

## **Wearable sensors for mobility assessment in elderly with movement disorders**

**Abstract:** Parkinson's disease (PD) is the second most common neurodegenerative disease in the United States, after Alzheimer's disease. The defining characteristics of PD include tremor, slowness of movement (bradykinesia), rigidity, and impaired balance and coordination. As these symptoms become more pronounced, patients may have difficulty walking, talking, or completing simple tasks.

Objective, reliable, and sensitive measures of balance and gait are critical for clinical assessment, as well as for studies of rehabilitation intervention. Recently, wearable sensors have been proposed as a portable, low-cost alternative to gait laboratories or dynamic posturography for measurements of gait and balance. In addition, wearable sensors offer the opportunity for immediate biofeedback of motor performances with the possibility of conditioning motor performances. In the future, wearable sensors may allow therapists and clinicians to perform tele-rehabilitation directly from home and monitor the natural mobility of the patients in the community.

**About the speaker:** Dr. Martina Mancini is a Senior Research Associate within the Department of Neurology at Oregon Health & Science University (OHSU). She received her master degree in Biomedical Engineering at the "Alma Mater Studiorum" University of Bologna in Italy where she also received her Ph.D. in Bioengineering. She then completed a postdoctoral fellowship within the Department of Neurology at OHSU. Dr. Mancini's translational biomedical research focuses on objectively characterize, understand, and monitor mobility impairments in patients with neurological disorders with wearable sensors in order to develop tailored rehabilitation interventions, such as biofeedback-based solutions. She has presented at national and international meetings on topics related to gait and balance impairments in persons with Parkinson's disease and parkinsonisms. Her efforts involves active collaborations with researchers at the Department of Electrical, Electronic and Information Engineering «Guglielmo Marconi» (DEI) at University of Bologna, the Neurology Department of "Sant'Anna" Hospital in Ferrara, University of Michigan, and OHSU. She recently received an NIH K99-R00 award from the National Center for Medical Rehabilitation Research (NCMRR) to characterize the physiology of gait disturbances during locomotion with body-worn sensors and to determine whether vibrotactile biofeedback improves such gait disturbances in Parkinson's disease *in a laboratory and home environments*.