



Designing beyond the norm to meet the needs of all people.

Working toward
universal access
through research,
design & education

December 2009

Dear Friends & Supporters,

The Beneficial Designs' team had a busy year.

Our powered wheelchair test lab was quite busy, and we continued to devote time and resources to wheelchair standards development. The trails and pedestrian access component of Beneficial Designs continues to grow. We are developing new technologies with USDA and FHWA government-funded research and development that will improve the efficiency of conducting assessments of trails and public rights-of-ways.

We would like to share with you the status of our current projects and our successes over the last year. Thank you for your continued support of our work. We wish you the very best for the New Year!

STAFF

- ❖ **Peter Axelson**, Founder and Director of R&D, presents our work worldwide. He loves spending time with his family and is an avid mono-skier and pilot.
- ❖ **Denise Axelson**, Research Engineer, assists with standards development work. She loves being a mom and enjoys playing volleyball, skiing, and cooking.
- ❖ **Bill Blythe**, Technical Assistant, likes to cook, play guitar, work with computers, and leads worship at church.
- ❖ **Barton Cline**, Software Developer and Electronics Technician, enjoys in-depth Bible study, family time, languages (incl. computer languages), and loves his job.
- ❖ **Harmony Hilderbrand**, Office Manager, is a senior at UNR, enjoys photography, baking, and spending time with her husband.
- ❖ **Stephen Pieters**, Shop Assistant, is a senior in high school who enjoys riding motorcycles, off-roading trucks, and fishing.
- ❖ **Rachel Rauber**, Office Assistant, is a junior in high school who enjoys fashion, dance, surfing, and reading.

- ❖ **Jaime Skilling**, Office Assistant, is a senior in high school, enjoys dancing and singing, and plans to study to become an elementary school teacher.
- ❖ **Sierra Stulac**, Office Assistant, is a sophomore in high school, and loves to dance and run. She does long jump and short sprints in track.
- ❖ **Jeremy Vican**, Trails Assistant, enjoys hiking, photography, and playing in the yard.

CONSULTANTS

- ❖ **Seanna Kringen**, Research Associate, focuses on accessible projects, enjoys traveling with her husband and three children.
- ❖ **Patti Longmuir**, Research Scientist, focuses on accessible recreation, enjoys the outdoors, and is defending her PhD thesis in January 2010.
- ❖ **Mike Passo**, Trails Project Specialist, provides technical expertise in trail accessibility and sustainability.
- ❖ **Carla Shepard**, Bookkeeper, enjoys four-wheeling, playing piano, singing, and camping.

UTAP & TrailWare^{2.0} Workshops

NIH/NICHD SBIR Phase II Grant #2 R44 HD29992-02

NIH/NICHD SBIR Phase II Grant #2 R44 HD36538-02

There are currently 1,044 trail enthusiasts trained to lead assessments using the UTAP. Workshops were recently held near Montecito, CA and during the 2009 Professional Trail Builders Conference in Asheville, NC. Florida continues to lead the way in providing training to their trails personnel and was presented a "Best Trails State In America" award by American Trails. Trail assessment coordinators are involving various groups to assist in the UTAP process, including Girl Scouts, 4-H Clubs, and high school and college students. Beneficial Designs provides the training materials and tools through PaxPress while American Trails coordinates most UTAP training courses. TrailWare 2.0 is used to generate trail access information, signage and trail management reports. Data is uploaded to <www.trailexplorer.org>, the TrailExplorer Website. For more information, contact <trails@beneficialdesigns.com> or visit <www.americantrails.org>.



Nevada Recreation Trails

NVRTP Grant #FY 2008-22

We are working on our third Nevada Recreational Trails Program project to provide signage in Northern Nevada. The goal is to continue making Trail Access Information (TAI) widely available in Northern Nevada for a variety of trails and trail users. In 2007/2008, we assessed 29 trails totaling 37.8 miles. A total of 80 TAI signs and 9 full panel color trail signs were created and installed. This year, we have assessed 103 miles of trail and are creating full color trail maps and TAI signs for at least 12 different parks.



Trail Access Information Signage Sample

Tahoe Meadows (near Lake Tahoe)

NVRTP Grant #FY 2008-24

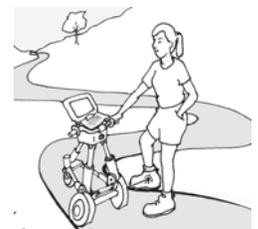
This project is designed to improve trail access

and opportunities while protecting the natural and archeological resources within and around Tahoe Meadows. In cooperation with the U.S. Forest Service and Nevada State Parks, three new loop trails totaling 3.4 miles have been built or improved, including 1200 feet of boardwalk along Ophir Creek. Two new stair sets and a new turnpike have also been constructed. Completion of this project is anticipated in 2010 with a new bridge over Ophir Creek, an interpretive sign, multiple directional signs, and a trails map.

High Efficiency Trail Assessment Process

USDA SBIR Phase II Grant # 2005-03226

This project created the Wheeled Instrumentation Sensor Package (WISP) to collect more accurate, objective information about trails, including shared use paths, backcountry single-track trails, and cross-country ski trails. To date, 70 trails have been assessed in Northern Nevada using the new system. Multiple HETAP systems have been purchased by state and city land managers and the National Park Service in Florida, Arizona, and Canada. This system has been commercially available through Beneficial Designs for the past year.



Accessible Trail Gate Barrier

USDA SBIR Phase II Grant # 2005-00325

The goal of this project is to design an electronic trail gate barrier that can be used with or without a mechanical trail gate barrier to restrict access to motorized trail vehicles, and allow access to personal mobility device users. The system uses infrared heat detection technologies to detect and report violations by motorized vehicle users.

A Standardized Assessment Process of Outdoor Recreation Facilities

USDA SBIR Phase I Grant # 2008-33610-18906

This project will create methods for assessing the accessibility of recreation elements used for outdoor recreation, picnic and camping facilities, such as picnic tables, fire rings, and water pumps.

Public Rights-of-Way Assessment Process to Determine Accessibility

US DOT Grant # DTRT57-08-C-10058

Beneficial Designs developed a manual sidewalk assessment process (SWAP) to systematically measure elements within the pedestrian environment, such as curb ramps and driveway crossings. In phase I, we were able to automate the process to reduce the time to perform assessments to 20% of the time required to perform assessments manually. We have added a laser to measure transition heights to detect tripping hazards. We have submitted a request to the Federal Highways Administration (FHWA) for Phase II funding to develop a commercial product.

Surface Accessibility

NIH/NICHD SBIR Phase II Grant #2 R44 HD30979-02

The Rotational Penetrometer (RP) measures the firmness and stability of trail surfaces, carpet, and other pedestrian routes. The RP is commercially available through Beneficial Designs. It is currently under review as an ASTM standard test method for the measurement of surface firmness and stability.



Universal Design Guidelines for Fitness Equipment (UDFE)

NIH/NICHD SBIR Phase I Grant #1 R43 HD049236-01
RERC NIDRR Grant #H133E070029

In phase I, draft guidelines for the universal design of aerobic and strength training equipment for greater accessibility were developed. We are now in year three of the five-year RERC on Recreational Technology and Exercise Physiology (RecTech) through the University of Illinois at Chicago. We are working closely with the Inclusive Fitness Initiative team in the U.K. to ensure that the U.S. UDFE Standards are developed in harmony with existing European standards. This work is all becoming part of an ASTM Standard. This work will provide universal design guidelines for the manufacturers of accessible fitness equipment.



Development of Uniform Standards for Cognitive Technologies

RERC NIDRR Grant #H133E090002 and the Coleman Institute for Cognitive Disabilities.

We are in year one of the five-year RERC on the Advancement of Cognitive Technologies (ACT) through the University of Colorado. We are working closely with the RERC and cognitive disability groups and individuals in order to develop standards for common products used daily such as cell phones and other consumer products. This project will work with projects underway internationally that address website accessibility, including Fluid, AEGIS, and the Raising the Floor initiative. Key information will be highlighted on the active website screen while less important information is moved to a backup screen.

Adaptive Ski Equipment Standards

Rehabilitation Engineering and Assistive Technology Society of North America (RESNA)

Peter is chair of the RESNA standards committee that developed specifications and test methods for adaptive ski equipment.



The standard was published in December of 2007 as a RESNA American National Standard. The committee meets each year in December in conjunction with the Ski Spectacular event in Breckenridge, Colorado.

Wheelchair Standards

Paralyzed Veterans of America Research Program (PVA)
Rehabilitation Engineering and Assistive Technology Society of North America (RESNA)

As Chair of the RESNA Assistive Technology Standards Board (ATSB), Peter oversees the work of the RESNA Assistive Technology Standards Committees. Denise continues to serve as the Secretariat for the RESNA ATSB. Next year's annual meetings will take place in Las Vegas in conjunction with the RESNA Conference. The new RESNA WC-1:2009 and WC-2:2009 standards were published in September of 2009. Peter continues to serve as Convener of the ISO Working Group on Wheelchair Test Methods. Beneficial Designs hosted the fall ISO meetings in South Lake Tahoe in October.

Wheelchair Testing & Design

We continue to provide testing and design services on a consulting basis for the wheelchair industry. In addition, we perform accessibility assessments and consultation. Contact <mail@beneficialdesigns.com> for more information.

Wheelchair Training Guides

PVA Research and Education Foundation

The Manual and Powered Wheelchair Selection & Training Guide books provide wheelchair users and therapists with step-by-step instructions for selecting wheelchairs and negotiating various environments. These books are available through PaxPress, a division of Beneficial Designs. For more information contact <paxpress@beneficialdesigns.com>.

FlexRim®

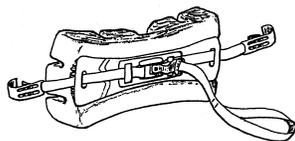
NIH/NICHD SBIR Phase II Grant #2 R44 HD36533-02A2

The FlexRim® is a compliant handrim that replaces the rigid interface between the wheelchair wheel and the handrim, reducing the gripping force and the impact forces. The FlexRim is manufactured by Spinergy and has been commercially available since September of 2007! For more product information, please contact Spinergy at (303) 823-6299 or visit <www.spinergy.com>.

PaxBac

NIH/NICHD SBIR Phase II Grant #2 R44 HD29983-02

The PaxBac is a lightweight back support that provides lumbar/sacral back support on wheelchairs with sling upholstery. It was manufactured by Invacare



for a limited time. It will soon be manufactured again by BES Rehabilitation Ltd. and will be distributed in the U.S. by Bodypoint <www.bodypoint.com>.

Canoe Seating System

NIH/NICHD SBIR Phase II Grant #2 R44 HD36944-02A1

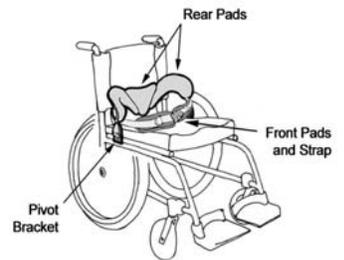
The Universal Design Canoe Seat is finished and is now commercially available! The seat replaces the existing bench seat. It provides adjustable pelvic, back, and lateral supports to improve balance and comfort. For more

product information, please contact Chosen Valley Canoe Accessories at (507) 867-3961 or visit <cvca@gear4portaging.com>.

HipGrip

NIH/NICHD SBIR Phase II Grant #2R44 HD36156-02A2

The HipGrip is a dynamic spring-loaded pelvic support device for people who have difficulty maintaining pelvic positioning in their wheelchair. The HipGrip allows the user to lean forward and provides variable resistance to assist the user back into an upright position. The HipGrip is manufactured and distributed worldwide by Bodypoint. For more information, contact Bodypoint at (800) 547-5716 or visit <www.bodypoint.com>.



Funding Agencies and other Acronyms:

DOT Department of Transportation
ISO International Organization for Standardization
NICHD National Institute of Child Health and Human Development
NIDRR National Institute on Disability and Rehabilitation Research
NIH National Institutes of Health
NVRTP Nevada Recreational Trails Program
PVA Paralyzed Veterans of America
RESNA Rehabilitation Engineering and Assistive Technology Society of North America
SBIR Small Business Innovation Research
USDA United States Department of Agriculture

Special Thanks & Acknowledgments

We would like to thank past employees Joey Gmuender and Lulu Yu, who are now in college. Their work on our projects was invaluable. We are also grateful to our technical consultants, Eric Class and Kent Nelson for their assistance with all of our trail projects. We are also grateful to our project consultants, Chris Lynskey and Mary Axelson.