



HERL Newsletter

News from the Human Engineering Research Laboratories VOL 16, No 1 • JANUARY 2017

2016 In Review

2016 was very good to the Human Engineering Research Laboratories. More people than ever learned about our work thanks to several high-profile news stories and awards, and we worked harder and with more success than ever before to create mobility tools for Veterans and everyone with disabilities. We were also able to raise money to help several Veterans transition to university STEM studies, thanks to many generous donors, and

we're doing it again (see page 7). We've introduced our technology to VIPs and had a chance to compete at the very highest levels worldwide. Finally, this was the year of the Paralympics, the greatest athletic showcase on Earth, which took place in front of an audience of billions in Rio, Brazil. Please keep in touch with HERL in 2017 and beyond via our website (<http://herl.pitt.edu/content/news>) and our Facebook page (<https://www.facebook.com/herlpitt/>)!



Cyathlon

Starting on October 8, HERL staff took the Mobility Enhancement Robotic Wheelchair, or MEBot, to Zurich, Switzerland, to race against other robotic wheelchairs from around the world in the inaugural Cyathlon. The Cyathlon was created with three aims in mind: to facilitate conversation between academia and industry; to facilitate discussion between technology developers and people with

disabilities; and to promote the use of robotic assistive aids to the general public. HERL competed against power wheelchair teams from eight other countries.

The team worked well together, and MEBot qualified for the finals but unfortunately timed out of the final round. However, MEBot was among the crowd favorites and was clearly the front runner in commercial potential for indoor/outdoor use.

HERL on video

This year, HERL was featured in the PBS documentary *Military Medicine: Beyond the Battlefield*, narrated by Bob Woodruff, which aired on all PBS channels for Veterans Day. It is currently available online at <http://www.pbs.org/militarymedicine>. HERL was also the subject of a CNN-produced clip that aired in February on the HLN channel about Dr. Rory Cooper's work with robotics and athletics. The video is available at <http://www.cnn.com/videos/sports/2016/02/02/athletes-research-intel-dr-cooper-pkg.cnn>.



VIPs

HERL was visited by Sergeant Major of the Army Daniel Dailey (far left) and *MythBusters* star Adam Savage (right), and also had the opportunity to show off inventions to VA Secretary Robert A. McDonald (near left).



And much more inside!

Current Research Abstracts

Cooper RA, Goldberg M, Milleville M, Williams R, The Experiential Learning for Veterans in Assistive Technology and Engineering (ELeVATE) Program, *Journal of Military, Veteran and Family Health*, pp. 96-100, Vol. 2, No. 2, November 2016.

SUMMARY: The ELeVATE program for transitioning Veterans has been shown to lead to increased self-efficacy.

Experiential Learning for Veterans in Assistive Technology and Engineering, or ELeVATE, is a program to assist wounded, injured, and ill Veterans in transitioning into university science, technology, engineering, and mathematics programs, with a special emphasis on assistive technology and engineering. This paper examines whether the ELeVATE model, by addressing academic preparation, professional development, rehabilitation counselling, and community reintegration, increases the academic success (defined as enrolling and excelling in a plan of study through a post-secondary institution) of transitioning Veterans with disabilities. Post-program surveys completed by seven participants indicated that they were satisfied with the efficacy of the program. Students rated the research paper and oral presentation of research, the networking seminar, and the resume writing workshop as “very helpful.” They found the group meetings with the vocational coordinator, the introduction to adaptive sports seminar, and the poster presentation to be “moderately helpful.” Seventy-one percent of the students indicated that being part of ELeVATE’s supportive cohort of Veterans was “very” or “extremely” valuable. They rated the effectiveness of the support they provided to their peers higher than the support they received from their peers. Over time, ELeVATE participants demonstrated increased self-efficacy (via General Self-Efficacy instrument scores) to succeed in STEM and increased engagement in campus life (via National Survey of Student Engagement scores), and ELeVATE’s impact even went beyond helping Veterans achieve their academic and personal goals.

Duvall J, Sinagra E, Cooper RA, Pearlman J, Proposed Pedestrian Pathway Roughness Thresholds to Ensure Safety and Comfort for Wheelchair Users, *Assistive Technology*, pp. 209-215, Vol. 28, No. 4, 2016.

SUMMARY: Using previous data, roughness thresholds of pathway surfaces are proposed.

In the United States, over three million people use a wheelchair for their primary means of mobility and they rely on functional and accessible pathways to participate in their communities. The Americans with Disabilities Act Accessibility Guidelines related to pathway roughness are currently ambiguous, subjective and therefore unable to be measured. Consequently, many public pathways are sufficiently rough to result in harmful vibrations and discomfort for wheelchair users. In previous research, subjective ratings and root-mean-square accelerations were reported from subjects traveling over surfaces with various roughnesses in their own wheelchairs. The purpose of the current study is to use previous data to propose roughness thresholds by correlating the roughness of surfaces to vibration data and subjective ratings from wheelchair users. The results suggest a pathway roughness index threshold of ≤ 50 mm/m (1.2 in./ft) for a surface segment of 100 m (328 ft) in length, and ≤ 100 mm/m (1.2 in./ft) for a surface segment of 3 m (9.8 ft) in length would protect wheelchair users against discomfort and possible health risks due to vibration exposure. For surfaces of different lengths, a 3 m (9.8 ft) and 100 m (328 ft) moving window should be used.

Mhatre A, Duvall J, Brown J, Grindle GG, Cooper RA, Ding D, Pearlman J, Design and Focus Group Evaluation of a Bed-Integrated Weight Measurement System for Wheelchair Users, *Assistive Technology*, pp. 193-201, Vol. 28, No. 4, 2016.

SUMMARY: The E-Scale, a bed-integrated body-weight measuring system, is introduced and evaluated.

Regular weight monitoring is known to help with weight management, which is an important part of maintaining a healthy, active lifestyle. Unfortunately, weight monitoring is challenging for wheelchair users because the few scales that are available are expensive and very large. Consequently, wheelchair users typically learn their weight at infrequent visits to their healthcare providers, which likely contributes to higher prevalence of obesity-related health risks among this population. In this article, we describe the design and development of the Embedded Scale, or E-Scale, which is a bed-integrated body-weight measuring system that allows a user to measure and track their weight. The E-Scale team followed a standard product development approach to build the E-Scale prototype. Bench testing results indicate that the performance of the prototype is on par with commercially available wheelchair scales (capacity = 1,200 lbs, accuracy = 1.73 lbs, and precision = ± 0.35 lbs over one-fourth rated capacity). Institutional Review Board (IRB)-approved focus groups with 20 Veterans who use wheelchairs for mobility were conducted to gather feedback about the design, which was very positive. Development and testing results suggests the E-Scale technology is feasible and may provide a valuable tool to help wheelchair users manage their weight.

Dicianno BE, Glick RM, Sowa GA, Boninger ML, Processes and Outcomes from a Medical Student Research Training Program in Integrative, Complementary and Alternative Medicine, *American Journal of Physical Medicine and Rehabilitation*, pp. 770-786, Vol. 95, No. 10, October 2016.

SUMMARY: Reports on a medical student training program and its outcomes.

In response to the growing need to train a new generation of clinician scientists, a research program was developed to train medical students in integrative, complementary, and alternative medicine (ICAM) research early in their careers. A total of 25 students (100%) successfully completed a 10-week program. Students reported significantly increased levels of knowledge in all 7 integrative, complementary, and alternative medicine topics at the conclusion of the program. All students presented their work at one or more local research symposia. In addition, the average number of quality research outputs, which included manuscripts, awards, and abstracts presented at national and international meetings, was 1.5 per student, which exceeded benchmarks based on prior program outcomes. Results from this program may be useful when planning larger or longer-term projects aimed at attracting physicians who will become our next generation of academicians, researchers, and healers.

Current Research Abstracts

Hogaboom NS, Worobey LA, Boninger ML, Transfer Technique Is Associated With Shoulder Pain and Pathology in People With Spinal Cord Injury: A Cross-Sectional Investigation, *Archives of Physical Medicine and Rehabilitation*, pp. 1770-1776, Vol. 97, No. 10, October 2016.

SUMMARY: Shows that better transfer technique is correlated with fewer injuries and less pain.

Objectives: To evaluate how transfer technique and subject characteristics relate to ultrasound measures of shoulder soft tissue pathology and self-reported shoulder pain during transfers in a sample of wheelchair users with spinal cord injury (SCI).

Design: Cross-sectional observational study.

Setting: Research laboratory, national and local veterans' wheelchair sporting events.

Participants: A convenience sample of wheelchair users (N=76) with nonprogressive SCI. Participants were aged >18 years, >1 year postinjury, and could complete repeated independent wheelchair transfers without the use of their leg muscles.

Main Outcome Measures: Transfer pain items from the Wheelchair User's Shoulder Pain Index; transfer technique assessed using the Transfer Assessment Instrument (TAI); and shoulder pathology markers examined using the Ultrasound Shoulder Pathology Rating Scale (USPRS).

Results: Better transfer technique (higher TAI) correlated with less injury (lower USPRS) (partial $\eta^2=.062$, $P<.05$) and less pain during transfers (partial $\eta^2=.049$, $P<.10$). Greater age was the strongest predictor of greater pathology (USPRS total: partial $\eta^2=.225$, supraspinatus grade: partial $\eta^2=.174$, $P<.01$). An interaction between technique and weight was found ($P<.10$): participants with lower body weights showed a decrease in pathology markers with better transfer technique (low weight: $R^2=.422$, $P<.05$; middle weight: $R^2=.200$, $P<.01$), while those with higher weight showed little change with technique ($R^2=.018$, $P>.05$).

Conclusions: Participants with better transfer technique exhibited less shoulder pathology and reported less pain during transfers. The relationship between technique and pathology was strongest in lower-weight participants. While causation cannot be proven because of study design, it is possible that using a better transfer technique and optimizing body weight could reduce the incidence of shoulder pathology and pain.

Worobey LA, Kirby RL, Heinemann AW, Krobot EA, Dyson-Hudson TA, Cowan RE, Presperin Pedersen J, Shea M, Boninger ML, Effectiveness of Group Wheelchair Skills Training for People With Spinal Cord Injury: A Randomized Control Trial, *Archives of Physical Medicine and Rehabilitation*, pp. 1777-1784, Vol. 97, No. 10, October 2016.

SUMMARY: Shows that group training can improve advanced wheelchair skills capacity.

Objective: To assess the effectiveness of group wheelchair skills training to elicit improvements in wheelchair skills.

Design: Randomized double-blinded controlled trial. **Setting:** Four Spinal Cord Injury Model Systems Centers.

Participants: Manual wheelchair users with spinal cord injury (N=114). **Intervention:** Six 90-minute group Wheelchair Skills Training Program (WSTP) classes or two 1-hour active control sessions with 6 to 10 people per group. **Main Outcome Measures:** Baseline (t1) and 1-month follow-up (t2) Wheelchair Skills Test Questionnaire (WST-Q) ver4.2 for capacity and performance and Goal Attainment Scale (GAS) score.

Results: Follow-up was completed by 79 participants (WSTP: n=36, active control: n=43). No differences were found between missing and complete cases. Many users were highly skilled at baseline with a WST-Q capacity interquartile range of 77% to 97%. There were no differences between groups at baseline in WST-Q measures or demographics. Compared with the active control group, the WSTP group improved in WST-Q capacity advanced score ($P=.02$) but not in WST-Q capacity or WST-Q performance total scores ($P=.068$ and $P=.873$, respectively). The average GAS score (0% at t1) for the WSTP group at t2 was $65.6\% \pm 34.8\%$. Higher GAS scores and WST-Q capacity scores were found for those who attended more classes and had lower baseline skills. **Conclusions:** Group training can improve advanced wheelchair skills capacity and facilitate achievement of individually set goals. Lower skill levels at baseline and increased attendance were correlated with greater improvement.

Crytzer TM, Hong E, Dicianno BE, Pearlman J, Schmeler M, Cooper RA, Identifying Characteristic Back Shapes from Anatomical Scans of Wheelchair Users to Improve Seating Design, *Medical Engineering and Physics*, pp. 999-1007, Vol. 38, No. 9, September 2016.

SUMMARY: Used digital scanning technology to classify spinal deformities in order to create better backrests.

Spinal deformities are common in people who require the use of a wheelchair for mobility as a result of spinal cord injuries and other disabilities. Sitting positions vary between individuals with disabilities who use wheelchairs and individuals without disabilities. In individuals with spinal cord injury, spinal deformities can result in the development of back contours that deviate from the shape of standard rigid back support shells. The purpose of this study was to distinguish and classify various back contours of wheelchair users by utilizing digital anatomic scanning technology in order to inform the future development of back supports that would enhance postural support for those with spinal deformities. The three dimensional (3D) locations of bony landmarks were digitized when participants were in position, using a mechanical wand linked to the FastScantm system commonly used to measure surface contours. Raw FastScantm data were transformed according to bony landmarks. A total of 129 individuals participated in this study. A wide range of back contours were identified and categorized. Although participant characteristics (e.g., gender, diagnosis) were similar amongst the contour groups; no one characteristic explained the contours. Participants who were seated in a forward lean position had a higher amount of pelvic obliquity compared to those seated in an upright position; however, participants' back contour was not correlated with pelvic obliquity. In conclusion, an array of different back shapes were classified in our cohort through 3D laser scanning technology. The methods and technology applied in this study could be replicated in future studies to categorize ranges of back shapes in larger populations of people with spinal cord injuries. Preliminary evidence indicates that customized postural support may be warranted to optimize positioning and posture when a standard rigid shell does not align with contours of a person's back. To optimize positioning, a range of contoured rigid backrests as well as height and angle adjustability are likely needed.

Current Research Abstracts

Kamaraj DC, Dicianno BE, Mahajan HP, Buhari AM, Cooper RA, Interrater Reliability of the Power Mobility Road Test in the Virtual Reality Based Simulator 2, *Archives of Physical Medicine and Rehabilitation*, pp. 1078-1084, Vol. 97, No. 7, July 2016.

SUMMARY: A power wheelchair driving test appears to be valid when administered via virtual reality.

Objective: To assess interrater reliability of the Power Mobility Road Test (PMRT) when administered through the Virtual Reality-based SIMulator-version 2 (VRSIM-2).

Design: Within-subjects repeated-measures design.

Setting: Participants interacted with VRSIM-2 through 2 display options (desktop monitor vs immersive virtual reality screens) using 2 control interfaces (roller system vs conventional movement-sensing joystick), providing 4 different driving scenarios (driving conditions 1–4). Participants performed 3 virtual driving sessions for each of the 2 display screens and 1 session through a real-world driving course (driving condition 5). The virtual PMRT was conducted in a simulated indoor office space, and an equivalent course was charted in an open space for the real-world assessment. After every change in driving condition, participants completed a self-reported workload assessment questionnaire, the Task Load Index, developed by the National Aeronautics and Space Administration.

Participants: A convenience sample of electric-powered wheelchair (EPW) athletes (N=21) recruited at the 31st National Veterans Wheelchair Games.

Main Outcome Measures: Total composite PMRT score.

Results: The PMRT had high interrater reliability (intraclass correlation coefficient [ICC]>.75) between the 2 raters in all 5 driving conditions. Post hoc analyses revealed that the reliability analyses had >80% power to detect high ICCs in driving conditions 1 and 4.

Conclusions: The PMRT has high interrater reliability in conditions 1 and 4 and could be used to assess EPW driving performance virtually in VRSIM-2. However, further psychometric assessment is necessary to assess the feasibility of administering the PMRT using the different interfaces of VRSIM-2.

Kamaraj DC, Dicianno BE, Mahajan HP, Buhari AM, Cooper RA, Stability and Workload of the Virtual Reality Based Simulator 2, *Archives of Physical Medicine and Rehabilitation*, pp. 1085-1092, Vol. 97, No. 7, July 2016.

SUMMARY: This paper assessed the stability and workload of power wheelchair driving ratings with VR.

Objective: To assess the stability of clinicians' and users' rating of electric-powered wheelchair (EPW) driving while using 4 different human-machine interfaces (HMI) within the Virtual Reality-based SIMulator-version 2 (VRSIM-2) and in the real world (accounting for a total of 5 unique driving conditions).

Design: Within-subjects repeated-measures design.

Setting: Simulation-based assessment in a research laboratory.

Participants: A convenience sample of EPW athletes (N=21) recruited at the 31st National Veterans Wheelchair Games.

Main Outcome Measures: Composite PMRT scores from the Power Mobility Road Test (PMRT); Raw Task Load Index; and the 6 subscale scores from the Task Load Index developed by the National Aeronautics and Space Administration (NASA-TLX).

Results: There was moderate stability (intraclass correlation coefficient between .50 and .75) in the total composite PMRT scores ($P<.001$) and the users' self-reported performance scores ($P<.001$) among the 5 driving conditions. There was a significant difference in the workload among the 5 different driving conditions as reflected by the Raw Task Load Index ($P=.009$). Subanalyses revealed this difference was due to the difference in the mental demand ($P=.007$) and frustration ($P=.007$) subscales. Post hoc analyses revealed that these differences in the NASA-TLX subscale scores were due to the differences between real-world and virtual driving scores, particularly attributable to the conditions (1 and 3) that lacked the rollers as a part of the simulation.

Conclusions: Further design improvements in the simulator to increase immersion experienced by the EPW user, along with a standardized training program for clinicians to deliver PMRT in VRSIM-2, could improve the stability between the different HMIs and real-world driving.

National Council on Disability Issues Progress Report

The National Council on Disability (NCD) has called on Congress to establish a Technology Bill of Rights for Americans with Disabilities in its annual report to Congress and the President outlining the state of the union for 57 million Americans with disabilities.

NCD's 2016 annual report, "National Disability Policy: A Progress Report," identifies access to information and communications innovations as a civil rights issue due to the power technology has to transform civic engagement and economic opportunity in the United States. This report, which fulfills NCD's statutory mandate to report annually on the state of disability policy in key areas, focuses on how information and communication technology (ICT) continues to transform modern life, and the potential ICT and assistive technology (AT) holds for improving how people with disabilities live in the world. People with disabilities have a right to and need accessible technology that allows them to interact with others in the virtual landscape that is increasingly where Americans gather information, conduct business and reach out to friends and family in the same way they needed ramps and accessible physical spaces a generation ago. Additionally, AT can improve the lives of people with disabilities by increasing

independence and providing a bridge to employment and opportunity.

Technology that enables access to full opportunities of citizenship under the Constitution is a right. This report examines the efforts of policymakers, technology industry leaders, people with disabilities, and others to promote policies and practices that will lead to technology that can be used by all and offers policy recommendations to Congress, federal agencies, and industry that, if implemented, demonstrate an unwavering commitment to accessible ICT and AT.

First established as an advisory Council within the Department of Education in 1978, NCD became an independent federal agency in 1984. In 1986, NCD recommended enactment of an Americans with Disabilities Act (ADA), and drafted the first version of the bill which was introduced in the House and Senate in 1988. Since enactment of the ADA in 1990, NCD has continued to play a leading role in crafting disability policy, and advising the President, Congress and other federal agencies on disability policies, programs, and practices.

Download the report at <http://www.ncd.gov/progressreport/2016/progress-report-october-2016>.

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Cooper RA, Goldberg M, Milleville M, Williams R, The Experiential Learning for Veterans in Assistive Technology and Engineering (ELeVATE) Program, *Journal of Military, Veteran and Family Health*, pp. 96-100, Vol. 2, No. 2, November 2016.

State of the Science Symposia, Fall 2016: *Caring for Wounded Warriors with Traumatic Brain Injuries and Lessons Learned in Medical Rehabilitation and Re-Integration: An International Perspective*

The State of the Science Symposium on Caring for Wounded Warriors with Traumatic Brain Injuries was held at the National Intrepid Center of Excellence in Bethesda, Maryland on September 30, 2016. Presentations and speakers:

Opening Remarks by LTG(ret) Eric B. Schoomaker, MD, former Surgeon General of the U.S. Army

Introduction on the Scope of the Problem of TBI within the Department of Defense - Louis M. French, PsyD, National Intrepid Center of Excellence

TBI as a Chronic Health Condition - John D. Corrigan, PhD, Ohio State University



Employment for Wounded Warriors Living with TBI - Ronald Drach, Drach Consulting

Clinical Recommendations for the Management

of Concussion/Mild TBI in the MHS - Scott C. Livingston, PhD, PT, ATC, and Inbal Eshel, MA, CCC-SLP, Defense and Veterans Brain Injury Center

Assistive Technology for Cognition for People with TBI - Dan Ding, PhD, University of Pittsburgh

Recovery Support for Service Members, Veterans, and their Family Members Affected by TBI - Katharine C. Stout, PT, DPT, NCS, MBA, Scott C. Livingston, PhD, PT, ATC, and Johanna M. Smith, MA, Defense and Veterans Brain Injury Center

Videos, presentations, and photos from these symposia, along with biographies of all speakers, are available on the HERL website at <http://herl.pitt.edu/education-outreach/symposia>.

Find the summary of Caring for Wounded Warriors with Traumatic Brain Injuries at <http://herl.pitt.edu/tbi>.

Find the summary of Lessons Learned in Medical Rehabilitation and Re-Integration: An International Perspective at <http://herl.pitt.edu/international-rehab>.



The State of the Science Symposium entitled “Lessons Learned in Medical Rehabilitation and Re-Integration: An International Perspective” was held at the Embassy of Canada in Washington, D.C. on November 10, 2016. Presentations and speakers:

The morning began with an award presentation commemorating the 50th symposium in the series. Following that, remarks were made by Rory A. Cooper, PhD; Commander Ian Torrie and Colonel Robert Spencer of the Embassy of Canada; Brigadier-General H.C. MacKay, Surgeon General, Commander, Canadian Forces Health Service Group; Al Kovach, National President, Paralyzed Veterans of America; and Paul F. Pasquina, MD.

Disability in Canadian Military Veterans Released Since 1998: Implications for Rehabilitation - Jim Thompson MD CCFP (EM) FCFP, Veterans Affairs Canada

Rehabilitation of the Complex Blast Casualty - Paul F. Pasquina MD, Uniformed Services University of the Health Sciences

Forging a New Future through Technology and Education - Rory A. Cooper PhD, University of Pittsburgh

Medical Rehabilitation and Reintegration of Wounded Canadian Soldiers - Michael Crouzat MD CCFP(SEM), Flight Surgeon, Advanced Dive Medical Officer

Lessons Learned in Medical Rehabilitation and Re-Integration: An International Perspective - LCol Markus Besemann, Head of Rehabilitation Medicine, Canadian Armed Forces

The PBS Documentary “Military Medicine: Beyond the Battlefield” was screened, followed by a question and answer session by LTG(ret) Eric B. Schoomaker MD.

Defence Medical Rehabilitation Centre: The Injured Serviceman and a Model of Care - Dr. Colonel Alan Mistlin, Frimley Park Hospital, United Kingdom

Ciran: An innovative rehabilitation model for patients with chronic pain, fatigue and dysfunctioning - Col. (Ret) Agali Mert, Royal Netherlands Airforce

The importance of non-clinical support in improving outcomes for veterans and their families - an Australian experience - Robyn Collins, AHPRA State Manager, Western Australia



HERL Profiles: 2016 Employees of the Year



Stacy Eckstein

Stacy received her BS in Biology from Geneva College and her Medical Technology certification from the American Society of Clinical Pathology in 1985. She worked in the Immunohematology Laboratory at Mercy Hospital for over 20 years before coming to the University of Pittsburgh where she first worked in research on HPV and head and neck cancers and served as project manager for the African-Caribbean Cancer Consortium. In 2009 she moved to HERL where she is responsible for assisting in the development and implementation of clinical protocols, subject recruitment, and data monitoring and management.



Kim Robinson

Kim is people oriented and likes to lend a hand whenever possible. She has a great sense of humor and enjoys making others laugh. Kim attended Bradford Business School for Accounting. Kim currently serves as Project Assistant for the International Society of Wheelchair Professionals (ISWP) which launched in February 2015 with a mission to provide wheelchair users worldwide with the best technology and service.

Help Us Help ELeVATE!

The Experiential Learning for Veterans in Assistive Technology and Engineering (ELeVATE) program supports Veterans transitioning to college for STEM careers.

Your contribution will help raise \$15,000 to cover the living stipends for three veterans during the 10-week on-campus portion of the summer 2017 ELeVATE program. Funds raised above our goal will be applied to stipends for other ELeVATE participants.

More information at <https://engage.pitt.edu/elevate>.

2016 HERL Honors

Rory A. Cooper

Honorary Doctorate, Xi'an Jiatong University; Seven Seals Award, Employers Support Guard and Reserve; Humanitarian Service Award, Central Rehabilitation Centre, Dublin, Ireland; Minute Man Award, National Guard Bureau; Young Distinguished Lecturer, Royal Military College of Canada; Liberty Bell Award and Keynote Lecturer, 28th Infantry Division; Marlin Mickle Innovation Award, University of Pittsburgh; Pitt Innovator Award; Honored at USMC Sunset Parade, June 28, 2016

Brad Dicianno

University of Pittsburgh-Honors Convocation Faculty Honoree

Michael Boninger

Matthews Lectureship University of Colorado; Distinguished Academician Award, Association of Academic Physiatrists; John Stanley Coulter Award, American Congress of Rehabilitation Medicine

Jennifer Collinger

2nd place, Annual International BCI Award: Intracortical Microstimulation as a Feedback source for Brain-Computer Interface Users

Yohali Burrola

Received a four-year fellowship from The National Council on Science and Technology to develop a wheelchair service training project in Mexico in conjunction with ISWP

Jorge Candiotti

Featured in the University of Pittsburgh Innovation Student Showcase with MEBot (Mobility Enhanced Robotic Wheelchair)

Brandon Daveler

Received the Rory A. Cooper & Dion Johnson Award for best first author peer reviewed journal article as a masters student; Neilson Foundation Scholarship Award; Featured in the University of Pittsburgh Innovation Student Showcase with MEBot

Jonathan Duvall

Neilson Foundation Scholarship Award

Hervens Jeannis

2016 scholarship award recipient for National Association of Medical Minority Educators (NAMME)

Deepan Kamaraj

Outstanding Poster Award, 3rd place, American Congress of Rehabilitation Medicine; Received SHRS Travel Grant, Student Advisory Board, School of Health and Rehabilitation Sciences

Josh Marino

Military Warrior Support Foundation "Homes for Wounded Heroes" program awarded him and his wife a mortgage-free house in Brookline, PA; The Humane Society of Silicon Valley "Mutual Rescue" project chose his story about his cat Scout to be made into a short film to illustrate how shelter animals can rescue us, just as we save them - film to be released in June 2017

Sara Múnera Orozco

Winner, RESNA Student Paper Competition: The Relationship Between Social Participation And Wheelchair Breakdowns In People With Spinal Cord Injury

S. Andrea Sundaram

Honorable Mention, RESNA Student Paper Competition: Development and Simulation of a Self-Leveling Algorithm for the Mobility Enhancement Robotic Wheelchair; 1ST Gear Competition first prize for manual wheelchair virtual seating coach; Featured in the University of Pittsburgh Innovation Student Showcase with MEBot

KaLai Tsang

Winner, RESNA Student Paper Competition: Measuring Heart Rate in Manual Wheelchair Users during Exercise and Free-living Activity with the latest Fitbit Surge Monitor



Human Engineering Research Laboratories



VA Center of Excellence for
Wheelchairs and Associated
Rehabilitation Engineering



University of Pittsburgh
School of Health & Rehabilitation Sciences
School of Medicine



University of Pittsburgh
NIDILRR Model Center on
Spinal Cord Injury



National Science Foundation
Advanced Technology
Education Center

Rory A. Cooper, PhD
Director

Brad Dicianno, MD
Medical Director

Michael L. Boninger, MD
Senior Associate Medical Director

Alicia Koontz, PhD RET
Associate Director for Research

Jonathan Pearlman, PhD
Assoc. Director for Product Innovation & Translation

Annmarie Kelleher, MS OTR/L ATP CCRC
Asst. Director for Clinical and Regulatory Affairs

Garrett Grindle, MS
Assistant Director for Engineering

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The Future of Mobility Related Technology

We are looking for volunteers who ...

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**Researchers at the Human
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To access the questionnaire, go to

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If you would like to participate but don't have access to the internet, please contact one of our clinical coordinators.

Following completion of the questionnaire you may choose to be entered into a drawing to win \$100.

Human Engineering Research Laboratories

**Bakery Square, 6425 Penn Avenue, Suite 400
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If you have questions or are interested in learning more about the study, contact our Clinical Coordinators at (412) 822-3700.

Contact us!

Email michael.lain@pitt.edu or call 412-822-3663

To subscribe to the electronic mailing list: <http://herl.pitt.edu/subscribe>

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Editor: Michael Lain

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