

Prospective 2020 Child Health Focused Discovery Phase Research Projects			
Suggested next step - students should contact PI to discuss prospects			
<a href="mailto:stacy.heilman@emory.edu">Contact stacy.heilman@emory.edu with questions</a>			
Name	Research Discipline	Discovery Project Focus	Role for Student
<b>Clinical Research Projects</b>			
Evan Anderson, MD	Infectious Disease	We have ongoing clinical trials in vaccinology and the epidemiology of vaccine preventable diseases.	A Discovery student could be involved with a subset analysis of existing datasets that we have about infectious diseases. We also are actively enrolling into a study of older adults and pregnant women in which we are determining the burden of acute respiratory tract infection due to RSV. The medical student could be involved with approaching and enrolling subjects and data analysis of a substudy.
Nitya Bakshi, MD	Cancer/Blood Disorders	Sickle Cell disease, chronic SCD pain and outcomes, using databases for research. It could also include a qualitative research project if interested.	Data collection, analysis, writing of manuscript. Opportunities include being primary author on the manuscript. Additionally, if students would like to do so- there is potential for being involved in other research projects in the group based on student interest.
Laura Blackwell, PhD	Critical Care Neurology including autism Neuropsychology	Our lab focuses primarily on diagnostic biomarker discovery within the spectrum of traumatic brain injury (mild to severe) as well as the role in biomarkers in predicting functional outcomes in children.	We have several ongoing research projects that the student could be involved in, including enrollment, data collection, entry, and analysis. We would expect a poster presentation and manuscript at the end of the time period.
Tobey MacDonald, MD	Cancer/Blood Disorders	Clinical/translational research of patient outcomes after treatment for childhood brain cancer	Perform clinical research in pediatric brain tumor population using questionnaires and/or clinical data to link genetic testing and/or clinical data obtained from medical record to outcomes (e.g. neurocognitive, survival, response to treatment and treatment-related toxicity)
Tamara Miller, MD	Cancer/Blood Disorders	The goal of this study is to use electronic medical record data to capture and understand side effects of therapy for pediatric leukemia patients. In order to accomplish this goal, chart abstraction to identify a cohort and gold standard data set of side effects needs to be accomplished and sub-analyses to answer clinical questions need to be performed.	A Discovery student will be involved in performing chart abstraction to expand the cohort of leukemia patients and to identify side effects of therapy for pediatric cancer. The student will also be involved in analyzing the data in the cohort to answer clinical questions in pediatric oncology.
Claudia Morris MD	Emergency Medicine/Infectious Disease	Adolescents and young adults ages 13-29 years have experienced increases in HIV diagnosis rates. Given the importance of early diagnosis to allow for prompt initiation of antiretroviral therapies to slow or stop disease progression and reduce transmission, the Centers for Disease Control and Prevention (CDC) recommends routine universal HIV screening for everyone over age 13 years in healthcare settings. This study will be a pilot of universal HIV screening and aims to 1) assess the feasibility and acceptability of universal HIV screening in a pediatric ED and 2) assess the prevalence of new adolescent HIV diagnosis made through universal HIV screening in a pediatric ED in a region with high HIV prevalence.	Discovery Student would approach patients in the Hughes Spalding emergency department > 13 years for HIV screening. Prevalence of new ED HIV diagnosis during the 5-month pilot study will be determined.

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Name	Research Discipline	Discovery Project Focus	Role for Student
<b>Outcomes Research Projects</b>			
Claudia Morris MD	Emergency Medicine	Gun violence: Aim 1: Determine healthcare utilization after pediatric firearm injury by examining Pediatric Health Information Systems (PHIS) database to ascertain the overall hospital charge, length of stay, fatality rate, events and admission placement during hospitalization (intensive care unit vs inpatient floor vs operating room) in comparison to victims of motor vehicle accidents. Aim 2: Determine if recurrent pediatric healthcare utilization is increased comparatively for patients who are victims of firearm injury compared to victims of motor vehicle injury over a 2-year period from injury.	Become familiar with Pediatric Health Information Systems (PHIS) database, extrapolate data to answer study questions. Deliverables will be data for abstract and manuscript submission.

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**Basic Science and Translational Research Projects**

Ann Chahroudi, MD, PhD	Infectious Disease	Studies of SIV persistence in infant rhesus macaques.	Role: sample processing, data acquisition and analysis Deliverables: co-authorship on a manuscript
Satheesh Chonat, MD	Cancer/Blood Disorders	My research broadly focusses on sickle cell disease, complement mediated hemolytic anemias and red blood cell membrane/enzyme disorders. This includes laboratory based and translational research in collaboration with other subspecialties.  Sickle cell disease (SCD) is a life-threatening blood disorder that affects millions of people worldwide, causing debilitating effects from acute painful episodes to chronic organ dysfunction, limiting quality of life and expectancy. Acute chest syndrome is one such acute complication, which remains a leading cause of death in patients with SCD, and currently the only available treatments include transfusions, antibiotics and oxygen therapy. Our lab has developed a novel pre-clinical animal model of acute lung injury in sickle mice. Potential project can focus on the correlation of biomarkers of complement-mediated acute lung injury in these mice and patients with SCD.	The discovery student will be involved in helping with mouse and <i>in vitro</i> experiments for the proposed project. This project can be completed in a timely manner as samples from humans are already collected and stored. Student will be mentored to analyze the data and prepare for student presentations and potential publications.
Erik Dreaden, PhD	Cancer/Blood Disorders Cardiac/Cardiology Rheumatology Transplant	Engineered Cytokines for CAR T-Cell Manufacturing	Chemical modification of recombinant proteins. Immune cell culture and immunophenotyping. Flow cytometry.
Erik Dreaden, PhD	Cancer/Blood Disorders Cardiac/Cardiology Rheumatology Transplant	Optical Control of Immune Cell Chemotaxis	Chemical modification of chemokine proteins. In vitro immune cell chemotaxis assays. Protein characterization. Live cell microscopy. Flow cytometry.
Ashwanth C. Francis, PhD	Infectious Disease	This project will elucidate the mechanisms of HIV-1 transport in the nucleus of living cells with an overarching goal to understand the selection of integration sites that lead to viral latency.	The student will learn and apply cutting-edge techniques including molecular cloning, recombinant virus generation, live-cell imaging and apply software mediated tracking of single HIV-1 virus in the nucleus of living cells to define the location of virus integration. The outcome of this research opportunity will impact the field of HIV-1 replication and latency by improving our understanding of HIV-1 integration site selection.
Grace Gombolay, MD	Neurology including Autism	The clinical course and risk factors for relapses in pediatric neuroimmunological diseases are often unknown. This project would examine those features in any of the neuroimmunological diseases including multiple sclerosis, optic neuritis, anti-MOG antibody demyelinating diseases and anti-NMDA receptor autoimmune encephalitis.	There are several opportunities for this project including focusing on clinical features in a particular disease or laboratory basic science work including ELISAs and flow cytometry. The goal would be to submit this as an abstract and then as an original research article.
Steven Goudy, MD	Surgery	Identifying regenerative approaches to improving oral cavity wound repair in a cleft palate model	The discovery student will be able to identify critical regulators of the oral cavity wound healing pathway and test regenerative strategies to repair the oral cavity.
Steven Goudy, MD	Surgery	Identifying the role and requirement of TgfBR3 during osteoblast development and identifying novel ways to deliver TgfBR3 to induce bone formation in vivo.	The discovery student would help identify the role of the TgfBR3 during mesenchymal stem cell osteoblast development and test bone regenerative strategies in TgfBR3 delivery using osteoinductive scaffolds.
Steven Goudy, MD	Surgery	Develop immunoregenerative strategy to improve oral cavity wound healing in a cleft palate model.	Determine the role and requirement of macrophages, neutrophils and T cells during oral cavity wound healing and helping identify drugable targets.
Steven Goudy, MD	Surgery	Develop bone regenerative strategies to repair bone loss in children.	Perform surgical repair of bone loss with delivery of bone inductive agents and identify down stream targets.
David Ku, MD, PhD	Cardiac/Cardiology Surgery	Determine the potential for heart attack and stroke by testing patient blood in a microfluidic system. Guides anti-platelet therapy.	IRB approved. Plan to start study at Grady in the next few months. Collect patient blood samples. Test blood using microfluidics. Analyze for statistical significance.

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**Basic Science and Translational Research Projects (continued)**

Tobey MacDonald, MD	Cancer/Blood Disorders	Preclinical testing of novel anti-cancer drugs against brain cancer and cancer metastasis	Perform standard assays of drug testing for efficacy against pediatric brain tumors with goal of development of drug to clinical trial
Tobey MacDonald, MD	Cancer/Blood Disorders	Link genomic/proteomic/metabolomic biomarkers to regulation of metastasis of childhood brain tumors	Collaborate with investigators at Emory and/or GA Tech to profile patient-derived tumor specimens from pediatric brain tumors with respect to genomic/proteomic and metabolic markers associated with metastasis
Greg Melikian, PhD	Infectious Disease	1. Ebola entry inhibitor structure-activity study.	Learn pertinent techniques and carry out experiments. Analyze and present the results.
Greg Melikian, PhD	Infectious Disease	Control of antiviral activity of interferon-induced transmembrane proteins	Learn cell biology, virology and biochemistry techniques, perform experiments and analyze data.
Greg Melikian, PhD	Infectious Disease	Testing and validation of Ebola virus entry inhibitors using a pseudovirus system	Learn relevant techniques, perform experiments and analyze data.
CK Qu, PhD	Cancer/Blood Disorders	Anti-tumor immunity in Noonan syndrome. Addressing this knowledge gap will lead to a better understanding of the mechanisms underlying the malignant progression in Noonan syndrome, which may ultimately benefit the rational design of a more effective therapeutic strategy for the malignancies developed in Noonan syndrome.	The student will examine developmental and functional changes in the mouse model of Noonan syndrome and potentially patient specimens.
Stephanie Sherman, PhD	Cardiac/Cardiology Neurology including Autism	The project focus would be to discover factors that explain the variability/severity of outcomes associated with Down syndrome, including congenital heart defects, level of cognition and behavior. Data have been collected from about 500 individuals Down syndrome and	The student will be involved in all aspects of the project, depending on their interest. The primary focus will be data analysis of the current dataset, but the student can also consider using eMR data from Emory. Irrespective, the student needs to have quantitative skills. The goal will be to complete data analyses of a specific hypothesis and to have results that can be used in a submitted paper.
Eric Sorscher, MD	Cancer/Blood Disorders/Cystic Fibrosis	Identifying genes that mediate escape of malignant tumor cells from chemotherapy. Studies of genes responsible for healthy aging.	A review of literature concerning genes that mediate stress response in cancer cells, and experiments to determine significance of these pathways in growing tumors and healthy aging. The project will include opportunities to learn standard molecular techniques (tumor cell culture, evaluation of mRNA levels, Western blot analysis; development of high throughput drug screening is also possible) – with a goal to better understand tumorigenesis and its relationship to cellular senescence.
Eric Sorscher, MD	Cancer/Blood Disorders/Cystic Fibrosis	Effect of common therapies given to cystic fibrosis patients (e.g., azithromycin) on expression of the gene responsible for the disease.	This project will include an opportunity to learn basic molecular techniques such as epithelial cell culture, Western blot analysis, and electrophysiology.
Dan Wechsler, MD, PhD	Cancer/Blood Disorders	Our lab is investigating the role of the CRM1 nuclear export protein in infant and childhood leukemias. We use state-of-the-art cell and molecular biology techniques to study protein-protein interactions and the role of different genes/proteins in leukemogenesis.	The student will work on one of the subprojects that identify and characterize candidate proteins that interact with CRM1 and proleukemic HOXA genes, using mouse and human cell lines.
Bill Wuest, PhD	Infectious Disease	We utilize organic chemistry to make new antibiotics with unique modes of action.	Student would synthesize compounds and perform antibiotic assays.