



Working toward
universal access
through research,
design & education

December 2006

Dear Friends & Supporters,

After relocating to new office space near the Minden airport last year, Beneficial Designs is almost finished remodeling. We brought the office space into ADA compliance and expanded our wheelchair testing lab! We continue to devote time and resources to wheelchair standards development, and our new testing facilities will help us further our standards work. In addition, we are a test site for wheelchair manufacturers to determine product compliance with the latest standards.

The trails component of Beneficial Designs is thriving! We continue to work on USDA funded research and development projects. In partnership with American Trails, we are implementing the use of the Universal Trail Assessment Process (UTAP) in trails communities throughout the US.

We would like to share with you some of our project successes over the last year. Thank you for your continued support of our work. We wish you Happy Holidays 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 Denise and Ria Maye and is a pilot and avid mono-skier.
- ❖ **Denise Axelson**, Research Engineer, assists with standards development work. She loves being a mom to Ria Maye, plays volleyball, skis, and cooks.
- ❖ **Bill Blythe**, Technical Assistant, likes to cook, play guitar, work with computers, and lead worship at church.
- ❖ **Harmony Hilderbrand**, Office Manager, oversees office tasks, is attending UNR and got married this year!
- ❖ **Brittany Schreckengost**, Office Assistant, is a junior in high school, likes snowboarding and taking care of kids.
- ❖ **Alicia Sturgess**, Office Assistant, is a senior in high school and likes to run track.
- ❖ **Jeremy Vican**, Trails Assistant, enjoys hiking, photography and playing in the yard.

CONSULTANTS

- ❖ **Seanna Kringen**, Research Associate, manages the research components of our projects, 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 trails accessibility and sustainability in Beneficial Designs' trail related projects. Mike is also on the board of directors of American Trails.
- ❖ **Mark Richter**, Research Engineer, has taken over the Beneficial Designs Biomobility lab and turned it into the Max Mobility lab. He was awarded his first SBIR grant 1 Oct 2006!
- ❖ **Carla Shepard**, Bookkeeper, enjoys four-wheeling, playing piano, singing, and camping.

ACTIVE PROJECTS

Accessible Trail Gate Barrier

USDA SBIR Phase II Grant # 2005-00325

The goal of this project is to design a trail gate barrier that will restrict access to motorized trail vehicles, but allow access to all non-motorized users and personal mobility devices. Current gates that allow mobility devices also allow small motorized vehicles, forcing land managers to choose between providing access to people with disabilities and protecting the trail environment. A phase II grant was awarded for this project and is underway.

High Efficiency Trail Assessment Process

USDA SBIR Phase II Grant # 2005-03226

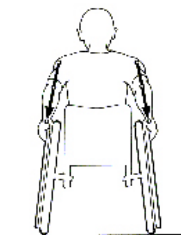
Phase II research to create a streamlined, cost-effective instrument for obtaining accurate, objective information about trail environments is progressing well. Preliminary results indicate that the sensor package will be able to attach to a variety of third party vehicles (cart, rola-wheel, ATV, etc.). Prototypes have been constructed and are currently being tested. This device will enable outdoor recreation and trail access routes to be assessed more efficiently.



OptiFit

NIH/NICHD Phase I Grant #1 R43 HD047071-01A1

A series of pilot studies have been conducted to explore the role of seated position and posture on propulsion biomechanics. Results suggest that seat height has a significant affect on propulsion measures and that there may be an optimal height such that propulsion efficiency is minimized.



Nevada Recreation Trails (NV NRT)

The NV NRT project has been ongoing since 2003. The NV NRT goal is to make Trail Access Information (TAI) widely available for a variety of trails in Northern NV. During 2006, priority trails were determined for Douglas, Washoe, Carson City, and Sparks Counties. Over 15 trails were assessed. In addition, a social trail at the Tahoe Meadows Interpretive Trail was obliterated with the help of volunteers and some trail reconstruction was completed.



Tahoe Meadows Interpretive Trail
Lake Tahoe, Nevada

Tahoe Meadows Interpretive Trail

Length: 1.5 mi (2.3 km)

Hiking

Dogs On Leash

Grade

Typical Grade: 2.3%

7% of the trail is 6%

327 ft (100 m) is 7%

2% grade is a standard range

X-Slope

Typical Cross Slope: 2.0%

30% of the trail is 3% to 5%

304 ft (93 m) is 6% to 10%

Tread Width

Typical Tread Width: 7.5 ft (2.3 m)

Minimum Clearance Width: 42 in (107 cm)

Surface Type

Aggregate / Gravel

82% is Firm or better

1400 ft (420 m) is Soft or worse

Obstructions

Rock: 2 inches high

Stump: 1 inch deep

Root: 2 inches high

NOTES: For maximum use of the trail, a 200 lb person should not exceed a 10% grade. The trail is not designed for use by people with a weight of more than 200 lb. The trail is not designed for use by people with a weight of more than 200 lb. The trail is not designed for use by people with a weight of more than 200 lb.

Trail Access Information

Trail Access Information Signage

UTAP Coordinator Workshops

This year over 60 more trail enthusiasts were trained to lead assessments using the Universal Trail Assessment Process (UTAP), with the Florida Office of Greenways & Trails training over 30. This brings the total number of UTAP Coordinators trained to over 800. American Trails has partnered with Beneficial Designs and is now coordinating most UTAP training courses. Beneficial Designs still provides the training materials and tool kits through PaxPress. The next UTAP workshop will be held during the Professional Trail Builders Conference in Reno, Nevada on 4-5 March. For workshop dates and locations, contact either <trails@beneficialdesigns.com> or <www.americantrails.org>.



Ski Area Accessibility

Peter continues to consult for the ski industry, helping to make their facilities and programs more accessible. He is also chair of a RESNA standards committee that developed specifications and test methods for adaptive ski equipment. The document has just gone through final balloting and will soon become a national standard. The committee met in December 2006 in conjunction with the annual 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 Atlanta. Peter also continues as Convener of the ISO Working Group on Wheelchair Test Methods. ISO meetings took place in Gratz, Austria in March and in Perth, Australia in October 2006. Revisions of the United States RESNA standards are scheduled to be completed in 2007.

Wheelchair Training Guides

The Manual and Powered Wheelchair Training guides 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>.

Design Consulting

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>.

COMPLETED PROJECTS

Canoe Seating System

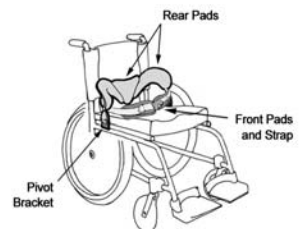
NIH/NICHD SBIR Phase II Grant #2 R44 HD36944-02A1
The Universal Design Canoe Seat is finished and is now commercially available! The seat attaches to the sides of the canoe, replacing the existing bench seat. It provides adjustable pelvic, back, and side supports and has an adjustable seat angle to improve balance and comfort. For more product information, please contact Chosen Valley Canoe Accessories <cvca@gear4portaging.com>.

FlexRim

NIH/NICHD 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 will be manufactured by Spinergy and will be commercially available in 2007!

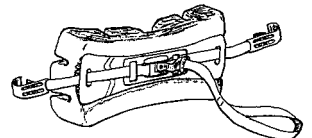
HipGrip

NIH/NICHD 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 currently being manufactured and distributed by Bodypoint <www.bodypoint.com> worldwide!



PaxBac

NIH/NICHD Phase II Grant #2 R44 HD29983-02
The PaxBac is a lightweight back support on 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>.



Universal Trail Assessment Process (UTAP)

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

The UTAP is a successful systematic methodology for measuring all types of trails and roads. It has been adopted by 5 states. Tools and training materials are distributed through PaxPress, Ordering information and forms may be requested through <paxpress@beneficialdesigns.com>

UTAP Training the Trainer

USDA Phase 2 Grant #00-33610-9415

There are currently four master level III trainers (three in the U.S. and one in Canada) who train other trainers. There are 15 level II trainers (12 in the U.S and 3 in Canada) who lead UTAP trainings, and there are over 50 level I trainers who assist with UTAP trainings. Train-the-Trainer manual, training materials and presentations are available through PaxPress <paxpress@beneficialdesigns.com>.

TrailWare^{2.0} UTAP Software

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

TrailWare^{2.0}, data processing software for the UTAP, generates trail access information, signage and trail management reports. It is available through PaxPress. Several state agencies and organizations are using TrailWare for their trail assessment needs. Over 650 trails across more than 20 states have been processed through TrailWare and uploaded to the TrailExplorer Website <www.trailexplorer.org>. The next TrailWare^{2.0} training will be held in Reno, Nevada 6 March 2007 during the Professional Trail Builders Conference. For information contact either <trails@beneficialdesigns.com> or <www.americantrails.org>.

Funding Agencies and Other Acronyms:

ISO International Organization for Standardization
SBIR Small Business Innovation Research
NICHD National Institute of Child Health and Human Development
RESNA Rehabilitation Engineering and Assistive Technology Society of North America
NIH National Institutes of Health
USDA United States Department of Agriculture

Surface Accessibility

NIH SBIR Phase II Grant #2 R44 HD30979-02

The Rotational Penetrometer (RP) can measure the firmness and stability of trail surfaces, carpet, and other pedestrian routes. The RP is commercially available through Beneficial Designs. It is now being reviewed for application in ASTM F1951, the standard test method for playground surfaces. For more information contact <trails@beneficialdesigns.com>.



Universal Design Guidelines for Fitness Equipment (UDFE)

NIH/NICHD Phase I Grant #1 R43 HD049236-01

Phase I of the UDFE project is complete. Design, construction, and installation guidelines for the universal design of aerobic and strength training equipment were developed. Look for these draft guidelines on the Beneficial Designs Website soon <www.beneficialdesigns.com>!



Special Thanks & Acknowledgments

We would like to thank past employees Paula Frey, Annabelle Monti, and Thomas Robson and those in the Nashville office whose work on our projects was invaluable. We are grateful to our technical consultants Tom Frazier, Eric Class, and Jay Frey for their assistance with setting up our new facilities and Barton Cline for his assistance with our HETAP programming.

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