

# JOINT BIOENGINEERING SEMINAR SERIES



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## “Quantitative Biomechanics of Manual Wheelchair Mobility in Children and Adults with Spinal Cord Injury”

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### **Abstract:**

Currently, there is limited research of the biomechanics of pediatric manual wheelchair mobility. Specifically, the biomechanics of functional tasks and their relationship to joint pain and health is not well understood. To contribute to this knowledge gap, a quantitative rehabilitation approach was applied for characterizing upper extremity biomechanics of manual wheelchair mobility in children and adolescents during propulsion, starting and stopping tasks. This research found that joint demands are significantly different amongst functional tasks, with greatest demands placed on the shoulder during the starting task. We identified multiple stroke patterns used by the children, some of which are not standard in adults. It can be concluded that functional tasks should be considered in addition to propulsion for rehabilitation and spinal cord injury (SCI) treatment planning. This research provides wheelchair users and clinicians with a comprehensive, biomechanical, mobility assessment approach for wheelchair prescription, training, and long-term care of children with SCI.

### **Bio:**

Brooke Slavens is an Assistant Professor in the Department of Occupational Science & Technology at the University of Wisconsin-Milwaukee. She is the Director of the Movement Analysis for Biomedical Innovation & Technology (Mobility) Lab. Dr. Slavens received her B.S. degree in Biomedical Engineering from the University of Iowa and her M.S. and Ph.D. degrees in Biomedical Engineering from Marquette University. Dr. Slavens completed a Postdoctoral Fellowship in Pediatric Mobility through the Orthopaedic and Rehabilitation Engineering Center (OREC) at Marquette University and the Medical College of Wisconsin.

Dr. Slavens' research interests include pediatric mobility, upper extremity motion analysis, musculoskeletal modeling and simulation, rehabilitation engineering, and orthopaedic biomechanics. She has received extramural funding from NIH, NSF, and NIDRR/NIDILRR for her research. She is an active member of the American Society of Biomechanics (ASB), IEEE Engineering in Medicine and Biology Society (EMBS), Gait and Clinical Movement Analysis Society (GCMAS) and the Rehabilitation Engineering and Assistive Technology Society of North America (RESNA).