

## Title & Abstract for Talk

### Biomechanical and Human Performance Evaluation of Exoskeletons

Technological advances have enabled development of exoskeletons, which are essentially wearable robotic systems designed to augment human performance. In particular, lower extremity exoskeletons have demonstrated a potential to be used as load-carriage aids. This is important for the Military as demanding physical performance tasks and excessive loads continue to burden the dismounted soldier. Exoskeletons represent one potential approach to alleviate these burdens of the soldier. This seminar reviews past and current work being done in the biomechanical and human performance evaluation of exoskeletons for human performance augmentation and load carriage at the U.S. Army Natick Soldier Research Development, and Engineering Center. The evaluations of exoskeleton prototypes raises awareness that a cross discipline of efforts in engineering, biomechanics, and physiology are required for exoskeletons to succeed in enhancing human abilities.

Biosketch: Jeffrey M. Schiffman, Ph.D.

Dr. Schiffman is a Research Physiologist at the Center for Military Biomechanics Research at the Natick Soldier Research, Development and Engineering Center. Dr. Schiffman earned his doctoral degree in biomechanics from the University of Kansas, where he studied in the Department of Health, Sports, and Exercise Science. He continued at the University of Kansas as a post-doctoral fellow in the Department of Mechanical Engineering. Dr. Schiffman's research interests at the doctoral and the post-doctoral level were motor control and balance recovery mechanisms. He has a Certificate in Gerontology Concentration and is a member of the American Society of Biomechanics and the International Society of Posture and Gait Research. Since joining Natick in 2001, Dr. Schiffman has investigated a range of biomechanics studies on load carriage and Soldier performance. He has also leads and participates in various research, management, and technical roles on the Army's exoskeleton programs. In 2007, Dr. Schiffman received a competitive Department of the Army In-house Laboratory Independent Research Award from the Office of the Assistant Secretary of the Army Acquisition, Logistics and Technology. With this award, Dr Schiffman is establishing new nonlinear tracking and predictive equations of human physiologic fatigue using biomechanical data sets. Dr. Schiffman also contributes to peer-reviewed journals as a lead author, presents papers at national scientific conferences within his field, and routinely performs a variety of advisory and review activities.