a subsequent career stage. Seventy-five percent of AIM graduates entered the workforce or continued their education while 25% are pursuing employment in the AM sector. These results suggest the AIM program may result in PwD' re-integration to the workforce and interest in continued professional development. Despite the AM focus of the AIM program, the results are still unclear whether the program is successful in sustained employment in that particular sector.