



TEXAS TECH UNIVERSITY

Department of Industrial, Manufacturing,
& Systems Engineering

Title: Brain, Mobility, and Injury: New Perspectives in Injury Biomechanics and Ergonomics Research



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Abstract: The design of engineering and therapeutic interventions to address traumatic brain injury and associated motor deficits requires a comprehensive understanding of the dynamic interplay between brain and musculoskeletal structure. In this talk, Dr. Chowdhury will demonstrate his recent research in advancing the field of neuro-biomechanics and ergonomics. He will present three of his recent studies. The first study focuses on the development of a multi-muscle fatigue model to evaluate human performance in various operational fields. The second study demonstrates the development of a novel deep-learning algorithm to predict shoulder joint reaction forces using only shoulder kinematics data. The third study aims to validate a novel head-neck finite element model and discuss the effects of neck damping properties on the mechanical responses of the brain under various head impacts commonly seen in contact sports, motor vehicle accidents, violent head impacts, and occupational head injuries. Finally, he will discuss potential collaboration and career opportunities in the USA.

Biography: Dr. Chowdhury joined as an Assistant Professor in the Department of Industrial, Manufacturing, and Systems Engineering at Texas Tech University in 2019. His research areas include traumatic brain injury, injury biomechanics, ergonomics, and helmet, exoskeleton, and prosthetic designs. He received his M.S. and Ph.D. in Industrial Engineering (with a major in Occupational Biomechanics) in 2012 and 2016 from West Virginia University, USA, respectively. He is originally from Bangladesh, where he completed his B.S. in Industrial and Production Engineering at the Bangladesh University of Engineering and Technology. He was a postdoctoral fellow at the University of Pittsburgh from 2016 to 2017 and an Assistant Research Scientist at Texas A&M University from 2017 to 2019. He has been serving as the Chair-Elect of the Occupational Ergonomics Technical Group of Human Factors and Ergonomics Society, USA, since 2020. So far, the Department of Homeland Security and the National Institute of Occupational Safety and Health have supported his research works. He currently serves on the editorial board (provisional) of prestigious *Human Factors* Journal.

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