Advancing Workplace Safety Surveillance with Ambulatory Inertial Sensors: A Research to Practice to Research Study

Mark Schall

Assistant Professor
Department of Industrial and Systems Engineering
Auburn University
Auburn, AL 36849, USA

Corresponding author’s Email: mark-schall@auburn.edu

Author Note: Mark Schall is an Assistant Professor of Industrial and Systems Engineering at Auburn University, and is a Certified Professional Ergonomist. Dr. Schall is the Deputy Director of the Occupational Safety and Ergonomics Program of the NIOSH-supported Deep South Center for Occupational Health and Safety. He received his PhD from the University of Iowa in 2014.

This study was supported by research funding from the Centers for Disease Control (CDC) / NIOSH (Grant # K01OH011183) awarded to Dr. Schall. The findings and conclusions in this report are those of the author and do not necessarily represent the views of the CDC/NIOSH. The author would like to acknowledge the efforts of the research assistants and mentors that helped make this project possible and the study participants for their time and involvement.

Abstract: Work-related musculoskeletal disorders (MSDs) are prevalent in the United States and are a major cause of pain, disability, and lost productivity. Occupational health and safety personnel employed in industries that commonly report a high incidence of MSDs, such as manufacturing, are often responsible for evaluating and modifying workspaces to prevent these conditions. The routine use of imprecise and biased self-report and/or observational-based exposure assessment methods, however, often limit such efforts. Wearable ambulatory inertial sensors (AISs) are direct measurement technologies that have recently emerged as a more objective approach for performing assessments of exposure to physical risk factors such as extremes of posture in the working environment. This presentation will focus on a research project supported by the Centers for Disease Control (CDC) / National Institute for Occupational Safety and Health (NIOSH; Grant # K01OH011183) that aims to address three methodological research gaps that currently prevent the broad adoption of AISs among industrial occupational health and safety personnel. In particular, a component of the project involves the development, evaluation, and implementation of a Research to Practice to Research (RtPtR) web application that summarizes direct measurements obtained from AISs to better inform operational decision-making. This web application as well as other findings of the project and their RtPtR implications will be discussed.

Keywords: Wearable Technology, Inertial Sensors, Musculoskeletal Disorders, Physical Activity