DEPARTMENT OF INTERNAL MEDICINE  
COLLEGE OF MEDICINE  

SUMMER RESEARCH OPPORTUNITIES FOR UNDERGRADUATE WOMEN  

APPLICATION DEADLINE: 03/01/2021  

PROJECT TITLE: Using ultrasound to prevent cardiac reperfusion injury  

Kevin Haworth  
University of Cincinnati  
3939 Cardiovascular Center  
231 Albert Sabin Way  
Cincinnati, OH 45267-0586  
hawortkn@ucmail.uc.edu  
Phone: 513-558-3536  
Fax: 513-558-6102  

Project Description  
The Haworth laboratory is investigating a technology to be used in the reduction of cardiac reperfusion injury. This type of injury occurs after treatment for a heart attack. Current treatments cause a rapid reintroduction of oxygen to damaged and dying cardiac cells. This rapid reintroduction of oxygen to damaged tissues actually causes further injury through oxidative damage, including the generation of reactive oxygen species. While the typical surgical intervention for a heart attack involves removing the blockage and restoring blood flow, it does not take measures to reduce oxidative reperfusion damage. Therefore, we are studying the use of an oxygen-scavenging technology to determine whether a reduction in oxygen concentration during reperfusion translates to decreased tissue damage. In order to do this, we use ultrasound to convert injected droplets containing an inert liquid to expanded bubbles containing oxygen-scavenging gas. We have shown that this technology can reduce available oxygen content in buffers and in tissue culture, but we are currently working to expand into more physiologically-relevant conditions (i.e. oxygen scavenging in tissue). Our lab’s work involves the amalgamation of several types of science, including physics, engineering, biology, and computer programming. It’s a great place for undergraduates to experience a collaborative research environment in a successful laboratory.