



VA Center Renewed

We are very proud to announce that the Department of Veterans Affairs Rehabilitation Research and Development Service (RR&D) has renewed HERL as the VA Center of Excellence for Wheelchairs and Associated Rehabilitation Engineering (WaRE).

RR&D recognizes these Centers as sites of rehab research that attract the brightest minds from academia, industry, and medicine into the VA and focus on finding research solutions to the needs of veterans with disabilities. WaRE is one of only 16 currently funded VA RR&D centers of excellence in the U.S.

This is the third time HERL has received the VA Center of Excellence. Our first center was awarded in 1999, concentrating on wheelchairs and related technology. When awarded a second round of funding in 2004, we broadened our research focus to include not just wheelchairs, but other types of assistive technologies for veterans and all people with disabilities. With this center renewal, HERL will receive continuous funding for five years.

The Center will continue to focus on the design, development, evaluation, and clinical

application of new technologies to improve the mobility of people with physical, cognitive, and sensory impairments.

Planned research projects in the new center include:

- Examining the relationship between activity, cardiovascular disease, and upper limb pain
- Building a GPS community of wheelchair users to track mobility patterns
- Evaluating and building new robotic technologies
- Design and development of a throwing and strength conditioning wheelchair for participation in sports
- Studying veterans who transition from using prosthetics to wheelchairs

We are very excited to continue researching solutions to improve the lives of veterans and all people with physical disabilities.

-Christine Heiner

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In May VARR&D reviewers toured HERL as part of our VA Center's Site visit prior to its renewal. (Left): Grad student Nahom Beyene demonstrates to Program Managers Bob Jaeger and Jay Freedman how the Forward Folding Ultralight Wheelchair disassembles and folds to fit in a airplane overhead compartment. (Middle): Padmaja Kankipati explains our wheelchair transfer research. (Right): Eun-kyoung Hong shows the center reviewers the ADI Designs Lightweight Adjustable wheelchair backrest she is testing in our Design and Prototyping lab.

CURRENT RESEARCH ABSTRACTS

Design, Development, and Testing of a Low Cost Electric Powered Wheelchair for India

Jon Pearlman, PhD, Rory Cooper, PhD, HS Chhabra, MD, Alexandra Jefferds, BS

Full article published in **Disability and Rehabilitation: Assistive Technology**, pp. 42-57, Vol. 4, No. 1, January 2009.

Purpose. There is a tremendous unmet need for appropriate wheeled mobility devices in developing countries. As part of a larger initiative to improve wheeled mobility designs in developing countries, we designed and developed an appropriate, low-cost electric powered wheelchair (EPW) for the Indian subcontinent.

Methods. We performed the following multi-phase design process: (1) Conceptual Design, (2) System Design, Prototype I fabrication, focus group testing with Indian stakeholders (n=29), (3) System re-design, Prototype II fabrication, and user trials with US (n=5) and Indian (n=25) subjects.

Results. (1) Preliminary investigations revealed that a conventional EPW design was infeasible due to the high component cost. Instead, we constrained our design to incorporate a single drive motor and manual steering, with the option of upgrading to power steering where economically feasible. (2) The first prototype was fabricated out of easily available,



L: 2nd generation SIMPL-EPW referenced in this study.
R: Current progress on the 3rd generation SIMPL-EPW

low-cost materials. Focus group testing demonstrated feasibility of the design and revealed differences between stakeholder groups. (3) Prototype II incorporated feedback from the first focus group and a needs assessment. US subjects provided valuable design advice prior to the India trials.

Indian subjects traveled

further in the SIMPL-EPW than their own manual wheelchair (MWC). Depending on spinal injury level, Indian subjects found the entire (tetraplegia) or outdoor portion (paraplegia) of the obstacle course significantly less challenging in the SIMPL-EPW compared to their own MWC.

Relevance: Wheelchair users in developing countries deserve high quality mobility devices to increase their quality of life. Once fully developed, the SIMPL-EPW may offer a low-cost indoor/outdoor mobility solution for people with disabilities.

-Jon Pearlman, Ph.D.

Satisfaction Related to Wheelchair Use in Older Adults in Both Nursing Homes and Community Dwelling

Amol Karmarkar, PhD, Diane Collins, PhD, Annmarie Kelleher, MS, OTR/L, Rory Cooper, Ph.D.

Full article published in **Disability and Rehabilitation: Assistive Technology**, pp. 337-343, Vol. 4, No. 5, September 2009.

Older adults commonly use wheelchairs for mobility limitations regardless of their living situations. However, very limited outcomes data are available to determine quality of the wheelchairs that older Americans are receiving, as well as their satisfaction with their wheelchair service delivery programs. One hundred thirty two older adults completed the standardized Quebec User Evaluation of Satisfaction with Assistive Technology (QUEST) in our study. Ninety participants were residents in VA or private nursing homes, and 42 were community dwelling individuals. Results suggested better quality manual wheelchairs were used by community dwelling participants compared to those participants living in nursing

homes. The community dwelling group reported higher levels of satisfaction with their wheelchairs as compared to the nursing home participants. Similarly, community dwelling participants who used power wheelchairs were more satisfied with their provision of service delivery. Level of satisfaction should be incorporated as a quality indicator for evaluating wheelchair prescriptions and service delivery programs for older Americans. This study also supports the establishment of a reevaluation process of wheelchair fit as the users age, to aide in provision of the best quality wheelchairs and service delivery programs for recipients within nursing homes and for those living in the community.

-Amol Karmarkar, PhD

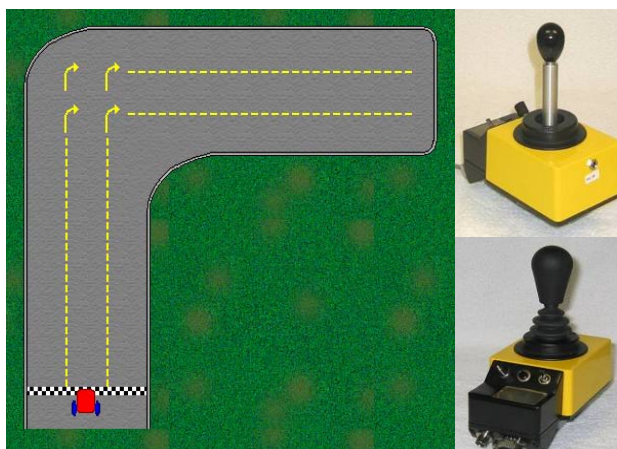
CURRENT RESEARCH ABSTRACTS

Joystick Use for Virtual Power Wheelchair Driving in Individuals with Tremor: A Pilot Study

Brad E. Dicianno, MD, Sara Sibenaller, MS, Claire Kimmich, Rory A. Cooper, PhD, Jay Pyo, DO

Full article published in **Journal of Rehabilitation Research and Development**, pp. 269-276, Vol. 46, No. 2, 2009.

People with disabilities such as Multiple Sclerosis and Parkinson's disease have difficulty operating control interfaces such as standard joysticks due to movement disorders like tremor. We developed a rigid, force sensing joystick that has performed as well as a conventional joystick in previous studies using real and virtual wheelchair driving tasks. In this study, we added to the force sensing joystick a specialized filter that has been used to cancel tremor effectively in microsurgery.



In the virtual driving simulation, the subject must move the virtual wheelchair along the center of a two dimensional track. HERL joystick in motion sensing mode (top) and isometric mode (bottom).

Our goal was to compare a standard joystick, a force sensing joystick, and the force sensing joystick with the filter in individuals with tremor operating a virtual wheelchair driving game. Although the filtering system did not improve driving performance in this study, the joystick without filter yielded better results than the conventional joystick, suggesting force sensing controls may be potentially beneficial alternative devices to minimize the effects of tremor. -Brad Dicianno, MD

Quantification of Activity During Wheelchair Basketball and Rugby at the National Veterans Wheelchair Games: a Pilot Study

Michelle L. Sporner, MS, CRC, Garrett G. Grindle, MS, Annmarie Kelleher, MS, OTR/L, ATP, Emily E. Teodorski, BS, Rosemarie Cooper MPT, Rory A. Cooper, PhD

Full article published in **Prosthetics and Orthotics International**, pp. 210-217, Vol. 33, No. 3, September 2009.

Purpose of work. The purpose of this study was to provide quantitative information of selected characteristics of wheelchair basketball and rugby game play. A miniaturized data logger was used to collect the distance traveled, average velocity, activity time, and number of starts and stops during basketball and rugby games.

Subjects/Procedures. Twenty basketball and 17 rugby athletes were recruited prior to wheelchair basketball and rugby tournaments during the 2007 and 2008 National Veterans Wheelchair Games. Inclusion criteria were age 18 years or older and participation in wheelchair basketball or rugby.

Results. The wheelchair rugby athletes on average traveled 2364.78 ± 956.35 meters at 1.33 ± 0.25 meters/second with 242.61 ± 80.31 stops and starts in 29.98 ± 11.79 minutes of play per game. The wheelchair basketball athletes on average traveled



Rugby and basketball at the 2009 National Veterans Wheelchair Games

2833.53 ± 1207.80 meters at 1.42 ± 0.15 meters/second with 239.78 ± 60.61 stops and starts in 33.16 ± 11.48 minutes of play per game.

Relevance: Previous research has not reported wheelchair basketball or rugby game play variables such as these, making this data set unique. The information could be used by players and coaches to create training protocols to better prepare for game conditions. ~Michelle L. Sporner, MS, CRC

CURRENT RESEARCH ABSTRACTS

Manual Wheelchair Stroke Characteristics During an Extended Period of Propulsion

Ian Rice, MS, Brad Impink, BS, Christian Niyonkuru, MS, Michael Boninger, MD

Full article published in **Spinal Cord**, pp. 413-417, Vol. 47, No. 5, May 2009.

Purpose of Work The way in which a manual wheelchair user (MWU) translates force through the upper extremities to the hand rim, may impact the development of upper extremity pain and injury. The purpose of this study was to examine stroke characteristics of long term manual wheelchair users during an extended manual wheelchair propulsion trial and the extent to which fatigue may alter propulsion biomechanics



Subjects/Procedures Kinetic data was recorded from twenty one subjects with paraplegia at four time points over the course of a 10 minute propulsion trial at a steady state speed of 1.4 m/s. Upper extremity kinetic parameters were recorded using Smartwheels (force and torque sensing pushrims).

Results Subjects propulsion biomechanics changed

from early to late during the 10 minute trial. Individuals displayed decreased maximum rate of rise of resultant force ($p=0.0045$) with a simultaneous increase in push time ($p=0.043$) and stroke time ($p=0.023$), while stroke frequency remained static. In addition, there was a decrease in maximum F_z ($p=0.045$) and maximum rate of rise of MP ($p=0.032$) both of which are considered to be

non productive propulsion forces.

Relevance: It is critical for clinicians and wheelchair users to understand the components of wheelchair propulsion that can lead to development of upper body pain and injury. Knowing and practicing the most effective and safe way to propel a manual wheelchair could improve a MWUs functional independence and overall quality of life.

-Ian Rice, MS

Effects of Handrim Technology on Upper Extremity Musculoskeletal Injury Principal Investigator: Michael Boninger, MD

You may be eligible to participate if...

- You use a manual wheelchair as your primary means of mobility
- Are between the ages of 18 and 65
- Have a spinal cord injury below T1 that occurred after the age of 18 and at least one year prior to enrolling in the study

You are being asked to participate in a research study that will be investigating the differences between different pushrim technologies (standard and ergonomic). The results of this study will be used to help manual wheelchair users choose between different types of pushrims as well as help clinicians to identify which pushrims are more appropriate for their clients. Participation in this study is expected to

take a total of 5 hours. Participants who complete the study will be reimbursed \$100.00.

If you are interested, please contact the Clinical Coordinator, **Michelle Oyster or Annmarie Kelleher** at:

Human Engineering Research Laboratories
VA Pittsburgh Health Care System, 151R1-H
7180 Highland Drive Bldg. 4, 2nd floor, East Wing
Pittsburgh, PA 15206
(412) 954-5297

To verify the validity of this study, you can call Dr. Ali F. Sonel, Associate Chief Of Staff /R&D, VAPHS Institutional Review Board (IRB) at (412) 954-5297.

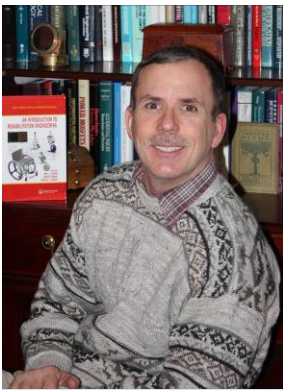
Awards and Accomplishments

In September our Medical Director **Michael Boninger, MD** was appointed Chair of the Department of Physical Medicine and Rehabilitation (PM&R) at the University of Pittsburgh. Dr. Boninger will continue to serve as Associate Dean of Medical Student Research in the School of Medicine.



Michael Boninger, MD

Our director **Rory Cooper, Ph.D.** received several awards over the summer and fall:



Rory Cooper, Ph.D.

- In March both the PA State Senate and House of Representatives honored Dr. Cooper for his many academic and athletic achievements.
- In July, the Honorable John P. Murtha of the U.S. House of Representatives (PA) officially recognized Dr. Cooper's many achievements; his words were published in the July 22 U.S. Congressional Record, proceedings and debates of the 111th congress, first session.

- Dr. Cooper won 5 gold medals at the 2009 National Veterans Wheelchair Games, in the slalom and 4 swimming competitions, class 3 masters division
- The Army gave Dr. Cooper the Outstanding Civilian Service Medal for exceptional leadership, service, and advocacy of severely injured service members at WRAMC from 2004-2008
- Dr. Cooper was also picked to receive the TRCIL Senator John Heinz Memorial award which is given yearly to honor those that have increased opportunities for people with disabilities for equal access in the community. He will be given the award on Sept. 30 awards ceremony.

Jay Pyo, DO from Walter Reed Army Medical Center (WRAMC) won the National Naval Medical Center Academic Research Competition for his work in collaboration between WRAMC and HERL. He received the award at the National Capital Consortium Graduation and Awards Ceremony on June 19.



Jay Pyo conducting HERL/WRAMC research at the 2008 VA/DVA Winter Sports Clinic

Jerry Baylor Places 3rd in VA Art Fair



Jerry Baylor took home 3rd prize in the crafts division for his "pet rocks" at All About Art, the Pittsburgh VA's annual veterans art festival. Jerry is the sports director for Keystone Paralyzed Vets of America and also a frequent HERL research participant.

Jerry's skillfully hand paints rocks and incredibly small pebbles with intricate patterns and designs, or to resemble animals such as turtles and ladybugs. He also displayed a lacquered storage trunk with hand painted scenery at the competition.

Right: Jerry's painting on the top of a storage trunk.

Bottom: Jerry's prize winning pet rocks



1st International Symposium on Quality of Life Technology (QoLT)

By the 2009 Undergraduate Interns (ASPIRE and QoLT REU Programs)

The first annual International Symposium on QoLT was held on June 30 - July 1 at the University of Pittsburgh, where scientists from around the world presented current quality of life technology research. Through this experience, we were able to learn a great deal about the most up-and-coming technologies in this field from some of its top professionals.

The symposium was organized into 5 sessions: Aging & Disabilities, Human System Interaction, Technology and Design for QoLT, Robotics, and Assistive Technology. Over 2 dozen speakers lectured, including 8 keynote speakers and poster presenters.

HERL Director Dr. Rory Cooper was a program chair and keynote speaker. Also presenting from HERL was graduate student Hsin-Yi Liu. Liu presented the HERL/QoLT project Virtual Seating Coach, a device that guides and reminds wheelchair users of proper seating functions. Pressure relieving shifting is crucial for power seat users to avoid pressure ulcers which can lead to very serious damage of the skin. The goal of the Virtual Coach is to remind the users when to shift position for pressure relief, and to guide them on how to do so via a touch screen interface with audio, visual, and text reminders and instructions. Jennifer Collinger, PhD, also from HERL, discussed her work on a direct brain interface for people with disabilities to control assistive devices. She is currently researching technologies using minimally invasive micro Electro-corticography (ECoG) —intracranial electrodes placed directly on the brain surface that record brain activity. Collinger and her research group are evaluating this technology in subjects who are undergoing ECoG monitoring for the treatment of epilepsy. Micro ECoG has enabled these subjects to move a cursor on a computer monitor using their thoughts. Micro ECoG recordings also contain information related to movement that could be used to further develop thought-controlled assistive devices for people with motor impairments.

Conference highlights included innovative work in robotics and artificial intelligence (AI). Adriana Tapus and Maja Mataric from the University of Southern California presented their work on socially assistive robotics. In the first longitudinal study of its

kind, the group researched and developed a music therapy robot with the potential to improve older peoples' brain function. Also notable was University of Tokyo's Tatsuya Harada's AI Goggles, a system consisting of a wearable camera and PC that assists with the recognition and memory of the users who wear it. These goggles are fixed with digital cameras that capture the user's field of view and eye movements, and are used to augment memories by automatically identifying everyday objects in real time. The primary application of

this device will be to aid people with Alzheimer's or other types of memory impairment. Harada feels his system outperforms existing technologies in both accuracy and speed, and is a major contribution to the field of visual and memory assistive systems.

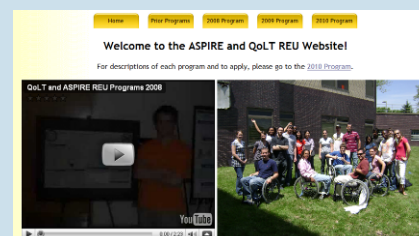
Overall, the symposium evoked a powerful message about the field of assistive technology and the direction it is taking in present

research. The sheer number of topics presented at this conference indicates significant advancement in a field that has recently erupted with innovation. With subjects ranging from assistive robots to improved wheelchair usage, the possibilities for expansion of the field are endless. As the number of individuals with disabilities increases over the years, the importance of such symposiums is clearly demonstrated by the interest generated among the general public and the involvement of the international community.



Harada's AI Goggles

Visit <http://www.herlpitt.org/Internships> to read more about the 2009 interns' experiences and to learn more about the ASPIRE and QoLT REU programs!



2009 National Veterans Wheelchair Games Research

HERL and Walter Reed Army Medical Center (WRAMC) brought six research studies to the National Veterans Wheelchair Games in Spokane, WA, July 13-18. Thank you to the 133 athletes who enrolled in the studies!

- We tested a portable wheelchair propulsion monitoring device and software that measures and recognizes upper limb use and wheelchair propulsion patterns during routine activities as well as over various sloped and surfaced terrains.
- We conducted 2 studies using dataloggers that collect information on wheelchair users' speed, distance travelled, and activity time. In the first study, a datalogger captured info from athletes participating in wheelchair soccer, handcycling, basketball and rugby. Combined with questionnaire data, these findings may lead to improved training techniques and improved equipment design, which may reduce the risk of injury. In the second study, dataloggers were installed on athletes' wheelchairs while at the NVWG and during regular use for an additional 2 weeks. The participants also completed a wheelchair skills test and surveys collecting demographic, health, and lifestyle information. Data collected from this study could potentially be used by



HERL and WRAMC researchers at the 2009 NVWG

clinicians to advocate for the appropriate technology and care for their patients.

- We evaluated athletes transferring out of their wheelchair to a mat table and back into their chair. We evaluated and scored each transfer using an assessment tool we developed. This tool could be beneficial in a spinal cord injury rehabilitation facility by providing clinical staff with valuable information on how well their patient is performing a transfer and which areas of the transfer need to be addressed.
- We organized focus groups to identify situations power wheelchair users encounter when driving and strategies they use to negotiate difficult situations. This info can be used to make driving rules that will assist new power wheelchair users in learning to drive their chairs and researchers in developing driving algorithms.
- We used digital scanning technology to scan the backs of athletes to identify common postural deformities. These scans will be used to develop wheelchair backrest molds to potentially suit the needs of a wide range of wheelchair users.

-Christine Heiner

Upcoming Events and Announcements

The University of Pittsburgh School of Health and Rehabilitation Sciences (SHRS) is holding a Fall Open House on **November 7, 2009**. Take this opportunity to meet with the SHRS faculty, staff, and students, tour their facilities, and learn first hand about the programs and the career opportunities they offer. SHRS offers undergraduate and graduate programs in fields such as Physical Therapy, Occupational Therapy, Rehabilitation Science and Technology, and Rehabilitation Counseling. The open house will be open from 10am—1pm at SHRS

in Forbes Tower on Atwood Street on the University of Pittsburgh Campus, Oakland.

For more information, contact:

SHRS Office of Recruitment

4022 Forbes Tower

Pittsburgh, PA 15260

Phone: (412) 383-6556

Web: www.shrs.pitt.edu

Register online at:

<http://www.shrs.pitt.edu/openhouse>

PerMMA Shown to Prominent Visitors

PerMMA (Personal Mobility and Manipulation Appliance) is a electric powered wheelchair enhanced with robotic arms. We are developing this device to help wheelchair users that have limited hand function, such as people with high levels of spinal cord injury and people with Cerebral Palsy.

PerMMA's robotic arms can be manipulated either by the wheelchair user them self, or via remote control by a user at another location. The wheelchair is fitted with webcams that see that the wheelchair user sees, so the remote user can see the wheelchair user's environment and control the robotic arms to assist them. If the wheelchair user needed assistance completing a task, they could call for help, and an assistant could get on the internet, see the wheelchair user's environment, and use PerMMA's robotic arms to help the wheelchair user complete the task.

PerMMA is currently able to complete tasks such as picking up objects and bringing them within the wheelchair user's reach, heating up food in a microwave, and getting the user a drink of water.

PerMMA is a project of the Quality of Life Technology Engineering Research Center (QoLT)

supported by the National Science Foundation and the Human Engineering Research Laboratories/ Department of Veterans Affairs RR&D Center of Excellence in Wheelchairs and Associated Rehab Engineering. PerMMA also receives support from the National Institutes of Health and the

Paralyzed Veterans of America.

On July 9th, PerMMA was exhibited at an event hosted by Senator Harry Reid in the Hart Senate Office Building on Capitol Hill and organized by the National Science Foundation's Cyber Physical Systems Program. In September we were also honored to demonstrate PerMMA to some prominent visitors in Pittsburgh for the G-20 summit.



(Left): Australian First Lady Theresa Rein uses PerMMA's remote controls to pick up and hand an object to Hongwu Wang. (Top Right): The Chinese delegation watches Juan Vazquez controls PerMMA's robotic arms to pick up a drinking cup for Ben Salatin. (Bottom Right): Garrett Grindle demonstrates PerMMA to Senator Harry Reid and Dr. Arden Bement. (photo courtesy Sandy Schaeffer Photography)

We had the opportunity to show PerMMA to the Prime Minister of Australia Kevin Rudd and first lady Ms. Therese Rein as well as Chinese Minister of Commerce Mr. Chen Deming .

-Christine Heiner and Jim Osborn, QoLT Executive Director

Upcoming Events and Announcements

Two Assistive Technology (AT) events will be held in the Pittsburgh area this fall. Mobility Works will be holding their annual Open House on **October 15th**, 11am-8pm at their Mossdale Blvd. location. The 6th AT Expo is also being held at the National Telerehabilitation Service System (Located within the Hiram G. Andrews Center in Johnstown, PA) on **November 4**, 9 a.m. - 4 p.m. Both events provide opportunities to learn about the latest AT products and services and watch assistive technology demonstrations. Both events are free and no prior

registration is required.

HERL will have a table at both events. Please stop by and meet us to learn about what we do. We will have information on hand about education and outreach activities as well as opportunities to participate in research studies.

For more info about the Mobility works expo, visit www.mobilityworks.com or call 1-866-347-3150. For more info about the AT Expo, visit www.cermusa.francis.edu or call 814-472-3389.

News From the University of Pittsburgh Department of Rehab Science and Technology (RST)

The U.S. Department of Veterans Affairs (VA) awarded a 3-year, \$3.64 million contract to RST to initiate the review, analysis, and development of VA Polytrauma Rehabilitation Center Assistive Technology Labs in Richmond, VA, Tampa, FL, Palo Alto, CA, and Minneapolis, MN.

Given the geographic diversity of the centers across the country, in addition to in-person interactions at the sites, the project will utilize emerging telerehabilitation and health informatics technologies developed by the Pitt team, including clinical telementoring, online education, outcomes data management, communication, and other information sharing between the sites and the University of Pittsburgh. The team will also build on their years of experience in the field of AT and program development, including the Center for Assistive Technology, a joint clinical program of RST and the University of Pittsburgh Medical Center.

The 4th Pennsylvania Disabled Veterans Rehabilitation/Vocational Retraining Project Community Response Symposium was held on August 6th at Hiram G. Andrews center in Johnstown, PA. The event addresses returning veterans' needs and is sponsored by RST, Veteran Community Initiatives, Inc, Veterans Leadership Program of WPA (VLP), Commonwealth Technical Institute at the Hiram G. Andrews Center, and Center of Excellence for Remote & Medically Underserved Areas (CERMUSA). The program was a great success, attracting about 150 attendees and providing information on various opportunities for vets, including sports and recreation, education, health care, and jobs.



QoLT Education and Outreach Coordinator Mary Goldberg presents on Research and Education Experiences for Veterans at the 2009 Community Response Symposium

News from the University of Pittsburgh Department of Physical Medicine and Rehabilitation (PM&R)

In June the University of Pittsburgh Medical Center's Institute for Rehabilitation and Research (IRR) opened a newly renovated, 77-bed center at UPMC Mercy, offering an unparalleled expansion of specialized services for the most traumatic and complicated injuries of the brain or spinal cord, as well as for strokes. These renovations represent an investment of more than \$18 million into UPMC Mercy and the care of rehabilitation patients. This transition of services to UPMC Mercy makes the IRR the region's only rehabilitation facility with an on-site Level 1 Trauma Center.

IRR is the largest rehabilitation provider in western PA and serves as the hub of a UPMC network of more than 70 rehabilitation facilities that combine clinical care and research to help patients regain independence and enhance their quality of life. PM&R and the School of Health and Rehab Sciences are IRR's academic partners. PM&R heads important clinical research trials at IRR, including UPMC Spinal Cord Injury Model System and the Traumatic Brain Injury Clinical Trials Network.

Pitt Builds New Veterans Service Office

The University of Pittsburgh has established a new Office of Veterans Services, a one-stop resource that will assist veterans in receiving their military benefits and becoming successful students. The office is being instituted with the intent to provide a seamless transition from military to student life by offering veterans an expanded array of services, ranging from an orientation tailor-made for them to counselors who have expertise in dealing with veterans' issues.

"The Office of Veterans Services furthers our University's commitment to military veterans who, according to the 2000 U.S. Census, constitute roughly 15 percent of all Western Pennsylvanians, including more than 33,500 residents of Pittsburgh. It will enhance our ability to effectively recruit, retain, educate, and graduate larger numbers of veterans," said Pitt Chancellor Mark A. Nordenberg. "We also are delighted to be partnering with the U.S. Department of Veterans Affairs in the Yellow Ribbon GI Education Enhancement Program and through it, to be honoring those who served."

The new Web portal—www.veterans.pitt.edu - provides easy access to expanded services.

HERL PUBLICATIONS

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Rice I, Impink B, Niyonkuru C, Boninger ML, Manual Wheelchair Stroke Characteristics During an Extended Period of Propulsion, **Spinal Cord**, pp. 413-417, Vol. 47, No. 5, May 2009.

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Dicianno BE, Sibenaller S, Kimmich C, Cooper RA, Pyo J, Joystick Use for Virtual Power Wheelchair Driving in Individuals with Tremor: A Pilot Study, **Journal of Rehabilitation Research and Development**, pp. 269-276, Vol. 46, No. 2, 2009.

Cowan R, Nash MS, Collinger JL, Koontz AM, Boninger ML, Impact of Surface Type, Wheelchair Weight, and Axle Position on Wheelchair Propulsion by Novice Older Adults, **Archives of Physical Medicine and Rehabilitation**, pp. 1076-1083, Vol. 90, No. 7, July 2009.

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Cooper RA, SMART^{Wheel}: From Concept to Clinical Practice, **Prosthetics and Orthotics International**, pp. 198-209, Vol. 33, No. 3, September 2009.

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HERL in the Community



Dr. Rory Cooper presented awards to the walk ambassadors.

Rory, Rosi, and Logan Cooper, Annmarie Kelleher, Jon Pearlman, Mark McCartney, Elaine Houston, Sara Peterson, Mary & Rob Goldberg, and Dan Ding and her family

walked and wheeled for Easter Seals at their 2009 "Walk with Me" on July 25 at the Pittsburgh Zoo. The event raised over \$36,000 for Easter Seals.

HERL IN THE NEWS

The American Veteran, April 2009:
[News You Can Use](#)

O & P Almanac, April 2009:
[Long Term Complications](#)

New Mobility, April 2009:
[Still Dreaming of an iBOT](#)

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VA Pittsburgh Healthcare System Press Release, July 2009: [Local VA Receives \\$5 Million for Research Center of Excellence](#)

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The Games Update

Stripe, July 2, 2009: [Physician Honored for Care of People with Disabilities](#)

Pittsburgh Post Gazette, July 9, 2009:
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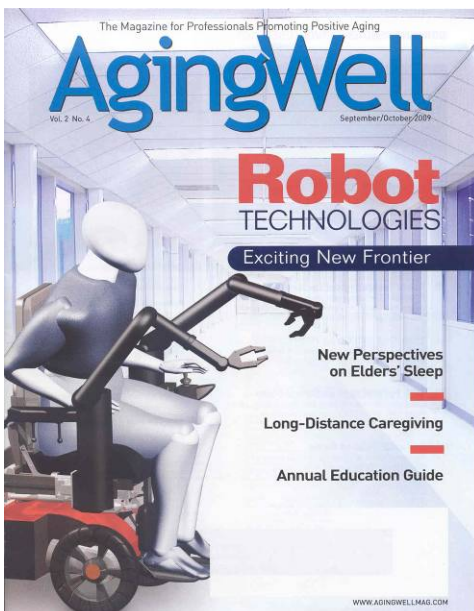
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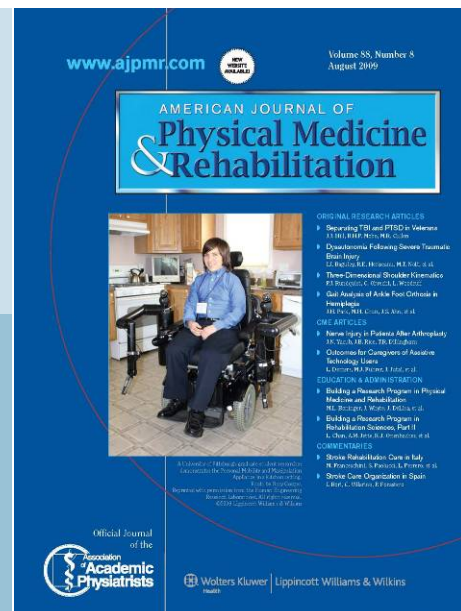
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PerMMA (Personal Mobility and Manipulation Device) was featured on the cover of 2 publications this fall. HERL grad student Ben Salatin and PerMMA appeared on cover of the August 2009 issue of the American Journal of Physical Medicine and Rehabilitation, Vol. 88, No. 8. (Image copyrighted by Wolters Kluwer Health and reprinted with permission). PerMMA also appeared on the cover of the September/October issue of Aging Well Magazine.





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on Spinal Cord Injury



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