



1994

...



THROUGH THE YEARS

Our Mission

To continuously improve the mobility and function of people with disabilities through advanced engineering in clinical research and medical rehabilitation.

Our Vision

To create a world where all people with disabilities have unencumbered mobility and function so that they can fully participate in and contribute to society.



Left to right: Edward DesLauriers (KPVA), Dr. Wes Rohr (Pitt) , John Bollinger (PVA), Dr. Thomas P. Detre, (Pitt) ,Dr. Rory A. Cooper (VA/Pitt) , Laura Miller (VA), Dr. Charles Robinson (Pitt).

HISTORY

1994

BEGINNING OF HERL'S JOURNEY

A monumental achievement for veterans and people with disabilities.

The Human Engineering Research Laboratories (HERL) teamed up with the University of Pittsburgh, the Paralyzed Veterans of America (PVA), and the Department of Veterans Affairs (VA) to establish a pioneering lab. This new space was to be located within a VA facility in Highland Drive.

The partnership brought together the expertise of researchers, engineers, and medical professionals which leveraged their collective knowledge and resources.

This collaboration set the stage for innovative advancements in assistive technology that make a profound impact for individuals with disabilities.

MILESTONES



Dr. Alicia Koontz with a SMARTWheel.

1995

SMARTWHEEL

Revolutionized how wheelchair setups could be customized to optimize the reduction of repetitive stress.

REHABILITATION ENGINEERING APPLIED TO MOBILITY

A textbook that set the standard for engineering textbooks in the field of rehabilitation.

X-BRACE

Designed to enhance performance, safety, and durability in folding wheelchairs.

GAMEWHEELS & GAMECYCLE

The first devices to address and incorporate exergaming for people with disabilities.

PUSHRIM-ACTIVATED POWER-ASSIST WHEELCHAIR (PAPAW)

A joint effort between Yamaha and HERL, it contributed to significant advancements in wheelchair tech.

ZERO THROW JOYSTICK

Gave users the ability to operate their power wheelchair with 360° of control.

CDC CENTER FOR INJURY RESEARCH AND CONTROL

This award was bestowed on HERL along with the Department of Neurosurgery of Pitt.

WHEELCHAIR COMPARISON STUDY

The first in a long series of studies was completed. One study highlighted challenges with wheelchairs' quality and standards non-compliance.



An engineer on the PAPAW.

1998

WHEELCHAIR SELECTION AND CONFIGURATION

This published book is the most cited text dedicated to wheelchair design and clinical service guidance, being translated in six different languages.

NATIONAL VETERAN WHEELCHAIR GAMES

Pittsburgh hosted the NVWG and was given its first VA *R&D Center of Excellence for Wheelchairs and Associated Rehabilitation Engineering (WARE)* award. The beginning of a 25+ year legacy...

2000

WHEELCHAIR ROAD LOADS AND WHOLE-BODY VIBRATION

Successfully addressed and reduced by inventing vibration-damping cushions, backrest fittings, and suspension elements to minimize shock, and vibration-induced injuries to the neck and back.

ASSISTIVE TECHNOLOGY CLINIC IN INDIA

Rory and Rosemarie Cooper worked with colleagues at the Indian Spinal Injuries Centre to establish this first-of-its-kind clinic in the region.

TELE-REHABILITATION RESEARCH PROGRAM

HERL was the home of the first major iterations of this program, primarily funded by the VA.



2001

ERGONOMIC DUAL SURFACE WHEELCHAIR PUSHRIM

The Ergonomic Pushrim (*left*) developed by HERL's team, marked a significant leap from traditional wheelchair hand rims. Ergonomic hand rims have successfully tackled traditional push rim issues by offering a better hand fit, enhancing mechanical efficiency during wheelchair propulsion.

2002

DATA LOGGER

The new, low-power, self-contained Data Logger developed by researchers at HERL, provides a reliable method for long-term monitoring of manual wheelchair users' activities in real-world environments.

PNEUMATIC SUSPENSION CASTER WHEELCHAIR FORK

Addressed the limitations of traditional shock absorption systems by offering a comprehensive design that adeptly handles both vertical and horizontal impact forces. By incorporating a sturdy caster fork, it ensures long-lasting durability for wheelchairs and similar devices.

2003

VIRTUAL SEATING COACH

An innovative technology providing personalized wheelchair seating recommendations for enhanced comfort and support, brought to commercial market by PERMOBIL.

GLIDE CASTER FORK

Based on oblique angle suspension that maximizes vibration dampening in both horizontal and vertical directions, and minimizes vibration transfer to the body of the rider, was brought to the Market by TiLite, LLC.

2004

STATE OF THE SCIENCE SYMPOSIUM SERIES STARTS

The State-of-the-Science (SoS) symposia started after Dr. Paul Pasquina and Dr. Rory Cooper had a discussion about the needs of rehabilitation healthcare providers, physical medicine and rehabilitation medicine residents to learn and integrate the most current knowledge and practice to provide the highest level of care to wounded, injured, and

ill service members in light of the patients coming to Walter Reed Army Medical Center and later Walter Reed National Military Medical Center (WRNMC). The SoS brings experts to WRNMC so that there can be greater participation by WRNMC providers and residents, and exposes experts to WRNMC and Uniformed Services University of Health Sciences.



SOS 2011



SOS 2012



SOS 2017



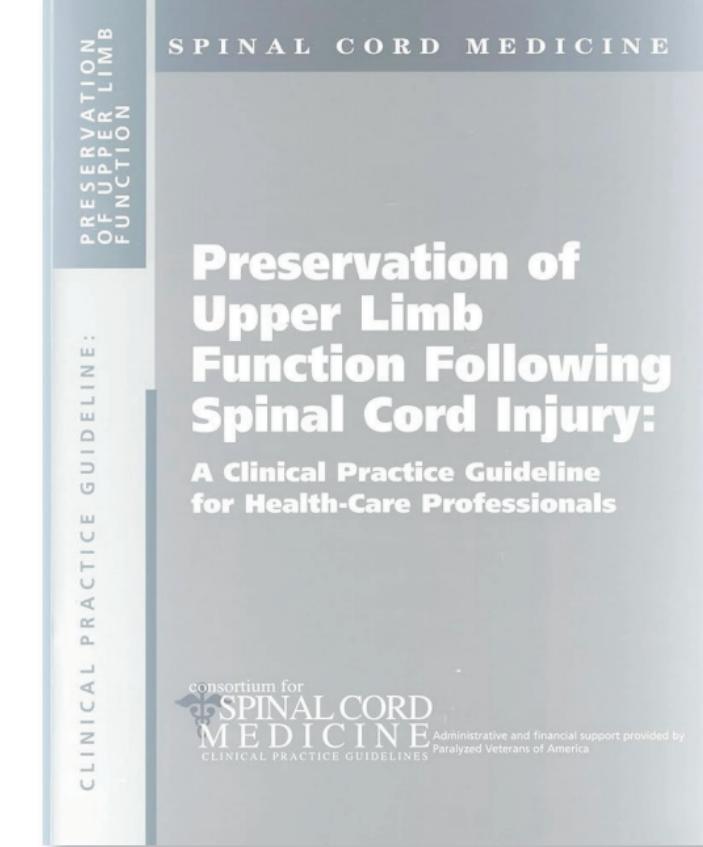
SOS 2023

GUIDELINES ON “UPPER LIMB PRESERVATION” RELEASED

Dr. Michael Boninger (HERL Medical Director 1998-20) spearheaded a team of experts in organizing one of the most widely used and referenced documents in the field today: a Clinical Practice Guideline (CPG) on Preservation of Upper Limb Function Following Spinal Cord Injury (SCI).

OASCF (OBLIQUE SUSPENSION CASTER FORK) PATENT

A patent was awarded for this innovative wheelchair design, focusing on effective shock absorption for both horizontal and vertical impacts during travel over uneven terrain.



2006

**QUALITY OF LIFE ENGINEERING
RESEARCH CENTER (ERC)**

HERL received this award from the National Science Foundation (NSF), along with Carnegie Mellon University and other partners.

2007

**SMART POWER ASSISTANCE
MODULE FOR MANUAL
WHEELCHAIRS PATENT**

Dr. Rory Cooper introduced the PHAATE (Policy, Human Activity Assistive Technology Environment) model.

**TRANSFER ASSESSMENT
INSTRUMENT (TAI)**

A groundbreaking clinical tool designed for the comprehensive evaluation of transfer skills.

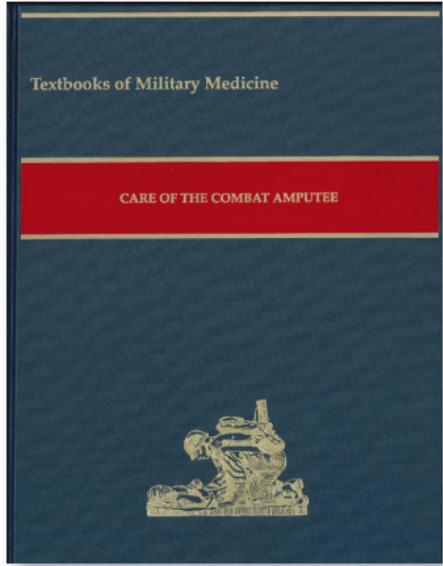
2009

**CARE OF THE COMBAT
AMPUTEE TEXTBOOK
PUBLISHED**

The “Care of the Combat Amputee” textbook, revered as the “gold standard” for military healthcare providers, plays a pivotal role in improving the quality of care for Veterans with traumatic amputations. By providing standardized guidelines, it ensures that medical professionals are

equipped with the knowledge and skills necessary to deliver the best possible care.

In the long-term care and rehabilitation domain, it emphasizes personalized approaches that consider the unique needs of each individual.



Dr. Cooper and the PerMMA in 2010

2010

PERSONAL MOBILITY AND MANIPULATION APPLIANCE

PerMMA's the first fully robotic mobility and manipulation device for people with disabilities. It provides bi-manual (two-arm) coordinated manipulation as well as fluid mobility.

VIRTUAL SEATING COACH

Initiated a series of connected devices leveraging AI to promote adherence to clinical guidelines.

WARRIOR TRANSITION LEADER-MEDICAL REHABILITATION HANDBOOK

A valuable resource created to aid and support military personnel during career and life transitions. Over 10,000 copies have been distributed or downloaded.

PERSONAL VEHICLE PATENT

A power mobility device designed to improve maneuverability on diverse terrains.



Inaugurating the Bakery Square site, 2011.

2011

HERL MOVES TO BAKERY SQUARE

In July 2011, HERL relocated from its original research lab at the VA's Highland Drive facility to the newly renovated Bakery Square. This move represented a pivotal moment for HERL, offering its investigators, staff, and faculty the chance to establish a state-of-the-art facility tailored to their specific requirements. The transition brought about

significant improvements, including the addition of a spacious laboratory bay and a dedicated machine shop area. HERL celebrated this milestone with an open house on August 4th, where they welcomed family, friends, and supporters from the VA and Pitt communities.

**MOBILITY ENHANCEMENT
ROBOTIC WHEELCHAIR**

A groundbreaking innovation designed for conquering challenging terrains, including curbs, uneven surfaces, and steep slopes.

VARIABLE COMPLIANCE JOYSTICK
Equipped with compensation algorithms offers adaptable control and enhanced precision in various power mobility ops.**ROBOTIC STRONGARM**

A specialized wheelchair attachment engineered to assist electric power wheelchair users in seamless transfers to and from other surfaces.

MOBILE CASTER PATENT

Designed to prevent drift and flutter, ensuring enhanced tracking when a mobile device moves across a side-sloped surface.



Dr. Jorge Candiotti and the MEBot.





28

The Robotic Strong Arm.

2013

**USER-ADJUSTABLE
WHEELCHAIR BACKREST
MOUNTING HARDWARE PATENT**

A technology to streamline backrest adjustments for users, improving simplicity, aesthetics, and incorporating essential features for commercial viability.

29

NATIONAL ACADEMY OF INVENTORS

Dr. Cooper elected Fellow of the NAI, partnered with the International Society of Wheelchair Professionals, whose mission to serve as a global resource for wheelchair service standards and provision through advocacy, education, standards, evidence-based practice, innovation and a platform for information exchange.

VA TECHNOLOGY TRANSFER ASSISTANCE PROGRAM

Start of the project which engages in a wide range of healthcare, research, and support initiatives for veterans, with a core mission of enhancing veterans' quality of life and healthcare outcomes.

SAMUEL E. HEYMAN SERVICE TO AMERICA MEDAL

Also known as the "Sammies", this premier awards program is considered the "Oscar" of public service.

DRIVING EVALUATION AND TRAINING PATENT

Covers techniques for assessing and enhancing driving skills through evaluation and training processes.

2017

PNEUCHAIR & PNEUSCOOTER

The PneuMobility project is focused on revolutionizing assistive mobility devices by developing innovative devices that run solely on compressed air technology.

2018

POWERED PERSONAL TRANSFER SYSTEM (PPTS)

A groundbreaking innovation

designed to revolutionize the process of transferring between a bed and a wheelchair, particularly for individuals, including many veterans, who depend on wheelchairs for mobility.

GUIDELINES FOR THE CARE OF PEOPLE WITH SPINA BIFIDA

One hundred Spina Bifida experts from around the world, led by **HERL Medical Director Dr. Brad Dicianno**, spent three years developing these Guidelines.



Dr. Rory Cooper at Morgan's Wonderland with the Pneuchair.



Dr. Brandon Daveler with the Pneuchair and the Pneuscooter.

2019

**AUTOMATED VEHICLE
SERVICES FOR PEOPLE WITH
DISABILITIES – INVOLVED
RESPONSIVE ENGINEERING
(ASPIRE)**

A HERL center studying how people with disabilities and older adults are affected by access to reliable accessible transportation.

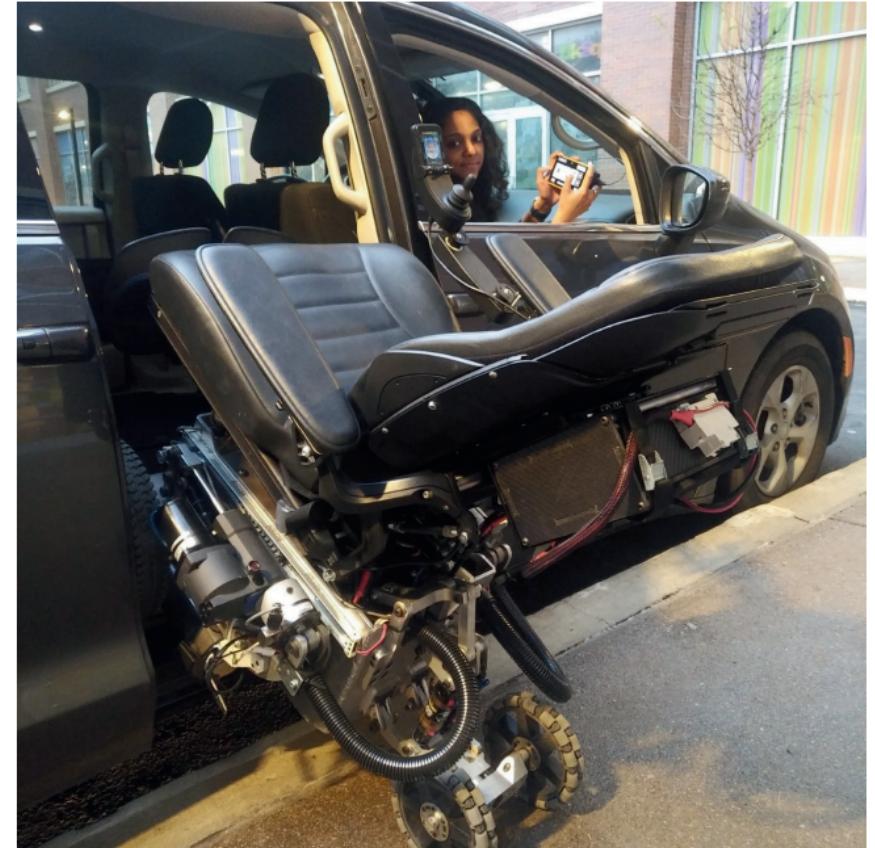
**MANUAL WHEELCHAIR ULCER RISK
MANAGEMENT COACHING SYSTEM
AND METHODOLOGY PATENT**

34

2020

**PORTABLE TOILET SEAT WRAP
FOR REDUCING PRESSURE
INJURIES AND METHODS (“ON
THE MOVE PAD”) PATENT**

Nikitha Deepak handling an electric wheelchair outside of the Bakery Square offices.



35

2021

GUIDELINES FOR SPINA BIFIDA CARE

This updated guidance encompasses 25 aspects of physical and mental health, as well as overall well-being for individuals with Spina Bifida.

PENNSYLVANIA VETERAN SERVICE MEDALS

The Commonwealth of Pennsylvania honored Dr. Grindle and Cooper with this award for their vital roles in safeguarding the lives of veterans during the COVID-19 pandemic.

2022

IEEE BIOMEDICAL ENGINEERING MEDAL

Dr. Cooper was honored with this prestigious award for his outstanding contributions to the field of biomedical engineering. This recognition highlights his achievements and groundbreaking research that have significantly advanced the intersection of engineering and medicine.

2023

NATIONAL INVENTORS HALL OF FAME

Dr. Rory Cooper was inducted to the 50th class.

NATIONAL MEDAL OF TECHNOLOGY AND INNOVATION

Dr. Cooper was presented this award by President Biden at the White House. This accolade is given to individuals who have made important contributions to the advancement of knowledge.

PARALLEL PATHS

Brad Dicianno, MD

Joined HERL as a medical student in 1998 - UPSOM Deans Summer Research Program

Continued as student and resident through 2005

Completed NIH K12 Post Doc fellowship in 2005-2008

Became Assoc. Medical Director in 2006

Became HERL Medical Director/COO in 2015

Alicia M. Koontz, PhD

Became a VA Research Career Scientist in 2024

Conducted predoctoral research at HERL under Dr. Rory Cooper from 1997 to completion of PhD in 2001

Became a VA Research Health Scientist in 2001

Assoc. Director of Education & Outreach at HERL in 2009

Became Assoc. Director of Research in 2014

Senior Assoc. Director of Research from 2021-present

Jorge Candiotti, PhD

Will probably get a parking spot with his name at HERL by 2030

Joined HERL as a research assistant 2008-2010 - Hybrid Propelled Operative Vehicle (HyPoV)

REU ASPIRE intern at HERL in Summer of 2009

Started his PhD at HERL in 2010

Completed his ARRT Postdoc fellowship in 2018-2019

Became Biomed Engineer at HERL-VA in 2019

Human Engineering Research Laboratories
VA Pittsburgh Healthcare System
6425 Penn Ave, Suite 400
Pittsburgh, PA 15206
herl@groups.pitt.edu

**SCAN FOR
ALL OUR LINKS**

