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HERL

HUMAN ENGINEERING RESEARCH LABORATORIES

HERL A.I. AT THE UNITED NATIONS

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IN THIS ISSUE

AI FOR GOOD Summit

RORY COOPER SPEAKS AT THE UNITED NATIONS

Excerpt from *PittWire* by Nick France - July 15, 2025

The University of Pittsburgh's Rory Cooper spoke at the United Nations as part of the AI for Good Global Summit in Geneva, Switzerland, on July 9. The esteemed Pitt innovator discussed how artificial intelligence is being deployed to fuel collaboration and improve the lives of people with disabilities, along with the challenges and ethical considerations of using AI in rehabilitation engineering.

Cooper's talk highlighted several pieces of technology developed in the Human Engineering Research Laboratories (HERL), a joint venture between Pitt and the U.S. Department of Veterans Affairs. Cooper is the founding director and VA Senior Research Career Scientist at HERL and serves as Pitt's assistant vice chancellor for research for STEM-health sciences collaborations.

The presentation featured a wheelchair that can traverse bumps, curbs and icy surfaces while keeping its user upright, a board game that teaches players about community mobility for mobility device users, a virtual coach that helps teach wheelchair users to use powered seat functions in real time, and the affordable, light-weight and fashionable Kirigami wheelchair.

Cooper has been using applied science to aid disabled veterans and other wheelchair users — both groups in which he counts himself — for more than 30 years. In addition to directing HERL, Cooper was elected to the National Academy of Engineering Class of 2024 and named to the U.S. Olympians and Paralympians Association's Executive Committee the same year. In 2023, he was awarded the National Medal of Technology and Innovation and was inducted into National Inventors Hall of Fame.

AI for Good is the United Nations' leading platform on artificial intelligence to solve global challenges. The summit is organized by the International Telecommunication Union in partnership with over 40 UN Sister Agencies and co-convened with the Government of Switzerland.

Dr. Cooper speaking at the UN's AI for Good Summit in Geneva, Switzerland.

Accolades & Events

Celebrating our best moments and achievements from the past three months.

Director, **DR. RORY COOPER**, spoke at the July AI for Good Summit in Geneva and the AI Horizons panel on Military Medicine, right here in Bakery Square in September! He was a keynote speaker at the 2025 American Society of Biomechanics conference in August, and presented a lecture on Inclusion and Transformative Technologies at the 2025 disABILITY Conference in September. Associate Director for Stakeholder Engagement, **ROSEMARIE COOPER**, also gave a lecture at the event, where they were both recognized for their contributions by the state of Pennsylvania. Dr. Cooper has moved on to the National Veterans Creative Arts Festival finals with his entry in the B&W Photo category. Medical Director, **DR. BRAD DICIANNO**, was lauded with the CLASS Community Hero Award, which will be presented in October. He gave lectures at the VA Advanced Platform Technology (APT) Center in July, and the Lund University Spina Bifida conference as well as the Disability Pride PGH 2025 festival in September. Senior Associate Director for Research, **DR. ALICIA KOONTZ**, gave a presentation at the PVA Summit in August along with staff researcher, **DR. SHANTANU SATPUTE**, and at the VAPHS 18th Annual Best Practice Conference in September. Student researchers **OWEN FLAUGH**, **JEFFREY PETTIGROW**, also presented their work at the VAPHS event. Core Investigator, **DR. GEORGE WITTENBERG**, presented at NERD Hour in July, and the CMU Neuro-design Seminar in September.

As a team, the Human Engineering Research Labs participated in and attended a vast array of events this quarter. This included the National Veterans Wheelchair Games in July, the PVA Summit in August, and the AI Horizons Summit, UPMC Wheelchair Rehab institute Wheelchair Wash, Disability Pride PGH, and Steelwheelers 5k—where Drs. Cooper and Sivakanthan came in 3rd in their respective categories—in September. The labs also hosted a variety of events, like our annual Research Experience (REx) Symposium and Open House in July **(FEATURED IN OUR PREVIOUS NEWSLETTER)**, and a showcase event co-hosted with Google in August followed by a group of visitors from the American Society of Biomechanics conference. HERL alum, **ERIC SINAGRA**, earned a Pitt School of Health And Rehabilitation Sciences Distinguished Alumni award.

Student researcher, **RUTUJA KULKARNI**, had her first primary author manuscript published in August, followed by her second one in September! **DRS. SANGMI PARK** and Brad Dicianno published manuscripts in July, followed by **DR. BREELYN STYLER** in August.

OUR PROGRESS THIS YEAR

9 prestigious science, engineering, and athletics awards received.

12 manuscripts published in respected, peer-reviewed journals.

2 patents awarded by the USPTO, and Germany, France, UK.

26 lectures and visits from distinguished peers and organizations to our lab.

8 scholarships for Veterans funded.

28 media features of our research.

IN 2025, WE'VE PRESENTED LECTURES AND RESEARCH ACROSS

2 continents

4 countries

6 American states + the District of Columbia

Research Article

Gamifying education on addressing real-world barriers, obstacles, and challenges commonly encountered by mobility device users: A convergent mixed-methods feasibility study

Sangmi Park[1], Jorge L. Candiotti[1,2], Verity Rampulla[3], Evan J. Rafferty[4], Rosemarie Cooper[1,5], Nikitha Deepak[1], Sivashankar Sivakanthan[1], Jason Raad[6], Rory A. Cooper[1,2,3,5]

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Context: Despite significant improvements in the built environment over the past 30 years, barriers and obstacles still make navigating accessible environments challenging. Mobility Device Users (MDUs) typically receive training in controlled settings; however, this training may not adequately prepare them for real-world challenges. To address this gap in training, essential skills were identified and gamified into an educational board game called HERL-Town.
Objective: To assess the feasibility of the game as a training tool.
Design: A convergent mixed methods design with quantitative data collected using the Model for the Evaluation of Educational Games (MEEGA+) instrument and qualitative data gathered in 12 focus groups.
Setting: National Disabled Veterans Winter Sports Clinic (Snowmass Village, Colorado).
Results: The analysis included 35 adult MDUs who use ground transportation at least once a week and 15 travel companions who travel regularly with MDUs. Transformed mean scores for all nine MEEGA + dimensions were 55.85, suggesting favorable educational potential and user experience. Content analysis of focus group discussions suggests participants found HERL-Town engaging and educational, though some suggested enhancements to educational content and usability of physical elements of the game.
Conclusion: HERL-Town offers a new and novel approach to training essential skills needed to utilize ground transportation effectively. MDUs may know how to operate mobility devices; however, anticipating challenges and identifying strategies for addressing these challenges in real-world environments requires trial and error garnered over an extended period. Gamification of these strategies may help MDUs anticipate these challenges and identify adaptive responses in dynamic environments.

Keywords: Assistive technology, Community integration, Gamification, Power scooter, Wheelchair training

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Color versions of one or more of the figures in the article can be found online at www.tandfonline.com/ysnm.
Supplemental data for this article can be accessed online at https://doi.org/10.1080/10790268.2025.2509050.

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Introduction

Limited mobility or changes in ability can significantly affect quality of life, economic stability, and civic and social participation (1–3). Ground transportation systems are essential for Mobility Device Users (MDUs) to maintain employment, run errands, access healthcare,

Gamifying Education on Addressing Real-world Barriers, Obstacles, and Challenges Commonly Encountered by Mobility Device Users

Despite significant improvements in the built environment over the past 30 years, barriers and obstacles still make navigating accessible environments challenging. To address this gap in training, essential skills were identified and gamified into an educational board game called HERL-Town.

Park, S.; Candiotti, J. L.; Rampulla, V.; Rafferty, E. J.; Cooper, R.; Deepak, N.; Cooper, R. A. Gamifying education on addressing real-world barriers, obstacles, and challenges commonly encountered by mobility device users: A convergent mixed-methods feasibility study. The Journal of Spinal Cord Medicine. 2025.

Distance Traveled by People Using Permobil Power Wheelchairs Based on Large Data Analytics

Data logging technologies have been implemented in manual and power wheelchairs (PWCs) to measure device performance and user behaviors. Previous studies have investigated mean daily distance traveled in both types of wheelchairs, however, with small sample sizes and limited time frames. Permobil instrumented its PWCs with connectivity to continuously collect usage data.

Zhu, H., Schein, R. M., Pramana, G., Nooijen, C., Leire, K., Dicianno, B. E., & Schmeler, M. R. Distance traveled by people using Permobil power wheelchairs based on large data analytics. Assistive Technology. 2025.

ASSISTIVE TECHNOLOGY
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Distance traveled by people using Permobil power wheelchairs based on large data analytics

Hanju Zhu, MPH[a], Richard M. Schein, PhD, MPH[a], Gede Pramana, PhD[a], Carla Nooijen, PhD[b], Karin Leire, MSc[b], Brad E. Dicianno, MD[a,c,d], and Mark R. Schmeler, PhD, OTR/L, ATP[a]

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ABSTRACT
Data logging technologies have been implemented in manual and power wheelchairs (PWCs) to measure device performance and user behaviors. Previous studies have investigated mean daily distance traveled in both types of wheelchairs, however, with small sample sizes and limited time frames. Permobil instrumented its PWCs with connectivity to continuously collect usage data. The purpose of this study was to analyze this dataset to calculate the mean daily distance traveled over the entire year of 2022 across a large sample of Permobil PWC users within the United States, compare the mean daily distance traveled and the number of use days among five wheelchair models, and to compare the mean daily distance traveled and the number of use days between PWC classifications (Group 3 and Group 4 PWCs). The study sample consisted of 3,058 Permobil PWCs across 5 models. Further reduced dataset for Group 3 and Group 4 devices comprised 2,615 wheelchairs. The results showed PWC users drove on average 1,365 m per day. Group 4 PWCs had a significantly higher mean daily distance traveled than Group 3 PWCs. PWCs were used on average 301 days in a year. Study results could inform scheduled maintenance, repairs, and replacements based on usage versus current indicator of device age.

ARTICLE HISTORY
Accepted 11 June 2025

KEYWORDS
activities of daily living; assistive technology; rehabilitation; wheelchairs

Introduction

Wheelchairs are frequently prescribed to facilitate independent mobility (Arledge et al., 2011) and promote social participation of individuals with mobility limitations (Ferretti et al., 2022). According to the U.S. Census Bureau, approximately 5.5 million adults have had experience with using a wheelchair in the United States (Taylor, 2018). The utilization of power wheelchairs (PWCs) enables people with disabilities to maintain their independence in mobility (Pettersson et al., 2014; Stenberg et al., 2016) and further reduces burdens to people around them (Frank et al., 2010).

Historically, data logging technologies have been implemented in manual wheelchairs (MWCs). Earlier studies had already validated the feasibility of accelerometers on MWCs to measure arm propulsion, activity level, and wheelchair propulsion (Postma et al., 2005; Tajima et al., 1994; Washburn & Copay, 1999). These studies also discussed future opportunities of data logging technologies across real-world settings and broader types of activities, and to compare interventions and users. A study of 52 MWC users using a data logger (Tolerico et al., 2007) indicated an event that promoted active participation resulted in more travel distance and greater levels of activity as compared to a home environment. Investigators from the study also observed more physical exertion in MWC users who were employed compared to those who were not. The study further reported data logging technologies assisted in recording MWC performance and user activity. A scoping review (Routhier et al., 2018) reported data logging devices on MWCs have demonstrated the capability to measure discrete factors on wheelchairs such as maneuverability, operation time, travel distance, and speed, as well as user variables including heart rate. The review described additional clinical implications and outcomes as logging devices become more advanced, affordable, and routinely applied on wheelchairs.

Similarly, data logging technologies have also been implemented in PWCs. A study of 17 PWC users (Cooper et al., 2002) showed people had higher use of their PWCs when taking part in activity-promoting events versus staying at home. The study also highlighted data loggers supporting more assessment outcomes were needed in PWC performance such as battery consumption, turning time, and direction detection as well as in user behaviors such as differences in use across season/climate conditions. Another study of 25 PWC users (Sonenblum et al., 2008) reported data logging devices were able to measure variation in PWC use among different users, environments, and times. Another scoping review (Routhier et al., 2019) discussed research showing their applications for global positioning systems (GPS) and to measure the use of seat functions (such as tilt, recline, and seat elevation), pressure relieving activities, and time spent in the PWC.

Currently, some PWC manufacturers can provide information regarding wheelchair performance and user behaviors.

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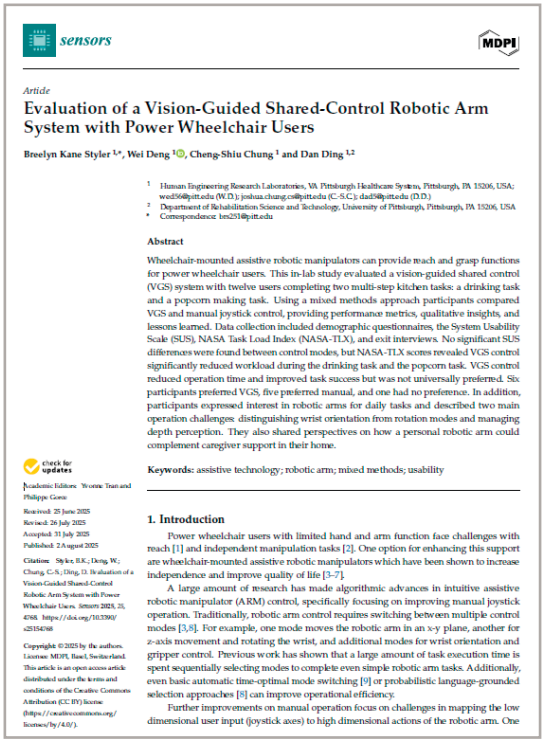

sensors

MDPI

Article

Evaluation of a Vision-Guided Shared-Control Robotic Arm System with Power Wheelchair Users

Breelyn Kane Styler [1,*], Wei Deng [1], Cheng-Shiu Chung [1] and Dan Ding [1,2]

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Abstract

Wheelchair-mounted assistive robotic manipulators can provide reach and grasp functions for power wheelchair users. This in-lab study evaluated a vision-guided shared control (VGS) system with twelve users completing two multi-step kitchen tasks: a drinking task and a popcorn making task. Using a mixed methods approach participants compared VGS and manual joystick control, providing performance metrics, qualitative insights, and lessons learned. Data collection included demographic questionnaires, the System Usability Scale (SUS), NASA Task Load Index (NASA-TLX), and exit interviews. No significant SUS differences were found between control modes, but NASA-TLX scores revealed VGS control significantly reduced workload during the drinking task and the popcorn task. VGS control reduced operation time and improved task success but was not universally preferred. Six participants preferred VGS, five preferred manual, and one had no preference. In addition, participants expressed interest in robotic arms for daily tasks and described two main operation challenges: distinguishing wrist orientation from rotation modes and managing depth perception. They also shared perspectives on how a personal robotic arm could complement caregiver support in their home.

Keywords: assistive technology; robotic arm; mixed methods; usability

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1. Introduction

Power wheelchair users with limited hand and arm function face challenges with reach [1] and independent manipulation tasks [2]. One option for enhancing this support are wheelchair-mounted assistive robotic manipulators which have been shown to increase independence and improve quality of life [3–7].

A large amount of research has made algorithmic advances in intuitive assistive robotic manipulator (ARM) control, specifically focusing on improving manual joystick operation. Traditionally, robotic arm control requires switching between multiple control modes [3,8]. For example, one mode moves the robotic arm in an x-y plane, another for z-axis movement and rotating the wrist, and additional modes for wrist orientation and gripper control. Previous work has shown that a large amount of task execution time is spent sequentially selecting modes to complete even simple robotic arm tasks. Additionally, even basic automatic time-optimal mode switching [9] or probabilistic language-grounded selection approaches [8] can improve operational efficiency.

Further improvements on manual operation focus on challenges in mapping the low dimensional user input (joystick axes) to high dimensional actions of the robotic arm. One

Evaluation of a Vision-Guided Shared-Control Robotic Arm System with Power Wheelchair Users

Wheelchair-mounted assistive robotic manipulators can provide reach and grasp functions for power wheelchair users. This in-lab study evaluated a vision-guided shared control (VGS) system with twelve users completing two multi-step kitchen tasks.

Styler, B.K.; Deng, W.; Chung, C.-S.; Ding, D. Evaluation of a Vision-Guided Shared-Control Robotic Arm System with Power Wheelchair Users. Sensors 2025.

Psychosocial Impact of Mobility Assistive Technology on Women Veterans

Despite the growing number of women Veterans with disabilities, data on how well mobility assistive technology (MAT) meets their needs are limited. Evaluating psychosocial impact is key to ensuring that MAT not only meets physical needs but also fosters social participation, mental well-being, and independence.

Kulkarni, RA; Banerjee, R; Berryman, K; Solanki, P; Weaver, FM; Dicianno, BE; Koontz, AM. Assessing the psychosocial impact of mobility assistive technology on women Veterans. Journal of Military, Veteran and Family Health. 2025.

RESEARCH

Assessing the psychosocial impact of mobility assistive technology on women Veterans

Rutuja A. Kulkarni[a], Rajit Banerjee[a], Kelsey Berryman[b], Pooja Solanki[c], Frances M. Weaver[b], Brad E. Dicianno[a] and Alicia M. Koontz[a]

ABSTRACT

Introduction: Despite the growing number of women Veterans with disabilities, data on how well mobility assistive technology (MAT) meets their needs are limited. Evaluating psychosocial impact is key to ensuring that MAT not only meets physical needs but also fosters social participation, mental well-being, and independence. The aim of this study was to examine the perceived psychosocial impact of using MAT on women Veterans' competence, adaptability, and self-esteem. Methods: Women Veterans (N = 501) who received MAT from the U.S. Department of Veterans Affairs within the past five years completed a national online survey including the Psychosocial Impact of Assistive Devices Scale (PIADS). Women were asked to score the PIADS on the basis of their experiences using their primary device type: cane, leg-foot orthosis, walker, power wheelchair (PWC), scooters, manual wheelchair (MWC), or crutches. Results: Participants expressed an overall positive psychosocial impact of MAT on competence (mean = 1.03, SD = 1.23), adaptability (mean = 0.76, SD = 1.43), and self-esteem (mean = 0.67, SD = 1.22). Around 17% of the total item responses indicated a negative perceived psychosocial impact of using MAT. PWC users' item scores indicated higher positive psychosocial impact than those of other device-type users ($0.001 < p < 0.023$). Discussion: Despite the overall positive psychosocial benefits of MAT, use was associated with feelings of low self-esteem, frustration, and embarrassment. The results highlight a possible mental health benefit for PWC users compared with other MAT users.

Key words: disability, efficiency, mental health, mobility aids, orthosis, PIADS, rehabilitation, wheelchair

RÉSUMÉ

Introduction : Malgré le nombre croissant de vétéranes ayant une invalidité, les données démontrant à quel point les technologies d'assistance à la mobilité (TAM) répondent à leurs besoins sont limitées. Il est essentiel d'évaluer l'effet psychosocial des TAM pour s'assurer qu'elles répondent non seulement aux besoins physiques, mais favorisent également la participation sociale, le bien-être mental et l'autonomie. Cette étude visait à examiner la perception de l'effet psychosocial des TAM sur la compétence, l'adaptabilité et l'estime de soi des vétéranes. Méthodologie : Les vétéranes (N = 501) qui ont reçu une TAM du ministère des Vétérans des États-Unis dans les cinq dernières années ont rempli un sondage national en ligne qui incluait l'échelle *Psychosocial Impact of Assistive Devices Scale* (PIADS, ou échelle sur les effets psychosociaux des dispositifs d'assistance). Les femmes ont été invitées à attribuer des scores sur l'échelle PIADS à leurs expériences d'utilisation de leur dispositif primaire : canne, orthèse jambe-pied, déambulateur, fauteuil roulant électrique (FRÉ), scooter, fauteuil roulant manuel (FRM) ou béquilles. Résultats : Selon les participantes, les TAM avaient un effet psychosocial positif global sur la compétence ($M = 1,03$, $ET = 1,23$), l'adaptabilité ($M = 0,76$, $ET = 1,43$) et l'estime de soi ($M = 0,67$, $ET = 1,22$). Environ 17 % de l'ensemble des réponses démontraient une perception négative de l'effet psychosocial des TAM. Les utilisatrices de FRÉ attribuaient des scores indicateurs d'un effet psychosocial plus positif que celui des utilisatrices d'autres dispositifs ($0,001 < p < 0,023$). Discussion : Malgré les avantages psychosociaux positifs globaux des TAM, leur utilisation était associée à une mauvaise estime de soi, à la frustration et à la honte. Les résultats font ressortir que l'utilisation du FRÉ était liée à la possibilité d'un avantage possible pour la santé mentale par rapport à l'utilisation du FRM.

Mots-clés : aides à la mobilité, efficacité, fauteuil roulant, invalidité, orthèse, PIADS, réadaptation, santé mentale

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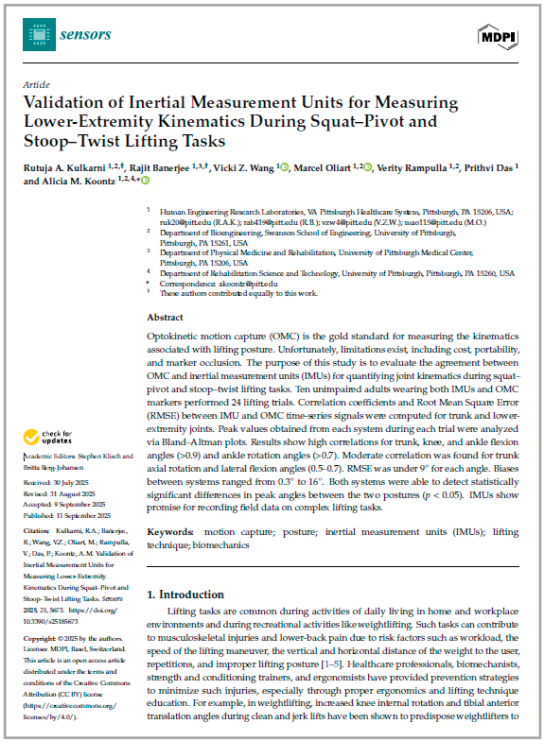
Validation of Inertial Measurement Units for Measuring Lower Extremity Kinematics during Squat-Pivot and Stoop-Twist Lifting Tasks

The purpose of this study is to evaluate the agreement between OMC and inertial measurement units (IMUs) for quantifying joint kinematics during squat–pivot and stoop–twist lifting tasks. Ten unimpaired adults wearing both IMUs and OMC markers performed 24 lifting trials.

Kulkarni, R.A.; Banerjee, R.; Wang, V.Z.; Oliart, M.; Rampulla, V.; Das, P.; Koontz, A.M. Validation of Inertial Measurement Units for Measuring Lower-Extremity Kinematics During Squat–Pivot and Stoop–Twist Lifting Tasks. Sensors. 2025.



sensors

MDPI

Article

Validation of Inertial Measurement Units for Measuring Lower-Extremity Kinematics During Squat–Pivot and Stoop–Twist Lifting Tasks

Rutuja A. Kulkarni [1,2,†], Rajit Banerjee [1,3,†], Vicki Z. Wang [1], Marcel Oliart [1,2], Verity Rampulla [1,2], Prithvi Das [1] and Alicia M. Koontz [1,2,4,*]

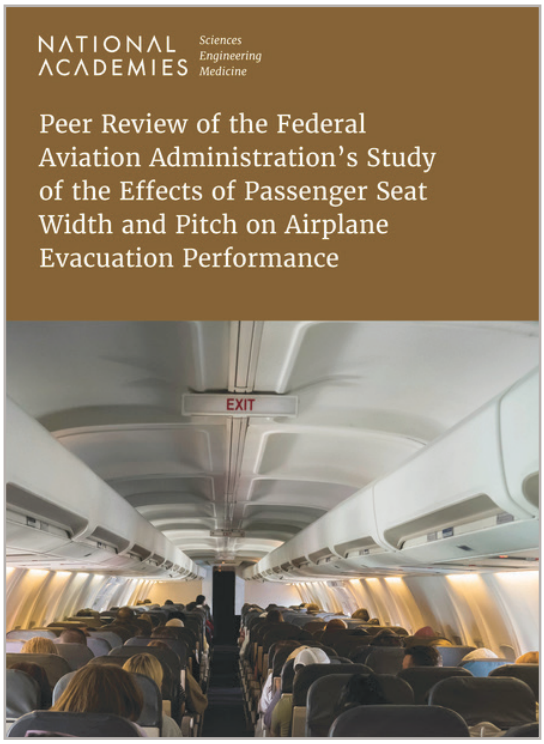
Abstract

Optokinetic motion capture (OMC) is the gold standard for measuring the kinematics associated with lifting posture. Unfortunately, limitations exist, including cost, portability, and marker occlusion. The purpose of this study is to evaluate the agreement between OMC and inertial measurement units (IMUs) for quantifying joint kinematics during squat–pivot and stoop–twist lifting tasks. Ten unimpaired adults wearing both IMUs and OMC markers performed 24 lifting trials. Correlation coefficients and Root Mean Square Error (RMSE) between IMU and OMC time-series signals were computed for trunk and lower-extremity joints. Peak values obtained from each system during each trial were analyzed via Bland–Altman plots. Results show high correlations for trunk, knee, and ankle flexion angles (>0.9) and ankle rotation angles (>0.7). Moderate correlation was found for trunk axial rotation and lateral flexion angles (0.5–0.7). RMSE was under 9° for each angle. Biases between systems ranged from 0.3° to 16°. Both systems were able to detect statistically significant differences in peak angles between the two postures ($p < 0.05$). IMUs show promise for recording field data on complex lifting tasks.

Keywords: motion capture; posture; inertial measurement units (IMUs); lifting technique; biomechanics

1. Introduction

Lifting tasks are common during activities of daily living in home and workplace environments and during recreational activities like weightlifting. Such tasks can contribute to musculoskeletal injuries and lower-back pain due to risk factors such as workload, the speed of the lifting maneuver, the vertical and horizontal distance of the weight to the user, repetitions, and improper lifting posture [1–5]. Healthcare professionals, biomechanists, strength and conditioning trainers, and ergonomists have provided prevention strategies to minimize such injuries, especially through proper ergonomics and lifting technique education. For example, in weightlifting, increased knee internal rotation and tibial anterior translation angles during clean and jerk lifts have been shown to predispose weightlifters to



Peer Review of Federal Aviation Administration Research on the Effect of Passenger Seat Pitch and Width on Aircraft Cabin Evacuation Efficiency

An ad hoc committee will conduct a peer review of the Federal Aviation Administration's (FAA's) report and accompanying data, including videos, documenting tests performed during 2019 and 2020 to determine the effect of passenger seat pitch and width on the egress time of cabin occupants during an emergency evacuation of a commercial airplane.

National Academies of Sciences, Engineering, and Medicine Peer Review of the Federal Aviation Administration's Study of the Effects of Passenger Seat Width and Pitch on Airplane Evacuation Performance. Washington, DC: The National Academies Press. 2025.

HERL SPOTLIGHT

Robert Powell, Cesar Hernandez, and Gavin Davidson demonstrated outstanding presence of mind and courage during a medical emergency at the Human Engineering Research Laboratories. When their colleague collapsed and became unconscious from a severe seizure, they immediately assisted with rendering aid and emergency communications.

Through their quick and decisive actions, our machinists and engineers safeguarded the life of their colleague and exemplified the highest traditions of service, responsibility, and teamwork. These actions reflect great credit upon them, the Human Engineering Research Laboratories, the Department of Veterans Affairs, and the University of Pittsburgh.

Top: Cesar accepting his award with Drs. Cooper, Grindle, and Dicianno.
Bottom: Bob accepting his award with Drs. Cooper, Grindle, and Dicianno.
Right: Gavin Davidson.

RECRUITING PARTICIPANTS.

SIGN UP TO OUR **REGISTRY**

A research registry is a collection of individuals interested in learning about research studies that may be of interest to them. We are inviting you to join in the Human Engineering Research Laboratories (HERL) Assistive Technology Registry because you might be interested in participating in our current or future research studies.

1 ACCESSIBLE AIRLINE TRANSPORTATION FOR MOBILITY DEVICE USERS: SURVEY

Purpose: To estimate pent-up demand among mobility device (MD) users to travel on commercial airlines and identify MD users' needs and pain points.

Study Requirements: Complete a survey about your demographics and airline travel experiences. The survey is expected to take no more than 20 minutes to complete.

2 GUIDELINES FOR POWERED WHEELCHAIR AND COMMERCIAL AIRPLANE COMPATIBILITY

Purpose: This small group interview aims to identify the needs and challenges of power wheelchair users (PWUs) in air travel.

Study Requirements: Participate in an interview to share your experiences and perspectives accessing and utilizing air travel-related services.

3 CLINICAL LIMITS OF USE TOOLS (CLOUT) OFF-ROAD MOBILITY DEVICES

Purpose: To develop clinical limits of use tools (CLOUT) for off-road wheelchairs and hand cycles to ensure their safe operation.

Study Requirements: Participate in one visit lasting up to 4 hours to conduct performance testing and mapping of the features of an off-road wheelchair or hand cycles.

4 VIRTUAL PEER COACHING IN MANUAL WHEELCHAIR SKILLS

Purpose: To determine the effectiveness of virtual coaching from a peer to improve manual wheelchair skills.

Study Requirements: Six, weekly peer coaching sessions via Zoom to improve wheelchair skills, access to a library of wheelchair skills training videos, and completion of questionnaires before and after training.

5 ASSESSING THE CAREGIVER ASSISTED TRANSFER TECHNIQUE (CATT) INSTRUMENT

Purpose: To validate the caregiver Assisted Transfer Technique Instrument, a new tool to assess the assisted transfer performance of individuals with disabilities and their caregivers.

Study Requirements: The study takes place over two visits in your home or our lab (your choice), each visit is no longer than two hours.

6 POWERED PERSONAL TRANSFER SYSTEM (PPTS): FOCUS GROUP

Purpose: To study the design of controls to better meet user needs of a robotic, independent-use, Group 3 Powered Personal Transfer System.

Study Requirements: You will be asked to watch a PPTS demonstration video and provide group feedback. The focus group will take no more than two hours.

7 AIRPORT MANUAL WHEELCHAIR: FOCUS GROUP

Purpose: To design a manual wheelchair tailored for airport use, addressing the current practice of airlines requiring wheelchair users to travel in regular passenger seats which poses significant challenges.

Study Requirements: Participation will take no more than two hours.

QUESTIONS?

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WILLIAM'S CORNER

INSIGHTS FROM OUR **PARTICIPANTS**

The Human Engineering Research Laboratories (HERL) have been a touchstone for me since its inception. I have personally and professionally worked with many of her old staff, students, and researchers, and have been delighted to be a part of this group. Unlike most university based research programs many of the staff, administration, and students are made up of qualified individuals from the population it serves, people with disabilities. That consumer control provides inherent quality assurance that I think other research programs lack. Why is that so important? I think it's important because they incorporate people with disabilities through stakeholder inclusion and engagement in addition to faculty, staff and students. When my son says "What did you do today Mom?" I respond by saying "I did a little research!" I get to help steer the ship that is research. If you want to feel a part of what's happening, know what's on the leading edge in technology, then be part of a stakeholder group at Human Engineering Research Laboratories. Because HERL has both types of experts, disabled and not disabled. There's a blend between reality and possibility. I see their programs beginning with thoughts, ideas, and what ifs being turned into prototypes, trials and projects. Support HERL by becoming part of their stakeholder engagement groups. Help steer the ship.

- DJ STEMMLER

Photo Gallery

Left to right, top to bottom: The HERL team at the AI Horizons event in Bakery Square; Dr. Cooper with athletes at the National Veterans Wheelchair Games; Dr. Duvall and Eric Sinagra at the award ceremony; the HERL team at the Steelwheelers 5k in North Park; Drs. Sangmi park and Jorge Candiotti with their Summer students; Josh Marino with the TeraBridges High School robotics team after their visit to the labs; the panelists for the AI Horizons talk on Artificial Intelligence in Veteran and Military Medicine including Dr. Siva Sivakanthan as moderator; Rosi and Dr. Cooper pose with their awards for speaking at the 2025 disABILITY conference; the HERL team with the president of the PVA at the PVA Summit; Dr. Breelyn Styler demonstrating her research at a Google demo event; Rosi and Dr. Cooper with Congressman Chris Deluzio and Senior Vice Chancellor for Research, Rob Rutenbar.


HERL


OFFICES
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HERL


Hail To Possible
VA
HUMAN
ENGINEERING
RESEARCH
SPEAKER

JULY-SEPTEMBER 2025

In the News

JULY 15

Rory Cooper speaks at the UN

Rory Cooper spoke at the United Nations as part of the AI for Good Global Summit in Geneva.

PITTWIRE

JULY 23

Club Lily and HERL Collaborate

HERL joined participants at Club Lily Summer Camp to research the use of newly developed pneumatic wheelchairs.

EASTERSEALS

JULY 28

Rehabilitation Technology Research on Display for Congressional Visit

Pitt hosted U.S. Representative Chris Deluzio for a tour of the UPMC Vision Institute to see demonstrations of a wide range of ongoing physical rehabilitation research projects.

PITT RESEARCH

AUGUST 25

IPC announces Paralympian VISTA 2025 keynote speaker

Announced as the second keynote speaker for December's VISTA 2025 Conference in Cairo.

IPC

AUGUST 27 **FEATURED MANUSCRIPT**

Women Veterans say mobility aids don't meet their needs

More than two million Veterans experience disabilities requiring a mobility device.

VA ORD

SEPTEMBER 5

How to Get the Best Wheelchair Setup for Your Lifestyle

Three longtime experts in the wheelchair industry answer your questions.

NEW MOBILITY

SEPTEMBER 11

Brad Dicianno Named a Community Hero

Vice chair for research in the School of Medicine's Department of PM&R, won a Community Heroes Award.

PITTWIRE

SAVE THE DATE

OCT 4
Hail to Heroes Pitt Football Game

OCT 10
Army 10-Miler

OCT 20
Global Innovation Summit event at HERL

OCT 27
Marine Corps Marathon

OCT 28
CLASS Awards Dinner

NOV 9
EQT 10-Miler

NOV 11
Veterans Day

DEC 7-12
11th VISTA Conference

OUR PARTNERS

NIDILRR
National Institute on Disability, Independent Living, and Rehabilitation Research

PVA
Paralyzed Veterans of America

NSF U.S. National Science Foundation

RUMINATION OF THE QUARTER

"HERL HAS BEEN THE PLACE WHERE I DISCOVERED MY PASSION FOR REHABILITATION ENGINEERING AND THE POWER RESEARCH HAS TO CHANGE LIVES. ALONG THE WAY, I'VE GAINED NOT ONLY TECHNICAL KNOWLEDGE, BUT ALSO FRIENDSHIPS, MENTORS, AND LIFE LESSONS THAT SHAPED ME AS A PERSON. I WOULDN'T BE ON THE PATH I AM TODAY WITHOUT THE SUPPORT AND OPPORTUNITIES THAT I'VE GOTTEN HERE."

- Rutuja Kulkarni
Research Assistant

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HUMAN ENGINEERING RESEARCH LABORATORIES

PITT - VA - UPMC