

2019 MS1 INTRO Summer Research Program

List of Mentors with projects

Agmon, Aric, Ph.D., Department of Neuroscience

- “Selective Vulnerability of Somatostatin-Containing Interneurons in Early Alzheimer’s Disease” Using a mouse model of familial (early-onset) AD, we will examine the electrophysiological, biochemical and morphological properties of these interneurons in ex-vivo cortical brain slices, and will record sensory-elicited activity of these neurons in awake, head-fixed animals. The student will have an opportunity to participate in experiments and assist in data analysis.

Boone, Brian, M.D., Surgical Oncology/Surgery/Microbiology, Immunology and Cell Biology

- “Targeting Neutrophil Extracellular Traps (NETs) to Reverse Cancer Associated Hypercoagulability” Neutrophil extracellular traps (NETs) occur when activated neutrophil release their intracellular contents, including DNA, histones and tissue factor into the circulation. This translational research project will study the role of NETs in hypercoagulability and thrombosis in pancreatic cancer and evaluate the effectiveness of inhibitors of an enzyme that is required for NET formation, PAD4 using novel measures of hypercoagulability.

Carr, Michele, DDS, M.D., Ph.D., Pediatric Otolaryngology

- “Pediatric Otolaryngology Operative Outcomes” Our research involves looking at outcomes of ENT surgery in children. This includes surveying parents, reviewing databases, and the opportunity to shadow Otolaryngology physicians in clinic and OR.
- “Wide Band Tympanometry in Children with Otitis Media” This project will determine if a new test is capable of distinguishing between types (serous, mucoid or purulent) of middle ear effusions in children. Patients will be recruited in the operating room, data collected and analyzed in order to prepare a manuscript.

Dietz, Matthew, M.D., Department of Orthopedics

- “The spatial relationship of biomarkers and fluorescence in a prosthetic joint infection (PJI) model” This project will evaluate inflammatory biomarkers through a multiplex panel assay in an in vivo PJI model. There will also be an emphasis on fluorescence and vascularity surrounding the tissue beds using laser assisted fluorescent angiography.

Du, Wei, M.D., Ph.D., Basic Pharmaceutical Sciences

- “Collaboration between DNA damage and immune responses in leukemic stem cell emergence and expansion”
- “Hematopoietic stem cell polarity in bone marrow failure and leukemia”
- “PARP-NHEJ interaction in cancer drug resistance”

Hayanga, Heather, M.D., Anesthesiology

- “Bystander intervention prior to arrival of emergency medical services: a needs assessment for education and training and reported willingness to respond”

Hayanga, J.W. Awori, M.D., Cardiovascular and Thoracic Surgery

- “Clinical outcomes in the use of extracorporeal therapies as a rescue option in contemporary practice”

Hollander, John, Ph.D., Exercise Physiology

- “Dysregulated Bioenergetics in the Diabetic Heart” The diabetic heart displays disruption in bioenergetics as a result of mitochondrial dysfunction and is a contributing factor to the enhanced propensity for subsequent cardiac events. Projects in our laboratory focus on addressing mitochondrial dysfunction in the diabetic through the development of therapeutic interventions designed to lessen bioenergetic disruption and identify biomarkers for disease progression

Ivanov, Alexey, Ph.D., Department of Biochemistry

- “Breast cancer cell dissemination, dormancy and reactivation at the metastatic site in mouse xenograft model”
- “Negative control of EMT and metastasis by epithelial-specific transcription factors”
- “Role of the TGF-beta pathway in EMT and drug resistance of triple-negative breast cancer”

Johnston, Richard, Ph.D., Pathology & Physiology, *NIOSH/CDC

- “Obesity and Asthma: pro-inflammatory, adipocyte-derived hormones, produced in excess by the adipose tissue of the obese, enhance pulmonary responses to asthma triggers” To that end, we are using neutralizing antibodies, recombinant proteins, and genetically-altered mice to identify the role of one or more adipocyte-derived hormones in obesity-induced asthma exacerbations. These studies include the measurement of airway responsiveness to bronchoconstrictors, pulmonary injury and inflammation, lung and adipose tissue gene expression, and specific immune cell populations in the lung.”
*Requires approval to enter NIOSH that takes 6 weeks for approval

Kolodney, Michael, M.D., Ph.D., Department of Dermatology

- “Use of reverse transcriptase qPCR to count tumor cells circulating in blood” Late stage tumors usually shed circulating tumor cells (CTCs) that can be detected in peripheral blood. The proposed project uses this novel approach to study the response of glioblastoma to treatment.

Lewis, James, Ph.D., Department of Neuroscience

- “Neuroimaging of sensory perception and cognition in the human brain.” Mechanisms of multisensory and hearing perception, and spoken language processing, using either evoked response potential (ERP) methods or 3 Tesla functional magnetic resonance imaging (fMRI).
- Identifying differences in functional (fMRI) and anatomical circuits for multisensory processing in individuals with versus without autism spectrum disorder
- Collect and analyze psychophysical measures of temporal binding windows of individuals with autism or traumatic brain injury
- fMRI study of brain networks for processing natural sounds and spoken language in English and Chinese

- Study of central nervous system, using magnetic resonance imaging (MRI) and physiological measures, resulting from transcutaneous electrical neural stimulation (TENS) as a treatment therapy.

Lockman, Paul, Ph.D., Basic Pharmaceutical Sciences, Translational Research, Experimental Therapeutics

- “The novel imaging techniques to simultaneously measure drug uptake tumor permeability in brain metastases of breast cancer”
- “The development of new formulations and or drug delivery strategies to increase chemotherapeutic concentrations in brain metastases”
- “Developing strategies to inhibit cancer cells from entering into brain tissue”

Mattes, Malcolm, M.D./Ph.D., Radiation Oncology

- We can tailor a radiation oncology-oriented research project to the students' interest. One potential project that a student may be interesting in pursuing is retrospectively evaluating patterns of disease progression among lung cancer patients on immunotherapy, in order to determine sites of disease that may be best targeted with radiation therapy in order to maximize the systemic response.

Morris, Ann, M.D., Radiation Oncology

- “Cultural Perceptions of Cancer and Cancer Care in Appalachia”
Our research group uses mixed methods, including (but not limited to) questionnaires, semi-structured interviews, surveys and demographic data to develop a more holistic picture of how, when and why patients in Appalachia choose to seek cancer-related care and how those patterns may drive regional cancer disparities. This work may be of particular interest to students interested in the social determinants of health, narrative medicine, population-based research and/or refining their skills in history taking.

Olfert, Mark, Ph.D., Exercise Physiology/Department of Physiology, Pharmacology & Neuroscience

- “Cardiovascular Health effects of Vaping: Are they really safer?”

Patel, Rusha, M.D., Otolaryngology/Head & Neck Surgery

- “Examining lymph node yield from submandibular gland sparing vs traditional submandibular gland resection surgery for elective neck dissection in oral cavity cancer”
- “Researching implicit bias in the treatment of head and neck cancer patients” - this would involve the design and implementation of an implicit bias test (IBT) for health care providers who see cancer patients.

Robinson, Cory, Ph.D., Microbiology, Immunology, and Cell Biology

- Obesity increases the risk of noncommunicable diseases such as diabetes, hypertension, cardiovascular disease, and cancer, but susceptibility or exacerbation of communicable diseases has not been thoroughly addressed. A research project in the laboratory explores a possible link with obesity-related parameters such as chronic inflammation and microbiome on enteric pathogen colonization and severity of infectious bacterial diarrhea.

Rudisill, Toni, Ph.D., Department of Epidemiology

- “Transportation safety and health policy research”

Sedney, Cara, M.D., Department of Neurosurgery

- “Impact of spine-health related internet use on pain catastrophizing in new referral patients at a spine clinic” (prospective assessment)
- “Effect of unitized cervical plating systems on post op outcomes” (retrospective)
- “Validation of a surgical scar rating system for posterior cervical surgery” (prospective)
- “Exploration of Appalachian spinal cord injured patients use of the internet and social media” (prospective)
- “Outcomes of low lumbar burst fractures” (retrospective but with some patient contact)

Tucker, Eric, Ph.D., Department of Neuroscience

- “Autism Spectrum Disorder (ASD) has many causes, and identifying specific genetic mutations that can predispose individuals to the disease will help improve treatment efforts. In order to uncover novel genetic features of ASD, we will survey medical records of patients from WV to identify individuals with Copy Number Variations (CNVs), and attempt to link these CNVs to patient phenotypes.”

Umer, Amna, Ph.D., Department of Pediatrics

- “Examining perinatal risk factors and infant outcomes.”

Vona-Davis, Linda, Ph.D., Department of Surgery

- “Tumor-associated adipocytes support breast cancer in obesity”

Yakovenko, Sergiy, Ph.D., Human Performance, Exercise Physiology

- “Man-machine interfaces for performance and rehabilitation using wearable sensors” The research project will develop the use of wearable technology to monitor human movement in real-time. These signals will be further processed using physiological and statistical models to quantify performance in the context of rehabilitation.