



## Army Surgeon General Visits HERL



Army Surgeon General LTG Eric Schoomaker and HERL Director Dr. Rory Cooper present the 2010 Rory Cooper-Dion Johnson Award to Hongwu Wang.

On May 28, 2010, Lieutenant General Eric B. Schoomaker, Army Surgeon General, visited HERL and delivered the annual the Clifford E. Brubaker Distinguished Lecture at the University of Pittsburgh School of Health and Rehab Sciences.

In his address, LTG Schoomaker gave an overview of injuries that soldiers returning from combat face, such as amputations and traumatic brain injury. He justified the need for additional research to help these injured veterans.

LTG Schoomaker also presented the 2010 Rory A. Cooper and Dion Johnson Award, which is given annually to a faculty-selected student in the Department of Rehabilitation Science and Technology (RST). Hongwu Wang, who is working towards his PhD in RST at HERL, was selected this year for his paper “Seventeen Years of Wheelchair Life-cycle Testing—the Impact of Time, Materials and Wheelchair Designs on Durability and Value”, which received an honorable mention at the Rehabilitation Engineering and Assistive Technology Society of North America Conference in Las Vegas, NV in June.

-Christine Heiner

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## HERL Hosts National VARR&D Centers of Excellence Meeting

On May 25-26, HERL, a Department of Veterans Affairs Rehab Research and Development (VARR&D) Center of Excellence in Wheelchairs and Associated Rehab Engineering, hosted the annual national VA RR&D Centers of Excellence meeting. This meeting unites representatives from each of the 15 VA RR&D centers of excellence from across the country to foster collaboration and discuss and improve administrative processes.

VARR&D and their Centers of Excellence share a common goal: to improve the quality of life of veterans with disabilities and impairments through a full spectrum of research. Just some of the research areas in which the centers specialize include vision and hear-



Top: The 15 Centers display their latest research advances at the poster session.  
Bottom: Randy Kardon, Director of the Center for the Prevention and Treatment of Visual Loss in Iowa City, and Bob Ruff from VA RR&D Central office, moderate a discussion on connecting research to clinical service delivery models/programs on a national basis

ing loss, brain rehabilitation, prosthetic engineering, and regenerative medicine.

The 90+ meeting attendees included VARR&D center directors and administrative officers, and VA RR&D Central office staff. Attendees broke out into smaller discussion groups to discuss common challenges such as information technology needs, institutional research review boards, advisory committees, and collaborating with the Department of Defense.

Centers had the opportunity to share their latest research developments during a poster session. The meeting also included a tour of the HERL labs and lectures from Brace Feldbusch of the Wounded Warrior Project and Drs. Doug Weber and Andrew Schwartz from the University of Pittsburgh Department of Physical Medicine and Rehab.

-Christine Heiner

## CURRENT RESEARCH ABSTRACTS

### Evaluation of Aluminum Ultralight Rigid Wheelchairs Versus Other Ultralight Wheelchairs Using ANSI/RESNA Standards

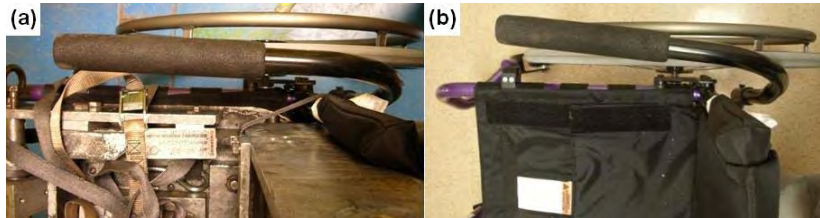
Hsin-yi Liu, M.S., Jonathan Pearlman, Ph.D., Rosemarie Cooper, MPT., Eun\_kyoung Hong, B.S.,  
Hongwu Wang, M.S., Benjamin Salatin, B.S., Rory A. Cooper, PhD

Full article published in *Journal of Rehabilitation Research and Development*, pp. 441-456, Vol. 47, No. 5, 2010.

**Purpose of the Work:** Ultralight wheelchairs have been shown to be more durable and cost-effective than other types of manual wheelchairs, but a recent study indicated

that the titanium ultralight rigid wheelchairs (TURWs) did not pass fatigue standards. This study compared the stability, durability, and strength among aluminum ultralight rigid wheelchairs (AURWs), TURWs, and aluminum ultralight folding wheelchairs (AUFWs) using ANSI/RESNA and ISO testing procedures.

**Procedures:** Twelve AURWs representing four models from four manufacturers were tested in this study: the TiLite AeroZ, the Invacare Crossfire, the Quickie GT, and the Kuschall AirPro. These models were the most popular AURWs prescribed at the Center for Assistive Technology at the University of Pittsburgh Medical Center and the VA Prosthetics



Armrest alignment of an Invacare Crossfire wheelchair, one of the AURWs tested in this study. Picture (a) shows the original alignment of the armrest. Picture (b) shows the alignment after the armrest was subjected to the static strength test.

and Sensory Aids Service (PSAS) and had similar frame designs to the previous tested TURWs.

We conducted the whole battery of ANSI/RESNA manual wheelchair standards tests on the AURWs.

**Results:** The AURWs and TURWs showed no difference in their test results across models. Tire pressure, tube wall thickness, and tube manufacturing were proposed to be the factors affecting wheelchair durability by comparing the failure modes, frames and components.

**Relevance to Wheelchair Users:** The frame material does not directly affect the performance and performance of AURWs and TURWs, but proper wheelchair manufacturing and design based on mechanical properties are important. Continuous research on wheelchair comparisons using wheelchair standards is essential to monitor the quality of wheelchair manufacturing and design.

-Hsin-yi Liu

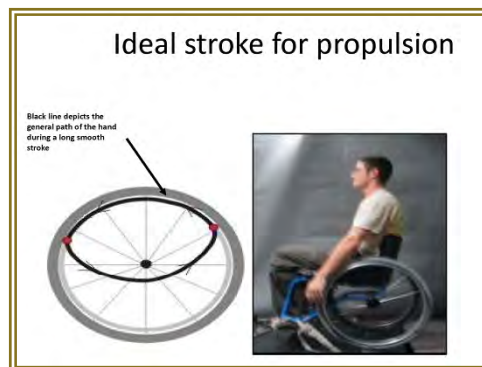
### Handrim Wheelchair Propulsion Training Using Biomechanical Real Time Visual Feedback Based on Motor Learning Theory Principles

Ian Rice, MS,OT, Dany Gagnon, PhD, Jere Gallagher, PhD, Michael Boninger, MD

Full article published in *Journal of Spinal Cord Medicine*, pp. 33-42, Vol. 33, No. 1, 2010.

**Purpose of Work:** The purpose of this research was to create a manual wheelchair propulsion-training program (MWPTP) that emphasizes propulsion techniques that can improve a manual wheelchair users stroke pattern and efficiency.

**Subjects/Procedures:** We evaluated one long-term manual wheelchair user (gender=male; age=45.6 yrs; weight = 65.7 kg; height = 1.80 m) who sustained a complete T4 spinal cord injury 11 years ago. The subject received a biomechanical assessment of over-ground manual wheelchair propulsion followed by three training sessions over a three month period. Training included use of real-time biomechanical feedback-based learning soft-



ware incorporating principles of motor learning theory.

**Results:** Measurements taken three months from baseline showed the subject increased contact angle while simultaneously reducing stroke cadence, mean resultant force, peak and mean moment out of plane force, and peak rate of rise of force applied to the pushrim.

**Relevance to Wheelchair users:** It is our hope that propulsion training could serve as a preventative intervention to minimize the upper extremity pain and injury often associated with manual wheelchair propulsion. In the future, this work may assist health-care professionals in training manual wheelchair users in a variety of settings.

-Ian Rice

## CURRENT RESEARCH ABSTRACTS

### Validation of Greyscale Based Quantitative Ultrasound in Manual Wheelchair Users

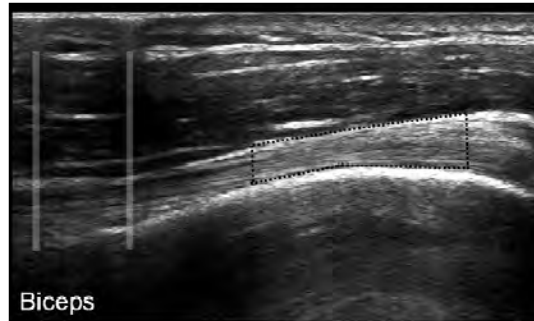
Jennifer L. Collinger, PhD; Bradley Fullerton, MD; Bradley G. Impink, BSE;  
Alicia M. Koontz, PhD; Michael L. Boninger, MD

Full article published in *American Journal of Physical Medicine and Rehabilitation*, pp. 390-400, Vol. 89, No. 5, May 2010.

**Purpose of the work.** Tendon disease on ultrasound is often described subjectively as an enlargement of the tendon and a disruption of the normal fibrillar pattern. Using image analysis and a unique localization method, we aim to derive objective, quantitative descriptors of tendon health which will facilitate ultrasound-based research. We will establish the validity of greyscale-based quantitative ultrasound (QUS) measures of the biceps and supraspinatus tendons by describing their relationship to established clinical measures of pathology.

**Subjects/Procedures.** Nine QUS measures of the biceps and supraspinatus tendons (located in the shoulder) were computed from ultrasound images collected from sixty-seven manual wheelchair users. Shoulder pathology was measured using questionnaires, physical examination maneuvers, and a clinical ultrasound grading scale.

**Results.** Increased age, duration of wheelchair use, and body mass correlated with a darker, more uni-



Ultrasound images showing the biceps tendon (top) and the supraspinatus tendon (bottom)

form tendon appearance consistent with tendon disease. Subjects with pain during physical examination tests for biceps and acromioclavicular joint tenderness exhibited significantly different supraspinatus QUS values. QUS measures of the biceps tendon differed significantly between subjects with healthy tendons, mild tendinosis, and severe tendinosis. Clinical grading of supraspinatus tendon health was correlated with QUS measures of the supraspinatus tendon.

**Relevance to Wheelchair Users.** Quantitative ultrasound is a valid method to quantify tendon injury and may allow for early detection of tendinosis as well as

provide a method for quantitatively measuring tendon changes over time. Manual wheelchair users are at a high risk for developing shoulder tendon disease and may benefit from quantitative ultrasound-based research that focuses on identifying interventions designed to reduce this risk.

-Jen Collinger

### Repeatability of Ultrasonographic Median Nerve Measures

Bradley G Impink, BS, Dany Gagnon, PhD, Jennifer L Collinger, PhD, Michael L Boninger, MD

Full article published in *Muscle and Nerve*, pp. 767-773, Vol. 41, No. 6, June 2010.

**Purpose of the Work:** To investigate the repeatability of ultrasound in measuring various median nerve shape and size characteristics.

**Subjects/Procedures:** Two investigators captured ultrasound images of the non-dominant median nerve at three levels of the wrist from twenty volunteers. Each investigator captured two images per subject at two occasions separated by 30 minutes of rest. Image analysis (reading) was performed twice per image to calculate the median nerve measures. We determined the amount of similarity between each image and reading.

**Results:** Similarity between investigators was generally average. Similarity within a single investigator

was at least average and mostly good when using a single image, captured at one occasion, and being read once. Ultimately, ultrasound is a reliable tool for measuring median nerve characteristics at multiple levels of the wrist.

**Relevance to Wheelchair Users:** We believe that an appropriately designed protocol can use ultrasound to determine the structural changes in the median nerve in response to wheelchair propulsion. This may help us better understand and prevent the development of carpal tunnel syndrome in wheelchair users.

-Brad Impink

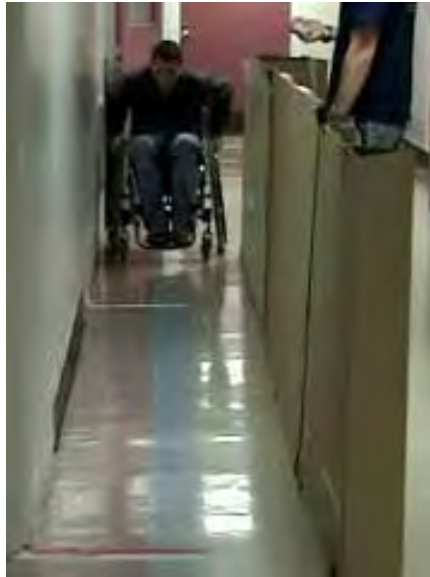
## CURRENT RESEARCH ABSTRACTS

### Design Features that Affect the Maneuverability of Wheelchairs and Scooters

Alicia M. Koontz, PhD; Eric D. Brindle, BS; Padmaja Kankipati, MS;  
David Feathers, PhD; Rory A. Cooper, PhD

Full article published in *Archives of Physical Medicine and Rehabilitation*, pp. 759-764, Vol. 91, No. 5, May 2010.

**Purpose of the Work.** Many wheeled mobility device users are unable to fully engage in activities within and outside of the home due to numerous environmental barriers impacting mobility. The American Disabilities Act of 1990 (ADA) provides guidelines on accessibility for wheeled devices in public places; however the data that was used to generate these guidelines is outdated. The purpose of this study was to collect current data on mobility device users to determine if revision is needed to Section 4.2.3 of ADA (clear space requirements) and investigate design features that impact maneuverability in confined spaces.



**Subjects/Procedures.** 213 wheelchair and scooter users volunteered for the study. They each propelled their own devices through a mock environment constructed of cardboard walls that formed an L-turn, 360°-turn in place, and a U-turn with and without a barrier. Openings into the mock environment were increased in 5 cm increments until the user could successfully perform each turning task without hitting the walls. Mobility devices were grouped into categories based on design features and compared to identify if certain features made it easier or harder to navigate in confined areas.

**Results.** Ultralight manual wheelchairs had the shortest lengths and required the least amount of space to

negotiate the turns compared to all other types of wheelchairs. Mid-wheel drive power wheelchairs required the least space for the 360°-Turn in place compared to front and rear-wheel drive power wheelchairs but performed equally as well as front wheel drive models on all other turning tasks. Seat functions on power wheelchairs such as tilt and recline did not significantly increase the space needed to perform the tasks.

#### **Relevance to Wheelchair Users.**

Results from this study provide information that will be helpful when selecting a mobility device and its features. The longer the device, the

more difficult it will be to maneuver it in confined spaces. Moving the rear axle forward on a manual wheelchair can reduce space needed for turns. Mid-wheel drive power wheelchairs require the least amount of space to do a 360°-turn in place but require the same space as a front-wheel drive for turns around a 90 degree bend. The handling of a front wheel drive PWCs may more intuitive for some users because the center of rotation is towards the front of wheelchair enabling the user to initiate a turn at the bend versus having to judge when to begin initiating a turn in order to clear a wider front-end swing angle.

-Alicia Koontz

## Upcoming Events

**MobilityWorks of Pittsburgh will once again be hosting their Expo on Oct. 14, 2010.** The event is Western PA's largest mobility expo and vendor fair -- with food, fun, raffle prizes and lots of useful information from local and national vendors. Consultants will be on hand from 11 AM to 8 PM to demonstrate and discuss assistive technology, accessible vehicles and home modifications. Professional representatives will also be there for questions and answers about rehabilitation, medical services, adaptive driving and veterans services.

The theme of this year's expo is "A Salute to the Men and Women of our Armed Services - Past and Present". Please visit the event web page for more information:

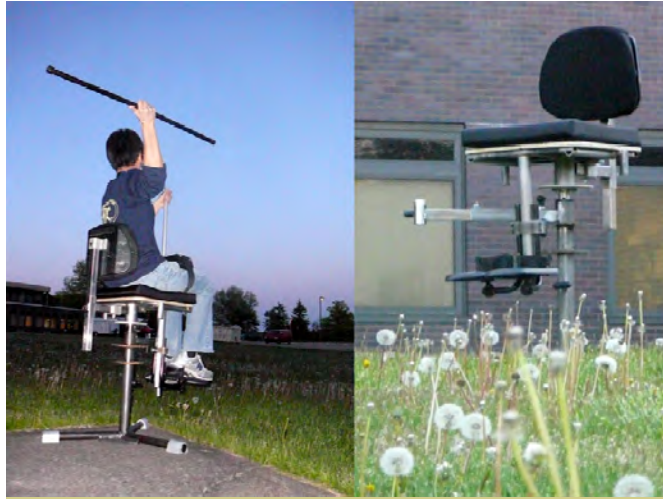
[www.mobilityworks.com/mobilityexpo.php](http://www.mobilityworks.com/mobilityexpo.php)

HERL and many of our affiliated organizations such as the UPMC Center for Assistive Technology and Keystone Paralyzed Veterans of America will be attending. We hope to see you there!

## Awards and Accomplishments

A group of HERL graduate students - **Cheng-Shiu Chung, Jui-Te Lin, Maria Toro, Nahom Beyene, and Yasmin Garcia** - were selected as one of five Student Design Competition finalists by the Rehabilitation Engineering and Assistive Technology Society of North America (RESNA). Their achievement was recognized at the RESNA annual conference in Las Vegas, Nevada, on June 27-29, 2010. They developed a Uniform Throwing Chair for Seated Throwing Sporting Events. Read about their project on page 8 of this newsletter and on RESNA's website:

<http://aac-lerc.psu.edu/wordpressmu/RESNA-SDC/2010/05/13/uniform-throwing-chair-for-seated-throwing-sporting-events/>



Left: Demonstration of how the throwing chair would be used in competition. Right: The assembled throwing chair.



Laura McClure

**Laura McClure, MPT, PhD** accepted a new position as Assistant Professor within the Department of Rehabilitation Science & Technology of the University of Pittsburgh. In her new capacity she will provide clinical services at the Center for Assistive Technology and faculty services related to

research and teaching activities. Laura has earned her PhD in July 2010, with the successful completion of her dissertation defense for doctoral candidate in Rehabilitation Science entitled: "Implementation of Clinical Practice Guidelines Following Acute Spinal Cord Injury". She received her M.S. in Physical Therapy and her B.S. in Health Science from Duquesne University in 2004 and 2003 respectively. Her research interests include spinal-cord injury rehabilitation, development of outcome measures and transfer techniques.

Other HERL students who completed their graduate studies this summer are:

**Amit Kumar**, Masters of Science in Rehabilitation Science and Technology. Thesis title: Test Re-Test Reliability of Functional Mobility Assessment

**Ian Rice**, PhD in Rehabilitation Science and Technology. Dissertation title: Manual Wheelchair Propulsion Training. Ian will soon be starting an assistant faculty appointment Department of Applied Health Science at the University of Illinois.

The Borden Institute, publisher of the textbook *Care of the Combat Amputee*, received an award in The Washington Book Publishers' 2010 Book Design & Effectiveness Competition. The book won the First Place award in Technical Text category for Small to Medium Nonprofit organizations. Accepting the award on behalf of all of the contributors were: Editors **COL Paul F. Pasquina (WRAMC)** and **Rory A. Cooper, PhD (HERL)**, Project Managers **Joan Redding (Borden Institute)** and **Christine Heiner (HERL)**, and Designer **Doug Wise (Borden Institute)** at a ceremony on June 10 in Washington, DC.

Walter Reed Army Medical Center doctors **Aeneas Janze** and **Jay Pyo** became certified with the American Board of Physical Medicine and Rehabilitation in June. ABPMR Board Certified Specialists are leaders in their field because they voluntarily participate in lifelong learning to keep their skills and knowledge current. They demonstrate their commitment to quality clinical outcomes, patient safety and a responsive, patient-centered practice. Drs. Pyo and Janze completed their resident research requirement with HERL.

## News from the University of Pittsburgh

### Department of Rehabilitation Science and Technology (RST)

Assistant Professor **Mark Schmeler PhD, OTR/L, ATP** was elected to the Rehabilitation Engineering and Assistive Technology Society of North America (RESNA) board of directors for a 3 year term.

Clinical Instructor **Amy Lane, OTR/L, CDRS** is now President-Elect for the Association for Driver Rehabilitation Specialists.

The **5th annual Pennsylvania Disabled Veterans Rehabilitation/Vocational Retraining Project Community Response Symposium** was held on August 18, 2010 at Hiram G. Andrews center in Johnstown, PA. The event is

# RST



Department of  
Rehabilitation  
Science and  
Technology

sponsored by RST, Veteran Community Initiatives, Inc, Veterans Leadership Program of WPA, Commonwealth Technical Institute at the Hiram G. Andrews Center, and Center of Excellence for Remote & Medically Under-served Areas. This symposium identifies best practices for providing for the needs of service members returning from Operation Iraqi and Operation Enduring Freedom with a goal to implement recommendations and ideas put action steps into operation.

This year's program provided information on programs such as homeless veterans initiatives, community vision rehabilitation and regeneration.

## Recently funded HERL grants

### Department of Veterans Affairs:

“Powered Seating Function Usage among Veterans-Compliance and Coaching”, Rory Cooper, PhD and Jon Pearlman, PhD

“Computer-based and Virtual Assessment of Power Wheelchair Mobility”, Rory Cooper, PhD and Brad Dicianno, MD, MS

“Longitudinal Study of Acute and Chronic Arm Pathology Following SCI”, Michael Boninger, MD and Alicia Koontz, PhD

“Understanding Quality and Equity in Wheelchairs for Veterans”, Larissa Myaskovsky, PhD and Michael Boninger, MD

“Assessing the Risk of Vibration Exposure during Wheelchair Propulsion” (Career Development Award), Jon Pearlman, PhD

“Biomechanical Validation of the Transfer Assessment Instrument”, Alicia Koontz, PhD (funding is pending on this award)

“Enhancement of Motor Cortex Activity in Persons with Spinal Cord Injury”, Douglas Weber, PhD and Jennifer Collinger, PhD. (funding is pending on this award.)

VA Healthcare Network VISN 4 Competitive Project Pilot Project Fund:

“Collecting Community Based Vibration Exposure of WC users to Determine Health Risk”, Jon Pearlman, PhD

“Neurofeedback to Enhance Neural Activity Following SCI”, Jennifer Collinger, PhD

### National Institutes of Health :

“Student Research Training in Integrative, Complementary, and Alternative Medicine”, Michael Boninger, MD

### Verizon Foundation:

“Wireless Technologies to Enhance Wellness”, Brad Dicianno, MD, MS

### National Science Foundation:

Experiential Learning for Veterans in Assistive Technology and Engineering, (ELeVATE), Rory Cooper PhD, Dan Ding, PhD, and Mary Goldberg, MEd.

### Department of Defense:

“Terrain-dependent driver assistance”, Emmanuel Collins (Florida State University), Dan Ding PhD, Rory Cooper, PhD

“Physical activity measurement in manual wheelchair users with SCI”, Dan Ding, PhD

## News from the University of Pittsburgh

### Department of Physical Medicine and Rehabilitation (PM&R)

#### IRRDAY 2010

June 2, 2010 marked the 6th annual Institute for Rehabilitation Research (IRR) Day for university students involved in rehabilitation research. PM&R proudly hosts this event and competition that showcases lectures and poster presentations from renowned rehabilitation physicians and scientists and the best graduate and medical student researchers from various rehab related disciplines in the University of Pittsburgh. This year nearly 200 students and faculty filled William Pitt Union for the event, making 2010's IRRDay the best attended one in its six year history. 58 abstracts were submitted from departments, schools and labs such as psychology, bioengineering, physical therapy, orthopaedic surgery, the Safar Center for Resuscitation Research, and the Stem Cell Research Center. Two honorable mention awards and one best research award were given in the categories of undergraduate, pre-doctoral, post-doctoral, and resident rehab research.



*Top: IRRDay 2010 Faculty, L to R: Amy Wagner, MD, Michael Boninger, MD; Gwen Sowa, MD, Elizabeth Skidmore, PhD, Joel Press, MD; Deirdre Dawson, PhD, and Joan Rogers, PhD.*

*Bottom L: Dr. Press addresses the IRRDay2010 audience. Bottom R: Pavel Zagadailov, MD presents his award winning work to IRRDay faculty*

#### IRRDAY Winners

##### **Best Rehabilitation Research by an Undergraduate:**

Rashid Ahmed, School of Arts and Sciences "The adverse effect on spatial learning following chronic administration of haloperidol or risperidone after experimental brain trauma is long-lasting"

##### **Best Rehabilitation Research by an Pre-Doctoral Student:**

Emily S. Grattan, MS, OTR/L, Department of Occupational Therapy, "Unilateral spatial neglect may not impede upper extremity recovery in individuals with subacute stroke"

##### **Best Rehabilitation Research by an Post-Doctoral/Fellow:**

Robert Gaunt, PhD, Department of Physical Medicine and Rehabilitation, "Single-unit activity recorded using non-penetrating electrode arrays on cat lumbar DRG surface"

##### **Best Rehabilitation Research by a Resident, and Honorable Mention Poster Winner**

Barrett Woods, MD, PGY-2, Department of Orthopaedic Surgery, "Non-invasive Tools to Assess Molecular Responses to Treatment for Disc Degeneration"

#### Honorable Mention Poster Winners

**Undergraduates:** Sarah Chlebowski Departments of Neuroscience & Psychology, "A combined therapeutic regimen of buspirone and enrichment is more efficacious than either alone in enhancing cognition in pediatric rats after TBI"

Bhaskar Ganti, Departments of Neuroscience & Psychology, "Chronic donepezil is not only ineffective in promoting functional improvement after cortical impact injury, but higher doses are actually detrimental"

**Pre-doctoral students:** Shaun Darrah, School of Medicine, MS3, "Modeling Genetic Susceptibility to Seizures after TBI"

Alan Degenhart, Department of Bioengineering, "Decorrelation of Electroencephalographic Signals During Closed-Loop Brain-Control"

**Resident:** Justin Hong, MD, Department of Physical Medicine and Rehabilitation, "Predictors of Depression in Adult Spina Bifida"

**Post-Doctoral/Fellows:** Elke Brown, MD, Department of Physical Medicine and Rehabilitation, "The effect of electrical stimulation on the regenerative potential of human muscle precursor cells"

Pavel Zagadailov, MD, Department of Physical Medicine and Rehabilitation, "Descriptive characterization of leptin concentration in TBI patients with respect to various demographic and injury-related variables."

#### New Brain Injury Conference

Brain injury often leads to physical disabilities as well as problems with thinking, memory, behavior, and social interactions. After a brain injury, some patients have difficulty communicating, others may be agitated or restless, still others may exhibit diminished motor control. Patients often struggle with a variety of cognitive and physical impairments such as difficulty walking and caring for themselves, personality changes and memory deficits.

Challenges such as these were addressed at the first annual "Current Topics in Brain Injury Rehabilitation Conference", sponsored by The Rehabilitation Institute Center for Brain Injury and PM&R, was held on May 15, 2010. The full day conference was aimed at a wide range of professionals including nurses, therapists, nursing assistants, physicians, case managers and social workers involved

with the treatment and rehabilitation of individuals with brain injuries. Continuing education credits were offered through the School of Social Work.

The 2<sup>nd</sup> Annual Current Topics in Brain Injury Rehabilitation will be held on April 2, 2011 at the UPMC Rehabilitation Institute, Mercy Hospital. You can receive more information on the conference as it becomes available by emailing Mary Synnott at [synnottm@upmc.edu](mailto:synnottm@upmc.edu).

## HERL Research at Veterans Sporting Events

HERL has conducted research at the National Veterans Wheelchair Games (NVWG) and National Disabled Veterans Winter Sports Clinic (NDVWSC) since 2000 and 2006, respectively. These sporting events help us to interact with and serve our veterans who use wheelchairs, as well as disseminate our research results, educate wheelchair users on our work, and recruit people who use wheelchairs and who live outside of Pittsburgh to participate in our research studies. Residents from Walter Reed Army Medical Center (WRAMC) also participate in this effort.

The HERL/WRAMC team recently returned from the 2010 NVWG in Denver, CO on July 4-10, where we enrolled a total of 139 participants in five research studies. One of the studies allowed athletes to evaluate a new type of "throwing chair" built at HERL. The

chair is built for athletes competing in throwing events such as shot put, discus and javelin in fully seated to partially standing positions and various throwing strategies. The HERL throwing chair adjusts to accommodate seated throwing athletes at all classification levels. The benefits of the throwing chair design are that participation will be easier, more standardized, and fair to all competing athletes. The chair was also designed with input by athletes who are also wheelchair users. HERL researchers obtained feedback on the chair from the 2010 NVWG athletes to help further improve its design.

The HERL research team plans to attend future NVWGs and NDVWSCs. Plans are already underway for research at the 2011 NDVWSC, which will take place March 27<sup>th</sup>-April 1<sup>st</sup> in Snowmass, CO. 2011 be an important year for HERL at the NVWG, as the VA Pittsburgh Healthcare System and Keystone Chapter of the Paralyzed Veterans of America will be hosting the next games in Pittsburgh. The kickoff to NVWG 2011 began with a fundraising concert from the country music group The Charlie Dainels Band on June 4 at Trib Total Media Amphitheater. Our director Dr. Rory Cooper, who is also a dedicated NVWG athlete, delivered some opening remarks. Rocky Bleier, a

former Pittsburgh Steeler and Veteran who overcame war injuries to return to the Steeler's starting lineup, made an appearance at the fundraiser.

HERL is expanding research efforts to conduct studies at some new veterans sporting events. The National Veterans Summer Sports Clinics (NVSSC) is a new VA program to be held in San Diego, CA focusing on instructing veterans with disabilities in

summer sporting activities, such as surfing, kayaking, and cycling. The first clinic will be held September 19-25, 2010 and HERL will be there to conduct research. We intend to participate in future NVSSCs.

This year HERL researchers also traveled to the first Annual "Warrior Games" during the week of May 10, 2010. The brain child of Brigadier

General Gary Cheek, Commanding General of the Army Warrior Transition Command, the Warrior Games are designed to present personal challenges through Paralympic sports to service-members of the warrior transition commands and to stretch traditional beliefs about the abilities that these individuals can achieve. Over 180 wounded, injured and ill military service-members and veterans gathered to compete at the US Olympic Training Center in Colorado Springs, Colorado for this event.

HERL brought the new throwing chair to the Warrior Games and received high marks from both athletes and coaches, so much so that the HERL research team became an integral part of the shot put, discus and javelin training and competition held on the athletic fields of the Air Force Academy.

Younger athletes also had the opportunity to evaluate the throwing chair at the National Junior Disability Championship (NJDC) in July. The NJDC provides an opportunity for athletes aged 7-21 to compete for medals in 7 different athletic events during 8 days of games. The 2010 NJDC was presented by World Sport Chicago, and were supported by the US Paralympics.

Plans are currently underway to send the throwing chair to the U.S. Paralympic Training Center in Chula Vista, CA.



*Top and Right: Athletes evaluate the HERL Throwing Chair at the Warrior Games. Bottom Left: Rocky Bleier with HERL Director Dr. Rory Cooper*

-Christine Heiner



## HERL PUBLICATIONS

Souza A, Kelleher AR, Cooper RM, Cooper RA, Ienozzi LI, Collins DM, Multiple Sclerosis and Mobility Related Assistive Technology: Systematic Review of Literature, **Journal of Rehabilitation Research and Development**, pp. 213-224, Vol. 47, No. 3, 2010.

Brose S, Weber D, Salatin B, Grindle GG, Wang H, Vazquez JJ, Cooper RA, The Role of Assistive Robotics in the Lives of Persons with a Disability, **American Journal of Physical Medicine and Rehabilitation**, pp. 509-521, Vol. 89, No. 6, June 2010.

Laferrier JZ, McFarland L, Boninger ML, Cooper RA, Reiber G, Wheeled Mobility: Factors Influencing Mobility and Assistive Technology in Veterans with Major Traumatic Limb Loss from Vietnam war and OIF/OEF Conflicts, **Journal of Rehabilitation Research and Development**, pp. 349-359, Vol. 47, No. 4, 2010.

Gailey R, McFarland LV, Reiber GE, Cooper RA, Czernieki J, Gambel J, Hubbard S, Maynard C, Unilateral Lower Limb Loss: Prosthetic Device Use and Functional Outcomes in Service Members from Vietnam war and OIF/OEF Conflicts, **Journal of Rehabilitation**

**Research and Development**, pp. 317-332, Vol. 47, No. 4, 2010.

Impink BG, Gagnon D, Collinger JL, Boninger ML, Repeatability of Ultrasonographic Median Nerve Measures, **Muscle and Nerve**, pp. 767-773, Vol. 41, No. 6, June 2010.

Liu H, Pearlman J, Cooper RM, Hong E, Wang H, Salatin B, Cooper RA, Evaluation of Aluminum Ultralight Rigid Wheelchairs Versus Other Ultralight Wheelchairs Using ANSI/RESNA Standards, **Journal of Rehabilitation Research and Development**, pp. 441-456, Vol. 47, No. 5, 2010.

Cooper RA, Cooper RM, What's the Right Ultralight?, **Paraplegia News**, pp. 30-31, Vol. 64, No. 7, July 2010.

Heiner CM, Combat Care, **Paraplegia News**, pp. 64-68, Vol. 64, No. 8, August 2010.

Cooper RA, Warrior Games, **Paraplegia News**, pp. 40-42, Vol. 64, No. 8, August 2010.

## HERL IN THE NEWS

**CalPoly Magazine:** [Innovate, Adapt, Overcome](#), Spring 2010.

**University of Pittsburgh Report of Chancellor Mark Nordenberg:** Supporting a World Class Faculty: Rory Cooper, 2010.

**Tribune Democrat:** [Memorial Originator, 4 Others to be Honored](#), June 21, 2010.

**Journal of the History of Medicine and Allied Services:** Realizing Major William Borden's Dream: Military Medicine, Walter Reed Army Medical Center, and Its Wounded Warriors, 1909-2009: An Essay Review, jrj042 first published online June 23, 2010 doi:10.1093/jhmas/jrj042.

**Pittsburgh Post Gazette:** [Veterans Competing in Wheelchair Games](#), July 3, 2010.

**Popular Science:** Rise of the Helpful Machines, pp. 46-47, August 2010.

**Valley News Dispatch:** [Wheelchair Competitor Maintains Busy Pace](#), July 1, 2010.

**PRISM:** [In Their Grasp](#), Summer 2010.

**Inside Indiana Business:** [Disabled Rose-Hulman Grad Hopes to Assist Others](#), May 27, 2010.

[www.mcgowan.pitt.edu](http://www.mcgowan.pitt.edu): [Textbook Takes a Top Award](#), July 2010.

**Pittsburgh Post Gazette:** [Wheelchair Highlighted in Magazine](#), August 11, 2010.

Our research project PerMMA (Personal Mobility and Manipulation Appliance), a system of remote control operated power wheelchair robotic arms, continues to receive national publicity. In August, *Popular Science* spotlighted PerMMA as one of the 10 most promising robots to help to help people with disabilities and the elderly.

We also just released a new PerMMA video on our YouTube page. Please visit

[www.youtube.com/HERLresearch](http://www.youtube.com/HERLresearch)



## Education & Outreach (E&O) News

### Quality of Life (QoLT) Ambassadors: Taking the Vision into the Community

QoLT is a unique partnership between Carnegie Mellon and the University of Pittsburgh that brings together a cross-disciplinary team of technologists, clinicians, industry partners, end users, and other stakeholders to create revolutionary technologies that will improve and sustain the quality of life for all people.

The QoLT Ambassadors, also known as the QA's, are a small team of volunteers inspired by the mission and vision of quality of life and endeavor to share our research and projects with the community. During the summer of 2009, The E & O team had the opportunity to meet with a retired physics teacher, Joe McLaughlin, who was volunteering in various capacities, including at the RoboWorld installation at the Carnegie Science Center in Pittsburgh. Joe is absolutely fascinated by the world of technology, and as a science educator, really has a knack for translating the technical jargon and philosophies into laymen's terms. We saw a gem, and welcomed him as a part of the QoLT Education and Outreach Team. Initially, we invited Joe to be a member of the Education and Outreach Advisory Board, for which he immediately established a communications forum to maintain contact amongst board members. To expand upon Joe's idea of a web presence that afforded E & O team members and the Advisory Board to interface, we pursued development of an Education and Outreach website ([www.qolt.pitt.edu](http://www.qolt.pitt.edu)) to house event calendars, program information, and outreach initiatives. One of those outreach initiatives was the QoLT Ambassadors.

The partnerships between Joe and the E & O team was a great fit, and we wondered...could there be more Joe McLaughlin's out there? The answer has been a resounding, yes! We formally defined the QoLT Ambassador role to ensure quality control and accuracy of message; we moved forward with informational meetings for potential QA's and scheduled a formal training session. The training will include an overview of QoLT research projects and thrusts, hands-on activities that illustrate the need for products that enhance quality of life for people with disabilities and the elderly; and tours of research facilities. Upon completion of training, each QA will be equipped with a kit that includes handouts and activities appropriate for any community event. Other items will be available to use, depending upon the audience.

To date, we have 5 candidates scheduled to participate in a training session scheduled for October 2010. We anticipate that the program will grow in numbers and scope enabling outreach to schools and community groups.

-Shelly Brown

## Elevate funded



In August we received great news from the National Science Foundation: our grant proposal entitled, Experiential Learning for Veterans in Assistive Technology and Engineering, or ELeVATE, will be funded. A program designed to re-integrate veteran and active duty service members to college, ELeVATE will become another key initiative in our growing community of engineers, scientists, practitioners, and consumers who are intellectually prepared and motivated to create and apply technology to benefit people with disabilities and older adults.

*Visit the new E&O website*

[www.qolt.pitt.edu](http://www.qolt.pitt.edu)

### Next State of the Science Workshop

The State of the Science workshops are held at the National Intrepid Center of Excellence and Walter Reed Army Medical Center. The symposia deliver to healthcare professionals the latest "state of the science" information needed to treat people with disabilities, especially returning wounded soldiers. We are holding an October 2010 workshop on Loss, Trauma, and Human Resilience; however, registration has closed.

**The next workshop on Sensory and Communication Impairment is scheduled for November 2010.** Topics will include *Vision Therapies and Regeneration, Hearing Preservation and Assessment, and Theory and Issues in Research on Blindness and Brain Plasticity*. Registration will be opening soon on [www.herlpitt.org](http://www.herlpitt.org) and [www.qolt.pitt.edu](http://www.qolt.pitt.edu).

# Research Participants Needed!

## The Impact of Transfer Setup on the Performance of Independent Transfers

You may be eligible to participate if:

- You are 18 years of age or older
- You use a wheelchair (manual or power) or scooter as your primary means of mobility
- You can perform independent transfers to/from your mobility device

HERL is looking for wheeled mobility users (men and women) to participate in a research study on the impact of transfer setup on the performance of independent transfers. Participation includes completing a questionnaire, recording body measurements, and assessing strength, ability to reach, and transferring from the wheeled mobility device to a different sur-

face. This study is funded in part by the US Access Board.

This research study will involve a 1.5 hour visit. You will be compensated \$50 for completing the study.

Participation is voluntary and all information collected will be kept strictly confidential.

Principal Investigators: Alicia Koontz, PhD & Rory Cooper, PhD  
If you are interested in participating or learning more about the study, please contact our Clinical Coordinators: Annmarie Kelleher or Stacy Eckstein at (412) 954-5287.

### A Final Announcement...



After 11 years working at HERL, I have accepted a new communications position in another department at the University of Pittsburgh. So I must take a moment to announce that this is my last HERL newsletter.

I have been writing, editing, and publishing this newsletter for HERL since 2002; this is my 29th issue. During this time I have built meaningful relationships with many of our readers, including our research participants. Thank you all so much for the support, guidance, and encouragement you have provided me during my time as the editor of this newsletter. I will terribly miss many of you who I have gotten to know during my time here. I feel honored to have been included in HERL's research efforts and am thankful for all I have learned during my time here.

-Christine Heiner

### CATEA's WorkRERC Studying Job Accommodation Needs

**Please note this research study is not being conducted at HERL. However, this is an online study for qualified participants.**

The Center for Assistive Technology and Environmental Access (CATEA) at Georgia Tech houses the Rehabilitation Engineering Research Center on Workplace Accommodations (WorkRERC). WorkRERC's focus is to provide better understanding of the needs for accommodations addressing employment barriers faced by people with disabilities. Our goal is to enable equitable access to employment, enhanced employment outcomes, and increased participation in the workplace for people with disabilities.

Currently, WorkRERC has a survey underway that examines the relationships between functional ability, job requirements, and accommodation use. Individuals are eligible to take this survey if they have a disability or loss of function AND are employed or volunteer. The survey is anonymous, is typically administered on-line, and takes an average of 30 minutes to complete. Respondents will have the option of saving their responses to continue the survey later, or taking the survey by telephone. To take the survey, please visit

<http://www.surveygizmo.com/s/200473/workplace-features-that-aid-function>. Those with difficulty accessing the computer can complete the survey by telephone. Please call 404-894-0561 to schedule a phone survey.

For more information about the WorkRERC, please visit <http://www.workrerc.org/>



Human Engineering Research Laboratories



VA Center Of Excellence For Wheelchairs and Associated Rehabilitation Engineering



University of Pittsburgh NIDRR Model Center on Spinal Cord Injury



Part of  
Quality of Life Technology Center  
a National Science Foundation Engineering Research Center

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[www.herlpitt.org](http://www.herlpitt.org).

## ARE YOU INTERESTED IN ASSISTIVE TECHNOLOGY RESEARCH?

The Human Engineering Research Laboratories (HERL) is recruiting individuals interested in participating in research studies for the **ASSISTIVE TECHNOLOGY REGISTRY**.

If you would like to be notified of research studies related to assistive technology for which you may be eligible to participate, contact The Human Engineering Research Laboratories and join the Assistive Technology Registry.

This is an informational resource and notification of a study does not obligate you to participate. You do not need to be located in, nor are you required to travel to, Pittsburgh in order to participate in research studies.

If you are at least 18 years of age, and use assistive technology (e.g. wheelchair, scooter, prosthesis, etc) please contact a Clinical Coordinator at (412) 954-5287 or [herlregistry@shrs.pitt.edu](mailto:herlregistry@shrs.pitt.edu) VAPHS, 7180 Highland Drive, 151R1-H, Pittsburgh, PA 15206

[www.herlpitt.org](http://www.herlpitt.org)