

REPPERGER RESEARCH INTERN PROGRAM

RESEARCH PROJECT #: AFRL-RHB-24-09

Plug-In Development for Musculoskeletal Modeling

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. OpenSim, an open-source musculoskeletal modeling software, plays a pivotal role within the ARMMOR group and the broader biomechanics field. These OpenSim models rely on experimentally collected data, such as motion capture and ground reaction forces, to predict joint loads and muscle activity. This information informs researchers about potential strategies to optimize warfighter readiness and minimize injury. During this internship, the student will have the opportunity to support the ARMMOR group with the development of an OpenSim Plug-in. This Plug-in will enable the ARMMOR team to perform muscle analyses for their models. The project objectives encompass two key tasks: (1) translating existing MATLAB scripts into C++ language and (2) integrating the C++ script into a ready-to-use OpenSim Plug-In. Additionally, in collaboration with other ARMMOR team members, the student intern will assist in data collection and analysis. The student may expect to gain experience in the following areas:

1. Acquire proficiency in assessing product reliability techniques.
2. Develop a high level of competence in MATLAB, C++, and OpenSim.
3. Enhance communication skills and adeptness in technical presentations through participation in ARMMOR team meetings, potentially leading to presentations before the leadership team.

Qualified candidates will have prior MATLAB experience.

Highly competitive candidates will have C++ (Visual Studio), OpenSim, and API knowledge.

ACADEMIC LEVEL: Masters; Doctoral; Undergraduate

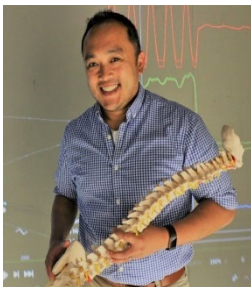
DISCIPLINE NEEDED:

- Engineering
- Computer Science

RESEARCH LOCATION: Virtual/Hybrid, 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.