

**Training Project Grants  
Annual Program Highlights  
Reporting Period: July 1, 2014 – June 30, 2015**

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Institution: The Ohio State University  
Training Program Grant Name: Occupational Safety and Health Training Grant : MS ISE/ Safety and Ergonomics**

**SECTION I**

**TPG Summary:**

The long term objectives of this program are to 1) increase the number of engineers who understand that they have a direct effect on the safety of workers who work with the equipment and work systems engineers design, and 2) increase the number of engineers who choose to go into applied or research positions in the area of occupational safety and health.

Annually, five traineeships in Occupational Safety and Ergonomics are available in the Department of Integrated Systems Engineering (ISE) at OSU. The specific aim of the program is to use these traineeships to provide educational opportunities to engineering students at the master's level who are interested in pursuing industrial, consulting, or academic careers in occupational safety and ergonomics or related areas. Plans of study typically require 4 semesters to complete and include a research thesis as a culminating project. Students take courses in occupational biomechanics, cognitive engineering, occupational health, industrial accident/incident prevention and control, human error and systems failure or resilience engineering, and experimental design. Students are trained in responsible research practices and have opportunities to get involved in cutting edge research that addresses a number of original NORA Priority Research Areas, including Low Back Disorders, Musculoskeletal Disorders of the Upper Extremities, Traumatic Injuries, Emerging Technologies, Organization of Work, Special Populations at Risk, Exposure Assessment Methods, and/or Intervention Effectiveness Research. Research projects, seminars, internships, a safety practicum, and other opportunities expose students to several sectors in the current NORA Sector-Based Approach such as Agriculture, Construction, Healthcare, Manufacturing, Public Safety, Service workers, and Warehousing. Students learn from OSU faculty, experienced practitioners, and from workers. While students learn about safety and ergonomics fundamentals, they also learn about emerging trends and concepts, such as resilience safety & engineering and wellness approaches to occupational safety and health. Laboratory facilities and equipment the students work with are state-of-the-art and the OSU Libraries system is second-to-none.

OSU's College of Engineering continues to implement and refine strategies for recruiting and retaining top-notch graduate students from groups that are underrepresented in engineering, and the ISE's NIOSH-sponsored training program actively participates in these strategies when recruiting participants for the program. The program has strong institutional support, as demonstrated by the provision of Tuition Awards for the trainees, which provide for full tuition support for up to two years per student. Advisory Board members who come from labor, state government, industry, research, and education, provide the program with important, relevant outside perspectives, as well as providing direct support to students through internships, safety practicum sponsorships, guest lectures in classes, and seminars. The training program provides Ohio, a state with more than 205,000 employers, and the surrounding region of the country with engineers with training to identify and address safety and ergonomics hazards in a wide variety of workplaces. Program graduates become valuable employees because of the breadth of their training (research methods, safety, health, ergonomics/human factors, and others), sector exposure (agriculture, manufacturing, warehousing, healthcare, and others), and instructor exposure (academics and experienced professionals), or they may opt to build upon that strong foundation of knowledge with further education and training at the doctoral level.

**Relevance:**

This training program is relevant to the public health because injuries that workers sustain on the job have important implications for their lives outside of work, including their financial situation (Foley *et al.* 2007),

as well as implications for costs incurred by states, employers, and other entities (Dembe 2001, Weil 2001, Costich 2010). Workers who either permanently or temporarily cannot perform their occupational tasks may also not be able to perform tasks at home, including caregiving tasks for children or for a parent or other family member who requires support in order to remain living in a private setting, rather than an institution (Franche *et al.* 2006). Engineers have the power to affect the health and safety of workers, but an appreciation of this requires special training and education, such as that provided through our Master's level Training Program in Safety & Ergonomics, in order to increase their ability to exert positive effects on worker safety and health; thus the relevance of this program to the public health.

**TPG web link:**

<http://ise.osu.edu/isefaculty/sommerich/TPG/home.html>

**SECTION II**

**Program highlights of high impact:**

**Internships:** Two students had successful internships experiences during the reporting period, one with Philips (medical devices) in Cleveland, and other with Honda in East Liberty, Ohio. The Honda experience served as that student's safety practicum, an experience that is required of all of our TPG-supported students. Over the years Honda has provided excellent safety practicum experiences for several of our TPG students. The students always learn a lot during these experiences and make significant contributions to the health and safety of the Honda associates that are impacted by the work the students do. This student was engaged in the following activities during her experience:

- Using Honda's assessment method, she completed Ergonomic Risk Assessments for several hundred assembly operations for two currently produced vehicle models.
- Created a comprehensive database that includes all Safety Training documentation for Honda employees that will make it easy to display associate information, when an associate was last trained, and whether it is time for further training.
- Assisted with New Model safety/ergonomic studies (NIOSH Lift Equation, Honda Ergonomic Design Guidelines, Safety Risk Assessment, Injury Forecasting, etc.), in preparation for production
- Performed job hazard analysis on newly-installed lift-assist equipment and performed environmental testing (air flow/temp. and light)
- Performed an ergonomics assessment of an office workstation for an employee who was experiencing neck and wrist discomfort

**Graduation:** One student graduated with an MS degree during this reporting period. She had two job offers before she completed her degree, both in her chosen area of human factors and design. She chose to work for a consulting firm, where she is involved with product design safety. Through such involvement she will have the opportunity to have a positive effect on workplace safety and worker performance. A manuscript from her thesis research has been submitted to *Applied Ergonomics*.

**Conference participation:** Trainees attended the International Meeting of the Human Factors and Ergonomics Society in Chicago (Oct. 2014), which gave them the opportunity to further develop their networks of professional contacts in the safety and human factors fields. Two trainees took advantage of the Career Center and interviewed with several prospective employers during the conference. Both are now (Sept. 2015) employed by companies with whom they first interviewed at the conference. The conference also provided an opportunity for our current students to meet one of our program graduates who is now pursuing a PhD at the University of Maryland.

Several students also attended the Honda Ergo Cup in Oct. 2014. As part of the lead up to the Applied Ergonomics Conference each year, Honda holds a competition among all its plants in Ohio to showcase ergonomics and safety-related improvements invented and implemented by Honda associates during the preceding 12 months. We are fortunate to be invited to this event each year, through one of the members of our advisory board who is a Staff Engineer in Ergonomics at Honda. This provides our students with a great opportunity to see novel safety and ergonomics intervention concepts in practice. It also provides the students with a great networking opportunity during which they can meet Honda safety professionals, engineers, and managers as well as safety professionals from the Ohio BWC, some of whom help to serve as judges for the competition. I was also invited to serve as a judge last year.

**Manuscripts and publications:** From research studies involving training grant supported students..... A study that investigated a new type of powered ambulance cot with a mechanism that precludes the need to perform any manual lifting was published in *Ergonomics* (Sommerich *et al.* 2015). A new manuscript was submitted to *Ergonomics*, that describes our multi-phase participatory intervention research study (R01OH009253) with echocardiographers and other types of sonographers. Two branch phases of that multi-phase study involved students in our safety and ergonomics MS program. In both branch phases our students investigated a new method of performing echocardiograms that was shown to reduce awkward postures and require less activity in the shoulder and arm muscles of the echocardiographers. Both of those branch phases are featured in the manuscript. And, as mentioned above, a manuscript from our student who graduated in Spring 2015 was submitted to *Applied Ergonomics*.

## References

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