

HERL Quarterly Newsletter

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Happy New Year from HERL!



The 2006 HERL research team at the DAV/VA Winter Sports Clinic. (Back, L to R): CPT Todd Wichman (WRAMC), Brad Dicianno, CPT Rob Wallach (Madigan Army Hospital), LTC Paul Pasquina (WRAMC), Diane Collins. (Front, L to R): CPT Allison Franklin (WRAMC), Rory Cooper, Shirley Fitzgerald (not pictured: Emily Teodorski)

As 2006 begins, the investigators and staff at HERL are exploring new opportunities to expand upon work begun just last year, conduct research at a new event, and analyze where we are going in the future.

This year we received funding to conduct 4 more of our popular "State of the Science" workshops with Walter Reed Army Medical Center (see "new grants," page 5). These free workshops are open to military and VA personnel as

well as patients and their families. Medical and rehab personnel may obtain Continuing Medical Education (CME) or Continuing Education Units (CEU) credits by attending. This year's first workshop will address Sensory Impairment on April 21 (registration deadline is April 14) and the second is on Assistive Technology Devices on May 26, 2006 (registration deadline is on May 19). The SoS workshops are held at Walter Reed Army Medical Center (WRAMC) and participants can register and view the workshop agendas at our website, www.herlpitt.org. Workshop sponsors include the University of Pittsburgh Departments of Physical Medicine and Rehabilitation and Rehabilitation Science and Technology and the Center for Continuing Education in the Health Sciences. Subsequent workshops will be announced later this year...continue to check the HERL website for updates.

We held our yearly Advisory Board Meeting on March 27-28. The purpose of this meeting is to objectively evaluate our performance. Our 2006 advisory board was comprised of representatives from some of our collaborating institutions: Tom Stripling (Paralyzed Veterans of America), LTC Paul Pasquina, M.D. (Walter Reed Army Medical Center), Carmen DiGiovine, Ph.D. (University of Illinois at Chicago), Jim Osborn (Carnegie Mellon University), Melissa Murray (Hiram G. Andrews Center), Attila

Domos (a longtime friend of the lab and participant in HERL research studies), Ron Boninger (Three Rivers Holdings, LLC), Mike McCue, Ph.D. (University of Pittsburgh Department of Rehab Science and Technology), and Charles Sfeir, DDS, Ph.D. (University of Pittsburgh/McGowan Institute of Regenerative Medicine.) The panel provided valuable insight as well as research and management suggestions to help take HERL into the future.

For the first time, HERL had the opportunity to attend and conduct research at the Disabled American Veterans (DAV)/VA Winter Sports Clinic from April 2-7 at Snowmass Village, CO (see "new grants," page 5). Also sponsored by the Department of Veterans Affairs, the DAV winter sports clinic promotes rehabilitation by instructing disabled veterans in adaptive skiing, and providing an introduction to other adaptive activities and sports. Researchers from WRAMC and Madigan Army Hospital



The Honorable R. James Nicholson, Secretary of Veterans Affairs (center), stopped by the HERL booth at the veterans' winter sports clinic

joined HERL in recruiting 97 new participants for studies examining physical activity and quality of life among veterans and military personnel who use wheelchairs and prosthetics.

As the summer approaches, so do two important annual HERL events: the Rehab Engineering and Assistive Technology Society of North America (RESNA) Conference and the National Veterans Wheelchair Games. This year's NVWGs are being held in Anchorage, Alaska and a team of HERL investigators will be conducting studies there.

-Christine Heiner

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CURRENT RESEARCH ABSTRACTS

Vibration Exposure of Individuals Using Wheelchairs over Concrete Paver Surfaces

Erik Wolf, MS, Jonathan Pearlman, MS, Rory A. Cooper, PhD, Shirley G. Fitzgerald, PhD, Annmarie Kelleher, MS, Diane M. Collins, PhD, Michael L. Boninger, MD, and Rosemarie Cooper, MPT
Full article published in *Disability and Rehabilitation*, pp. 1443-1449, Vol. 27, No. 23, December 2005.

Purpose of Work: According to the International Standards Organization 2631-1 standard on human vibration, individuals in a seated position are at risk of injury due to whole-body vibrations when exposed for long periods of time. Wheelchair users fit this description perfectly, however little research has been conducted to evaluate the amount of vibration transmitted to a wheelchair user. The purpose of this study was to evaluate the amount of vibrations transmitted to the user during travel of different sidewalk surfaces.

Procedures: Ten unimpaired subjects propelled over nine different sidewalk surfaces in a manual wheelchair and a powered wheelchair. One surface was a standard poured concrete sidewalk and each of the other eight was a concrete or brick paver of varying bevels.

Results: For the manual wheelchair, three surfaces resulted in higher vibration exposure than the



Vibration exposure to wheelchair users was analyzed and compared over these eight concrete surfaces

standard surface; the 8mm bevel surface in a 90 degree herringbone pattern, and the two 6mm bevel surfaces. For the power wheelchair, two surfaces resulted in higher vibration exposure than the standard poured concrete the 8mm bevel surface and one of the 6mm bevel surfaces. **Relevance to Wheelchair Users:** Using smaller bevels on pavers exposes individuals using wheelchairs to less vibration. Also, pavers installed in a 90 degree herringbone pattern produced lower vibration exposures. It is recommended that only pavers of 6 mm bevel or less be used, with a 90 degree herringbone pattern. It is possible to provide sidewalks that are made from concrete or brick pavers that are also safe for wheelchair users.

-Erik Wolf, M.S.

Evaluation of the Safety and Durability of Low-Cost Nonprogrammable Electric Powered Wheelchairs

Jonathan Pearlman, MS, Rory Cooper, Ph.D., Jaideep Karnawat,
Rosemarie Cooper, MPT, Michael L. Boninger, M.D.

Full article published in *Archives of Physical Medicine and Rehabilitation*, pp. 2361-2370, Vol. 86, No. 12, December 2005.

Purpose of the work. To control rising healthcare costs, insurance companies may try to reimburse for lower-cost assistive technology, such as non-programmable electric powered wheelchairs (EPWs). With these lower-cost alternatives, it is important to make sure the devices function safely and effectively.

Subjects/Procedures: We performed ANSI/RESNA wheelchair standards testing protocols on 12 selected low-cost non-programmable EPWs (3 of each of four models) to measure durability and performance of the devices.

Results: We found that 9 out of 12 of these devices did not fulfill the required durability standards. Additionally, other safety issues, such as motor overheating, could adversely affect the performance of



EPWs tested, clockwise: Electric Mobility, Invacare, Golden, and Pride.

the device.

Relevance to Wheelchair Users: To ensure the safety and maximum function of the user, high-quality EPWs must be available. The low-cost non-programmable EPWs we tested did not meet these standards, and EPW users should investigate the devices available to them.

-Jon Pearlman, M.S.

(Picture reprinted from "Evaluation of the Safety and Durability of Low-Cost Nonprogrammable Electric Powered Wheelchairs," Pearlman, et al, Archives of Physical Medicine and Rehabilitation, pp. 2361-2370, Vol. 86, No. 12, December 2005 with permission from the American Congress of Rehab Medicine and the American Academy of Physical Medicine and Rehabilitation)

CURRENT RESEARCH ABSTRACTS

The Development and Preliminary Evaluation of a Training Device for Wheelchair Users: The GAME^{Wheels} System

Shirley G. Fitzgerald, PhD; Rory A. Cooper, PhD; Emily Zipfel, BFA; Donald M. Spaeth, PhD, ATP; Jeremy Puhlman, BSE; Annmarie Kelleher, MS, OTR/L, ATP; Rosemarie Cooper, MPT, ATP; Songfeng Guo, PhD

Full article published in **Disability and Rehabilitation: Assistive Technology**, pp. 129-139,
Vol. 1, No. 1-2, January-June 2006.

Purpose of the Work. Training of appropriate wheelchair propulsion methods may be beneficial to manual wheelchair users by reducing pain and improving quality of life. This study involved the development and initial user testing of a haptic device, the GAME^{Wheels} System, which combines wheelchair propulsion training and computer game play.

Subject/Procedures. Two separate models of GAME^{Wheels} were developed: a GAME^{Wheels} Clinical and a GAME^{Wheels} Trainer. To

verify and compare the practicality and functionality of the two GAME^{Wheels} systems, several focus groups were conducted: first to determine whether the systems could be set-up using different types of instructional materials and second to determine if the systems could be taught to novice users. In the first focus group, three subjects independently used both systems with the aid of instructional materials. Set up time was recorded and subjects completed a questionnaire to provide feedback on 1) ease of assembly 2) overall impression of assembly process 3) level of frustration during assembly and 4) usefulness of instructional materials. Open-ended questions probed subjects' thoughts on how the device could be improved. In the second focus group, three experts each taught two novice subjects how



to use the devices. The subjects then used the devices and responded to the questionnaire.

Results. Subjects' overall impressions of the systems were that they were 'fun' to play. Suggestions were raised to improve the design, which have been incorporated into further refinement of the GAME^{Wheels} systems. The trainer system was viewed more favorably than the clinical system. Subjects gave higher ratings of ease of learning and operating, more positive overall impressions, higher rating of

perceived fun, and lower levels of reported frustration than with the clinical system.

Relevance to Wheelchair Users. For manual wheelchair users, use of their upper extremities is crucial to achieving and maintaining independence, both in and out of the home. Training individuals to propel a wheelchair in an appropriate manner could significantly reduce upper limb pain and injury. This research provides a technology solution to help train wheelchair users in appropriate propulsion techniques both in a clinical and a home setting. The results of focus group testing are used to improve product designs which will be transferred to industry and developed into marketable products.

-Emily Zipfel, BFA

Towards the Development of an Effective Technology Transfer Model of Wheelchairs to Developing Countries

Jon Pearlman, MS, Rory Cooper, Ph.D., Emily Zipfel, BFA, Rosemarie Cooper, MPT, Mark McCartney

Full article published in **Disability and Rehabilitation: Assistive Technology**, pp. 103-110,
Vol. 1, No. 1-2, January-June 2006.

Purpose of the work. In low-income countries, there is a tremendous need for wheelchairs (WC) to help people participate more fully in society, and live more independently. Developing a model to understand the factors that affect WC technology transfer to these countries will help streamline the process.

Subjects/Procedures: We reviewed pertinent literature and used personal experiences to develop a preliminary model of the factors affecting WC technology transfer to these countries.

Results. We developed a model which uses four characteristics (Input, Sustainability, Appropriateness, and Impact) to compare four tech-transfer models (Charitable, Workshop, Manufacturing, and Globalization).

Relevance to Wheelchair Users. Wheelchair users around the world require technology that meets their needs, and can maximize their potential to be part of their society. Understanding the process to both develop and deliver WCs to these individuals works toward this goal.

-Jon Pearlman, MS

HERL PUBLICATIONS

Collins DM, Fitzgerald SG, Sachs-Ericsson N, Scherer M, Cooper RA, Boninger ML, Psychosocial Well-Being and Community Participation of Service Dog Partners, **Disability and Rehabilitation: Assistive Technology**, pp. 41-48, Vol. 1, No. 1-2, January-June 2006.

Fitzgerald SG, Cooper RA, Zipfel E, Spaeth DM, Puhlman JR, Kelleher A, Cooper R, Guo S, The Development and Preliminary Evaluation of a Training Device for Wheelchair Users: The GAME^{Wheels} System, **Disability and Rehabilitation: Assistive Technology**, pp. 129-139, Vol. 1, No. 1-2, January-June 2006.

Pearlman J, Cooper RA, Zipfel E, Cooper RM, McCartney M, Towards the Development of an Effective Technology Transfer Model of Wheelchairs to Developing Countries, **Disability and Rehabilitation: Assistive Technology**, pp. 103-110, Vol. 1, No. 1-2, January-June 2006.

Cooper RA, Boninger ML, Cooper RM, Kelleher A, Use of the Independence 3000 IBOT™ Transporter at Home and in the Community: A Case Report, **Disability and Rehabilitation: Assistive Technology**, pp. 111-117, Vol. 1, No. 1-2, January-June 2006.

Frontera WR, Fuhrer MJ, Jette AM, Chan L, Cooper RA, Duncan PW, Kemp JD, Ottenbacher KJ, Peckham PH, Roth EJ, Tate DG, Rehabilitation Medicine Summit: Building Research Capacity, **Disability and Rehabilitation**, pp. 71-75, Vol. 28, No. 1, January 2006.

Also published in:

Archives of Physical Medicine and Rehabilitation, pp. 148-152, Vol. 87, No. 1, January 2006.

Journal of Neuroengineering and Rehabilitation, [open access](#), Vol. 3, No. 1, January 2006.

Physical Therapy, pp. 285-291, Vol. 86, No. 2, February 2006.

OTJR: Occupation, Participation, and Health, pp. 33-38, Vol. 26, No. 1, Winter 2006.



Michael Boninger, MD was the editor of the Spring 2006 issue of Topics in SCI Rehab. This special issue focused on current assistive technology and featured two articles from HERL (Topics in SCI Cover reprinted with permission from Thomas Land Publishers)

Journal of Head Trauma and Rehabilitation, pp. 1-7, Vol. 21, No. 1, January-February 2006.

Guo S, Grindle GG, Authier EL, Cooper RA, Fitzgerald SG, Kelleher AR, Cooper R, Development and Qualitative Assessment of the GAME^{Cycle} Exercise System, **IEEE Transactions on Neural Systems and Rehabilitation Engineering**, pp. 83-90, Vol. 14, No. 1, March 2006.

DiGiovine CP, Koontz AM, Boninger ML, Advances in Manual Wheelchair Technology, **Topics in Spinal Cord Injury Rehabilitation** (issue editor: Michael L. Boninger, MD), pp. 1-14, Vol. 11, No. 4, Spring 2006.

Cooper RA, Cooper RM, Tolerico M, Guo S, Ding D, Pearlman J, Advances in Electric Powered Wheelchairs, **Topics in Spinal Cord Injury Rehabilitation** (issue editor: Michael L. Boninger, MD), pp. 15-29, Vol. 11, No. 4, Spring 2006.

Ambrosio F, Boninger ML, Souza AL, Fitzgerald SG, Koontz AM, Cooper RA, Biomechanics and Strength of Manual Wheelchair Users, **Journal of Spinal Cord Medicine**, pp. 407-414, Vol. 58, No. 5, 2005.

Wolf EJ, Pearlman J, Cooper RA, Fitzgerald SG, Kelleher AR, Collins DM, Boninger ML, Cooper R, Vibration Exposure of Individuals Using Wheelchairs Over Sidewalk Surfaces, **Disability and Rehabilitation**, pp. 1443-1449, Vol. 27, No. 23, December 2005.

Pearlman JL, Cooper RA, Karnawat J, Cooper R, Boninger ML, Evaluation of the Safety and Durability of Low-Cost Nonprogrammable Electric Powered Wheelchairs, **Archives of Physical Medicine and Rehabilitation**, pp. 2361-2370, Vol. 86, No. 12, December 2005.

Current Events/Announcements

Pittsburgh Area Brain Injury Alliance (PABIA) is helping to activate a letter writing campaign in support of PA State Senate bill 887. The bill proposes to advance funds needed for research for the care and recovery of people with traumatic brain and spinal cord injury in Pennsylvania. People are encouraged to write to their local senators in support of 887. (To find your local rep and read more about the bill, visit www.pasen.gov). For more info on PABIA, visit their site www.pabia.org.



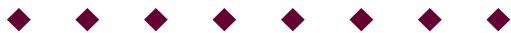
On Feb 20, The International Paralympic Committee became the first International Federation to launch its own Internet television channel, www.paralympicsporttv. ParalympicSport.TV broadcasts 24/7 free of charge and holds video archives of the Torino 2006 Paralympic Winter Games.



UCP CARES is a new series of workshops being presented by United Cerebral Palsy of Pittsburgh, UCP Kids, and the Family Advocacy Network. Local and national experts speak on issues that aim to help children with disabilities connect to their communities at these workshops, targeting families of children with diverse abilities, teachers, and other professionals. For more information and a schedule of upcoming workshops, visit <http://www.ucppittsburgh.org> or contact UCP of Pittsburgh at (412) 683-4160.



A new magazine called *Kids on Wheels* launched this year. With upbeat photography and illustrations, KOW is a positive, motivating resource for kids with disabilities, as well as their families, rehab professionals, and teachers. To subscribe or advertise in KOW, contact No Limit Communications at 888-850-0344, or visit www.kidsonwheels.us.



The VA, Hiram G. Andrews Center, University of Pittsburgh Department of Rehab Science and Technology, and Uniformed University of Health Sciences are sponsoring a symposium, "Developing a Community Response" on May 3, 2006 at the University of Pittsburgh a Johnstown Living/ Learning Center. The symposium will identify best practices for providing for the needs of service members returning from Operation Iraqi and Operation Enduring Freedom. To register, call 814-255-7209.

NEW HERL GRANTS

"Wheelchair Propulsion Training." Principle Investigator: Michael L. Boninger, M.D. National Institutes of Health, \$142,940, April 1, 2006-March 31, 2008.

"Impact of Physical Activity on Participation and Quality of Life in Individuals who use Prostheses & Other Assistive Technology/Lower Extremity Prostheses versus Wheelchair for Functional Performance and Participation of Military and Veteran Personnel." Principle Investigator: Shirley Fitzgerald, Ph.D. Telemedicine and Advanced Technology Research Center, \$17,856, April 1, 2006-March 31, 2007.

"American Student Placements and Internships in Rehabilitation Engineering (ASPIRE)" Principle Investigator: Rory Cooper, Ph.D./Co-PI: Alicia Koontz, Ph.D. National Science Foundation, \$271,500, May 1, 2006-April 31, 2009.

"State of the Science Symposia Series on Rehabilitation Research to Clinical Practice in Support of the Military Amputee Research Program." Principle Investigator: Rory Cooper, Ph.D. Telemedicine and Advanced Technology Research Center, \$69,795, January 1, 2006-November 30, 2006.

"Biomechanical Investigation of Optimal Wheelchair Transfer Techniques." Principle Investigator: Megan Yarnall, B.S. Center for Injury Research and Control, \$5,000, June 2006-June 2007.



HERL IN THE MEDIA

Disability Matters with Joyce Bender (Radio Show), Tuesday, January 23, 2006: Guest Rory Cooper. Show is archived on www.benderconsult.com.

PVA Research, Education, and Practice Guidelines Program 2005 Annual Report: From Science to Service: The Human Engineering Research Labs, pp. 9-11.

Stroke Smart, January/February 2006: Choosing the Right Wheels, p. 28.

VA Research Currents, January 2006: VA Central Office Guest Speakers on March 31, 2005 (Alicia Koontz, Ph.D.)

H (The Magazine of the Heinz Endowments), Winter 2006: Abiling the Disabled, pp. 4-11.

Pitt Magazine, Winter 2006: Lasting Impressions (Rory Cooper, Ph.D.), p 32.

News from the Department of Rehabilitation Science and Technology

Linda van Roosmalen, Ph.D. was awarded a grant from the National Collegiate Inventors & Innovators Alliance in Dec. 2005 for her proposal, "Wheelchair Mounted Pelvic Restraint." The award is in the amount of \$15,250. Dr. Roosmalen is an Assistant Professor at RST and an investigator with the RERCs on Wheelchair Transportation Safety and Telerehabilitation.

Sue Fuhrman's paper, "Characterization of Pediatric Wheelchair Kinematics and WTORS Loading in Rear Impact" was selected as one of the winning papers for the 2006 Rehabilitation Engineering and Assistive Technology Society of North America (RESNA) Student Scientific Paper competition.

News from the Department of Physical Medicine and Rehabilitation

Anthony E. Kline, Ph.D. received the American Academy of Physical Medicine and Rehabilitation, President's Citation Award for "Chronic Risperidone Treatment after Experimental Traumatic Brain Injury Negatively Impacts Functional Outcome"

The Dept of PM&R, along with the Depts. Rehab Science and Technology, Communication Science and Disorders, and the Center for Continuing Education in the Health Sciences are sponsoring the **Institute of Rehabilitation and Research Day** on June 1, 2006 at Thomas E. Starzl Biomedical Science Tower, Room S100 (University of Pittsburgh). For more information or to register for IRR day, visit the PM&R website: www.rehabmedicine.pitt.edu.

Continuing Medical Education: The University of Pittsburgh School of Medicine is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians. The University of Pittsburgh School of Medicine designates this educational activity for a maximum of 3.5 AMA PRA Category 1 Credits™. Each physician should only claim credit commensurate with the extent of their participation in the activity. Other healthcare professionals are awarded 0.35 continuing education units (CEUs) which are equal to 3.5 contact hours.

Featured HERL Student: Rachel Cowan

You have to be tough to succeed in the exciting but sometimes violent and aggressive sport of quad rugby. On the Pittsburgh Steelwheelers Rugby team, Rachel Cowan is the only woman on a team with 12 men. Regularly she comes to work with prominent and scary-looking bruises and scrapes, usually shrugging them off if anyone mentions them.

This is Rachel's third year playing with the Steelwheelers; this year she received a sportsmanship award at the 2006 United States Quad Rugby Association (USQRA) Heartland Sectional Playoffs on March 17-19, 2006 in Montgomery, AL. She received the same honor in January 2005 at the USQRA's 5th annual "Knock and Roll" Tournament in Jupiter, FL.

Rachel came to HERL from North Carolina in 2003 in pursuit of a Ph.D. in Rehabilitation Science and Technology. She holds a BS in Physical Education from the University of North Carolina (2000) and an MS in Health & Exercise Science from Wake Forest University (2003). Rachel works under the mentorship of Dr. Michael



Rachel Cowan in action with the Pittsburgh Steelwheelers Rugby Team

Boninger, primarily in the Biomechanics and Neuromotor Control Laboratory, evaluating wheelchair propulsion techniques. Rachel is a key member of the Smart^{Wheel} user's group, which develops clinically relevant protocols and standards of use for the Smart^{Wheel}, a wheelchair propulsion measurement instrument developed at HERL. She is also a Integrative Graduate Education and Research Traineeship (IGERT) student. The IGERT program seeks to train PhD scientists and engineers in Assistive Technology at the University of Pittsburgh and Carnegie Mellon University. Only 4-6 HERL grad students are supported by the IGERT each year.

When Rachel is not working hard she is playing hard. She plays basketball on the Steel City Starz, lifts weights 3 times a week and does cardiovascular workouts 4-5 times a week in addition to playing rugby. This summer she also plans to add adaptive rowing to her schedule.

Upon completion of her PhD, Rachel hopes to become a Professor concentrating in biomechanics/human movement. "I like teaching," she noted.

-Christine Heiner

HERL AWARD WINNERS

Eliana Chaves' paper, "Community Participation Assessment of Individuals with Spinal Cord Injury", and **Michelle Tolerico's** paper, "Assessing the Activity Levels of Manual Wheelchair Users" were selected as two of the winning papers for the 2006 Rehabilitation Engineering and Assistive Technology Society of North America (RESNA) Student Scientific Paper competition.



Eliana Chaves and Michelle Tolerico were selected as winners in RESNA's 2006 Student Scientific Paper Competition

Ian Rice, a HERL doctoral student, won first place in Los Angeles marathon wheelchair race on March 19, 2006.

Rory Cooper, Ph.D. was selected to serve as a member of the Department of Veteran's Affairs, Biomedical Engineer, GS-858, National Professional Standards Board. In his role he will serve as the agent for the Under Secretary for Health in Reviewing the qualifications of applicants and employees in the profession for appointment and advancement in the VA.

Dr. Rory Cooper Delivers Inaugural Address at Pitt

On Tuesday, March 28, 2006, Dr. Rory Cooper gave his inaugural lecture to commemorate his official induction as FISA/PVA Endowed Chair and Distinguished Professor in the Department of Rehabilitation Science and Technology at the University of Pittsburgh. The prestigious ceremony was hosted by University of Pittsburgh Provost James V. Maher, who in his introduction praised Dr. Cooper highly for his numerous achievements in the fields of assistive technology research and academia. Dr. Maher presented Dr. Cooper with a Medal of Office, noting that his title was a unique one within the university.

Dr. Cooper's lecture was entitled, "Eat your own Dog Food: Participatory Action Design," referencing an expression used in engineering design. "It's really the idea that you shouldn't get other people to use your technology, your ideas or your devices before you'd



Pitt Provost James V. Maher presents Dr. Cooper with a Medal of Office, making official his appointment as FISA/PVA Endowed Chair and Distinguished Professor

use them yourself. And it's kind of put in that derogatory form of 'Eat Your Own Dog Food' because most of what we do the first time is unsuccessful. So it's kind of another way for engineers to say to learn from your own mistakes before you impose them on others," Cooper explained.

During his speech, Dr. Cooper shared much of his personal history that has shaped him into the successful researcher he

is today, from his first experiences using a wheelchair, to his career in wheelchair racing, to his early attempts at designing wheelchairs. He outlined the evolution of his work, thanking many of his colleagues, co workers, mentors, and students for contributing to his successes along the way. "It's not an individual effort. It takes a group working together," said Cooper.

-Christine Heiner

Human Engineering Research Laboratories

Mailing Address:
VA Pittsburgh Healthcare System
7180 Highland Drive
Building 4, 2nd Floor East Wing, 151R-1
Pittsburgh, Pa, 15206

Phone: 412-365-4850
Fax: 412-365-4858

E-mail any comments, corrections, or questions concerning
the newsletter to the editor, Christine Heiner at:

Email: heinercm@pitt.edu

VA Center Of Excellence For
Wheelchairs and Associated
Rehabilitation Engineering

University of Pittsburgh Model
Center on Spinal Cord Injury

Rory A. Cooper, Ph.D.
Director

Michael L. Boninger, M.D.
Medical Director

Shirley G. Fitzgerald, Ph.D.
Associate Director of Research,

Donald M. Spaeth, Ph.D., ATP, RET
Associate Director of Engineering



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ARE YOU INTERESTED IN WHEELCHAIR RESEARCH?

The Human Engineering Research Laboratories is recruiting individuals interested in participating in research studies for the **WHEELCHAIR USERS REGISTRY**. If you would like to be notified of Wheelchair related Research Studies for which you may be eligible to participate, contact The Human Engineering Research Laboratories and join the Wheelchair Users 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 a wheelchair or scooter, please contact **Emily** or **Annamarie** for more information.

VA PGH Healthcare System 7180 Highland Drive Pittsburgh, PA 15206
412-365-4850 registry@herlpitt.org www.herlpitt.org