Sponsor Projects for Pauley Heart Center
2022 Summer Undergraduate Research Fellowship

Sponsor Name	*Sponsor Research Areas*	*Project*
Dr. Justin Canada, PhD Assistant Professor Department of Internal Medicine Division of Cardiology	cardiopulmonary exercise testing, exercise physiology of heart failure, cardio-oncology, clinical research	**"Association of Exercise Stress variables with Non-invasive Cardiovascular Imaging Findings"** The coupling of exercise stress testing with non-invasive imaging modalities such as cardiac MRI, stress echocardiography, radionuclide imaging allows the opportunity to evaluate the structure and function of the heart both at rest and during dynamic movement. The project will identify and collect variables obtained during exercise stress and determine their associations with non-invasive imaging variables and cardiovascular risk status. The student will obtain a mentored-learning experience in these exercise stress procedures, identify a clinical question, collect identified variables to answer their clinical question, analyze results, and present a summary abstract of findings.
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.
Jennifer Jordan, PhD Assistant Professor Department of Biomedical Engineering	imaging, cardio-oncology, biomedical engineering	**"Association of Myocardial Perfusion with Fibrosis following Potentially Cardiotoxic Chemotherapy"** Cancer survivors who received potentially cardiotoxic chemotherapies are at an increased risk for heart failure and exercise intolerance. Many of these therapies are associated with myocardial fibrosis and recent work has shown that increased fibrosis around blood vessels in the heart may limit the ability to increase blood flow to the heart tissue during times of increased demand, such as exercise. In this project, the student will utilize image processing software to analyze cardiovascular MRI images to determine the association of myocardial fibrosis and perfusion deficits in a population of cancer survivors.
Moe Makkiya, MD Assistant Professor Department of Internal Medicine Division of Cardiology	Cardiac imaging, cardiac echocardiography, new software and innovation in cardiac imaging, valvular heart disease, hypertrophic cardiomyopathy.	**Speckle-Tracking Exercise Echocardiography with Novel Imaging Technique of Higher Frame Rate Echocardiography** is the primary imaging modality in evaluating heart disease given its feasibility, easy accessibility, low cost, and lack of ionizing radiation. Global longitudinal strain (GLS) derived from speckle-tracking echocardiography (STE) detects subclinical myocardial dysfunction and can predict cardiac outcomes, however its use is limited in exercise

		testing. The goal of this study was to demonstrate the feasibility of relatively high frame rate for STE exercise stress echocardiography. The student will trace the ventricles of the heart on the echo videos during rest and exercise, and perform strain images as well as build databases with obtained measurements.
Arturo Cardounel, MD Assistant Professor Division of Cardiothoracic Surgery Department of Surgery	heart disease, heart failure, molecular biology, endocarditis	The research focus of our laboratory is on developing novel therapeutic strategies for treating cardiovascular disease. One of our current projects involves creating tissue valves for treating patients with infections of their heart valves. Studies carried out in the laboratory will evaluate the performance and durability of a tricuspid valve replacement technique in pigs using autologous pericardium. The aims of the study will evaluate dynamic valve morphology, flow characteristics, hemodynamics, ventricular and atrial function and susceptibility to infection. Students participating in the study will participate in all aspects of the research including assisting with the surgical implantation, assessing function of the valve with ultrasound and carrying out molecular biology studies on the valve tissue at the end of the study.