REPPERGER RESEARCH INTERN PROGRAM

RESEARCH PROJECT #: AFRL-RHB-27-09

Mobile UI/UX Design and Front-End iOS Engineering for Wearable Biosensors

PROJECT DESCRIPTION: The Software Development Cell (SDC) is an organic Air and Space Biosciences Division (RHB) asset within the Product Development Branch (RHBA). Its mission is to leverage mobile software platforms and specialized, agile teams to accelerate technology development and transition. Primarily focusing on customer-driven solutions, the SDC designs, builds, and deploys specialized iOS and Android applications while leveraging widespread collaboration opportunities across the Department of War (DoW), industry, and academic partners.

This project sits at the intersection of product design and front-end iOS development. As an ORISE participant, you will assist in translating a prototype Android application to iOS for the Sensor for the Measurement of Aircrew Conditioning (SMAC) project. SMAC integrates cost-effective wearable inertial measurement unit (IMU) sensors to track countermovement jump (CMJ) performance, which quantifies lower-body muscular power critical for pilots executing anti-gravity straining maneuvers (AGSM) under high +Gz stress. Under the guidance of a mentor, you will focus on developing user-friendly layouts, dashboard screens, and interface flows that help clinicians, physical therapists, and coaches manage multiple sensors simultaneously, view real-time feedback (such as jump height, force, and impulse), and export data.

LEARNING OBJECTIVES: Under the guidance of a mentor, you will gain hands-on experience to complement your education and support your academic and professional goals. Along the way, you will engage in activities and research in several areas, including but not limited to:

1. Gain practical experience applying Apple's Human Interface Guidelines (HIG) to design intuitive and accessible workflows for operational military environments.
2. Learn to translate static UI designs, wireframes, and prototypes into responsive, native front-end iOS code using SwiftUI and UIKit.
3. Develop visual data dashboards for real-time biosensor performance metrics, including force, impulse, and jump height.
4. Participate in field testing and iterative design reviews, collecting usability feedback from clinicians and aircrew to refine application layouts.

ACADEMIC LEVEL: Bachelor's, Master's
DISCIPLINE NEEDED: Software Engineering, Computer Science and Engineering (General)
RESEARCH LOCATION: Wright-Patterson Air Force Base, Dayton, Ohio
RESEARCH MENTOR: Peter Le, Ph.D
Industrial and Systems Engineering, The Ohio State University, 2016



Dr. Peter Le is a Senior Research Biomedical Engineer and technical leader at the Air Force Research Laboratory, 711th Human Performance Wing, where he serves as Product Area Lead for Biotechnology Performance and provides technical leadership for the Software Development Cell. His work sits at the intersection of science, engineering, and technology development, where he brings together multidisciplinary teams to address complex medical and human performance challenges while translating emerging technologies into operational capabilities. Rather than focusing on a single technology or discipline, Dr. Le leads across

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domains to identify high-impact opportunities, shape technical strategies, and guide solutions from research and prototyping toward real-world application. He holds a Ph.D. in Industrial and Systems Engineering with a focus on Human Systems Integration, an M.S. in Mechanical Engineering from Colorado School of Mines, and B.S. in Mechanical Engineering from the University of Colorado Denver.
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