

REPPERGER RESEARCH INTERN PROGRAM

RESEARCH PROJECT #: AFRL-RHD-21-03

INVESTIGATION OF RADIO FREQUENCY PULSE BIOLOGICAL RESPONSE IN HIGH-RESOLUTION PREDICTIVE MODELS

PROJECT DESCRIPTION: As part of the Air Force Research Laboratory, the Bioeffects Division (RHD) has played a key role in understanding the biological effects of directed energy (DE) for more than 50 years. Our mission is to understand the risks associated with warfighter exposure to DE sources. Specific objectives of the division include preventing mission degradation due to DE exposure and enabling our forces to function safely, effectively, and efficiently on the DE battlefield.

Recently, our group has initiated experimental and theoretical efforts to construct and validate high-resolution models of biological structures. These are coupled to electromagnetic models for energy deposition. We examine the sensitivity of predictive multi-physics models to these detailed structures and endpoints for tissue damage responses. The selected research candidate should expect to assist with wet lab research tasks as well as data analysis and presentation of results.

ACADEMIC LEVEL: Associates, Bachelors, Masters, PhD

DISCIPLINE NEEDED:

- Engineering
 - Bioengineering and Biomedical Engineering
 - Chemical Engineering
- Life Health and Medical Sciences
 - Anatomy
 - Animal Behavior
 - Animal Sciences
 - Basic Biomedical Sciences
 - Biochemistry
 - Biology (General)
 - Biophysics
 - Cellular and Molecular Biology
 - Comparative Medicine and Laboratory Animal Medicine
 - Computational Biology
 - Developmental Biology
 - Environmental Health
 - Genetics, Animal and Plant
 - Immunology
 - Microbiology
 - Neurosciences
 - Structural Biology
- Mathematics and Statistics
 - Applied Mathematics
 - Mathematics (General)
- Other Physical Sciences
 - Chemistry (General)
 - Material Sciences
 - Physical Chemistry
 - Polymer Chemistry

- Physics
 - Atomic and Molecular
 - Physics (General)
 - Theoretical Physics

RESEARCH LOCATION: JBSA, Fort Sam Houston, San Antonio, TX

RESEARCH ADVISER: Stacey Martens, MS
Biological Sciences, Northern Illinois University, 2014

Ms. Stacey Martens joined the Air Force Research Laboratory (AFRL) in 2014 as a research biological scientist for the Radio Frequency Bioeffects branch. Her research efforts focus on understanding the biological effects of Directed Energy (DE) systems on both eukaryotic and prokaryotic cells. The long term goal of this work is to understand how DE affects cellular physiology so that we can increase human performance and guarantee the safety of military personnel. Before joining AFRL, Ms. Martens served as a Research Assistant at Northern Illinois University while pursuing a Master's Degree in Biological Sciences. Her master's thesis focused on the role of regulatory genes controlling mycotoxin production in *Aspergillus nidulans*. She also collaborated with the USDA to determine the role of two separate gene clusters and their association with morphological development and secondary metabolism in *Aspergillus flavus*. Ms. Martens has been in the field of Biological Sciences for 8 years and has received multiple honorable awards for her research at AFRL & NIU. Additionally, her research has been published in high impact journals.