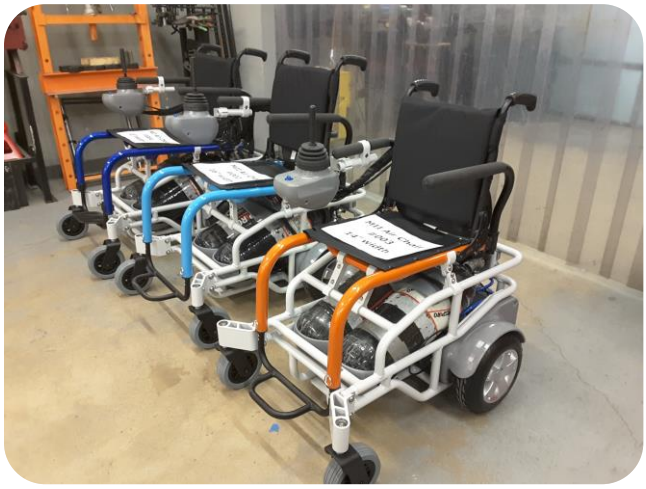
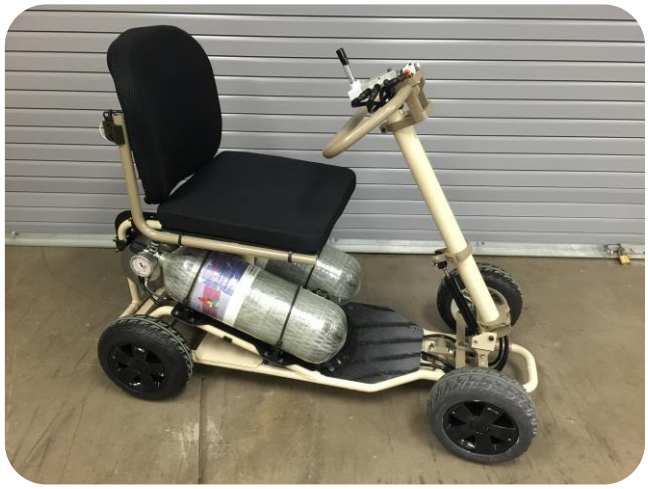
UNIVERSITY OF PITTSBURGH
innovation
INSTITUTE





PneuMobility: Air Powered Mobility Devices ID: 3504

Featured Innovators: Rory A. Cooper, PhD and Brandon Daveler, MS

People with disabilities who require powered mobility assistance currently have no choice other than electric devices with expensive, slow-charging batteries. These devices are also incapable of being exposed to wet environments due to the electronics used to drive them. As a result, users are restricted from participating in water activities – such as going to a pool, waterpark, or beach – and users must transfer out of the device when it's time to take a shower. The PneuMobility devices are driven using only compressed air, which removes the need for electronics. Without batteries on board, our devices weigh a fraction of electric powered devices, recharge in minutes, and no longer require expensive battery replacement. Not only could that save the user up to $500 per year, but it also removes the hassle of proper battery disposal.

Technology Description

The PneuMobility system consists of air tanks, air powered motors, air lines, and control valves. This air-powered design reduces maintenance, and anyone with basic technical skills can troubleshoot a problem if one arises. The compressed air supply can be recharged an infinite number of times without losing performance, can be thrown away without any environmental concerns, and doesn't need to be replaced during the lifetime of the mobility device. While battery-powered devices can take up to eight hours to recharge, PneuMobility air tanks take only 10 minutes to refill.

Advantages

- Lightweight
- Waterproof
- Quick recharge time
- Removes the need for expensive and environmentally-hazardous batteries

Applications

- Home use, including showering
- Recreation that involves getting wet (e.g., waterparks, public pools, beaches)
- Hospitals
- Nursing Homes
- Airports

Stage of Development

Prototypes of the PneuChair and PneuScooter have been designed and created. The PneuChair has undergone standards testing.

IP Status

An International PCT application was filed in January 2017. These technologies are available for licensing (excluding US waterparks).

UNIVERSITY OF PITTSBURGH
innovation
INSTITUTE

Innovators

Rory Cooper, PhD

Associate Dean for Inclusion
FISA/Paralyzed Veterans of America
Chair and Distinguished Professor
Department of Rehabilitation Science
and Technology
University of Pittsburgh

Dr. Cooper is the Founding Director and VA Senior Research Career Scientist of the Human Engineering Research Laboratories, a VA Rehabilitation R&D Center of Excellence in partnership with Pitt. Dr. Cooper has authored or co-authored over 300 peer-reviewed journal publications and has 20 patents awarded or pending. He is the author of two books and co-editor of two more, including the award-winning *Care of the Combat Amputee*.

Dr. Cooper is an elected Fellow of the National Academy of Inventors, as well as RESNA, IEEE, AIMBE, and BMES. In 2017 he was awarded the Samuel J. Heyman Service to America Medal – the Oscar for government service – for his innovations aimed at helping disabled veterans and other Americans.

Education

PhD in Electrical and Computer Engineering
University of California, Santa Barbara

MS in Electrical Engineering
California Polytechnic State University, San-Luis Obispo

BS in Electrical Engineering
California Polytechnic State University, San-Luis Obispo

Publications

- An Introduction to Rehabilitation Engineering, Edited by Rory A. Cooper, Hisaichi Ohnabe, and Doug Hobson, Taylor and Francis Group, 444 pages, 2006.
- Wheelchairs: A Guide to Selection and Configuration, Rory A. Cooper, Demos Medical Publishers, New York, NY, 380 pages, 1998.
- Rehabilitation Engineering Applied to Mobility and Manipulation, Rory A. Cooper, Institute of Physics Publishing, London, England, 516 pages, 1995.

Brandon Daveler, MS

PhD student
Department of Rehabilitation Science
and Technology
University of Pittsburgh

Mr. Daveler is a graduate student researcher at the Human Engineering Research Laboratories. He is currently working towards his PhD in Rehabilitation Science and Technology from the University of Pittsburgh. His research focuses on the design and development of assistive technology specifically powered wheelchairs.

Brandon is also a person with a disability due to a spinal cord injury from a motocross accident in 2005. As a wheelchair user for over a decade, he has become an expert in wheelchair and assistive technology and applies his experiences and knowledge to solving problems for other individuals with disabilities.

Education

MS in Rehabilitation Science and Technology
University of Pittsburgh

BS in Engineering Science
The Pennsylvania State University

Publications

- Daveler B, Wang H, Gebrosky B, Grindle GG, Schneider U, and Cooper RA (2017). Integration of Pneumatic Technology in Powered Mobility Devices. Topics in Spinal Cord Injury Rehabilitation: Spring 2017, Vol. 23, No. 2, pp. 120-130.
- Daveler B, Salatin B, Grindle GG, Candiotti J, Wang H, Cooper RA (2015). Participatory design and validation of mobility enhancement robotic wheelchair. Journal of Rehabilitation Research & Development: Vol. 52, No. 6, pp. 739-750.

University of Pittsburgh
Innovation Institute
130 Thackeray Ave
Pittsburgh, PA 15260
innovation.pitt.edu

Contact
George Coulston
Technology Licensing Manager
412-648-2236
gcoulston@innovation.pitt.edu