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Introduction

Research and development are central to the advancement of assistive technology. Research instructs us on what is needed, and development creates the devices to fill the needs. We focused an earlier issue of *Technology and Disability* on research and development (3/4), reporting on research underway and technology in the creation stage at seven major centers in the United States and Canada. We were not able to cover all the major research and development centers in one issue, so this issue reports on an additional eight centers.

Levitt and Bakke describe the work of the Rehabilitation Engineering Research Center (RERC) on hearing enhancement and assistive devices. This Center is designing instruments for the early detection of hearing loss, addressing issues of access to telecommunications by persons with hearing loss, and developing improved hearing aids. Hearing aids offer the potential to improve communication for many people, but often perform unsatisfactorily. In an earlier issue of *Technology and Disability* (3/1) one study reported a dissatisfaction rate of 60 percent for hearing aids used by elders. This RERC is working to improve the signal processing capabilities of hearing aids and at the same time developing improved instruments for audiological assessment.

Vanderheiden discusses research and development at the Rehabilitation Engineering Research Center on access to computers and information systems at the University of Wisconsin's Trace

Center. The projects of this RERC are focused on problems faced by individuals with disabilities with the use of computers, information systems, and information appliances. Like buildings, the new technology that makes life easier for able-bodied persons will only work well for persons with disabilities if it is designed with 'software/hardware ramps and curb cuts.' Similarly, as we find with buildings, many of these microcomputer and information system features designed for persons with disabilities work well for all of us — universal design!

The Rehabilitation Engineering Center on Wheelchair Technology is described by Hobson and Brubaker. This Center is developing improved batteries, control interfaces, and motors for powered mobility devices; designing better frames, suspensions and steering mechanisms for wheelchairs, studying possibilities for the design of innovative mobility devices for use indoors, working on improved cushions, and investigating ways to improve the prescription of wheelchairs. The RERC on Wheelchair Technology is also involved in research to support standards development for wheelchairs. Development of standards for assistive technology is important for ensuring safe and useful products.

Worksite accommodation is the focus of the Wichita Rehabilitation Engineering Research Center at Wichita State University. Leslie describes the application of engineering techniques to vocational environments for persons with disabilities. This Center is developing systems for

effective transitioning of students into employment, studying pre-vocational environments, and using rehabilitation engineering in competitive employment settings.

Lane describes the work of the Rehabilitation Engineering Research Center on Technology Evaluation and Transfer at the Center for Assistive Technology at the University of Buffalo. This Center provides a mechanism for inventors from across the country to have their prototype assistive devices carefully evaluated. Assistive devices that pass the evaluation are supported by this RERC in finding a corporate partner to take the device into the marketplace. This RERC has three teams of evaluators: consumers, technical staff (such as engineers and therapists) and marketing and technology transfer experts. A five step process, with greater resources applied at each step, ensures that deserving devices are commercialized. The RERC-TET also established a partner corporation, run by and for persons with disabilities, that will continue the work of the RERC after federal funding is discontinued.

Jaffe describes the Department of Veteran Affairs's Palo Alto Rehabilitation Research and Development Center. This Center has focused considerable effort on research of the musculoskeletal system, and presents an example of one of their studies which focuses on posture. Device development is also a primary mission, and Jaffe discusses the Vocational Training Facility, an interactive training program that teaches desktop publishing skills to persons with spinal cord injury. Another unique development project of this Center is a computer-controlled finger spelling hand which offers persons who are deaf and blind the capability of conversing with other persons as

well as providing access to computers and communication devices.

Birch, Watzke and Bolduc discuss the research and development work at the Niel Squire Foundation in Vancouver, British Columbia, Canada. This Center is involved in the development of an environmental control system, a robotic system, a keyboard/mouse emulator, and a speech assisted reading and writing program.

The New Mexico Technology Deployment Pilot Project is testing a model for transferring technology from a federal laboratory to the development of assistive devices. Three partners, the University of New Mexico's Research Institute for Assistive and Training Technologies, Sandia National Laboratories and Laguna Industries are working together, and have developed a process for moving the latest technology into the area of assistive devices. The authors also provide a detailed review of the literature on assistive technology device needs.

The articles in this issue, together with those in the November 1994 issue of *Technology and Disability*, preview the range of new assistive technology to be available as products in the future. Although researchers and consumers are typically separated by the processes of manufacturing, distributing and marketing, these articles show the value of research and development to the end users of assistive devices. The research and development centers featured here, in turn, acknowledge the critical role of consumer involvement in the quality and relevance of their work.

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