



Workshops—2020

W18 Injury Biomechanics: An Interdisciplinary Approach and Forensic Applications

Amanda M. Agnew, PhD, The Ohio State University, Columbus, OH 43210; Angela L. Harden, MA*, The Ohio State University, Columbus, OH 43210; John H. Bolte, PhD*, The Ohio State University, Columbus, OH 43210; Yun-Seok Kang, PhD*, The Ohio State University, Columbus, OH 43210*

Learning Overview: After attending this workshop, attendees will comprehend the advantages of using an interdisciplinary team to address questions concerning injury biomechanics and associated trauma analysis. Attendees will be exposed to the applications of injury biomechanics across multiple scientific disciplines through presentations and hands-on experiences. Additionally, attendees will be introduced to the value of experimental testing in developing and validating forensic methods of injury analysis and the importance of scientific validity and error rates.

Impact on the Forensic Science Community: This workshop will impact the forensic science community by providing attendees with an introduction to injury biomechanics and the applications of this research to forensic anthropology, engineering and applied sciences, and forensic pathology.

Injury biomechanics is the science that relates mechanical forces to disruption of anatomical regions of the human body. As a multidisciplinary field encompassing engineering, physiology, anatomy, and medicine, an understanding of injury biomechanics would benefit forensics, specifically in regard to analyzing injuries, the mechanisms that cause them, and recreating traumatic events.

The focus of this workshop is to introduce the principal aims of injury biomechanics research and discuss how these aims are relevant in forensic fields and methods. The utilization of a multidisciplinary team encompassing injury biomechanics, forensic anthropology, forensic pathology, and human anatomy allows for a holistic approach to investigating the relationships between injury and physical mechanical properties. By doing so, identifying mechanisms of injury will satisfy *Daubert* standards and provide quantifiable methods to support expert testimonies. Ultimately, this interdisciplinary pursuit will increase accuracy and precision in the reconstruction of traumatic events.

Presentations will begin with an introduction to injury biomechanics and the importance of an interdisciplinary team of scientists. Following the introduction, attendees will learn about the applications and limitations of forensic injury biomechanics. The development of injury criteria, injury risk assessment, and injury thresholds of the human body will then be discussed. Experimental design will next be presented in detail, addressing what goes into the design, interpretation of experiments, and the importance of quantitative data and error rates. Experimental testing methods and applications will then be addressed; specifically, the role of experimental testing in the development and validation of forensic methods. Attendees will be presented with current injury biomechanics research conducted in the Injury Biomechanics Research Center focusing on the injury mechanisms of different anatomical body regions. Each research presentation will address the following: objectives and hypotheses of the project, interdisciplinary contributions, applications of the research to various fields and professions with an emphasis on forensic applications. Attendees will be provided the opportunity to observe and discuss the soft tissue and skeletal trauma associated with each presentation and discuss interpretations. At the end of this workshop, attendees will be provided with the opportunity to discuss injury biomechanics in general and direct questions to the panel of experts who are engineers, anatomists, and forensic anthropologists.

Trauma, Methods, Fracture