Joint Department of
BIOMEDICAL ENGINEERING

UNC CHAPEL HILL | NC STATE UNIVERSITY

Coulter Seminar Series Presents

Rehabilitation Engineering

Neural and biomechanical correlates of post-stroke gait retraining

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Dr. Kesar is an Associate Professor in the Division of Physical Therapy, Department of Rehabilitation Medicine at Emory University. She is the Director of the Motion Analysis Laboratory at Emory Rehabilitation Hospital. She also holds appointments as training faculty in the Neuroscience graduate program at Emory and the joint Biomedical Engineering (BME) program at Emory University and Georgia Tech. Dr. Kesar's research capitalizes on multi-modal techniques, including 3-dimensional motion capture, electromyography, non-invasive peripheral nerve stimulation, transcranial magnetic stimulation, and functional electrical stimulation. She has a strong track record of gaining external funding for her research from both foundation (American Heart Association, Foundation for Physical Therapy Research) and federal sources (National Institutes of Health).

ABSTRACT

A stroke induces a cascade of neurophysiologic changes in cortical and spinal circuits that result in biomechanical gait impairments (reduced paretic propulsion, footdrop) and gait dysfunction (reduced speed), which in turn adversely affect quality of life. The overarching premise of our research is that while increasing gait speed is a major goal of stroke gait rehabilitation, targeting walking speed as a primary gait rehabilitation outcome without regard to biomechanical and neural mechanisms fails to meet the emerging standards of precision medicine, which is the future of rehabilitation research. This seminar will present our laboratory's recent and ongoing research probing neurobiological (top--down) and biomechanics (bottom--up) mechanisms underlying post-stroke gait rehabilitation. The seminar will present data from our lab elucidating neural mechanisms of treadmill training interventions combined with functional electrical stimulation, probed using non-invasive brain and peripheral nerve stimulation techniques. The seminar will also discuss our recent work on real-time gait biofeedback, including game -based biofeedback interfaces for stroke gait retraining. Through the seminar, we also hope to gain valuable feedback from and foster new collaborations with the outstanding research groups at UNC and NC State.

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