

REPPERGER RESEARCH INTERN PROGRAM

RESEARCH PROJECT #: AFRL-RHD-21-01

ASSESSMENT OF TRANSGENIC MICE AS LIVING RADIOFREQUENCY DOSIMETERS

PROJECT DESCRIPTION: This project will utilize transgenic mouse model, designed to express bioluminescence in response to an increase in hsp70, to image deposition of heat by radiofrequency (RF) exposure. A high powered RF source will be used to generate a mild thermal exposure. Images will be collected using an IVIS SpectrumCT in vivo imaging system which will allow for the simultaneous acquisition of 3D optical tomography with microCT structural imaging. The bioluminescence images generated from the expression of hsp70 will be used to locate regions that experience thermal stress and co-registered with the microCT images, which will provide a reference for visualizing heat deposition. Heat shock protein upregulation will be confirmed with genomic and proteomic analysis. The participant will conduct research on this topic over 10 weeks culminating in a presentation.

ACADEMIC LEVEL: Bachelors, Masters, PhD

DISCIPLINE NEEDED:

- Life Health and Medical Sciences
 - Basic Biomedical Sciences
 - Biochemistry
 - Biology (General)
 - Biophysics
 - Cellular and Molecular Biology
 - Genetics, Animal and Plant
 - Microbiology
 - Neurosciences
 - Pharmacology
 - Physiology

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

RESEARCH ADVISER: Caleb Roth, PhD

Radiation Biology, University of Texas Health Science Center at San Antonio (UTHSCSA), 2016

Dr. Caleb Roth is a research scientist in the Air Force Research Laboratory's Radio Frequency Bioeffects Branch. Dr. Roth began work at the United States Air Force Research Laboratory, Radio Frequency Bioeffects Branch at Brooks City-Base in 2004 as a Research Scientist for General Dynamics AIS. In 2012, Dr. Roth was awarded the SMART Scholarship (The Science, Mathematics and Research for Transformation Scholarship for Service Program). Dr. Roth received his Ph.D. in Radiation Biophysics from University of Texas Health Science Center San Antonio in 2016. Dr. Roth conducts active research in many projects, including RF bioeffects/dosimetry, small animal imaging, the use of photoacoustic techniques (probe beam deflection) to study cellular/biophysical effects associated with short duration electrical pulses, advanced cellular microscopy, and the measurement of genetic or proteomic effects of high peak power microwave and electric pulse exposure. Dr. Roth has published more than 25 peer-reviewed publications, and over 28 conference proceedings. He is an adjunct professor at UTHSCSA in the department of Radiological Sciences and is a member of the Radiation Biology Graduate Track Committee.