

Sponsor Projects for Pauley Heart Center 2023 Summer Undergraduate Research Fellowship

<i>Sponsor Name</i>	<i>Sponsor Research Areas</i>	<i>Project</i>
Dr. Bernard Fuemmeler, PhD, MPH Professor Department of Health Behavior and Policy	obesity, nutrition, physical activity, sedentary activity, epidemiology, statistical analyses, psychosocial factors	“Racial and Ethnic Disparities in Childhood Obesity and Obesity-Related Behaviors” The student will help the laboratory investigate racial and ethnic disparities in childhood obesity and obesity related behaviors, such as sedentary activity and poor nutrition. Students working in the lab will be exposed to epidemiological methods for examining these disparities using existing databases. The goal of this research will be to describe some of the social and/or psychological factors that may contribute to childhood obesity and explain the variation we see between different racial and ethnic groups.
Dr. Jordana Kron, MD Associate Professor Department of Internal Medicine Division of Cardiology	cardiac arrhythmias, electrophysiology, implantable cardioverter defibrillators, sarcoidosis	“Cardiac Sarcoidosis Consortium Registry” The Cardiac Sarcoidosis Consortium is an international multicenter collaboration co-founded in 2011 by VCU, University of Michigan and University of Colorado and has a prospective registry of more than 700 patients with cardiac sarcoidosis from 25 centers. The student will help to update the database for the enrolled patients from VCU and also devise a hypothesis and query the database to try to answer a question with the current data.
Dr. Cory Trankle, MD Assistant Professor Department of Internal Medicine Division of Cardiology	exercise test, left atrium, cardiac imaging, magnetic resonance imaging (MRI)	“Atrial Function During Stress Testing” This project aims to evaluate the ability of the atria (top chambers of the heart) to increase their squeezing function (contractility) during exercise. Prior technological limitations have prevented clear imaging of the atria during exercise. However, with improvements in MRI technology, we are now able to collect images of the atria during exercise-based stress tests. This project will retrospectively evaluate the function of the atria during stress tests and compare that function to the individuals' ability to exercise. The student will trace the atria of the heart

		on the MRI videos during rest and exercise, as well as build databases with obtained measurements.
<p>Dr. Edward Lesnefsky, MD Professor Department of Internal Medicine Division of Cardiology and Dr. Qun Chen, PhD Associate Professor Department of Internal Medicine Division of Cardiology</p>	<p>Myocardial injury is increased in aged heart following heart attack and accelerates the transition to post-infarction heart failure. Aging-induced mitochondrial dysfunction augments cardiac injury during heart attack. My recent research is focused on studying the mechanisms by which aging leads to mitochondrial dysfunction. The ultimate goal is to find effective therapeutic approaches to decrease cardiac injury by improving mitochondrial function in aged population.</p>	<p>Our research finds that endoplasmic reticulum (ER) stress contributes to mitochondrial dysfunction during aging. Complex I is a key component of mitochondrial respiratory chain. We find that key protein subunits of complex I are decreased by aging. calpain is a mitochondrial localized protease. Activation of calpain leads to degradation of complex I subunits during heart attack. Thus, our project is to study if ER stress activates mitochondria-localized calpain causing depletion of subunits of complex I that results in the age-induced mitochondrial dysfunction. Our recent study shows that chronic treatment using metformin can decrease the ER stress in aged hearts. Thus, we will study if chronic metformin treatment can protect complex I in aged hearts by decreasing mitochondrial calpain activation through attenuation of the ER stress. In addition, we will study if the restoration of mitochondrial function with chronic metformin feeding will decrease cardiac injury in the aged hearts following heart attack.</p>
<p>Dr. Sangeeta Shah, MD Associate Professor Department of Internal Medicine</p>	<p>Preventive Health, Middle School Education, Health awareness, Hypertension</p>	<p>“TEACH BP” It has been shown that children can affect their parents’ awareness of health issues and influence their behavior. The PI of this study is collaborating with faculty in the VCU School of Education and with educators in the Hopewell public school system to provide an age appropriate didactic and experiential learning program on the topic of hypertension for 4th graders. Elementary students will learn how to measure the blood pressure of their adult caregivers and advise them on when to seek medical evaluation. The ultimate goal is to raise community awareness for a very common health concern. A summer intern for this project will participate in the planning and execution of the TEACH BP program in Hopewell schools, as well learning methods of data collection</p>

		and analysis for this community engaged research project.
<p>Dr. Alex Lucas, PhD Instructor Department of Health Behavior and Policy</p>	<p>Cancer survivorship, Behavioral Interventions, Physical Activity, Quality of Life</p>	<p>“Behavioral Exercise Training to Reduce Cardiovascular Disease Risk in Men Undergoing Androgen Deprivation Therapy” The student will assist us as we develop and refine a behavioral exercise training intervention, that can be remotely delivered to men from medically underserved communities diagnosed with prostate cancer. The goal of this research is to refine a behavioral exercise intervention to buffer the negative sequelae of treatment with ADT. The student will gain experience with functional exercise testing, and creating materials that will be delivered remotely to support exercise training. Students may also be involved in the collection of qualitative interview data to help understand the different experiences of patients who are attempting to adopt exercise while living in rural or urban areas.</p>
<p>Dr. Anindita Das, PhD Associate Professor Department of Internal Medicine Division of Cardiology</p>	<p>Myocardial ischemia/reperfusion injury, Myocardial pre/post-conditioning, Chemotherapeutic-induced cardiotoxicity, mTOR signaling, Cancer biology, Inflammation, Apoptosis, microRNAs</p>	<p>Project 1: Role of miRNAs against myocardial ischemia/reperfusion injury in diabetic heart We are interested to examine the contributions of miRNAs to heart pathology in the diabetic context, including a polycistronic miRNA cluster, miR-17-92. Using cardiomyocyte-specific diabetic miR-17-92 knockout/Knock-in mice, we will scrutinize the critical role of miR-17-92 in the setting of acute myocardial infarction in diabetic mice.</p> <p>Project 2: Effect of Combination Therapy (with PDE5-mTOR Inhibitors) in Attenuation of Chemotherapy/immunotherapy-induced Cardiotoxicity. Chemotherapeutic agents and immunotherapy cause systemic inflammation and serious multi-organ toxicity, including cardiotoxicity in many cancer patients. Our lab is also interested to examine the effect of a novel combination therapy (with PDE5-mTOR inhibitors) in attenuation of chemotherapy/immunotherapy-induced cardiotoxicity.</p>

		Students can learn basic Cardio-Oncology research skills by performing experiments in vitro cellular and molecular biology (cardiomyocytes and cancer cells) as well as in vivo (mouse) cardiotoxicity models.
Dr. Salvatore Carbone, PhD Assistant Professor Department of Kinesiology & Health Sciences	diet, nutrition, heart failure, obesity, diabetes, fitness	“Unsaturated Fatty Acids to Improve Cardiorespiratory Fitness in Patients with Obesity and Heart Failure with Preserved Ejection Fraction” The project investigates the effects of a diet rich in healthy fats found in food like extra-virgin olive oil, nuts and avocado, in patients with obesity and heart failure. After received adequate training, the student will work with me directly on a daily basis to help with data collection, including collection of medical and nutritional data, and processing of blood samples, and will ultimately learn how to generate a research poster under my supervision.