

# **2008 Virtual Rehabilitation**

**Vancouver, BC, Canada**  
**25-27 August 2008**



**IEEE Catalog Number:**  
**ISBN 13:**

**CFP0855A-PRT**  
**978-1-4244-2700-0**

# Table of Contents

<b>Human-Centered Socially Assistive Robotics for Rehabilitation: Is It Time for a Robot Coach?</b> .....	1
<i>Maja J Mataric</i>	
<b>Using a Multi-Task Adaptive VR System for Upper Limb Rehabilitation in The Acute Phase of Stroke</b> .....	2
<i>Mónica S. Cameirão, Sergi Bermúdez i Badia, Esther Duarte Oller and Paul F. M. J. Verschure</i>	
<b>A Low-Tech Virtual Reality Application for Training of Upper Extremity Motor Function in Neurorehabilitation</b> .....	8
<i>Gerdienke Prange, Thijs Krabben, Birgit Molier, Herman van der Kooij and Michiel Jannink</i>	
<b>Use of a Virtual Environment to Investigate Planning of Unconstrained Reach</b>	
<b>Actions After Stroke: a Feasibility Study</b> .....	13
<i>Jill Campbell Stewart, James Gordon and Carolee J. Winstein</i>	
<b>Feedback Distortion to Augment Controllability of Human Limb Motion</b> .....	22
<i>Brian Dellon and Yoki Matsuoka</i>	
<b>Post-Stroke Training of a Pick and Place Activity in a Virtual Environment</b> .....	28
<i>Ludovic Dovat, Olivier Lamercy, Berna Salman, Vineet Johnson, Roger Gassert, Etienne Burdet, Teo Chee Leong and Ted Milner</i>	
<b>Developments in Balance Assessment and Intervention As a Challenge for Virtual Rehabilitation</b> .....	35
<i>Emily A. Keshner</i>	
<b>Haptic Effects Modulate Kinetics of Gait But Not Experience of Realism in a Virtual Reality Walking Simulator</b> .....	36
<i>Judith E. Deutsch, Rares F. Boian, Jeffrey A. Lewis, Grigore C. Burdea and Andrea Minsky</i>	
<b>Virtual Scene Velocity Influences Postural Responses to an Inclined Base of Support</b> .....	41
<i>Yun Wang, Robert V. Kenyon and Emily A. Keshner</i>	
<b>A VR-Haptic Locomotor System to Retrain Anticipatory Postural Adjustments Post Stroke</b> .....	45
<i>Alison R Oates, Claire F Perez and Joyce Fung</i>	
<b>Postural Adjustments As an Acquired Motor Skill: Delayed Gains and Robust Retention After a Single Training Session Within a Virtual Environment</b> .....	50
<i>Orit Elion, Yotam Bahat, Itamar Sela, Itzhack Siev-Ner, Patrice (Tamar) Weiss and Avi Karni</i>	
<b>Is Extra-Retinal Information Needed to Control Steering of Locomotion in Presence of a Rotational Optic Flow?</b> .....	54
<i>Maxim Hanna, Joyce Fung and Anouk Lamontagne</i>	
<b>Comparison of Reaching and Grasping Kinematics in Patients With Hemiparesis and In Healthy Controls in Virtual and Physical Environments</b> .....	60
<i>Mindy F. Levin, Eliane C. Magdalon, Stella Maris Michaelsen and Antonio A. F. Quevedo</i>	
<b>Myo-Pong: a Neuromuscular Game for The Uva-Neuromuscular Training System Platform</b> .....	61
<i>R. de la Rosa, A. Alonso, S. de la Rosa, and D. Abásolo</i>	
<b>Telerehabilitation Via a Mobile Robot</b> .....	62
<i>Daniel Labonté, Francois Michaud, Richard Cloutier, Marc-Andre Roux, Dominic Létourneau, Michael Lauria, and Patrick Boissy</i>	
<b>Optimization of a Tactile Feedback System to Aid The Rehabilitation of Lower-Limb Amputees</b> .....	63
<i>Martin O. Culjat, Richard E. Fan and Warren S. Grundfest</i>	
<b>Handcare2: a Novel Cable Interface for Hand Rehabilitation</b> .....	64
<i>Ludovic Dovat, Olivier Lamercy, Roger Gassert, Etienne Burdet and Teo Chee Leong</i>	
<b>Application of Virtual Reality in Upper Limb Rehabilitation</b> .....	65
<i>Rhona Guberek, Sheila Schneiberg, Heidi Sveistrup, Patricia McKinley and Mindy F. Levin</i>	
<b>A Virtual Rehabilitation System for Wobble Board Balance Training With Children</b> .....	66
<i>Diarmaid Fitzgerald, Nanthana Trakarnratanakul, Luke Conroy, Paddy Nixon and Brian Caulfield</i>	
<b>Inscape - Interactive Storytelling &amp; Augmentative-Alternative Communication</b> .....	67
<i>Mathieu Dautricourt and Francesco Toninelli</i>	
<b>A Virtual Reality-Based Paradigm to Study Functional Dual Task Performance During Locomotion Post Stroke</b> .....	68
<i>Rachel Kizony, Mindy F. Levin, Lucinda Hughey, Claire Perez and Joyce Fung</i>	
<b>Wii-Habilitation Increases Participation in Therapy</b> .....	69
<i>Avinash Ramchandani, Kevin Carroll, Roel Buenaventura, Jason Douglas and Justin Liu</i>	
<b>Examining Sensory Reweighting in Healthy Elderly and in Those With Brain Injury</b> .....	70
<i>Joseph.E. Barton and Emily.A. Keshner</i>	
<b>Virtual Reality and Real-Time Feedback to Improve Gait Performance in a Polytrauma Patient</b> .....	71
<i>Jason M. Wilken and Benjamin J. Darter</i>	

<b>Engaging Breathing Exercises: Developing an Interactive XNA-Based Air Flow Sensing and Control System .....</b>	<b>72</b>
<i>M. Bolas, B. Lange, I. Dallas, A. Huerta and A.A Rizzo</i>	
<b>Arm and Trunk Kinematic Features During Reaching in Virtual and Real World Environments.....</b>	<b>73</b>
<i>Dario G. Liebermann, Sigal Berman, Mindy F. Levin and Patrice (Tamar) L. Weiss</i>	
<b>Nintendo Wii Remote for Computer Simulated Arm and Wrist Therapy in Stroke Survivors With Upper Extremity Hemiparesis.....</b>	<b>74</b>
<i>Ron S. Leder*, Gil Azcarate, Rodrigo Savage, Saiph Savage, L. Enrique Suca*, David Reinkensmeyer*, Carlos Toxtli, Emilio Roth and Ariel Molina</i>	
<b>Reliability of Implantable Myoelectric Sensors (IMES).....</b>	<b>75</b>
<i>Jack F. Schorsch and Richard F. ff. Weir</i>	
<b>The Rutgers Arm II Rehabilitation System .....</b>	<b>76</b>
<i>Grigore C. Burdea, Devin Fensterheim, Daniel Cioi and Amine Arezki</i>	
<b>The Virtual Reality Lateralized Attention Test: Sensitivity and Validity of a New Clinical Tool for Assessing Hemispatial Neglect .....</b>	<b>77</b>
<i>Amanda M. Dawson, Laurel J. Buxbaum and Albert A. Rizzo</i>	
<b>The Effects of Increased Attentional Demand On The Perception of Visual Vertical.....</b>	<b>83</b>
<i>Lucinda K. Hughey, Rachel Kizony, Claire Perez, and Joyce Fung</i>	
<b>Assessment and Monitoring of Recovery of Spatial Neglect Within a Virtual Environment .....</b>	<b>88</b>
<i>Assaf Y. Dvorkin, William Z. Rymer, Richard L. Harvey, Ross A. Bogen and James L. Patton</i>	
<b>Effect of Environment On Motivation and Sense of Presence in Healthy Subjects Performing Reaching Tasks.....</b>	<b>93</b>
<i>Christiane B. Lourenço, Liza Azeff, Heidi Sveistrup and Mindy F. Levin</i>	
<b>A Virtual Reality Paradigm for The Assessment and Rehabilitation of Executive Function Deficits Post Stroke: Feasibility Study.....</b>	<b>99</b>
<i>Laura Carelli, Francesca Morganti, Patrice L. (Tamar) Weiss, Rachel Kizony and Giuseppe Riva</i>	
<b>Playstation 3-Based Tele-Rehabilitation for Children With Hemiplegia.....</b>	<b>105</b>
<i>Meghan Huber, Bryan Rabin, Ciprian Docan, Grigore Burdea, Michelle E. Nwosu, Moustafa Abdelbaky and Meredith R. Golomb</i>	
<b>Virtual Worlds and Games for Rehabilitation and Research.....</b>	<b>113</b>
<i>Nedialko I. Krouchev and John F. Kalaska</i>	
<b>Virtual Environments Increase Participation of Children With Cerebral Palsy in Robot-Aided Treadmill Training .....</b>	<b>121</b>
<i>Alexander Koenig, Karin Brüttsch, Lukas Zimmerli, Marco Guidali, Alexander Duschau-Wicke, Mathias Wellner, Andreas Meyer-Heim, Lars Lünenburger, Susan Koeneke, Lutz Jäncke and Robert Riener</i>	
<b>A Paediatric Interactive Therapy System for Arm and Hand Rehabilitation.....</b>	<b>127</b>
<i>Pawel Pyk, David Wille, Edith Chevrier, Yves Hauser, Lisa Holper, Ismael Fatton, Roger Greipl, Sonja Schlegel, Luzia Ottiger, Bärbel Rückriem, Aniña Pescatore, Andreas Meyer- Heim, Daniel Kiper, and Kynan Eng</i>	
<b>Analysis of Movement to Develop a Virtual Reality Powered- Wheelchair Simulator .....</b>	<b>133</b>
<i>Philippe S. Archambault, François Routhier, Mathieu Hamel and Patrick Boissy</i>	
<b>TUPI - a Library of Components for Accessibility Systems for Motor Impairments .....</b>	<b>139</b>
<i>Carlos Roberto França, José Antonio dos Santos Borges and Fabio Ferrentini Sampaio</i>	
<b>Usability Evaluation of E-Motion: a Virtual Rehabilitation System Designed to Demonstrate, Instruct and Monitor a Therapeutic Exercise Programme.....</b>	<b>144</b>
<i>Diarmaid Fitzgerald, Dan Kelly, Tomas Ward, Charles Markham and Brian Caulfield</i>	
<b>Virtual Musculoskeletal Scenario-Testing Case-Studies .....</b>	<b>150</b>
<i>Madusudanan Sathia Narayanan, Srikanth Kannan, Leng-Feng Lee, Frank Mendel and Venkat N. Krovi</i>	
<b>Integration of Virtual Reality Based Task Into Controlled Dynamometry to Enhance Motor Rehabilitation.....</b>	<b>157</b>
<i>Imre Cikaşlo</i>	
<b>RUPERT: an Exoskeleton Robot for Assisting Rehabilitation of Arm Functions.....</b>	<b>163</b>
<i>Sivakumar Balasubramanian, Ruihua Wei, Mike Perez, Ben Shepard, Edward Koeneman, James Koeneman, and Jiping He</i>	
<b>Low-Cost, At-Home Assessment System With Wii Remote Based Motion Capture .....</b>	<b>168</b>
<i>Suneth Attygalle, Margaret Duff, Thanassis Rikakis and Jiping He</i>	
<b>A Virtual Tabletop Workspace for Upper-Limb Rehabilitation in Traumatic Brain Injury (TBI): a Multiple Case Study Evaluation .....</b>	<b>175</b>
<i>Nick Mumford, Jonathan Duckworth, Ross Eldridge, Mark Guglielmetti, Patrick Thomas, David Shum, Heiko Rudolph, Gavin Williams and Peter H. Wilson</i>	

<b>Arm Pointing Movements in a Three Dimensional Virtual Environment: Effect of Two Different Viewing Media</b> .....	<b>181</b>
<i>Sandeep Subramanian, Christian Beaudoin and Mindy F Levin</i>	
<b>Audio Concepts Maps for Virtual Rehabilitation of The Blind</b> .....	<b>186</b>
<i>Jaime H. Sánchez and Héctor E. Flores</i>	
<b>Blindaid: a Learning Environment for Enabling People Who Are Blind to Explore and Navigate Through Unknown Real Spaces</b> .....	<b>193</b>
<i>Orly Lahav, David W. Schloerb, Siddarth Kumar, and Mandayam A. Srinivasan</i>	
<b>Computer Gaming for Vision Therapy</b> .....	<b>198</b>
<i>Tristan Carvelho, Robert S. Allison, Elizabeth L. Irving and Christopher Herriot</i>	
<b>Eye Contact As Trigger for Modification of Virtual Character Behavior</b> .....	<b>205</b>
<i>Helena Grillon, and Daniel Thalmann</i>	