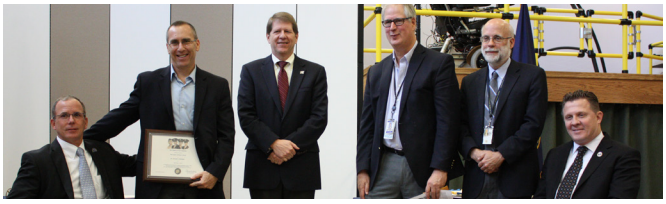
HERL Newsletter

News from the Human Engineering Research Laboratories Vol. 13, No. 2 · December 2014

Commemorating



Twenty Years

of Research

The Human Engineering Research Laboratories celebrated 20 years of mobility research with a gala banquet on November 3 and an open house on November 4, 2014.

The banquet, hosted by HERL and the University of Pittsburgh's School of Health and Rehabilitation Sciences, featured war correspondent and filmmaker Mike Boettcher as keynote speaker. Awards of appreciation were presented to representatives of HERL's many friends and benefactors, including VA Pittsburgh Healthcare System, the Department of Veterans Affairs, the Paralyzed Veterans of America, UPMC, Mitsubishi Electric America Foundation, the Disabled Veterans National Foundation, and others.

The following day, HERL's open house hosted over 200 guests who were treated to brief words from HERL directors Dr. Rory Cooper and Dr. Michael Boninger and from officials from VA Pittsburgh and the University of Pittsburgh. Dr. Cooper then awarded the Four Chaplains Legion of Honor to Dr. Boninger, Jim Riemer, Jared Souter, Jeanetter South-Paul, and G. Reynolds Clark. A ceremonial cake was cut and all guests received tours and demonstartion of HERL's latest projects.

Read about HERL's many research accomplishments over 20 years on page 5.

HERL Receives USAID Grant

The University of Pittsburgh (Pitt) has been awarded a grant from the US Agency for International Development (USAID) to develop the International Society of Wheelchair Professionals (ISWP) that will be the self-sustaining network of international and regional partners dedicated to the professionalization of wheelchair (WC) services around the world. ISWP will be built around a federation of regional and international Affiliate Members which will help ensure ISWP activities are culturally relevant, timely, and focused on the most important WC-related issues.

ISWP will initially be led by a group of WC experts at Pitt, with strategic partnerships that have already been established with USAID & The World Health Organization (WHO) and will be the basis for two outcomes. In the near-term, ISWP will be started and an Affiliate network will grow; in the long term, Pitt plans to use ISWP as a starting point for a WHO Collaborating Centre on WCs. ISWP's mission will be that WC users are provided the best technology with the best service worldwide. This will be accomplished by promoting the WHO Guidelines on the Provision of Manual WCs in Less Resourced Countries (WHO, 2008) (WHO-G), promoting training and research activities; and improving WC design, manufacturing and coordinating services. To that end, ISWP Affiliates will be representative of all of the stakeholders outlined in the WHO-G, with the addition of research institutions dedicated to improving WC services through evidence-based practice. ISWP will accomplish more than the minimum expectation in all of the objective (O) areas through the following activities:

O1) Develop and deploy hybrid (online/in-person) training of the Wheelchair Service Training Package (WSTP) and related knowledge tests.

O2) Develop a public and private-facing cloud-based database which is used by Affiliates and other stakeholders to collect, analyze and report outcomes that are aligned with outcome measures identified by the WHO working groups and are aligned with NIH PROMIS variables.

O3) Develop an online presence for ISWP including a website, list serves, moderated forums, social media outlines and online training modules that include regional information *(Cont. on p. 2)*

Current Research Abstracts

Wang H, Tsai C, Jeannis H, Chung C, Kelleher AR, Grindle GG, Cooper RA, "Stability Analysis of an Electrical Powered Wheelchair Mounted Robotic Assisted Transfer Device," *Journal of Rehabilitation Research and Development*, pp. 761-774, Vol. 51, No. 5, 2014.

SUMMARY: We are developing a "Strong Arm" wheelchair transfer assistance device; this article discusses the stability of the system.

The ability of people with disabilities to live in their homes and communities with maximal independence often hinges, at least in part, on their ability to transfer or be transferred by an assistant. Because of limited resources and the expense of personal care, robotic transfer assistance devices will likely be in great demand. An easy-to-use system for assisting with transfers, attachable to electrical powered wheelchairs (EPWs) and readily transportable, could have a significant positive effect on the quality of life of people with disabilities. We investigated the stability of our newly developed Strong Arm, which is attached and integrated with an EPW to assist with transfers. The stability of the system was analyzed and verified by experiments applying different loads and using different system configurations. The model predicted the distributions of the system's center of mass very well compared with the experimental results. When real transfers were conducted with 50 and 75 kg loads and an 83.25 kg dummy, the current Strong Arm could transfer all weights safely without tip-over. Our modeling accurately predicts the stability of the system and is suitable for developing better control algorithms to enhance the safety of the device.

Mahajan HP, Spaeth DM, Dicianno BE, Brown K, Cooper RA, Preliminary evaluation of a variable compliance joystick for people with multiple sclerosis, Journal of Rehabilitation Research and Development, pp. 951-962, Vol 51, No. 6, 2014.

SUMMARY: A customizable variable control joystick may be better than a conventional wheelchair joystick for people with MS.

Upper-limb fatigue is a common problem that may restrict people with multiple sclerosis (MS) from using their electric powered wheelchair effectively and for a long period of time. The objective of this research is to evaluate whether participants with MS can drive better with a variable compliance joystick (VCJ) and customizable algorithms than with a conventional wheelchair joystick. Eleven participants were randomly assigned to one of two groups. The groups used the VCJ in either compliant or noncompliant isometric mode and a standard algorithm, personally fitted algorithm, or personally fitted algorithm with fatigue adaptation running in the background in order to complete virtual wheelchair driving tasks. Participants with MS showed better driving performance metrics while using the customized algorithms than while using the standard algorithm with the VCJ. Fatigue adaptation algorithms are especially beneficial in improving overall task performance while using the VCJ in isometric mode. The VCJ, along with the personally fitted algorithms and fatigue adaptation algorithms, has the potential to be an effective input interface for wheelchairs.

Liu H, Cooper RM, Kelleher AR, Cooper RA, "An Interview Study for Developing a User Guide for Power Seating Function Usage," *Disability and Rehabilitation: Assistive Technology*, pp. 499-512, Vol. 9, No. 6, November 2014.

SUMMARY: A powered seating functions user guide was developed using an internally developed questionnaire.

Purpose: Powered seating functions (PSFs) provide powered wheelchair users an independent means to adjust posture dynamically. To facilitate the best use of PSFs in daily living, we conducted this structured interview study to develop a preliminary user guide to provide "take-home" information to powered wheelchair users.
Method: An internally developed questionnaire to assess clinical recommendations of PSF usage was administered in an interview format to clinical seating and mobility specialists. A qualitative analysis was applied to codify the recommendations, and the findings were transformed into a PSF user guide.
Results: Specific but varied seating positions and temporal indications were recommended for performing pressure relief positioning. For several activities, appropriate seating positions should be determined according to the immediate physical condition of the user and/or the environmental settings.
Conclusion: The methods and positions of using PSFs should be determined with consideration for individual preferences, physical condition, environmental setting, and desired tasks after thorough clinical seating assessments. Precautions about positioning and driving safety, and the importance of discussing with clinicians are emphasized in the user guide. This PSF user guide will be updated after more scientific evidence accumulates and be structurally evaluated for its face and content validity in the future.
Implications for Rehabilitation: PSFs can be used to assist with many daily activities and health management. The methods and positions of using PSFs should be determined with consideration for individual preferences, physical condition, environmental setting, and desired tasks after thorough clinical seating assessments. Precautions about driving safety and sitting stability affected by changes in the seating angles should be emphasized in user education and training.

USAID (cont.)

controlled by Affiliates, and promote regional and international conferences by leveraging an existing International Seating Symposium network of conferences (currently held in 6 countries).

O4) Develop a qualifying process for WCs which is based on ISO testing results, usability in different terrains, and field-experiences with the devices; and implement a supply-chain management system which can provide planning, monitoring and oversight of WC provision worldwide.

O5) Run advocacy campaigns through strategic partners, support working groups to develop low-cost ISO and usability test methods.

Current Research Abstracts

Worobey LA, Udofa IA, Lin Y, Koontz AM, Farrokhi SS, Boninger ML, "Reliability of freehand three-dimensional ultrasound to measure scapular rotations," *Journal of Rehabilitation Research and Development*, pp. 985-994, Vol 51, No. 6, 2014.

SUMMARY: Three-dimensional ultrasound appears to be a reliable method of measuring shoulder rotation.

The objective of this study was to evaluate the reliability of using freehand three-dimensional ultrasound to measure scapular rotations (internal/external, upward/downward, anterior/posterior). The scapular position in 22 healthy, nondisabled individuals was imaged three times in four testing positions of interest (arm at rest and humeral elevation in the sagittal, frontal, and scapular planes). We found substantial reliability across scanning positions and scapular rotations, with intraclass correlation coefficients ranging from 0.62 to 0.95. The highest reliability was found in the rest testing position. Our standard error of measurement was less than 2 degrees for all measurements and less than 0.5 degrees for most. Minimum detectable change ranged from 0.37 to 3.08 degrees. Our results agree with the pattern of movement found in other studies, with the scapula moving toward a more externally rotated, upwardly rotated, and posteriorly tilted position with humeral elevation. Further study is warranted to compare our methods to a gold standard, apply them to evaluation of dynamic movement, and determine whether they can be used to detect shoulder pathology.

Boninger ML, Wechsler LR, Stein J, "Robotics, Stem Cells, and Brain-Computer Interfaces in Rehabilitation and Recovery from Stroke: Updates and Advances," *American Journal of Physical Medicine and Rehabilitation*, pp. S145-S154, Vol. 93, No. 11, Supplement 3, November 2014.

SUMMARY: Robotics, stem cells, and brain-computer interfaces have great potential in stroke treatment.

Objective:
The aim of this study was to describe the current state and latest advances in robotics, stem cells, and brain-computer interfaces in rehabilitation and recovery for stroke.

Design:
The authors of this summary recently reviewed this work as part of a national presentation. The article represents the information included in each area.

Results:
Each area has seen great advances and challenges as products move to market and experiments are ongoing.

Conclusions:
Robotics, stem cells, and brain-computer interfaces all have tremendous potential to reduce disability and lead to better outcomes for patients with stroke. Continued research and investment will be needed as the field moves forward. With this investment, the potential for recovery of function is likely substantial.

Brad Dicianno to Become HERL Medical Director

As of January 1, 2015, Brad Dicianno, MD will become HERL's Medical Director. After 20 years as Medical Director of the Human Engineering Reserach Laboratories, Michael Boninger, MD, will be stepping down to become Senior Associate Medical Director.

Dr. Dicianno is HERL Associate Medical Director and Associate Professor in the Department of Physical Medicine and Rehabilitation at the University of Pittsburgh Medical Center. Clinically, he treats the assistive technology and rehabilitation needs of individuals with complex disabilities including spina bifida. His research interests focus on developing and studying interventions targeted to improving health and wellness in individuals with complex disabilities (wheelchairs, adaptive sports, telemedicine, virtual reality, and preventative care programs).

Dr. Dicianno graduated from the University of Pittsburgh with a BS in Evolutionary Biology and a BA in the History and Philosophy of Science and from the University of Pittsburgh School of Medicine with his medical doctorate. He completed residency in the Department of Physical Medicine and Rehabilitation at the University of Pittsburgh Medical Center where he served as chief resident. He then completed an NIH fellowship within the Rehabilitation Medicine Scientist Training Program and obtained a Masters Degree in Bioengineering.

2014 Publication Review

Rice LA, Smith I, Kelleher AR, Greenwald KK, Boninger ML, "Impact of a Wheelchair Education Protocol based on Practice Guidelines for Preservation of Upper Limb Function: A Randomized Trial," *Archives of Physical Medicine and Rehabilitation*, 10-19.e11, Vol. 95, No. 1, January 2014.

Collinger JL, Vinjamuri R, Degenhart AD, Weber DJ, Sudre GP, Boninger ML, Tyler-Kabara EC, Wang W, "Motor-related brain activity during action observation: a neural substrate for electrocorticographic brain-computer interfaces after spinal cord injury," *Frontiers in Integrative Neuroscience*, Article 17, Vol. 8, 2014.

Collinger JL, Kryger M, Barbara R, Betler T, Bowsher K, Brown EHP, Clanton ST, Degenhart A, Foldes S, Gaunt RA, Gyulai FE, Harchick EA, Harrington D, Helder JB, Hemmes T, Johannes MS, Katyal KD, Ling GSF, McMorland AJC, Palko K, Para MP, Scheuermann J, Schwartz A, Skidmore ER, Solzbacher F, Srikameswara AV, Swanson DP, Swetz S, Tyler-Kabara EC, Velliste M, Wang W, Weber DJ, Wodlinger B, Boninger ML, "Collaborative Approach in the Development of High Performance Brain-Computer Interfaces for a Neuroprosthetic Arm: Translation from Animal Models to Human Control," *Clinical and Translational Science*, pp. 52-59, Vol. 7. No. 1, February 2014.

Duvall J, Cooper RA, Sinagra E, Stuckey D, Brown J, Pearlman J, "Development of Surface Roughness Standards for Pathways Used by Wheelchairs," *Journal of the Transportation Research Board*, pp. 149-156, Vol. 2387, 2014.

Worobey L, Pearlman J, Oyster M, Gebrosky B, Boninger ML, "Differences between Manufacturers in Reported Power Wheelchair Repairs and Adverse Consequences among People with Spinal Cord Injury," *Archives of Physical Medicine and Rehabilitation*, pp. 597-603, Vol. 95, No. 4, April 2014.

Boninger ML, Worobey L, "Perfect - the Enemy of Good" (Correspondence), *Archives of Physical Medicine and Rehabilitation*, pp. 608-609, Vol. 95, No. 4, April 2014.

Sicari BM, Rubin JP, Dearth CL, Wolf MT, Ambrosio F, Boninger ML, Turner NJ Weber DJ, Simpson TW, Wyse A, Brown EHP, Dziki JL, Fisher LE, Brown S, Badylak SF, "An Acellular Biologic Scaffold Promotes Skeletal Muscle Formation in Mice and Humans with Volumetric Muscle Loss," *Science Translational Medicine*, p. 234ra58, Vol. 6, No. 234, 30 April 2014.

Huang W, Vodovotz Y, Kusturiss MB, Barclay D, Greenwald K, Boninger ML, Coen PM, Brienza D, Sowa G, "Identification of Distinct Monocyte Phenotypes and Correlation with Circulating Cytokine Profiles in Acute Response to Spinal Cord Injury: A Pilot Study," *Physical Medicine and Rehabilitation*, pp. 332-341, Vol. 6, No. 4, 2014.

Sindall P, Lenton JP, Malone L, Douglas S, Cooper RA, Hiremath SV, Tolfrey K, Goosey-Tolfrey VL, "Effect of Low-Compression Balls on Wheelchair Tennis Match Play," *International Journal of Sports Medicine*, pp. 424-431, Vol. 35, No. 5, May 2014.

Groah SL, Ljungberg I, Lichy A, Oyster M, Boninger ML, "Disparities in Wheelchair Procurement by Payer Among People with Spinal Cord Injury," *Physical Medicine and Rehabilitation*, pp. 412-417, Vol. 6, No. 5, May 2014.

Rodakowski J, Skidmore ER, Anderson SJ, Begley A, Jensen MP, Buhule OD, Bonginer ML, "Additive effect of age on disability for individuals with spinal cord injuries," *Archives of Physical Medicine and Rehabilitation*, pp. 1076–1082, Vol. 95, No. 6, June 2014.

Li M, Huang H, Boninger ML, Sejdić E, "An analysis of cerebral blood flow from middle cerebral arteries during cognitive tasks via functional transcranial Doppler recordings," *Neuroscience Research*, pp. 19-26, Vol. 84, July 2014.

Cooper RA, De Luigi AJ, "Adaptive Sports Technology and Biomechanics: Wheelchairs," *Physical Medicine and Rehabilitation*, pp. S31-S39, Vol. 6, No. 8 Supplement, August 2014.

De Luigi AJ, Cooper RA, "Adaptive Sports Technology and Biomechanics: Prosthetics," *Physical Medicine and Rehabilitation*, pp. S40-S57, Vol. 6, No. 8 Supplement, August 2014.

Dicianno BE, "21st Century Challenges to the Provision of Health Care to Adults with Spina Bifida: A Rehabilitation Approach," *Archives of Physical Medicine and Rehabilitation*, pp. 1601–1602, Vol. 95, No. 9, September 2014.

Kamaraj DC, Dicianno BE, Cooper RA, "A Participatory Approach to Develop The Power Mobility Screening Tool and The Power Mobility Clinical Driving Assessment Tool," *BioMed Research International*, 15 pages, Article ID 541614, 2014.

Tsai C, Boninger ML, Koontz AM, Hogaboom N, "The Relationship Between Independent Transfer Skills and Upper Limb Kinetics in Wheelchair Users," *BioMed Research International*, 12 pages, Article ID 984526, 2014.

Lin Y, Boninger ML, Worobey L, Farrokhi S, Koontz AM, "Effects of Repetitive Shoulder Activity on the Subacromial Space in Manual Wheelchair Users," *BioMed Research International*, 9 pages, Article ID 583951, 2014.

HERL Website Improved

Three of the most important sections of this website have now been expanded and improved! The Education section (**http://herl.pitt.edu/education**) now covers HERL's programs for *all* students - including K-12, undergraduate, graduate, post-doctoral, Veteran, and continuing education students. The Current Research Projects section (**http://herl.pitt.edu/research/projects**) details more than 25 projects that HERL researchers are working on or investigating at this time. And finally, the Grants section (**http://herl.pitt.edu/research/grants**) has been updated for 2015.

If you have questions or comments, you can contact the webmaster at mil72@pitt.edu.

Ojeda M, Ding D, "Temporal Parameters Estimation for Wheelchair Propulsion Using Wearable Sensors," *BioMed Research International*, 10 pages, Article ID 645284, 2014.

Mason B, Lenton J, Rhodes J, Cooper RA, Goosey-Tolfrey VL, "Comparing the activity profiles of wheelchair rugby using a miniaturised data logger and radio frequency tracking system," *BioMed Research International*, 8 pages, Article ID 348048, 2014.

Wang H, Tsai C, Jeannis H, Chung C, Kelleher AR, Grindle GG, Cooper RA, "Stability Analysis of an Electrical Powered Wheelchair Mounted Robotic Assisted Transfer Device," *Journal of Rehabilitation Research and Development*, pp. 761-774, Vol. 51, No. 5, 2014.

Boninger ML, "The Wheelchair Needs Our Help" (Commentary), *Physical Medicine and Rehabilitation*, pp. 940-941, Vol. 6, No. 10, October 2014.

Liu H, Cooper RM, Kelleher AR, Cooper RA, "An Interview Study for Developing a User Guide for Power Seating Function Usage," *Disability and Rehabilitation: Assistive Technology*, pp. 499-512, Vol. 9, No. 6, November 2014.

Boninger ML, Wechsler LR, Stein J, "Robotics, Stem Cells, and Brain-Computer Interfaces in Rehabilitation and Recovery from Stroke: Updates and Advances," *American Journal of Physical Medicine and Rehabilitation*, pp. S145-S154, Vol. 93, No. 11, Supplement 3, November 2014.

Gentile N, Brown EHP, Stearns KM, Rubin JP, Boninger ML, Ambrosio F, Dearth CL, Badylak SF, "Targeted Rehabilitation following Extracellular Matrix Scaffold Transplantation in Patients with Volumetric Muscle Loss," *American Journal of Physical Medicine and Rehabilitation*, pp. S79-S87, Vol. 93, No. 11, Supplement 3, November 2014.

Mahajan HP, Spaeth DM, Dicianno BE, Brown K, Cooper RA, "Preliminary evaluation of a variable compliance joystick for people with multiple sclerosis," *Journal of Rehabilitation Research and Development*, pp. 951-962, Vol 51, No. 6, 2014.

Worobey LA, Udofa IA, Lin Y, Koontz AM, Farrokhi SS, Boninger ML, "Reliability of freehand three-dimensional ultrasound to measure scapular rotations," *Journal of Rehabilitation Research and Development*, pp. 985-994, Vol 51, No. 6, 2014.

**This list includes all journal articles for which HERL authors have contributed and does not include articles in press or e-published ahead of print.*

20 Years of Research Milestones

1994 HERL founded

1994 SmartWheel developed

1998 Ergonomic pushrim (Natural Fit) developed

1998 Pittsburgh hosts National Veterans Wheelchair Games

1999 Initial VA Rehab R&D Center funding

1999 NIDRR SCI Model Center awarded

1999 PAPAW study in collaboration with Yamaha

2000 Most efficient WC propulsion pattern identified

2001 GAMECycle invented

2002 Oblique angle caster fork invented

2004 PathLock invented

2005 NSF-ERC QoLT awarded

2005 Low-cost adjustable pediatric WC

2006 SCI Clinical Guidelines on preservation of upper limb function written

2008 PerMMA invented

2009 Transfer Assessment Instrument created

2010 Virtual Seating Coach developed

2010 Cueing Kitchen developed

2011 HERL moves to Bakery Square

2011 Pittsburgh VA hosts National Veterans Wheelchair Games for the 2nd time

2011 Strong Arm invented

2012 MeBot invented

2012 KitchenBot invented

2013 Pathway Standards written

2014 Wheelchair Maintenance study begins

2014 HERL Staff Member of the Year: Ron Wesolowski

On November 21, HERL Administrative Assistant/Information & Technology Professional Ron Wesolowski received the HERL Staff Member of the Year Award for 2014. Ron is the person who greets you when you enter the HERL lobby; however, he has many other duties, such as record keeping, purchasing, and recruiting speakers for HERL's lecture series. He is also HERL's Information Technology professional: Ron sets up, maintains, and troubleshoots all of HERL's computer equipment. Congratulations, Ron, on a job well done!

State of the Science Symposium Summary:
Diversity and Disparity in Rehabilitation for Wounded, Injured, and Ill Veterans

The State of the Science Symposium on Diversity and Disparity in Rehabilitation for Wounded, Injured, and Ill Veterans was held in Sanford Auditorium at the Uniformed Services University of the Health Sciences in Bethesda, Maryland on November 14, 2014.

After opening remarks by symposium director **Dr. Paul Pasquina**, retired U.S. Army colonel and current Chief Clinical Officer for the Department of Behavioral Health for the District of Columbia **Elspeth Cameron Ritchie, MD** presented "Medical and Psychological Issues for Female Service Members."

Following this, **Larissa Myaskovsky, Ph**D, Associate Professor of Medicine, Psychiatry, and Clinical and Translational Science in the School of Medicine at the University of Pittsburgh, gave a presentation entitled "The Influence of Race, Cultural, and Psychosocial Factors on Disparities in Processes and Outcomes of Care for Spinal Cord Injury."

Stuart Hoffman, PhD, the Scientific Program Manager for the Brain Injury Portfolio at the Department of Veterans Affairs discussed the national research action plan of the Federal coordination for traumatic brain injury research.

Major Camille McGann, MD, U.S. Army, Assistant Professor of Radiology atthe Uniformed Services University of the Health Sciences, presented a talk entitled "Cultural Competency and Health Disparity in Medicine."

In honor of the 10th anniversary of the State of the Science Symposium series, course directors **Rory Cooper, PhD**, and **Paul Pasquina, MD**, distributed special awards to deserving guests, such as **William Lake**, former Army surgeon general **Eric Schoomaker**, Paralyzed Veterans of America National President **Al Kovach**, Walter Reed Director BG **Jeffrey B. Clark**, and Dr. Pasquina himself.

Following the award ceremony, **Rooshey Hasnain, PhD**, Visiting Clinical Assistant Professor in Asian American Studies at the University of Illinois at Chicago, presented "Listening to the Silent Voices: Supporting Asian American Veterans with Disabilities Through Better Mental Health and Vocational Rehabilitation Services."

The final presentation of the day was given by **Seth Messanger, PhD**, director of qualitative research for the Center for Rehabilitation Sciences Research and Associate Professor of Anthropology at the University of Maryland, Baltimore County, in which he discussed the long-term community reintegration of Military Personnel with spinal cord injuries.

The organizers of the State of the Science Sympoisum would like to thank the Paralyzed Veterans of America for providing lunch with their generous donation.

Videos, presentations, and photos from this symposium are available, along with biographies of all speakers, on the HERL website at **http://herl.pitt.edu/diversity-disparity**. You can also browse symposia dating back to 2011 at **http://herl.pitt.edu/education-outreach/symposia**.

PREVIOUSLY: *State of the Science Symposium on Advanced Technology*

On September 12, 2014, the State of the Science Symposium on Advanced Technology for Wounded, Injured, and Ill Veterans was held in Sanford Auditorium at the Uniformed Services University of the Health Sciences in Bethesda, Maryland.

Speakers were **RADML Joan F. Hunter, MSN** who made opening remarkrs; **COL Stephen E. Braverman, MD**; **Levi J. Hargrove, PhD**; **Ronald J. Triolo, PhD**; **Rory A. Cooper, PhD**; **LTG (ret) Rick Lynch** (via phone); **COL (ret) Paul F. Pasquina, MD**; **Mark Lindholm, OTR, ATP**; **Dana A. Draa, MA, CRC, COMS**; and **Brian Schulz, PhD**.

Videos, presentations, and photos from this symposium are available, along with biographies of all speakers, on the HERL website at **http://herl.pitt.edu/advanced-technology**.

HERL Away from Home:
RESNA and ISS Conferences

The Human Engineering Research Laboratories are always actively recruiting volunteers for our research studies. And of course we are always interested in speading the word about our activities and our research. So you can find HERL exhibiting at the two most important American assistive technology conferences: the International Seating Symposium (ISS) and RESNA.

The ISS is the lead educational and scientific conference in the field of wheelchair seating & mobility and related technologies. The 31st ISS, to be held February 26-28, 2015 in Nashville, expects to host over 1800 people from around the world. The Symposium will include scientific and clinical papers, research forums, in-depth workshops, panel sessions, and an extensive exhibit hall. Presentations will address the wheeled mobility and seating challenges and solutions for people with disabilities across the lifespan and conditions such as neuromuscular disorders, spinal cord injury and diseases of the spinal cord, orthopedic conditions, systemic conditions, obesity, and polytrauma.

The HERL/RST/VA booth at the 2013 International Seating Symposium in Nashville, Tennessee.

The ISS is sponsored by the University of Pittsburgh and is held in the United States in odd-numbered years,. In even-numbered years, ISS is held in Vancouver, BC, Canada, and is sponsored by the University of British Columbia. (HERL only attends odd-numbered years.)

Designed by and for people passionate about the use of assistive technology to improve the health and well-being of people with disabilities, the Rehabilitation Engineering and Assistive Technology Society of North America (RESNA) Conference offers educational sessions, scientific paper sessions, posters, plenary sessions with internationally-recognized speakers, and exhibits. This year, the RESNA Conference will be held June 10-14 in Denver.

Invitation to Invention:
The AAAS-Lemelson Invention Ambassadors Program

The American Association for the Advancement of Science (AAAS) and the Lemelson Foundation have joined together to celebrate inventions and inventors in order to increase global understanding of the role of invention in improving our quality of life, creating products and building businesses, and fostering innovation. To do this, the AAAS-Lemelson Invention Ambassadors program has been created and the inaugural class of seven ambassadors has been chosen.

The ambassadors:

- **Karen Burg** - Director, Institute for Biological Interfaces of Engineering; Vice President for Research & Professor of Chemical Engineering, Kansas State University
- **Rory Cooper** - Endowed Chair and Professor of Rehabilitation Science and Technology; Professor of Robotics Institute, Carnegie Mellon University
- **Sorin Grama** - Co-Founder and CEO of Promethean Power Systems (USA and India)
- **Paul R. Sanberg** - Founder and President of the National Academy of Inventors; Sr Vice President for Research and Innovation, University of South Florida
- **Steven Sasson** - Inventor of Digital Camera
- **Paul Stamets** - Founder of Fungi Perfecti and Host Defense Organic Mushrooms
- **Vinod Veedu** - Director of Strategic Initiatives at Oceanit

This esteemed group of Ambassadors are from academia, industry, private companies; have approximately 150 patents amongst them; and have demonstrated: (1) a high regard for the role of invention; (2) an invention track record; (3) an accomplished professional career; (4) a commitment to invention's role in impacting environmental sustainability; and (5) experience or interest in speaking to audiences. Ambassadorships are 12 months long and each Ambassador will be evangelists for invention in strategically selected public engagement venues.

To learn more, visit **http://www.aaas.org/program/aaas-lemelson-ambassadors-program**. Class 2 nominations are now open.

VINOD VEEDU

KAREN BURG

PAUL STAMETS

RORY COOPER

PAUL SANBERG

SORIN GRAMA

STEVEN SASSON

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
NIDRR Model Center on Spinal Cord Injury

National Science Foundation
Advanced Technology Education Center

Rory A. Cooper, PhD
Director

Michael L. Boninger, MD
Medical Director

Jonathan Pearlman, PhD
Associate Director of Engineering

Alicia Koontz, PhD, RET
Associate Director for Research Capacity Building

Brad Dicianno, MD
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HERL Research Report & 20th Anniversary Brochure

Have you received a copy of the HERL Research Report? Includes information on HERL's current projects, initiatives, and facilities. Full color with many photos. 12 pages. Printed with HERL's 20th Anniversary Commemorative Brochure (4 pages; full color).
To receive a FREE copy, please call (412) 822-3663 or email mil72@pitt.edu.

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) 822-3700 or herlregistry@shrs.pitt.edu.

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Contact us!

Comments and questions (or to subscribe to the print newsletter):
mil72@pitt.edu or call **412-822-3663**

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