

REPPERGER RESEARCH INTERN PROGRAM

RESEARCH PROJECT #: AFRL-RHB-25-10

Wearable Sensor Optimization for Human Movement Biomechanics

PROJECT DESCRIPTION: The Advanced Research in Musculoskeletal Modeling for Operational Readiness (ARMMOR) group focuses on quantifying and reducing musculoskeletal injury risks for warfighters through advanced biomechanical sensing and Modeling capabilities. Wearable sensors are important for in-field measurements and health surveillance but have unexplored validity and optimization for many tasks and/or environments. Student interns will explore the measurement of biomechanics in novel scenarios with wearable inertial measurement unit (IMU) sensors and contribute to the optimization of sensor parameters within the OpenSim Modeling software for validation with motion capture systems.

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 experience with hands-on research including the collection (motion capture, IMU) and analysis (Visual3D, OpenSim/OpenSense, statistics) of biomechanical data.
4. Participate in the development of novel approaches for assessing and optimizing wearable sensors for in-field use.

Qualified candidates will have experience in motion capture and MATLAB/Python.

Highly competitive candidates will have experience with IMUs, OpenSim, and Visual3D.

ACADEMIC LEVEL: Masters; Doctoral

DISCIPLINE NEEDED:

- Engineering
- Kinesiology and Exercise Physiology

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

RESEARCH MENTOR: Peter Le, Ph. D.

Industrial and Systems Engineering (Human Systems Integration), Ohio State University, 2016



Dr. Peter Le is a Research Biomedical Engineer at the Air Force Research Laboratory, 711th Human Performance Wing and serves as the Research 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, biopsychosocial mechanisms of musculoskeletal disorders, return-to-duty, and wearable sensing.