

The Fatigue Failure Mechanism in the prevention and management of WRMSD

Pre-conference Workshop

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Faculty:

Sean Gallagher

Mary Barbe

Musculoskeletal disorders (MSDs) have been the focus of significant research efforts for several decades. Much has been learned; however, identifying specific causal mechanisms for MSDs has been lacking. Recently, however, a prospective causal mechanism has been put forth suggesting that musculoskeletal tissues experience the development of damage in the same manner as other materials: they experience cumulative damage development through fatigue failure due to exposure to repetitive stress. Several lines of evidence support the fatigue failure mechanism, including results of animal studies, epidemiology studies, ex vivo tests demonstrating that all musculoskeletal tissues exhibit a fatigue failure process when repetitively stressed, and results of validation studies of risk assessment tools that employ fatigue failure methods. This workshop will provide theoretical background regarding the fatigue failure process, will discuss supporting evidence, and will describe important ramifications in terms of MSD risk assessment, job design, and other ergonomics-related issues. The workshop will also cover up-to-date information regarding musculoskeletal tissues and the nervous system, epidemiological data regarding MSDs, injury and healing, and many other topics. Hands-on exercises will be provided using easy-to-use fatigue failure risk assessment tools (LiFFT, DUET, and The Shoulder Tool). Implications regarding MSD prevention and optimising musculoskeletal health will also be included.

About Our Speakers:

1. Sean Gallagher

Dr Sean Gallagher, PhD, CPE, FAIHA, is currently the Hal N. and Peggy S. Pennington Associate Professor Emeritus in Auburn University's Department of Industrial Engineering. Dr Gallagher has worked in the Ergonomics field for over 38 years, starting with the U.S. Bureau of Mines (1984-1995), then the National Institute for Occupational Safety and Health (1995-2011), and now Auburn University (2012-present). He is a Fellow of the Human Factors and Ergonomics Society and the American Industrial Hygiene Association. Dr Gallagher is a Certified Professional Ergonomist and a two-time winner of the International Ergonomics Association/Liberty Mutual Medal in Occupational Safety and Ergonomics (2013 and 2018) and a recipient of the 2020 Paper of the Year Award by the journal "Ergonomics". He has received

various other team-based awards, including 2009 Alice Hamilton Award for Excellence in Occupational Safety and Health (Educational Materials Category) and the 2011 HHS Innovates Award (Secretary's Pick).

2. Mary F. Barbe

Mary F. Barbe, PhD, FAAA, is currently a Full Professor at the Center for Translational Medicine at Lewis Katz School of Medicine of Temple University in Philadelphia. She has over 212 peer-reviewed publications to her credit. Using rat models, she has researched mechanisms and treatments for pain and work-related musculoskeletal disorders (repetitive strain injuries) in humans. She is a Fellow of the American Association of Anatomists (FAAA) and the American Society of Bone and Mineral Research. She is also the president of the Advances in Mineral Metabolism society for 2021–2023. She was the recipient of the Senior Faculty Research Excellence Award from the Lewis Katz School of Medicine in 2017, the Temple University Faculty Research Award from Temple University in 2019, the Educator Award from the Philadelphia Chapter of the Society for Neuroscience in 2008, the Christian R. and Mary F. Lindback Foundation Award from Temple University for Distinguished Teaching in 2008, and the Excellence in Teaching Award from College of Allied Health Professions in 1997 and 2007. She has also received various team-based awards, including The ISSLS Prize for Lumbar Spine Research 2018 from the International Society for the Study of the Lumbar Spine.