



# HERL Quarterly Newsletter

VOLUME 1, ISSUE 4

WINTER EDITION  
DECEMBER 2002

## LETTER FROM THE EDITOR

Welcome to the winter issue of the HERL Quarterly Newsletter. One of the biggest developments at HERL since the last newsletter is our director Dr. Rory Cooper's receipt of the prestigious Olin E. Teague award on September 18, 2002. The Teague award is given to a VA employee or team of employees whose accomplishments have been of special benefit to veterans with service-connected problems. The award honors the late Olin E. Teague,



Rory Cooper receiving the Olin E. Teague award from the Honorable Leo S. Mackay, Jr., Deputy Secretary of Veterans Affairs, at a ceremony on September 18th.

who was an advocate for disabled veterans as well as a U.S. Representative and Chairman of the House Committee on Veterans Affairs. The Teague award is the highest award given by the U.S. Department of Veterans Affairs. The award was presented to Dr. Cooper at a ceremony in Washington, D.C. The award honors Dr. Cooper's contributions to the rehabilitation of people with paralysis to include the design of modern manual and power wheelchair standards, the development and implementation of wheelchair standards, the understanding of secondary disabilities among wheelchair users, and the need for improving community integration for veterans who use wheelchairs.

In other HERL news, this fall we had the privilege of working with Dr. Luc van der Woude from Amsterdam. Dr. van der Woude, a colleague in the field of wheelchair research, was a HERL visiting faculty member from June until October. During his sabbatical, Dr. van der Woude lectured, wrote, consulted, and also encouraged HERL employees to have some fun. Shortly before returning to Amsterdam, Dr. van der Woude organized a wheelchair basketball game in the VA gym and encouraged HERL faculty, staff, and students to play. (read more about Dr. van der Woude's visit on page 5)



The HERL wheelchair basketball game in September.



Teams of junior high students working through Techlink will program this LEGO robot to use sensors to perform lifting and grabbing tasks.

As I am writing this, plans are underway at HERL for a Tech-Link Robotics Camp, which will take place on November 16 here at the Highland Drive VA. The camp's goal is to inspire interest in math, science, and technology in junior high students with and without disabilities. HERL engineers will mentor several teams of Tech-Link students in programming and maneuvering a LEGO Mindstorm robot. We hope this robotics camp will lead to future involvement in an officially sanctioned FIRST Lego League Robotics Competition. We will report on the results of the Tech-Link Robotics Camp in the next edition of the HERL Quarterly newsletter, which will be published in March 2003. If you are interested, please visit our website at [www.herlpitt.org](http://www.herlpitt.org).

Once again I want to thank all of our research participants and colleagues for all their encouragement and input on the HERL Quarterly Newsletter. This issue completes our first year of publishing the newsletter. I continue to encourage readers to submit materials to be published so HERL can continue to disseminate all kinds of information pertinent to people with disabilities, disability organizations, and those involved in rehabilitation research.

HERL wishes you all a happy holiday season and a happy new year!



*Christine Henner*

Editor, HERL Quarterly Newsletter

INSIDE THIS ISSUE:	
Current Research Abstracts	2-3, 6
Publications/Media	4
Current Events/Classified	4
Visiting Faculty Profile	5
Featured HERL Student	7
Agency Spotlight	7
Research Participant Spotlight	6

## CURRENT RESEARCH ABSTRACTS

### Range of Motion and Stroke Frequency Differences Between Manual Wheelchair Propulsion and Pushrim Activated Power Assisted Wheelchair Propulsion

Tom Corfman, M.S., Rory Cooper, Ph.D., Michael Boninger, M.D.,  
Alicia Koontz, Ph.D., ATP, Shirley Fitzgerald, Ph.D.

#### Purpose of the Work:

The purpose of this investigation was to examine the use of the Yamaha JWII pushrim-activated power-assist wheel (PAPAW) as a method for decreasing upper extremity range of motion (ROM) and propulsion frequency in manual wheelchair users. It was hypothesized that the use of the JWII PAPAW would reduce upper extremity ROM and propulsion frequency when compared to conventional pushrim propulsion.

**Procedures:** Ten manual wheelchair users were examined for upper extremity joint ROM and stroke fre-



The Yamaha JWII PAPAW

quency while using their own wheelchair and a wheelchair equipped with PAPA wheels.

**Results:** The use of the PAPAW decreased shoulder flexion/extension, and horizontal flexion/extension; elbow flexion/extension; and wrist flexion/extension and ulnar/radial deviation for many speed and resistance combinations. Stroke frequency was unaltered in all cases.

**Relevance to Wheelchair Users:** The use of the PAPAW may reduce the incidence of upper extremity injury in the manual wheelchair user population and allow individuals to remain in a manual wheelchair longer before transitioning to an electric-powered wheelchair, thus affording the benefits of exercise.

-Tom Corfman, M.S.

### Analysis of Whole-Body Vibrations of Suspension Manual Wheelchairs: Utilization of the Absorbed Power Method

Erik Wolf B.S., Rory A Cooper Ph.D., Andrew Kwarciak B.S.E.

**Purpose of Work:** Because wheelchair users use their chairs as a primary mode of mobility, the prolonged exposure to transmitted forces can cause secondary injuries such as spinal disc degeneration, and low-back pain. Based on the exposure magnitudes of vibrations defined in the ISO-2631 standard, wheelchair companies added suspension to their wheelchairs to reduce the level of vibrations that are transmitted to a manual wheelchair user. Using the absorbed power method to evaluate the amount of whole-body vibrations that are transmitted to a manual wheelchair user, do suspension manual wheelchairs reduce these vibrations?

**Procedures:** A male with a spinal cord injury at the T7/8 level with over twenty years of manual wheelchair experience served as the test pilot in this study. Six manual wheelchairs were used in this study; three suspension wheelchairs, the Quickie XTR, Invacare A6S, and Colours Boing and three cross brace folding wheelchairs, the Invacare Action Xtra, E&J Epic, and Quickie 2. The test pilot was asked to descend three curbs of increasing height (50mm (2"), 100mm (4"), and 150mm (6")). Each of the wheelchairs was instrumented with three devices. The first device measured the vibrations at the seat, the second measured the vibrations at the head, and the third measured the forces experienced by the wheelchair from the curb

descents. A computer program was written to convert the raw data to absorbed power and the results were calculated.

**Results:** For each of the wheelchair types, the suspension wheelchairs and the non-suspension wheelchairs the absorbed power increased

as the height of the curbs increased. Visually, the absorbed power of the suspension wheelchairs was less than that of the cross brace wheelchairs. However the statistics showed that the difference was not significant.

**Relevance to Wheelchair Users:** This data is clinically important because it could present a justification to prescribe a suspension manual wheelchair over a non-suspension manual wheelchair to reduce to incidence of low-back pain and other secondary injuries, and therefore reducing hospital costs and personal injury to veterans who use manual wheelchairs.



Subject descending the 100mm curb

-Erik Wolf, B.S.

## CURRENT RESEARCH ABSTRACTS

### Shoulder Kinematics And Kinetics During Two Speeds of Wheelchair Propulsion

Alicia M. Koontz, Ph.D., ATP, Rory A. Cooper, Ph.D.,  
Michael L. Boninger, M.D., Aaron L. Souza, M.S., Brian T. Fay, Ph.D.

**Purpose of the Work:** Daily wheelchair propulsion has been associated with the development of repetitive strain injuries at the shoulder. Limited data have been published on the shoulder due to the complexity of the joint and limitations in instrumentation to measure arm motion and strain. This study determined the loads acting on the shoulders and its corresponding movement patterns during wheelchair propulsion to understand possible precursors to injury.

**Subjects/Procedures:** Twenty-seven adult individuals with paraplegia volunteered to participate in this study. The subjects' own manual wheelchairs were instrumented with wheels that measured applied hand force and torque. Their arms were prepared with markers for tracking their arm movements. Subjects' propelled on roller system at two constant speeds (2 and 4 mph) while data were collected. A mathematical model was applied to calculate the loads and motion of the shoulder joint.



In this study, markers were placed on these points on the body to track the subjects' arm movements while propelling a wheelchair.

**Results:** The shoulders moved through a greater range of motion and had calculated loads that were nearly 2 times greater at the fast speed compared to the slow speed. Maximum loads tended to occur when the shoulder joint was in a position commonly associated with repetitive type injuries involving the rotator cuff.

**Relevance to Wheelchair Users:** Certain shoulder positions combined with large loads acting on the shoulder during wheelchair propulsion may predispose people who use manual wheelchairs to shoulder pain and injury. Propelling at slow speeds (< 2 mph) minimizes shoulder strain. This study also provides insight into interventions and training strategies for preventing shoulder problems.

-Alicia Koontz, ATP, Ph.D.

### Mechanical Properties of Polyurethane Elastomers in an Oblique Angled Suspension Caster Fork for Wheelchairs

Corey Blauch, B.S. Rory Cooper, Ph.D., Songfeng Guo, Ph.D., Mark McCartney, B.S.,  
E. Wolf, B.S. Michael Dvorznak, B.S.



The Oblique Angled Suspension Caster Fork

**Objectives:** The purpose of this study is to understand how different hardnesses of a shock absorbing rubber (elastomer) work in a suspension caster. The rubber in suspension casters must have a specific hardness for a specific body weight in order to absorb shock properly. The rubber must also be able to absorb shock for the life of a wheelchair. Polyurethane was chosen as the absorbing rubber because it is virtually unaffected by temperature and it will return to its shape even after constant pressure on it.

**Methods:** The study consisted of two tests: a load-deflection test and a duration test. A compression testing device was used to measure the amount of deflection when the caster was loaded on the device as it would be over common obstacles. This testing allows us to make some

generalizations about what hardness of polyurethane is appropriate for different body weights. The same compression testing device was used to measure the long term effects of loading the elastomer by measuring the reaction force of the rubber while simulating five years of loading. This testing allows us to notice any fatigue in the rubber by a decrease in reaction force.

**Results:** The load-deflection testing results show that they could be used in selecting a proper rubber for a suspension caster. The fatigue testing results showed no loss in reaction force throughout the whole test.

**Relevance to wheelchair users:** The fatigue testing proved that polyurethane is an appropriate material to be used in suspension casters. It will last at least five years (and most likely more) without weakening. The load-deflection testing showed how to choose the appropriate hardness of elastomer depending on expected load on casters.

-Corey M. Blauch, B.S.

## RECENT HERL PUBLICATIONS

Fay B, Boninger ML, The Science Behind Mobility Devices for Individuals with Multiple Sclerosis, **Medical Engineering and Physics**, Vol. 24, No. 6, pp. 375-383, July 2002.

Sachs-Ericsson N, Hansen NK, Fitzgerald S, Benefits of Assistance Dogs: A Review, **Rehabilitation Psychology**, Vol. 47, No. 3, pp. 251-277, August 2002.

Souza AL, Shimada SD, Koontz AM, Ground Reaction Forces During the Power Clean, **Journal of Strength and Conditioning Research**, pp. 423-427, Vol. 16, No. 3, August 2002.

**Spinal Cord Medicine: Principles and Practice**, Vernon Lin, M.D., *Editor*, Demos Medical Publishing, New York, NY, 2003

Wheelchairs and Seating, R.A.Cooper, M. L. Boninger, R. Cooper, T. Thorman, Ch. 46, pp. 635-654

Musculoskeletal Pain and Overuse Injuries, M.L. Boninger, R.A. Cooper, B. Fay, A. Koontz, Ch. 38, pp. 527-534

## HERL IN THE MEDIA

**Pittsburgh Post-Gazette, July 29, 2002, Page A-6:** Award Winners

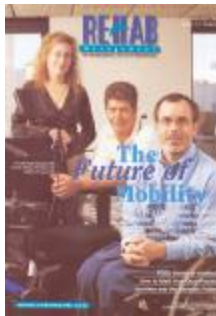
**VA Research Currents, Vol. 2, No. 8, August 2002, Page. 3:** Career Milestones: Rory Cooper/Michael Boninger

**Pittsburgh Post Gazette, Monday, August 12, 2002:** Riverside Margarita

**Pittsburgh Post Gazette, September 17, 2002, Page B-1:** We Have the Ability to Do More

**The Times/Beaver Newspaper, September 17, 2002, Page A-8:** Pitt Professor Develops Sturdier Wheelchair

**Pitt Campaign Chronicle, September 23, 2002, Page 26:** Cooper Receives Highest Veterans Affairs Award



**University Times, September 26, 2002, Page 11:** People of the Times: Rory A. Cooper

**Rehab Management, Vol. 15 No. 8, November 2002, pp. 18-22:** Making Moving Easier

## CURRENT EVENTS/CLASSIFIED

*If you know of a current event or have an ad that you would like to post in the HERL Quarterly Newsletter, please contact Christine Heiner at (412) 365-4854 or by e-mail at heinercm@pitt.edu*

The Northwest Region of the Multiple Sclerosis Association of America needs your help! Volunteer group leaders are needed to facilitate support groups for individuals with MS. If you are interested in volunteering, please contact director Susan Freund at 1-800-833-4672, ext. 106.

Almost new handcycle for sale: 1997 Quickie Shadow Mach II handcycle, hardly used. Adjustable footrests, sliding seat, seat pillow, 3 speed. Cranks smoothly. Color: Antique Bronze. Best offer. Please contact Jan Martin, (412) 882-6807.

Dancing Wheels, a theatre company comprised of dancers with and without disabilities, will be performing the holiday show "The Snowman" from Dec. 6-8 at the Tri-Metro Campus Theatre in Cleveland. Tickets are \$15 or \$10 each for groups of 10 or more. "The Snowman" will also run at the Stranahan Theatre in Toledo, OH starting Feb. 25th. For tickets, call (216) 432-0306.

If you use a wheelchair, WE NEED YOU for our study, Functional, Psychological, and Economic Benefits of Service Dog Partnerships (Note: You do **NOT** need to have a service dog to participate in our study). The VA R&D Center of Excellence for Wheelchairs and Related Technology and the University of Pittsburgh are conducting a study to examine the effect service dogs have on wheelchair users with regard to function, psychological and socioeconomic factors. We are interested in information about individuals who use wheelchairs and either own service dogs, are on a waiting list to receive a service dog, or are not interested in obtaining a service dog.

You are eligible for the research study if you are:

- 18 years of age or older
- Use a wheelchair or scooter as your primary means of mobility (for 75% of mobility)

And **ONE** of the following:

1. Use a service dog

(continued on next page)





## Visiting Investigator Profile: Luc van der Woude, Ph.D.

Luc van der Woude, Ph.D. came to Pittsburgh on June 22nd from Vrije Universiteit in Amsterdam, where he is an associate professor at the Department of Kinesiology, Faculty of Human Movement Sciences, and member of the research school Institute for Fundamental and Clinical Human Movement Sciences. Dr. van der Woude chose to take a sabbatical at HERL in the hopes of experiencing a different research and teaching environment in a field of expertise similar to his own. "In the field of wheelchair research there are basically two leading labs in the world: Pittsburgh and Amsterdam," said van der Woude. The fact that he is an adjunct associate professor at Pitt's Department of Rehab Science and Technology and had visited HERL several times naturally lead to the idea of Dr. van der Woude spending a sabbatical at our lab.

Dr. van der Woude kept busy during his 3-month visit. He traveled to Cleveland with the HERL research team to participate in the 2002 National Veterans Wheelchair Games. He also began working with Drs. Cooper and Boninger on a collaborative textbook, "Biomechanics and Physiology of Manual Wheelchair Use." Dr. van der Woude had the opportunity to provide his perspective in the writing of HERL research papers and grant proposals as well.

Dr. van der Woude also taught a four part RST Stu-



Dr. Van der Woude visited HERL from June until October 2002.

dent Lecture Series and Visiting Faculty Lectures at the University of Pittsburgh. Dr. van der Woude was eager to introduce rehab research from his university and compare and contrast it with HERL's approach. "Our much more biologically steered 'Amsterdam' perspective differs from some degree from the more engineering perspective at HERL," said van der Woude of his lecturing experiences. "The teaching was great fun to do."

In addition to lecturing, consulting, and writing, Dr. van der Woude also organized a memorable wheelchair basketball game which took place in the Highland Drive VA gym. HERL faculty, staff and students were all eager to participate in the basketball game.

Dr. van der Woude returned to Amsterdam on October 4th. His absence was immediately felt at HERL; he provided much insight and laughter during his visit to the lab. "All has taught me to appreciate even more the somewhat different approach HERL takes in our mutual research field, much more geared towards engineering and clinical application," van der Woude said. "The position of HERL in that is crucial, so much closer to clinical practice... a part of an impressive and unprecedented VA and UPMC system, unknown in my country."



Dr. van der Woude explains the rules before the HERL wheelchair basketball game

by Christine Heiner

## CURRENT EVENTS/CLASSIFIED

(continued from last page)

2. Are on a waiting list to obtain a service dog
3. Are not interested in obtaining a service dog.

If you agree to participate in the study, you will be asked to answer questionnaires.

These people will be asked to complete questionnaires 3 times over 9-months:

1. People waiting lists to obtain service dogs
2. People who have received a service dog in the past two weeks

These people will only be asked to complete questionnaires once:

1. If you have had a service dog for more than two weeks
2. If you are not interested in obtaining a service dog.



These questionnaires will take no more than 1 hour to complete and will ask questions about basic information like age, gender, type of disability, socioeconomic information (education, occupation, etc.), and healthcare use. In addition, they will ask about your level of happiness, life satisfaction, social life, your abilities to do everyday activities, and if you have a dog as a pet. All answers that you provide will be kept **strictly confidential**. You will be paid \$20.00 for your time every time you complete a questionnaire.

Your participation in this study is **strictly voluntary**. If you are interested in participating or have any questions, please do not hesitate to contact us:

**Shirley G. Fitzgerald, PhD at 1-412-365-4840 -or-  
Diane Collins, OTR/L at 1-412-365-4844 or email  
Diane at: dmcst84@pitt.edu**

## RESEARCH PARTICIPANT SPOTLIGHT: GREG TRAYNOR



Gregory Traynor and Nala

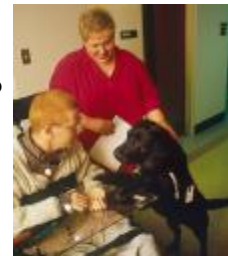
Greg Traynor and his companion, a friendly black Labrador retriever named Nala, have made quite a few visits to the Human Engineering Research Laboratories recently. Greg initially came to HERL to participate in a research study involving a wheelchair-mounted robotic arm. HERL investigators learned that he just so happened to have a wheelchair service dog. Greg went on to participate in one of HERL's wheelchair service dog studies as well as our Outcomes study. Greg also became somewhat of a "HERL celebrity" when he and Nala agreed to pose in a picture with Diane Collins, the lead student on HERL's service dog study. The photo ran

with an article profiling Pitt's School of the Health and Rehab Sciences (SHRS) in the May 28, 2002 issue of the Pitt Campaign Chronicle.

Greg, who earned his bachelor's degree in Administration of Justice from Penn State University, just started graduate school this fall. He is studying for a masters degree in Rehabilitation Counseling, a program under SHRS just like Rehab Science and Technology and HERL. He's also working with adaptive driving equipment and should be on the road shortly. Greg's long term goal is to work as a rehabilitation counselor for PA's Office of Vocational Rehabilitation (OVR).

Greg's already working to provide support to people who have disabilities; he runs an internet group though Yahoo called "pa service dogs." The group provides a discussion forum for people with disabilities who use service dogs in Pennsylvania.

To learn more about Greg's service dog internet group, visit <http://groups.yahoo.com/group/paservicedogs/>.



Greg, Nala, & Diane in the Pitt Campaign Chronicle

-Christine Heiner

### Evaluation of Selected Sidewalk Pavement Surfaces

Rory A. Cooper, Ph.D., Erik Wolf, B.S., Shirley G. Fitzgerald, Ph.D.,  
Annmarie Dobson, O.T.R., William Ammer, B.S.

**Purpose of the work:** To conduct an evaluation of the vibration exposure during electric powered wheelchair driving and manual propulsion over selected sidewalk surfaces. The mechanical energy requirements for manual wheelchair propulsion were also examined.

**Participants and Design:** Ten unimpaired individuals gave written informed consent to participate in this study. Evaluation of vibration exposure and energy requirements for selected sidewalk surfaces was calculated. Six surfaces were tested. One surface was a poured concrete sidewalk with a brush finish to represent the norm (Surface 1). Three sidewalk surfaces were made from interlocking concrete pavement installed to industry specifications. Surfaces 2, 3, and 4 were made of concrete pavers of varying bevels and placed in a 90 degree herringbone pattern. Surfaces 5, and 6 were clay pavers and placed in a 45 degree hemmingbone pattern. The interlocking concrete pavement surfaces were constructed of blocks with squared edges (Surface 2), 3.2 mm (1/8") beveled edges (Surface 3), and 6.4 mm (1/4") beveled edges (Surface 4).

**Results:** For both the manual and electric powered wheelchair, at 1 m/s, significant differences were found in peak accelerations between the seat and footrest ( $p < 0.0001$ ) and between the sidewalk sur-



Shock and vibration were measured as subjects propelled manual wheelchairs over these six pavement surfaces

faces ( $p = 0.004$ ). The peak accelerations at the seat for surfaces 2, 5 and 6 were lower than the standard sidewalk surface. Similar results in the peak accelerations were found with the electric powered wheelchair at 2 m/s. Results from the mixed model indicated that the sidewalk resulted in significantly higher ( $p < 0.0001$ ) vibration for most of the octaves examined.

**Relevance to Wheelchair Users:** The greatest risk for injury due to shock and vibration exposure is when the frequency is near the

natural frequency of seated humans. The natural frequency of seated humans is between 4 Hz and 12 Hz. The sidewalk surface resulted in higher or no difference in power per octave in throughout most of natural frequency range of seated humans. The work required to propel over the surfaces tested were not statistically significantly different. This is probably because the surfaces all had similar grade and no cross-slope. Besides appearance and construction concept, the only substantive distinguishing characteristic was surface roughness due to the joints. Comparison to ISO 2631, shows that at 1 m/s all surfaces, but surfaces 4 and 5 exceed the exposure limit after greater than eight hours of wheelchair driving. It is unlikely that wheelchair users will spend more than eight hours driving over sidewalk surfaces at a given stretch.

-Erik Wolf, B.S.

## AGENCY SPOTLIGHT: Paralyzed Veterans of America (PVA)

Paralyzed Veterans of America (PVA), founded in 1946, is a congressionally-chartered organization dedicated to serving the needs of veterans of the armed services who have spinal cord injuries. PVA had developed a unique expertise that makes the organization the leading advocate for its' members, forging for quality health care, civil rights, and opportunities that maximize independence. PVA is also an advocate for research and education in the field of spinal cord injury and dysfunction. In 1975, the Paralyzed Veterans Board of Directors created the Technology and Research Foundation, which was renamed the Spinal Cord Research Foundation (SCRF) in the 1980s.

SCRF is a non-profit corporation committed to supporting research to improve the quality of life and find better treatments and cures for people with spinal cord injury. SCRF also provides grant funding for research in this area. The Human Engineering Research Labs have received several grants from both SCRF and PVA. HERL would not exist without PVA's support; in fact, Paralyzed Veterans of America provided the funding to Dr. Rory Cooper, a lifetime PVA member since 1981, to start up HERL in 1994.

The Keystone Paralyzed Veterans of America (KPVA) chapter serves Pittsburgh and western Pennsylvania. KPVA has a strong commitment to improving the quality of life and pro-

tecting the rights of SCI or neurologically impaired patients. This chapter strives to support SCI research and fights for the rights of people with disabilities, especially in issues concerning accessibility and barrier-free design. Part of

their mission is to improve the quality and increase the quantity of opportunities in wheelchair sports and recreation. KPVA has supported HERL in our research efforts at the National Veterans Wheelchair Games. KPVA has also

helped us in disseminating the results of our research to people with disabilities by allowing us to publish lay abstracts from our studies in their monthly newsletter, *The Parascope*. Many KPVA members and officers have generously participated in HERL research studies and served on HERL advisory boards.

KPVA will be holds it's annual banquet at the 911th Airlift Wing/SVBC in Coraopolis on November 16th. The banquet is an opportunity to honor the KPVA members and officers who so generously and enthusiastically serve the organization, who's only support comes from contributions made by the general public. A group of HERL faculty, staff and students will be attending the KPVA banquet.

To learn more about PVA national, visit their website [www.pva.org](http://www.pva.org). For more info on KPVA, visit their website [www.kpva.org](http://www.kpva.org) or call them at 412-220-7533.

-Christine Heiner



Dr. Cooper and KPVA athletes at the 2000 National Veterans Wheelchair Games



PVA Deputy Executive Director John Bollinger presented HERL with a donation at the lab dedication in 1994.

## FEATURED HERL STUDENT: IAN RICE



Ian Rice joined the Human Engineering Research Laboratories this past September to pursue a doctoral degree in Rehabilitation Science and Technology. Even though he is a new student, Ian was no stranger to HERL when he arrived in the fall. He graduated with his masters degree from the Occupational Therapy program at Washington University in St. Louis; Ian was a student of David B. Gray, Ph.D., a collaborating investigator on HERL's University of Pittsburgh Model Center on Spinal Cord Medicine. Ian also participated in our CULP-SCI advisory board meetings in May to help us evaluate our progress on the collaborative project.

Ian is working with Dr. Michael Boninger in the wheelchair biomechanics laboratory. Although his doctoral studies have just begun, Ian says he plans to continue a career in research after he receives his Ph.D.

On Sunday, Sept. 29th, Ian and other HERL students competed in the annual City of Pittsburgh Great Race. Ian placed 2nd overall in the 10K wheelchair competition and placed 1st in the quad wheelers division, winning a \$150 award. He also set a course record in his division, completing the 10k race in 28:33.

-Christine Heiner



Human Engineering Research Laboratories

Mailing Address:  
VA Pittsburgh Healthcare System  
7180 Highland Drive  
Building 4, 2nd Floor East Wing, 151R-1  
Pittsburgh, Pa, 15206

Phone: 412-365-4850  
Fax: 412-365-4858

E-mail any comments, corrections, or questions concerning  
the newsletter to the editor, Christine Heiner at:  
Email: heinercm@pitt.edu

VA Center Of Excellence For Wheelchair  
And Related Technology  
University of Pittsburgh Model Center on  
Spinal Cord Injury

Rory A. Cooper, Ph.D.  
*Director*

Michael L. Boninger, M.D.  
*Medical Director*

Shirley G. Fitzgerald, Ph.D.  
*Associate Director of Research,  
VA R&D Center of Excellence for  
Wheelchair and Related Technology*

## Interested in Participating in a HERL Research Study?

Research studies at our laboratories involve participants who utilize manual or power wheelchairs as a means for mobility. The majority of our studies involve a visit to the Human Engineering Research Laboratories located at the Highland Drive VA Medical Center in Pittsburgh, PA. However, some of our studies are survey based and do not involve travel.

*If you're interested in participating  
in a HERL Research Study, contact  
our clinical coordinators Rosemarie  
Cooper or Annmarie Dobson at  
(412) 365-4850.*

If you are interested in obtaining further information about how you can participate in current or future studies, please contact Annmarie or Rosi, Clinical Coordinators for the Human Engineering Research Laboratories at (412) 365-4850. We look forward to hearing from you.

