



Working toward
universal access
through research,
design & education

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

December 2008

Dear Friends & Supporters,

The Beneficial Designs team had a very exciting year. We are nearing completion on some cutting-edge projects while continuing to develop ideas for new ones.

Our powered wheelchair test lab was quite busy. We continue to devote time and resources to wheelchair standards development. The trails and pedestrian access component of Beneficial Designs is thriving. We continue to develop new technologies with USDA and FHWA-funded research and development projects.

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 a Merry Christmas and all the 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 lead 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, oversees office tasks. She is attending UNR, enjoys photography, and spending time with her husband.
- ❖ **Patrick Ketter**, Trail/Sidewalk Assessment Coordinator, enjoys cycling, soccer and spending time with his family.

- ❖ **Stephen Pieters**, Shop Assistant, is a junior in high school who enjoys riding motorcycles, off-roading trucks, and fishing.
- ❖ **Jaime Skilling**, Office Assistant, is a junior in high school, and likes to dance.
- ❖ **Jeremy Vican**, Trails Assistant, enjoys hiking, photography and playing in the yard.

CONSULTANTS

- ❖ **Seanna Kringen**, Research Associate, enjoys swimming and hiking with her husband and three children.
- ❖ **Patti Longmuir**, Research Scientist, focuses on accessible recreation projects, enjoys the outdoors, and is currently working on her Ph.D.
- ❖ **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

The UTAP is a successful systematic methodology for measuring all types of trails and roads. We now have over 1,000 trail enthusiasts trained to lead assessments using the Universal Trail Assessment Process! Florida continues to lead the way in providing training to their trails personnel. American Trails continues to coordinate most UTAP training courses with Beneficial Designs providing the training materials and tools through PaxPress. Level I and II Trainers conduct UTAP trainings. This year a train-the-trainer course was conducted to train more trainers. TrailWare^{2.0} generates trail access information, signage and trail management reports. Data created using TrailWare^{2.0} is uploaded to the TrailExplorer Website <www.trailexplorer.org>. The next UTAP and TrailWare^{2.0} workshops will be held during the Professional Trail Builders Conference in Asheville, NC on 15-20 March 2009. For workshop information, contact <trails@beneficialdesigns.com> or visit <www.americantrails.org>.



Nevada Recreation Trails

NVRTP Grant #FY 2008-22

We completed our second Nevada Recreation Trails project. The goal of this project is to make Trail Access Information (TAI) widely available in Northern Nevada for a variety of trails and trail users. In 2007/08, we assessed 29 trails 37.8 miles. A total of 80 TAI signs and 9 full panel color trail signs were created and installed. Trail surface improvements, new culverts and new bridge railings were also completed on the Tahoe Meadows Interpretive Trail. We are now starting Phase III to expand on this work.

The Nature Trail
 Round Trip from Parking Lot
 Rancho San Rafael Park

Length 1.1 mi (1.8 km)

 **Hikers**

 **Dogs on Leash**
 per posted restrictions

 **No Bikes**

 **No Motorized Vehicles**

 **Grade**

Typical Grade 5.9%

21% of the trail is 8% to 14%

424 ft (129 m) is 14% to 25%
 8% grade is a standard ramp.

Trail Access Information Signage Sample

Tahoe Meadows (near Lake Tahoe)

NVRTP Grant #FY 2008-24

The goal of this project is to improve trail access and provide a sustainable, designated trail system within Tahoe Meadows. Working with the U.S. Forest Service, Nevada State Parks and the Tahoe Rim Trail Association, four new loop trails totaling 3.5 miles have been constructed or improved, including 1/4 mile of new boardwalk along Ophir Creek. Two new stair sets and turnpike have been constructed. Completion of this project is anticipated in 2009 with a new bridge over Ophir Creek, interpretive signs, overhead trail maps and directional signs.

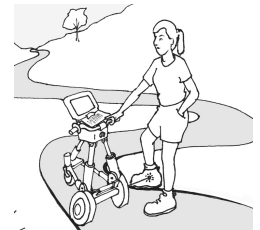


**Tahoe Meadows Interpretive Trail
 Lake Tahoe, Nevada**

High Efficiency Trail Assessment Process

USDA SBIR Phase II Grant # 2005-03226

This project created a High Efficiency Trail Assessment Process (HETAP) and a Wheeled Instrumentation Sensor Package (WISP), which collects accurate, objective information about trail environments. To date, 22 trails in Northern Nevada have been surveyed using HETAP/WISP. This software and sensor package is now commercially available through Beneficial Designs.



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, water pumps.

Accessible Trail Gate Barrier

USDA SBIR Phase II Grant # 2005-00325

The goal of this project is to design a trail gate barrier for non-motorized trails that will restrict access to motorized trail vehicles, but allow access to designated non-motorized users and personal mobility devices. Current gates that allow mobility devices also allow some motorized vehicles, forcing land managers to choose between providing access to people with disabilities and protecting the trail environment. This project developed a prototype mechanical trail gate barrier. An electronic trail gate monitoring system is under development. It will use infrared heat technologies to detect and report a motorized vehicle violation.

Public Rights-of-Way Assessment Process to Determine Accessibility

US DOT Grant # DTRT57-08-C-10058

Beneficial Designs developed the sidewalk assessment process (SWAP) which is modeled after the highly successful Universal Trail Assessment Process used to objectively measure trails. The SWAP uses a similar process to systematically measure elements within the pedestrian environment, such as curb ramps and driveway crossings. We are currently developing software to assess sidewalks and curb ramps more efficiently to help cities improve accessibility more cost effectively.

Surface Accessibility

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

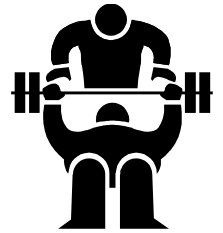
The Rotational Penetrometer (RP) measures the firmness and stability of trail surfaces, carpet, and other pedestrian routes. The RP is commercially available through Beneficial Designs. It is currently under review as an ASTM standard test method for playground surfaces. For more information, contact <trails@beneficialdesigns.com>.



Universal Design Guidelines for Fitness Equipment

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

We successfully completed the NIH Phase I research project. Draft guidelines for the universal design of aerobic and strength training equipment were developed. These guidelines will allow more people of all abilities to use fitness equipment at their local health club facility. The results of this project are on our website.



We are now in year two 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 to ensure that the U.S. UDFE Standards are developed in harmony with existing European standards as much as possible. ASTM has initiated a task group to further develop these draft standards into an ASTM Standard.

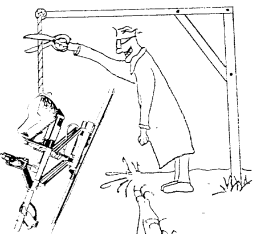
Canoe Seating System

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

The Universal Design Canoe Seat is finished and is now commercially available! The seat attaches to the sides of the canoe, replacing the existing bench seat. It provides adjustable pelvic, back, and side supports, and has an adjustable seat angle to improve balance and comfort. For more product information, please contact Chosen Valley Canoe Accessories <cvca@gear4portaging.com>.

Adaptive Ski Equipment Standards

Peter is chair of the RESNA standards committee that developed specifications and test methods for adaptive ski equipment. The first standard was completed and 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

As Chair of the RESNA Technical Standards Board, Peter oversees the work of all RESNA standards committees. Denise still serves as Secretariat. Annual meetings were held this year in conjunction with the RESNA conference in Washington DC. Revisions of the national RESNA standards are scheduled to be completed by January of 2009. Peter also continues as Convener of the ISO Working Group on Wheelchair Test Methods. ISO meetings took place in Japan in May and in Germany in October.

Wheelchair Testing & Design

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

FlexRim ®

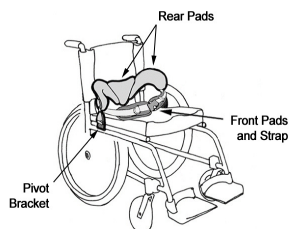
NIH/NICHD SBIR Phase II Grant #2 R44 HD36533-02A2

The FlexRim® is a compliant handrim that replaces the rigid interface between the wheelchair wheel and the handrim, reducing the impact forces experienced by users. 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>.

HipGrip

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

The HipGrip is a dynamic spring-loaded pelvic support device for persons who have difficulty maintaining pelvic positioning. The HipGrip allows the user

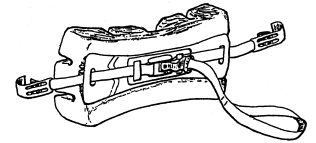


to lean forward and provides variable resistance to assist the user back into an upright position. The HipGrip is manufactured and distributed worldwide by Bodypoint <www.bodypoint.com>.

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 in the late 90's 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>.

Wheelchair Training Guides

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

Funding Agencies and Other Acronyms:

ISO International Organization for Standardization

SBIR Small Business Innovation Research

NICHD National Institute of Child Health and Human Development

NIH National Institutes of Health

NIDRR National Institute on Disability and Rehabilitation Research

RESNA Rehabilitation Engineering and Assistive Technology Society of North America

USDA United States Department of Agriculture

DOT Department of Transportation

NVRTP Nevada Recreational trails Program

Special Thanks & Acknowledgments

We would like to thank past employees Sidney Hinds and Joey Gmuender, 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.