HERL Newsletter

News from the Human Engineering Research Laboratories Vol 18, No 2 · September 2019

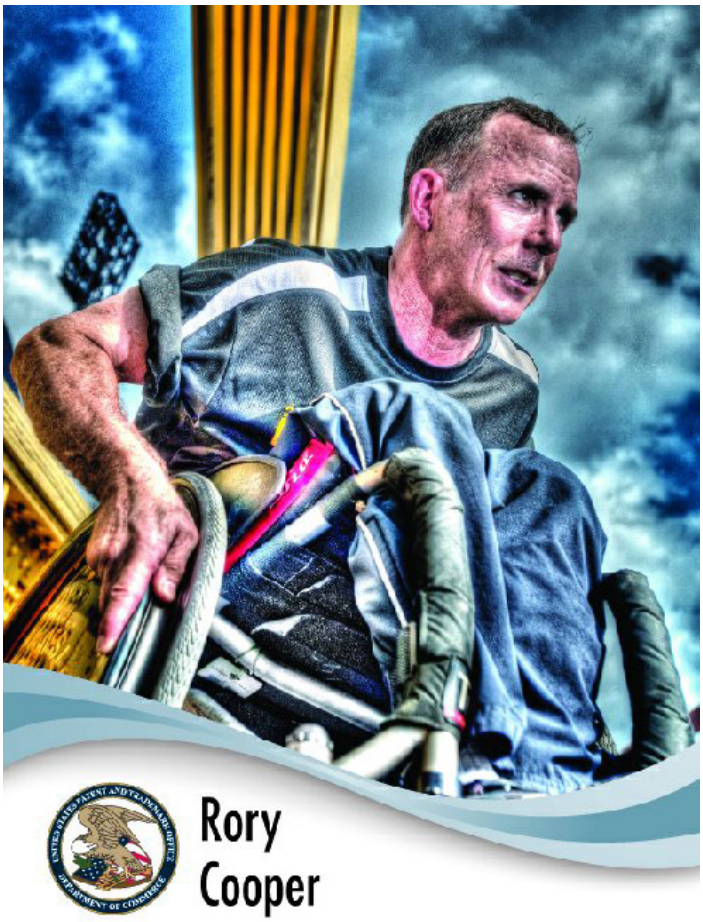
HERL Hosts 25th Anniversary Celebrations

Thursday, July 25th, was a very special day for the Human Engineering Research Laboratories (HERL).

Both the City of Pittsburgh and Allegheny County officially proclaimed July 25th to be "HERL Day" *(see the official proclamations at* ***https://is.gd/herlproclamation****)*. In the morning, the Final Symposium of the Research Experience for Undergraduates (REU) and Experiential Learning for Veterans in Assistive Technology and Engineering programs (ELeVATE) took place. The Keynote Speaker was Dr. Eliana Ferretti, HERL alum and Assistant Professor in the Department of Science of Human Movement and Coordinator of the Assistive Technology Research Center at the Federal University of São Paulo (UNIFESP), Baixada Santista Campus. Honors were presented to Thomas Martineau, ELeVATE paper and pitch winner; Michelle Karabin, REU paper and pitch winner; Jordan Hoydick, REU

paper winner; Evan Suter, REU paper and poster winner; and Sara Mancilla, ELeVATE poster winner.

After the symposium ended, HERL held its annual Open House. Guests of honor included VA Pittsburgh Healthcare Sysytem (VAPHS) Director Donald Koenig, VAPHS Chief of Staff Dr. Ali Sonel, and Veterans Heath Adminitration Executive-in-Charge Dr. Richard Stone, who participated with HERL Directors for a cake-cutting ceremony. *(continued on p. 4)*



USPTO Honors Cooper with Collectible Trading Card

HERL Director Dr. Rory Cooper writes:

"You may find it of interest that on Saturday, 18 May 2019, I was revealed as the #28 Inventor in the US Patent and Trademark Office "Collectible Card Series." Others include Thomas Edison, Nicolas Tesla, Steve Wozniak, George Washington Carver, and Temple Grandin. The reveal was done at the Smithsonian Institute of American History by the Deputy Director of the USPTO Laura Peter during Military Invention Day of the Lemelson Exhibit. Among the people present were the Secretary of the Navy Richard Spencer, Admiral John Richardson, Chief Naval Officer, MG Cedric Wins, and Elizabeth Dougherty of USPTO.

"Prior to the reveal, we were given a wonderful behind the scenes tour of the Smithsonian to see some amazing historical artifacts (including a piece of the Flag that inspired the National Anthem). After the reveal, guests of the Smithsonian *(continued on p. 4)*

Current Research Abstracts

Greenhalgh M, Landis JM, Brown J, Kulich H, Bass S, Alqahtani S, Deepak N, Crytzer TM, Grindle G, Koontz AM, Cooper RA, Assessment of Usability and Task Load Demand Using a Robotic Assisted Transfer Device Compared to a Hoyer Advance for Dependent Wheelchair Transfers, American Journal of Physical Medicine and Rehabilitation, pp. 729-734, Vol. 98, No. 8, August 2019.

Objective: Manual lifting can be burdensome for people who care for power wheelchair users. Although technologies used for dependent transfers are helpful, they have shortcomings of their own. This study compares the usability and task load demand of a novel robot-assisted transfer device to a clinical standard when performing dependent transfers.

Design: A cross-sectional study was conducted to assess caregivers (N = 21) transferring a 56-kg mannequin with the Strong Arm and Hoyer Advance at three transfer locations. Feedback was gathered through qualitative surveys.

Results: Usability was significant in multiple areas important for transfers. Caregiver fatigue and discomfort intensity were reduced, and the Strong Arm was preferred at the three transfer locations. Device ease and efficiency favored Strong Arm at two stations as was discomfort frequency. In addition, physical demand, frustration, and effort were significantly lower using Strong Arm compared with the Hoyer Advance.

Conclusions: Compared with the Hoyer, participants favored Strong Arm for transfer usability and task load demand. However, further Strong Arm developments are needed.

SUMMARY: Strong Arm shows great promise for dependent transfers, but more work is needed.

Koontz AM, Bass S, Kulich H, Cooper RA, Effects of grab bars and backrests on independent wheelchair transfer performance and technique, Physiotherapy Research International, e1758, Vol. 24, No. 1, January 2019.

Objective: For individuals who rely on wheeled mobility devices for primary mobility, the ability to transfer independently greatly enhances participation in activities within and outside of the home. Nonlevel transfers are challenging and inevitable as not all surfaces in all settings can be made level with an individual's seat to floor height. The purpose of this study was to investigate the effects of two transfer aids, grab bars, and backrests, on the performance and quality of nonlevel transfers.

Methods: This study employed a repeated-measures design with transfer setup as the independent variable. Sixty-eight (53 men and 15 women) wheeled mobility device users performed level and nonlevel transfers to a bare surface, a surface with grab bars present, a surface with grab bars, and a backrest present. For each condition, participants were asked to transfer as high and as low as they could go while still performing an independent and safe transfer. The transfer assessment instrument was used to evaluate the quality of their transfer technique.

Results: Participants were able to transfer an absolute height up to 2.5 cm (1″) higher and lower when grab bars or grab bars and a backrest were present on the surface ($p < 0.042$) and 2.3 cm (~1″) higher relative to their wheelchair level seat high when grab bars were present on the surface ($p < .001$). Transfer technique significantly improved for both uphill and downhill transfers with the presence of grab bars and a backrest as shown by the transfer assessment instrument scores ($p < 0.046$).

Conclusions: The presence of grab bars and a backrest on transfer surfaces may help mobility device users to achieve higher and lower absolute transfer heights and facilitate better transfer technique.

SUMMARY: Grab bars and backrests may improve independent transfers.

Dicianno BE, Joseph J, Eckstein S, Zigler CK, Quinby E, Schmeler M, Schein R, Pearlman J, Cooper RA, The Future of the Provision Process for Mobility Assistive Technology: A Survey of Providers, Disability and Rehabilitation: Assistive Technology, pp. 338-345, Vol. 14, No. 4, 2019.

Purpose: The purpose of this study was to evaluate the opinions of providers of mobility assistive technologies to help inform a research agenda and set priorities.
Materials and methods: This survey study was anonymous and gathered opinions of individuals who participate in the process to provide wheelchairs and other assistive technologies to clients. Participants were asked to rank the importance of developing various technologies and rank items against each other in terms of order of importance. Participants were also asked to respond to several open-ended questions or statements.
Results: A total of 161 providers from 35 states within the USA consented to participation and completed the survey.
Conclusions: This survey revealed themes of advanced wheelchair design, assistive robotics and intelligent systems, human machine interfaces and smart device applications. It also outlined priorities for researchers to provide continuing education to clients and providers. These themes will be used to develop research and development priorities.

SUMMARY: In this study, areas of future research in mobility assistive technology were identified.

Current Research Abstracts

Jeannis H, Goldberg M, Seelman K, Schmeler M, Cooper RA, Participation in science and engineering laboratories for students with physical disabilities: survey development and psychometrics, Disability and Rehabilitation: Assistive Technology, pp. 692-709, Vol. 14, No. 7, 2019.

Purpose: The purpose of this study is to address the development of the Full Participation Science and Engineering Accessibility (FPSEA) self-report survey that gathers experiences from students with physical disabilities (SwD-P) using a postsecondary laboratory and to evaluate the survey's stability.

Methods: Survey items were generated from an extensive literature review and recommendations articulated by experts. Think-aloud sessions and content validity index (CVI) were used to determine survey content validity and help finalize survey items. Individuals with physical disabilities (n=20) who have taken a postsecondary science or engineering laboratory course completed the survey and took it again 10–14 days apart. The test–retest reliability was assessed using Spearman Rho coefficients for Likert-scale items, Chi-square and Fisher's exact test for the dichotomous items. Missing data completely at random (MCAR) test was computed before reliability data analysis.

Results: Each sub-item passed the MCAR test, indicating that the data are missing completely at random and can be imputed to perform the analysis. Reliability analysis was completed on 20 individuals. The FPSEA had good content reliability: the item-level CVI of items kept ranged from 0.86 to 1. The scale-level CVI was 0.94. Stability was demonstrated with adequate Spearman correlation ranged from 0.56 to 0.86.

Conclusions: No previous survey had been developed linking SwD-P and the postsecondary science and engineering (S&E) laboratory setting prior to this work. Overall, FPSEA is reliable and stable for reporting the barriers and facilitators to use S&E laboratories from the SwD-P's perspective.

SUMMARY: The FPSEA is an appropriate reporting tool for S&E laboratory barriers and facilitators.

Candiotti JL, Kamaraj DC, Daveler B, Chung C, Grindle GG, Cooper RM, Cooper RA, Usability Evaluation of a novel robotic wheelchair for indoor and outdoor environments, Archives of Physical Medicine and Rehabilitation, pp. 627-637, Vol. 100, No. 4, April 2019.

Participants: A convenience sample of expert EPW users (N=12; 9 men, 3 women) with an average age of 54.7±10.9 years and 16.3± 8.1 years of EPW driving experience.

Interventions: Not applicable.

Main Outcome Measures: Powered mobility clinical driving assessment (PMCDA), Satisfaction Questionnaire, National Aeronautics and Space Administration's Task Load Index.

Results: Participants were able to perform significantly higher number of tasks (P=.004), with significantly higher scores in both the adequacy-efficacy (P=.005) and the safety (P=.005) domains of the PMCDA while using MEBot over curbs and cross-slopes. However, participants reported significantly higher mental demand (P=.005) while using MEBot to navigate curbs and cross-slopes due to MEBot's complexity to perform its mobility applications which increased user's cognitive demands.

Conclusions: Overall, this usability evaluation demonstrated that MEBot is a promising EPW device to use indoors and outdoors with architectural barriers such as curbs and cross-slopes. Current design limitations were highlighted with recommendations for further improvement.

SUMMARY: MEBot shows promise for both indoor and outdoor environments.

Marino DJ, Rivera V, Joseph J, Williams R, Jeannis H, Goldberg M, Grindle GG, Kimmel J, Cooper RA, Accessible Machining for People who use Wheelchairs, WORK: A Journal of Prevention, Assessment, and Rehabilitation, pp. 361-370, Vol. 62, No. 2, 2019.

Despite the Americans with Disabilities Act mandate for reasonable accommodations, wheelchair users are often placed in the role of observer and note-taker when learning machining and fabrication skills due to a lack of accessibility. The focus of this case study report is to identify and develop reasonable accommodations for wheelchair users in an academic machine shop environment to address accessibility limitations of original equipment manufacturer (OEM) machines. Individual wheelchair users working and learning within the Human Engineering Research Laboratories (HERL) were observed and interviewed about their experiences using the machine shop equipment without modifications, followed by further observations after accommodations were implemented.

SUMMARY: Describes the development of accommodations in an academic machine shop environment.

Celebration (cont.)

On the evening of the 25th at the University of Pittsburgh's Alumni Hall, more than a hundred Department of Veterans Affairs, University of Pittsburgh, Military, and Veteran VIPs attended to honor HERL on its silver anniversary. Ron Drach – Purple Heart-decorated Vietnam Veteran, Former DAV National Employment Director, and former Director of Government and Legislative Affairs, Veterans' Employment and Training Service, U.S. Department of Labor – gave the Keynote Speech, and 30 separate individuals and organizations were recognized with the inaugural Distinguished Self-Less Service Medal for extraordinary support of HERL. *(See sidebar for awardee list; certificate reproduced below.)*

Human Engineering Research Laboratories

IS PRESENTED THE

DISTINGUISHED SELF-LESS SERVICE MEDAL

The Distinguished Self-Less Service Award is presented for distinguished service, ability, accomplishments, or courage while making contributions representing extraordinary progress to the mission of the Human Engineering Research Laboratories. The contributions are so extraordinary that other forms of recognition would be inadequate.

July 25, 2019
Pittsburgh, Pennsylvania

Rory A. Cooper, PhD
Founder and Director

USPTO (cont.)

(around 10,000 people over the course of the day) could pick-up some of the trading cards, including #28. I spent some time talking with inventors of all ages - from kids to military research scientists to established inventors in industry and academia."

The USPTO launched the Inventor Collectible Card Series in 2012 at the USA Science and Engineering Festival. The cards feature caricatures of various inventors and are designed to recognize a wide variety of patent holders from diverse backgrounds and demographics in an effort to encourage and inspire future generations of inventors and innovators from various walks of life. New cards are released periodically and are typically distributed at USPTO booths at various education and outreach festivals and events. The concept for the cards was developed by the Office of Education and Outreach at the USPTO.

To see the full list of Collectible Cards, visit: **https://www.uspto.gov/kids/cards.html**.

Distinguished Self-Less Service Awards

Alumni
David Algood, Brad Dicianno, Dan Ding, Eliana Ferretti, Jongbae Kim, Alicia Koontz, Sean Shimada

Champion of HERL
Clifford Brubaker, David Cowgill, Patricia Dorn, Ronald Drach, Steven Graham

Collaborator
Keystone Paralyzed Veterans of America
National Veterans Wheelchair Games
(PVA Sports and VA National Team Staff)

Community Partner
Disabled Veterans National Foundation
Paralyzed Veterans of America

Faculty/Investigator
Michael Boninger, Rosemarie Cooper, Hisaichi Ohnabe

Friend of HERL
Ted Couperus

Media
PN Magazine
VA Research Currents

Research Participant
David Gifford, Holly Koester, Thomas Strang

Staff
Steve Albright, Andrea Bagay, Mark McCartney, Paula Stankovic

The Distinguished Self-Less Service Award is presented to those who display distinguished service, ability, accomplishments, or courage, and have personally made a contribution representing substantial progress to the HERL mission. The contribution must be so extraordinary that other forms of recognition would be inadequate.

HERL Milestones

To help celebrate our 25th Anniversary, HERL Directors Dr. Rory Cooper and Dr. Brad Dicianno compiled a list of specific milestones over the last 25 years that were especially important to our history, to scholarship in the field of assitive technology, and to the lives of people with disabilities. To see the milestones, go to **https://herl.pitt.edu/timeline/**.

Center / REAP Directors' Retreat

On April 9, 10, and 11, HERL was proud to be the host for the 2019 Rehabilitation Research & Development Center and Research Enhancement Award Program (REAP) Directors' Retreat. For the retreat, HERL hosted VA VIPs such as Dr. Patricia Dorn (Director, VA RR&D Service), Ms. Karen Lohmann Siegel (Deputy Director, VA RR&D Service), Dr. Shirley Groer (Scientific Program Manager, Social Reintegration and Mental Health Program, VA RR&D), Dr. Lynda Davis (VA Chief Veterans Experience Officer), Dr. John Kaplan (Director, VA Technology Transfer Program), and Mr. Ricardo Gonzalez (Administrative Officer, VA RR&D Service); Directors from other VA Centers such as Dr. Ronald Triolo (Director, Advanced Platform Technology Center, Cleveland) and Dr. Ben Greenberg (Co-Director, Center for Neurorestoration and Neurotechnology, Providence); and local preeminents such as Dr. Steven Graham (Director, GRECC, VA Pittsburgh Healthcare System), Dr. Ronald Poropatich (Director, Center for Military Medicine Research, McGowan Institute, University of Pittsburgh), David Cowgill (VA Public Affairs Officer, VISN-4), and Dr. George Coulston (Technology Licensing Manager, University of Pittsburgh Innovation Institute).

HERL also hosted a Veteran Service Organization panel during the retreat that included Chris Toner (Chief of Staff, Wounded Warrior Project); Dan Standage (Vice President, Diversity and Inclusion, Student Veterans of America); Dan Pultz (Senior Team Leader Emeritus, Semper Fi Odyssey/Military Coordinator, TEAM TBI 1.0); Cheryl L. Vines (Director of Research and Education, Paralyzed Veterans of America); David Roudabush (Out reach Coordinator, University of Pittsburgh Office of Veteran Services); Carlos Carmona (President, Association of the U.S. Army, Fort Pitt Chapter); and Brig. General Dave Papak, USMC (Travis Mann Foundation).

News & Notes

- The 14th International Convention on Rehabilitation Engineering and Assistive Technology (iCREATe2020) will be held in Taiwan summer 2020.
- Dr. Laurel Kuxhaus is the new Program Director of the Biomechanics & Mechanobiology Program at the National Science Foundation. Dr. Cooper was on Dr. Kuxhaus's doctoral committee.
- We're sad to see Dr. Sarah Bass and Dr. Akhila Veerubhotla leave HERL, but we know they will succeed in all their future endeavors. Dr. Bass has joined the staff at Walter Reed National Military Medical Center and Dr. Veerubhotla is now working at the Kessler Institute.
- Warm welcomes to new staff members Heather Norris, Assistant to the Director; Daniel Post, Research Assistant; and Robert Powell, Machinist.
- HERL attended the Paralyzed Veterans of America Summit + Expo, August 15-17 in Orlando, Florida. Dr. Lynn Worobey co-presented a pre-conference workshop on wheelchair skills assessment and training for spinal cord injury clinicians on August 14, and Dr. Akhila Veerubhotla gave a presentation on wearable devices for tracking activity in people with spinal cord injury on August 17. Dr. Veerubhotla, Dr. Dan Ding, and Yousif Jamal Shwetar presented a poster abstract on the comparison of predicting equations for estimating energy expenditure in wheelchair users with spinal cord injuries.
- On August 16 at the Paralyzed Veterans of America Summit, Dr. Steven W. Brose was awarded the Paralyzed Veterans of America Clinical Excellence Award. Dr. Brose is Chief of the Spinal Cord Injury/Dysfunction Unit at the Syracuse VA Medical Center. He was a student at HERL/WARE, published several papers, and was a recipient of a PVA Research Fellowship with Dr. Cooper as his mentor. Dr. Brose completed his Residency in Physical Medicine & Rehabilitation within the Department of Physical Medicine & Rehabilitation of the School of Medicine of the University of Pittsburgh.
- HERL Director Dr. Rory Cooper was featured in a new short documentary video from Freethink's "Superhuman" series, which profiles the pioneers and patients on the frontlines of medical innovation. Check out the video and the whole series at **https://www.facebook.com/freethinksuperhuman/**.

State of the Science Symposium, 17 May 2019
Recent Advances in Osseointegration

The State of the Science Symposium on Promoting Successful Community Reintegration After Trauma was held at the Henry M. Jackson Foundation for the Advancement of Military Medicine in Bethesda, Maryland on Friday, May 17, 2018 as part of a two-day gathering of experts in osseointegration. The symposium was presented by the Center for Rehabilitation Science Research; the Department of Physical Medicine and Rehabilitation at the Uniformed Services University of the Health Sciences; the Department of Rehabilitation, Walter Reed National Military Medical Center; the University of Pittsburgh, School of Health and Rehabilitation Sciences, Department of Rehabilitation Science and Technology; the Human Engineering Research Laboratories, VA Pittsburgh Healthcare System; the University of Pittsburgh School of Medicine Center for Continuing Education in the Health Sciences; with generous support from the Paralyzed Veterans of America.

Presentations at the Symposium:

Opening Remarks / Recap of May 16 OI Meeting - Dr. Paul Pasquina, Uniformed University of the Health Sciences

Review of the Devices/Skin Interface/OI Registry - CAPT Jonathan Forsberg, Walter Reed National Military Medical Center

Rehabilitation Outcomes for Osseointegration - Dr. Danielle Melton, TIRR Hermann Memorial

Psychiatric Considerations Pre, During and Post Osseointegration - Dr. Harold Wain, Walter Reed National Military Medical Center

Adaptive Sports Post Osseointegration - Harvey Naranjo, Walter Reed National Military Medical Center

Osseointegration Pain Management - Dr. Edward Dolomisiewicz, Walter Reed National Military Medical Center

Development of a Percutaneous Osseointegrated Prosthesis for Transfemoral Amputees - Bart Gillespie, G.E. Whalen VA Medical Center

Standardized Outcomes - Barri Schnall, Walter Reed National Military Medical Center

Osseointegration at a Military Medical Center - Michelle Nordstrom, Walter Reed National Military Medical Center

Osseointegration: Prosthetics and Failsafes Current and Future - Dave Beachler, Walter Reed National Military Medical Center

OI Interface Technology: Overview of the MPL Experience To Date - Courtney Moran, Johns Hopkins University

FDA Perspective on Osseointegrative Orthopaedic Devices - Chen Zhuang, U.S. Food & Drug Administration

Development of Osseointegrated Orthopaedic Device Evaluation Methods - Dr. Andrew Baumann, U.S. Food & Drug Administration

Patient Perspectives on Osseointegration: Survey of Veterans with Upper Limb Amputation - Dr. Heather Benz, U.S. Food & Drug Administration

Comparison of Balance Outcomes in Amputees with an Osseointegrated vs. Traditional Socket Prosthesis - Dr. Robert Gailey, University of Miami

Restorative Rehabilitation, A National Effort - CAPT Craig Salt, Naval Medical Center San Diego

Improving Transitional Care Post Osseointegration - Dixie L. Johnson, Walter Reed National Military Medical Center

Sensory Restoration in People with Lower-Limb Amputation - Dr. Hamid Charkhkar, Case Western Reserve University

Warrior Care and Transition - COL Matthew St. Laurent, MEDCOM, U.S. Army

Dr. Rory Cooper and Dr. Paul Pasquina signed coipies of their book *Promoting Successful Integration* at lunchtime.

Videos, presentations, and photos from these symposia, along with biographies of all speakers, are available on the HERL website at **https://herl.pitt.edu/education-outreach/symposia**. Videos and presentations from *Recent Advances in Osseointegration* may be found at **https://herl.pitt.edu/osseointegration**.

Recent HERL Grant Abstracts

Lynn Worobey, PhD: NIH Grant

My career and research interests have centered on the science of movement and factors that maximize mobility. Whether this is through injury prevention, assistive technology, or biomechanical optimization, it is critical to clinical practice that these processes be well understood so that we can provide the most informed patient treatments. In order to carry out more effective clinically-based studies that inform patient care, it is my desire to continue my training through practical experiences with both formal coursework and a oversight by a strong mentoring team in the following domains: (1) activity-based data collection and analysis and (2) use of advanced statistical methods to investigate multiple factors. Through the K23, I will also gain experience specifically focused on my transition to independence; this will include grantsmanship and lab management, leading the design and implementation of clinical and translational studies, management of personnel and meetings, and pursuit of tenure and an R01. This continued training will be completed in the context of a research study that characterizes activity patterns in functional mobility after spinal cord injury (SCI).

Aim 1 of this study is to predict mobility at discharge and at 1-year post-discharge, based upon patient characteristics and activity during IPR. Mobility outcomes can be challenging to predict, particularly for individuals with moderate strength and sensory impairments. Selecting appropriate training is increasingly important with shrinking lengths of stay and there are potential opportunity costs and adverse consequences on quality of life and participation for individuals who do not receive appropriate interventions. Additional activity measures that we can collect early in the IPR stay, by utilizing low-cost sensors, have the potential to provide rich data sets that we can examine to garner insight into outcomes with little administrative burden. Using a machine learning approach, we will investigate patient characteristics and activity-monitoring data to improve predictive models of patient mobility based on data acquired early in the rehab stay. Achieving these aims will improve patient and clinician understanding of anticipated changes in mobility in the year following SCI to appropriately target expectations and interventions to maximize functional outcomes.

Aim 2 of this proposal is to quantitatively evaluate functional mobility changes (i.e., wheeling vs. walking or changes in activity within mode) in the first year post injury and their impact on quality of life and participation. There are factors following discharge that challenge or enhance the sustainability of walking for functional mobility including energy costs, neurologic recovery and biopsychosocial factors such as resilience, self-efficacy, environment, and caregiver support. The association between these factors and post-discharge changes in mobility are not well understood. Using wearable sensors we will quantify time spent walking and wheeling to identify transitions between walking and wheeling, identify factors that contribute to these transitions and investigate their impact on participation.

Theresa Crytzer: Spina Bifida

Children with spina bifida, a congenital condition ofthe spine and spinal cord, have a higher rate of obesity compared to typically developing peers. One barrier to better prevention of obesity is accurately assessing body fat.

Michele Polfuss is leading a research team in a $3.6 million federal grant to investigate methods of accurately measuring patients' body composition in a clinical setting. Polfuss is the Joint Research Chair in the Nursing of Children at the University of Wisconsin-Milwaukee and Children's Hospital of Wisconsin. With this interdisciplinary team of professionals, she will determine methods of providing information on the amount of energy expended or calories used in children with spina bifida and determine an accurate assessment of their weight category.

"Children with spina bifida are known to have a decreased level of energy expenditure, although we cannot specify how much less as compared to their typically developing peers," Polfuss said. "Our hypothesis is that the number of calories we currently recommend parents feed their children may be higher than it should be, inadvertently contributing to excess weight gain."

For people who are not disabled, health providers can get a fairly accurate assessment of a person's weight status by measuring the person's height and weight, and then using this information to calculate a body mass index. That doesn't work well for children with spina bifida who may be unable to stand or have orthopedic complications that challenge their ability to have an accurate measure of height or weight performed, said Polfuss. If the measure of height or weight is not accurate, then the BMI is inaccurate.

Theresa Crytzer is PI of the Pittsburgh site for this study.
See https://uwm.edu/news/nursing-researcher-awarded-grant-to-study-obesity-in-children-with-spina-bifida/

Other Recent Grants Awarded:

- Dr. Dan Ding - VA Merit Review - Development of Vision-Guided Shared Control for Assistive Robotic Manipulators

- Dr. Jorge Candiotti - VA Competitve Career Development Fund

- Dr. Brad Dicianno - PA Dept of Health: Addressing Social Determinants of Health for Persons Living with Spina Bifida

- Dr. Rory Cooper - Craig H. Neilsen Foundation: Creating Opportunity & Independence Project

Human Engineering Research Laboratories

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Wheelchairs and Associated
Rehabilitation Engineering

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School of Health & Rehabilitation Sciences
School of Medicine

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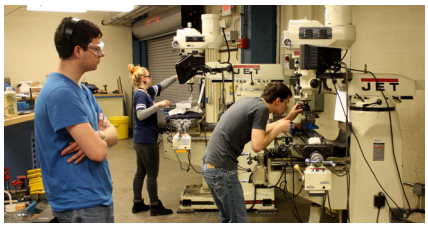

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