

Industrial & Systems Engineering  
Seminar Announcement

Objective methods for characterizing exposures to physical risk factors which may contribute to musculoskeletal disorders in apple harvesting

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**Abstract:** Most of the US farmworkers are migrant workers, who perform physically-demanding work but are less likely to report poor working conditions that exposes them to greater risk for musculoskeletal disorders (e.g. prolonged non-neutral postures, repetitive motions and forceful exertions). Technology such as harvest-assisted mobile orchard platforms has been introduced to the field to increase work efficiency but its potential impact on musculoskeletal health effects is unclear. The existing methods to assess ergonomic risk factors are not suitable to examine agricultural work due to the variability observed in the field. The goal of this research is to develop methods to characterize these musculoskeletal health risk exposures. The objective measures include kinematic (arm movements) and physiological (muscle activity) data collected in the field using inclinometer and electromyography, respectively. These exposure assessment methods are used to evaluate and compare different apple harvesting methods/equipment, i.e. ladders and mobile platforms, in Washington State. The findings suggest that mobile platforms could reduce the kinematic measures of musculoskeletal health risk exposures but may not reduce physiological impact observed in muscles. This research has potential benefits as it enables field-based measurement of ergonomic risk factors in agriculture. The results lead to recommendations for engineering and administrative interventions to improve work environment for farmworkers, which will ultimately improve their overall health and well-being.

**Bio:** *Ornwipa (Fah) Thamsuwan* is a postdoctoral fellow at the Institute of Health Metrics and Evaluation, Seattle WA. Fah received her PhD in Industrial Engineering from the University of Washington in 2016 where she worked as a research assistant at the Ergonomics Laboratory, Department of Environmental and Occupational Health Sciences. Her current research interest is to improve ergonomics at workplace, particularly in agriculture since 2012, through quantifying ergonomics hazards and developing effective interventions. Her prior research in 2010-2013 focused on whole-body vibration exposures among vehicle operators.

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