BCRFA Funding in Action

Listed below are summaries of projects receiving funding from the Breast Cancer Research Foundation of Alabama (BCRFA) investment of $1,050,000 in breast cancer research for 2021. Since its inception in 1996, the BCRFA has raised $10.8 million to fund innovative breast cancer research to help diagnose, treat, prevent, and eradicate the disease. All funds raised stay in the state of Alabama, but the research has a global, life-saving impact.


Randall Davis, MD


Suzanne Lapi, PhD


Erica Stringer-Reasor, MD

Advancing the Prognostic, Immunotherapeutic, and Imaging Potential of FCRL6 in Breast Cancer ***O'Neal Comprehensive Cancer Center at UAB***

Immunotherapy is having a revolutionary impact on the treatment of breast cancer, but unfortunately, tumors in women treated with these drugs eventually adapt to the therapy and relapse by outsmarting the immune system. In these BCRFA-funded studies, we are studying a receptor on immune cells that may be targeted to overcome shielding resistance by tumors, advance visualization of immune cells at tumor sites, and could serve as a new prognostic market of tumor immunity in breast cancer patients.


Mick Edmonds, PhD

A Novel SRC Inhibitor for the Treatment of Metastatic Breast Cancer

O'Neal Comprehensive Cancer Center at UAB

Metastatic disease is the leading cause of death for persons with breast cancer in Alabama and the nation. Genomic analyses of breast tumors obtained from women in Alabama have allowed for us to discover a new gene that is shut off in breast cancer. We've found that reactivation of this gene prevents breast cancer cells from metastasizing and propose in this BCRFA Scholar Proposal to test if this gene can be targeted to cure metastatic breast cancer.


Xu Feng, PhD


Douglas Hurst, PhD

RANK Signaling Pathways in Breast Cancer Development

O'Neal Comprehensive Cancer Center at UAB

RANKL is a protein that was identified in the late 1990s as a critical factor regulating the formation of osteoclasts, the body's bone-resorbing cells, and immune cell development and survival. Studies revealed that RANKL plays roles in breast development, progesterone-induced breast cancer and Brca1 mutation-induced breast cancer. Our long-term goal of this project is to carry out further studies to gain a better understanding of how exactly delineate RANKL promotes breast cancer development with an aim of developing novel drugs for preventing breast cancer.


Selvarangan Ponnazhagan, PhD

Combinatorial Genetic Immunotherapy and RANKL Antagonism for Breast Cancer

O'Neal Comprehensive Cancer Center at UAB

Cancer immunotherapy activates a patient's own immune system to recognize and kill tumor cells. However, as the tumor grows, it secretes chemicals which block the immune cells from attacking them. In addition to tumor cells, immune cells and bone corroding cells called osteoclasts in the tumor environment also respond to these chemicals and adapt themselves to helping the growing tumor contributing immune suppression and bone damage. Effective therapies to cure metastatic breast cancer should simultaneously address these pathologies. Toward this ultimate goal, we propose to test unique combination therapies that are biologically-driven and have shown promise in preliminary studies. We will adopt a genetic antibody engineering approach to establish a stable therapeutic strategy to overcome current limitations in breast cancer immunotherapy.


Troy Randall, PhD


Erica Stringer-Reasor, MD


Ahmed Elkhanany, MD

Identifying Neo-Antigen-Reactive T Cells in Breast Cancer Using Organoid Cultures

O'Neal Comprehensive Cancer Center at UAB

This project focuses on how tumor organoids can be best used in personalized medicine approaches to treat breast cancer by making organoids from TNBC and HER2+ breast cancer, identifying neoantigens and tumor reactive t-cells, and helping establish a personalized medicine pipeline in which organoids can be used to test drugs, identify tumor-reactive T cells, develop adoptive cell therapies, and make personalized therapeutic cancer vaccines.

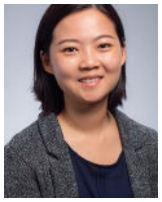

Rajeev S. Samant, PhD


David A. Schneider, PhD

Unraveling a Novel Vulnerability of Breast Cancer

O'Neal Comprehensive Cancer Center at UAB

The nucleolus is centrally involved in the maintenance of cellular homeostasis under normal, stress, and disease conditions. It is a vital component in the ability of a breast cancer cell to meet and beat the unusual survival demands caused during the spread of the breast cancer cells to cause metastasis. Hypoxia (lack of oxygen) within a tumor mass is a well-known stress factor associated with poor prognosis and is responsible for increased angiogenesis, invasiveness, and therapeutic resistance. Hypoxia also increases the numbers and activity of nucleoli of breast cancer cells. Our proposed work will uncover novel drug targeting opportunities hidden in the nucleolus to unravel new strategies to mitigate metastatic progression.


Nan Cher (Flo) Yeo, PhD

Understanding WRN-Dependent Pathways to Regulate Genome Stability in TNBC

O'Neal Comprehensive Cancer Center at UAB

The Werner syndrome RecQ DNA helicase (WRN) plays a critical role in regulating cancer genome stability. Using a CRISPR-based functional genomic screen approach, we are interested in identifying genes and pathways involved in the WRN-dependent regulation of cancer cells. Our preliminary data suggest that WRN may interact with BRCA1 to regulate replication-transcription conflicts associated with genomic instability, which we seek to investigate.


Corinne Augelli-Szafran, PhD


Omar Moukha Chafiq, PhD


Rebecca Boohaker, PhD

Development of Novel Clofarabine Analogs for Breast Cancer Therapy—BCRFA Impact Award *Southern Research*

The goal of this project is to develop a new class of potent anti-breast cancer analogs of Clofarabine, an FDA-approved drug discovered by Southern Research, for treating relapses acute lymphoblastic leukemia in children, and to determine the mechanism by which these new analogs inhibit breast cancer cell growth and proliferation.


Karim Budhwani, PhD, DLA

Personalized Oncology Efficacy Test (POET) - BCRFA Innovation Award *CerFlux*

Nearly 70% of breast cancer patients are treated with what turn out to be ineffective first-line therapeutics, because those drugs do not match the patient's tumor, imposing a substantial physical, emotional, and financial burden. This is because tumors differ greatly from patient to patient. But, due to lack of clinically relevant, personalized efficacy evaluation tools, treatment is based on generalized parameters. There is a critical, unmet, and urgent need to match the right treatment to the right patient prior to treatment, CerFlux is developing innovative technology to bridge this gap by rapidly matching patient tumor tissue with various therapeutics simultaneously—before treatment—to identify the right treatment for each patient on an individualized basis. This promising innovation, which is fundamentally better than the current approach, could transform breast cancer treatment and make a significant impact on the lives of millions of patients worldwide.


Natalie Gassman, PhD


Michelle Schuler, PhD


Marie Miguad, PhD

Targeted Nanoparticle Delivery to Reduce STAT3 and Improve Cell Killing in Triple Negative Breast Cancer *Mitchell Cancer Institute at University of South Alabama*

Triple negative breast cancer (TNBC) is an aggressive subclass of breast cancer that lacks the molecular targets used to treat most breast cancers. The signal transducer and activator of transcription 3 (STAT3) is highly activated in TNBC and is associated with high metastatic risk and poor survival. We have designed a targeted peptide-based nanoparticle to inhibit STAT3 in TNBC cells to increase cell killing and reduce metastases, offering a unique molecular target for TNBC to enhance breast cancer survivorship.


Nancy Merner, PhD


Erica Stringer-Reasor, MD

Breaking Research Participation Barriers in Alabama – An African American Breast Cancer Genetics Study *Auburn University and O'Neal Comprehensive Cancer Center at UAB*

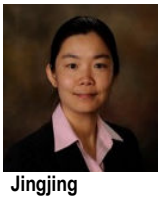
African Americans (AA) are underrepresented in medical research studies, which has negatively impacted the health of this population. Lower research participation exists for many reasons, including mistrust of researchers (due to a lack of historical research integrity), lower socioeconomic status, decreased access to/awareness of facilities, sociocultural factors, and low levels of education/health literacy. In studying hereditary breast cancer, the team has established recruitment protocols to reach underrepresented individuals in Alabama and engage them in a virtual research study.


Nancy Merner, PhD


Clayton Yates, PhD

The Identification of Genetic Risk Factors Associated with Hereditary African American Breast Cancer *Auburn University and Tuskegee University*

African American women have been underrepresented in hereditary breast cancer research since the discoveries of BRCA1 and BRCA2; thus, the role that inherited risk factors play towards African American breast cancer needs to be thoroughly investigated. By studying the Alabama Hereditary Cancer Cohort, which was established to reach underrepresented individuals in Alabama for cancer genetics research, this project aims to identify and functionally study African American breast cancer genetic risk factors through whole-exome sequencing and in vitro CRISPR-Cas9 genome-editing, respectively.


Jingjing Qian, PhD

Reducing Breast Cancer Risk in Alabama - The Role of Medications *Auburn University*

This project focuses on describing how medications that may reduce breast cancer risk (i.e., selective estrogen receptor modulators and aromatase inhibitors) have been prescribed in Alabama, and examining their impact on breast cancer risk among women in Alabama. Study findings would help clinicians understand potential risk and benefit of these medication on breast cancer diagnosis.


Robert Sobol, PhD

Exploiting a Novel, Live-Cell, Real-Time Poly-ADP-Ribose Probe for Discovery of PARG Inhibitors *Mitchell Cancer Institute at University of South Alabama*

Breast cancers show genetic defects in the capacity to repair damage to the genome, most commonly found in BRCA-mutant tumors. BRCA mutant tumors are highly responsive to a new class of drugs called PARP-inhibitors that function by blocking the activity of the enzyme PARP1, a cellular machine that responds to the stress of robust replication seen in a cancer cell. A new target has emerged in the enzyme PARG, a related cancer target that promotes robust cancer cell replication by removing the protein tag (PAR) created by PARP1. Our lab has developed a novel fluorescent probe (RealPAR) that can be used to screen for inhibitors of PARG directly in cancer cells. Our goal is to use RealPAR to screen a small molecule diversity library of drug-like small molecules that can be used to inhibit PARG and test for the ability to selectively kill BRCA2 mutant cancer cells.