

Integrating Virtual Reality into Clinical Practice

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Description

Research conducted at the VRPSYCH Lab at the Institute for Creative Technologies (ICT), University of Southern California (USC) will be presented including the use of a variety of game console and interface systems such as the *Nintendo Wii™*, *Nintendo WiiFit™*, *Sony Playstation EyeToy™*, and *Novint Falcon* for a range of patient populations including spinal cord injury, traumatic brain injury and stroke. The development of low cost VR systems using low cost optical motion tracking/capture system with off the shelf Webcams and infrared cameras and low cost LED's or reflective markers attached to the body or to relevant objects (e.g., handheld "jogging" weights, mugs and other "everyday" items) for use in the clinic setting for assessment and rehabilitation balance and upper extremity impairments will also be discussed. Research conducted in the CAREN VR system in the Military Performance Lab (MPL) at the Center for the Intrepid (CFI), Brooke Army Medical Center (BAMC) will be presented including gait training (providing real-time feedback and external focus of attention), assessment and training of postural and dynamic stability following amputation using a variety of techniques and assessment of cognitive demand on walking stability following concussion.

Objectives:

1. To discuss the benefits of using VR for assessment and rehabilitation
2. To discuss the use of a problem based approach to the implementation of novel techniques in a clinical setting,
3. To highlight the current use of a range of VR and motion capture technologies (both high and low cost) in a civilian and military setting, and
4. To provide a video based demonstration of a number of low-cost novel interaction devices currently trialed in the clinical setting with a range of military and non military patients following amputation, concussion, spinal cord injury, stroke and traumatic brain injury.

Intended Audience: The tutorial is intended for physical and occupational therapists *new* to the field of Virtual Rehabilitation and developers of computer applications, although others may benefit as well.



Sheryl Flynn received her degree in Physical Therapy from NYU in 1991 specializing in the treatment of disease and impairments of the nervous system. In 2001, she completed a PhD focused in the theoretical basis of movement. In 2005, Dr. Flynn completed a post-doctoral fellowship in Neuroscience at the McKnight Brain Institute at the University of Florida. For over 4 years now, Dr. Flynn has been investigating the use of virtual reality/ video games for rehabilitation of nervous system disease and injury. Currently, Dr. Flynn is a leader of the Motor Rehab section of the USC VR Psych Lab, directed by Dr. Skip Rizzo. Her focus of research is in understanding game design as it pertains to neurorehabilitation. In addition, Dr. Flynn is CEO of Blue Marble Games, a small start-up company whose mission is to build games for the benefit of individuals undergoing rehabilitation.



Belinda Lange received a Science Degree from Flinders University of South Australia in 1999, and completed her degree in Physiotherapy (with Honors) and PhD from the University of South Australia. Dr. Lange's PhD work involved the use of virtual reality as a distraction technique for children receiving medical procedures in the Emergency Department. She received a prestigious International Postdoctoral Fellowship Award from the American Association of University Women, Educational Foundation. Dr. Lange currently holds a Postdoctoral Research Associate position at the Institute for Creative Technologies, University of Southern California. She is involved in a range of research

projects that focus on the use of video game technology and virtual reality for cognitive assessment, motor rehabilitation, exercise in healthy individuals, postoperative exercise and pain distraction during medical procedures.



Jason Wilken received his master's degree in Physical Therapy and PhD in Rehabilitation Science from the University of Iowa. In 2005 Dr Wilken assumed his current position as Director of the Military Performance Laboratory at the Center for the Intrepid, Fort Sam Houston, Texas. In that capacity he directs an active research mission focused on maximizing physical function in individuals who have been injured during military service. Current research efforts include assessment of advanced prosthetic technologies for individuals with lower extremity amputation, development of novel virtual reality based training interventions to normalize gait kinematics as well as identification and treatment of concussion associated motor impairments.