WestVirginiaUniversity®

SCHOOL OF PUBLIC HEALTH

Department of Biostatistics

Monthly Seminar Series

Wednesday, November 7, 2018

11:00 a.m. – 12:00 p.m.

WVU Rockefeller Neuroscience Institute

Room 1070

Speaker:

Jacek K. Urbanek, PhD

Assistant Professor, Division of Geriatric Medicine and Gerontology

Core Faculty, School of Medicine

John Hopkins University

Topic:

Objective Quantification of Human Activity in Large Health Studies Using Wearable Accelerometers

Abstract:

Accelerometers are now ubiquitous in health studies, where they are used to provide objective proxy measurements of physical activity. The data produced by these devices is extremely large and complex, while most health studies only use crude summaries of the 24-hour activity cycle. We introduce analytic methods designed to quantify the macro- and micro-structure of the data and its association with health outcomes. The macro-structure refers to minute-level aggregated data, which characterizes activity intensity, while the micro-structure refers to the sub-second level of the raw data (10-100Hz), which characterizes individual movement patterns. We introduce a complete analytical pipeline for processing, storing, and fusing macro-scale accelerometry data collected in large-scale health studies. Based on the resulting data structure we propose a new method for quantifying the individual sleep chronotype and social jet lag. Methods are motivated by and illustrated on the National Health and Nutrition Examination Survey (NHANES), which collected accelerometry data on tens of thousands of subjects. To characterize the micro-structure of the data we will introduce new methods for detection and identification of walking in the free-living environment. Results indicate that the micro-scale characteristics of free-living walking are associated with physical function, mobility, fatigability, and fitness in community-dwelling older adults.