

NIOSH Training Project Grant Annual Report
PI: Mark E. Benden, Ph.D, Principal Investigator
Award: 5T03OH009410
Term: Year 5 (7/1/2016-6/30/2017)

TPG Summary: The Occupational Safety and Health Training Program at Texas A&M University's School of Public Health delivers high quality training in occupational safety and health, with available concentrations in safety, health, and ergonomics for masters level students. Students completing the program possess knowledge and skills in the general concepts of development problems and solutions with cost/benefit analysis related to occupational safety and health/wellness, ergonomics, industrial hygiene, occupational disease, human anatomy, user-computer interaction, display and controls, information process, industrial process safety, epidemiology, and statistics.

Relevance: Occupational safety and health specialist (OS&H) are critical to ensuring the safety and health of the national workforce; however, the demand for trained OS&H professionals continues to exceed the supply. The Texas A&M Occupational Safety and Health Training Program is focused on increasing the number of qualified OS&H professional in the local and regional workforce as well as provide high quality internship experiences for trainees.

Key Personnel: list key personnel, roles, contact info, and phone number.

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High Impact Stories. For the Year 5 reporting period (July 1, 2016-June 30, 2017), the program made a significant impact in increasing the overall number of qualified OS&H personnel in the region. As a department in this period, we graduated 35 total graduate students currently working in the OS&H fields. Another significant activity is the internship experience which not only provides invaluable training but also leads to employment opportunities. The current student graduates have had 95% placement into full-time EHS jobs at graduation and 100% shortly after. All 16 of the NIOSH trainees have had multiple job offers at graduation.

The two Year 5 NIOSH trainees both completed research experiences in design and safety and human factors including 3D drawings and 3D printing of new tools they designed and tested. The two NIOSH trainees were part of a contingent that attended the Applied Ergonomics Conference as well as local chapter meetings. The students successfully completed the program and secured employment as OH&S professionals. One of the students accepted a position as a Safety Logistics Coordinator for a private road and bridge company. The other student accepted a position as an Environmental Health and Safety Coordinator.

Program faculty were awarded over \$500,000 in grants and contracts from funders including the National Academy of Sciences Grants Gulf Research Program, National Science Foundation, Texas Transportation Institute, NSF, NIH and a number of private industry sponsors including Herman Miller and OERC.

In addition, the program faculty published the following articles during the past year. An asterisk denotes student authorship.

1. Buchanan JJ, Park I, Chen J, Wright DL, **Mehta RK**. *Bimanual coordination patterns are stabilized under monitoring-pressure*. *Exp Brain Res*. 2017 Jun; 235(6):1909-1918. doi: 10.1007/s00221-016-4869-0. Epub 2017 Mar 18.
2. Grobe S, Kakar RS, Smith ML, **Mehta R**, Baghurst T, Boolani A. *Impact of cognitive fatigue on gait and sway among older adults: A literature review*. *Prev Med Rep*. 2017 Feb 24; 6:88-93. doi: 10.1016/j.pmedr.2017.02.016. eCollection 2017 Jun.
3. **Johnson N**, Carrillo G, **Mehta RK**. *Academic and Psychosocial Impact of Air Pollution on Children*. *Pediatric Neurotoxicology*: Springer; Aug 2016; 167-180.
4. Marsalia AC*, Ferris TK, **Benden ME**, **Zheng Q**. *Evaluation of Vibrotactile Warning Systems for Supporting Hazard Awareness and Safety of Distracted Pedestrians*. *IIE Transactions on Occupational Ergonomics and Human Factors* June 2016; 4(4):222-235.
5. McKendrick R, **Mehta R**, Ayaz H, Scheldrup M, Parasuraman R. *Prefrontal hemodynamics of physical activity and environmental complexity during cognitive work*. *Hum Factors*. 2017 Feb;59(1):147-162. doi: 10.1177/0018720816675053.
6. **Mehta RK**. *Integrating Physical and Cognitive Ergonomics*. *IIE Transactions on Occupational Ergonomics and Human Factors* June 2016; 4(2-3):83-87
7. **Mehta RK**, Ayaz H, McKendrick R, Izzetoglu K, Willems B, Ziegler M. *Is Functional Near Infrared Spectroscopy (fNIRS) Appropriate for your Research?* Sept 2016; 60(1):188-190.
8. **Mehta RK**, **Peres SC**, Steege LM, Potvin JR, Wahl M, Stanley LM, Nesthus TE. *Fatigue Monitoring and Management across Different Industries*. *Proceedings of the Human Factors Society Annual Meeting* Sept 2016;60(1):993-996.
9. **Mehta RK**, Rhee J, Cavuoto L. *Muscle Oxygenation Correlates of Handgrip Fatigue with Obesity*. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* Sept 2016; 60(1):1031-1035.
10. **Mehta RK**, Cavuoto LA, *Relationship Between BMI and Fatigability Is Task Dependent*. *Hum Factors*. 2017 Aug;59(5):722-733. doi: 10.1177/0018720817695194. Epub 2017 Mar 7.
11. **Mehta RK**, **Peres SC**, Kannan P, Rhee J, Shortz AE, Mannan MA. *Comparison of objective and subjective operator fatigue assessment methods in offshore shiftwork*. *Journal of Loss Prevention in the Process Industries*, July 2017;48, 376-381.
12. **Mehta RK**, Rhee,J*. *Age-specific neural strategies to maintain motor performance after an acute social stress bout*. *Exp Brain Res* 2017 Jul;235(7):2049-2057. doi: 10.1007/s00221-017-4949-9. Epub 2017 Mar 29. doi: 10.1016/j.clinbiomech.2016.03.011. Epub 2016 Apr 8
13. Osofundiya O*, **Benden ME**, **Dowdy D**, **Mehta RK**. *Obesity-specific neural cost of maintaining gait performance under complex conditions in community-dwelling older adults*. *Clinical Biomechanics* 2016 June;35:42-48. doi: 10.1016/j.clinbiomech.2016.03.011. Epub 2016 Apr 8.
14. Pajoutan M, Cavuoto LA, **Mehta RK**. *Testing the efficacy of existing force-endurance models to account for the prevalence of obesity in the workforce*. *J Occup Environ Hyg*. 2017 Oct;14(10):786-792. doi:0.1080/15459624.2017.1334902
15. **Peres SC**, Quddus N, Kannan P, Ahmed L, Ritchey P*, Johnson W, Rahmani S, Mannan MS. *A summary and synthesis of procedural regulations and standards—Informing a procedures writer's guide*. *Journal of Loss Prevention in the Process Industries* 2016;44:726-734.
16. **Peres SC**, Verona D, Nisar T*, Ritchey P*. *Towards a systematic approach to real-time sonification design for surface electromyography*. *Displays*, April 2017; 47, 25-31.
17. **Peres SC**, **Mehta RK**, Ritchey P*. *Assessing ergonomic risks of software: Development of the SEAT*. *Applied Ergonomics* 2017 Mar;(59):377-386. doi: 10.1016/j.apergo.2016.09.014. Epub 2016 Oct 12.
18. **Pickens AW**, **Benden ME**, Schneider DE, **Zhao H**. *Use of Stand-Biased Desks to Reduce Sedentary Time in High School Students: A Pilot Study*. *International Journal of Child Health and Nutrition* 2016;5(2):75-78.
19. **Pickens AW**, Kress M, **Benden ME**, **Zhao H**, Wendel M, Congleton J. *Stand-capable desk use in a call center: a six-month follow-up pilot study*. *Public Health* 2016 Jun;135:131-134.
20. **Pickens AW**, Robertson LD, Smith, ML, Zhao,H, Mehta RK, Song S. *Limitations of a Mobile Hearing Test Application*. *Hearing Journal* June 2017;70(6), 34-37. doi: 10.1097/01.HJ.0000520667.85649.13
21. Shortz A, **Mehta RK**. *Cognitive challenges, aging, and neuromuscular fatigue*. *Physiology and Behavior*. 2017 Mar 1;170:19-26. doi: 10.1016/j.physbeh.2016.11.034. Epub 2016 Nov.
22. Wendel ML, **Benden ME**, **Zhao H**, Jeffrey C. *Stand-Biased Versus Seated Classrooms and Childhood Obesity: A Randomized Experiment in Texas*. *American Journal of Public Health* 2016 Oct;106(10):1849-1854. doi: 10.2105/AJPH.2016.303323. Epub 2016 Aug 23.

23. Wendel ML, **Benden ME**. *Standing Vs Sitting Time In Stand-Biased Classrooms Respond*, American Journal of Public Health, March 2017;107(3), p e4-e5. doi: 10.2105/AJPH.2016.303618.
24. Garrett, G.* , **Benden, M., Mehta, R., Pickens, A., Peres, S.C.**, & Zhao, H. (2016). *Call Center Productivity Over 6 Months Following a Standing Desk Intervention*. IIE Transactions on Occupational Ergonomics and Human Factors, 2016 May;188-195.

Presentations:

1. Ardoin W, Hoyle W*, Bewaji T*, Ferris T, **Peres S**, Hallbeck S, Kaplan R and Brady P. *Real-time remote physiological monitoring The role of communication in three paradigms of inpatient care*. Human Factors and Ergonomics Society Annual Meeting, Washington DC. September 2016;60(1):618-622.
2. **Peres S**. *Unpacking the Phrase Human Factors and What it Means for Safety in Industrial Work Settings*. Texas Chemical Council Safety Seminar, Galveston, TX. June 2016.
3. **Peres S**. *Human Factors Methods and Procedures: What you can do now*. BP Collaborative Safety Workshop, Houston, TX. 2016.
4. **Peres S**. *Workers Experiences with Using Procedures: How Methods in Human Factors Can Help*. IADC Human Factors Conference & Exhibition, Houston, TX. October 2016.
24. Verona D, **Peres SC**. *A Comparison between the Efficacy of Task-Based Vs. Data-Based sEMG Sonification Designs*. 23rd International Conference on Auditory Displays (ICAD 2017).
5. Sonaiké I*, Bewaji T*, Ritchey P* and **Peres S**. *The Ergonomic Impact of Swype*. Human Factors and Ergonomics Society Annual Meeting, Washington DC. September 2016.
6. Shortz, AE.* **Mehta, RK. & Benden, ME**. (2016). *Cognitive Effects of Stand-Biased Desks in High Schools*. 2016 Applied Ergonomics Conference. March 21-24, Orlando, FL.
7. **Peres, SC. Mehta, RK. & Ritchey, P*** (2016). *Software Biomechanics: Developing a New Self report Assessment Tool*. 2016 Applied Ergonomics Conference. March 21-24, Orlando, FL.
8. Pankey, RB.* , **Mehta, RK**, Woosley, J., Shortz, A* , & Yoshikawa, A (2014). *A comparison of four sensory condition protocols on the mCTSIB balance tests in aging adults*. In Medicine and Science in Sports and Exercise (Vol. 46, No. 5, Pp. 690-691)
9. **Mehta, RK**, Shortz, AE* (2014). *Stress impacts physical competencies in older obese adults*. Poster presented at the APHA Annual Meeting & Exposition. New Orleans, LA, Nov 15-19.