

REPPERGER RESEARCH INTERN PROGRAM

RESEARCH PROJECT #: AFRL-RHB-25-06

Finite Element Modeling of Lumbar Spine during Parachute Operations

PROJECT DESCRIPTION: The Advanced Research in Musculoskeletal Modeling for Operational Readiness (ARMMOR) group is dedicated to quantifying and mitigating musculoskeletal injury risks for warfighters through advanced biomechanical sensing and modeling capabilities. Finite element modeling (FEM) has allowed researchers to explore tissue-load transfer within the spine for decades. However, the loading conditions applied in FEM are often driven by cadaveric studies that do not represent natural human movement. Recently, researchers have combined musculoskeletal (MSK) modeling with FEM to bridge the gap between this mismatch of loading conditions. During this internship, your primary focus will be to support the ARMMOR group by performing finite element modeling of the lumbar spine during parachute jumps, driven by MSK modeling results based on in-field data. Qualified candidates will have some experience in FEA software such as LS-DYNA, Adams, Abaqus, Ansys.

LEARNING OBJECTIVES: 1) Integrate into a multidisciplinary team combining biomechanics, physiology, engineering, and data software skills. 2) Engage with projects related to interventions for the warfighter. 3) Gain hands-on experience with finite element analysis of the lumbar spine in a military context.

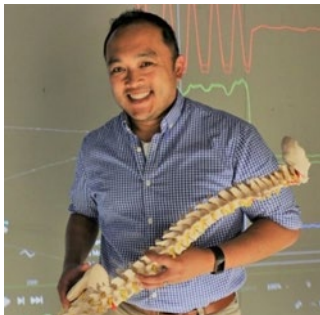
ACADEMIC LEVEL: Undergraduate; Masters; Doctoral

DISCIPLINE NEEDED:

- Engineering

RESEARCH LOCATION: Wright-Patterson Air Force Base, Dayton, Ohio

RESEARCH MENTOR: Peter P. Le, Ph.D.
Industrial and Systems Engineering, The Ohio State University, 2016



Dr. Peter Le is a Senior Research Biomedical Engineer at the Air Force Research Laboratory, 711th Human Performance Wing and serves as the Lead for the Aerospace Operations Chronic Health Risk Modeling Line of Effort. He earned his PhD in Industrial and Systems Engineering (Human Systems Integration) from The Ohio State University in 2016 with extensive training at the Spine Research Institute. His current research interests are in aircrew neck and back pain, musculoskeletal modeling, and wearable sensing to inform decision guidance tools for injury mitigation / human performance optimization.