Catalyst Awards

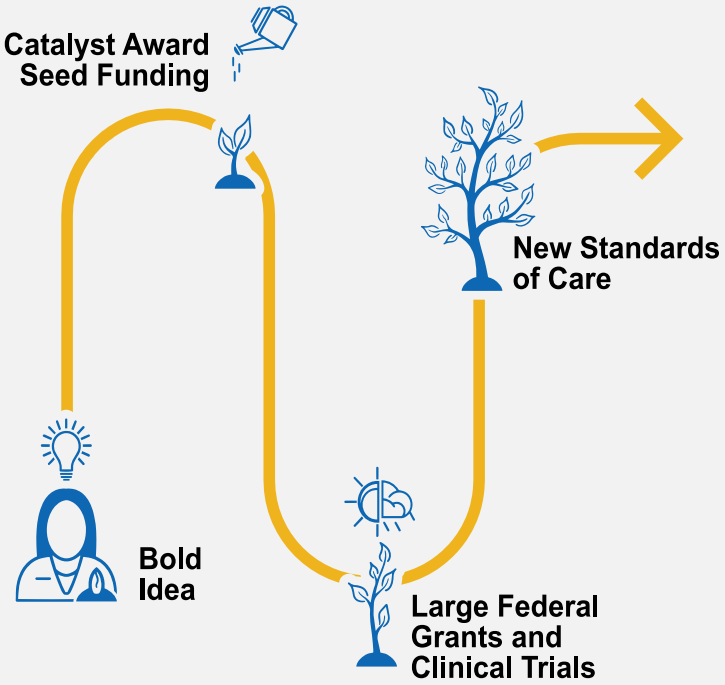
Alvin J. Siteman Cancer Center

Bold Ideas, Bright Future

Can dietary changes affect breast cancer outcomes? How can tailored tobacco programs reduce lung cancer risk in high-need communities? How does stress affect colorectal cancer cells? These are just a few of the questions being asked– and answered– by Siteman researchers.

Groundbreaking cancer advancements start with a single idea—an exciting discovery with the potential to transform prevention, diagnosis, and treatment. Federal grants do not always support the early-stage research needed to move these promising ideas forward, but private philanthropy bridges this gap, providing essential seed funding.

Siteman created the Catalyst Awards to ignite the spark that will lead to the next breakthrough in cancer prevention, diagnosis, and treatment.



Help propel the next big innovation in cancer care.

The Catalyst Awards are funded entirely by charitable donations to the Siteman Annual Fund. With your help, we can advance further and faster. On behalf of the many individuals who will benefit from your generosity, thank you.

Visit giving.washu.edu/Catalyst2025 to give.

For more information, contact our team at friendsofsiteman@wustl.edu or 314-935-4725.

SITEMAN CANCER CENTER

WashU Medicine | BJC HealthCare

2025 Awardees

BREAST CANCER

Carmen Bergom, MD, PhD
Assistant Professor
Department of Radiation Oncology

Title: Favorably Modulating the Breast Cancer Tumor Microenvironment by Utilizing Dietary Interventions

Summary: Radiation therapy is an important treatment for breast cancer, but tumors can still return, and not all patients respond the same way. Simple dietary strategies like intermittent fasting—alternating between periods of eating and fasting—may help improve how well radiation works. In a mouse model of breast cancer, combining intermittent fasting with radiation slowed tumor growth more than radiation alone and changed the tumor's surrounding immune cells in ways that could enhance treatment. Fasting also altered how tumors use branched-chain amino acids, nutrients found in many proteins, which may help reprogram the immune environment to respond better to therapy. This work will build on these findings to pinpoint how changes in diet affect tumor metabolism and immunity, laying the groundwork for future dietary or drug-based strategies to make radiation more effective and improve outcomes for patients.

Andrew Davis, MD
Associate Professor
Department of Medicine
Principal Investigator

Emily Podany, MD
Assistant Professor
Department of Medicine
Co-PI

Title: Impact of social determinants of health on targeted treatment use in patients with metastatic breast cancer

Summary: Black patients are more likely to be diagnosed with breast cancer at a later stage and to die from the disease, with this gap especially pronounced in North St. Louis County. Prior work showed that Black women with metastatic breast cancer and certain tumor mutations are much less likely to receive a targeted oral therapy called a PI3K inhibitor. The reasons for this gap are unclear, and it is unknown whether similar disparities exist for other targeted treatments. This project examines how social factors—such as access to transportation, housing, and financial security—affect the use of these medicines. Since July 2023, more than 500 patients in North County have completed a 19-question social determinants of health survey, with results linked to their medical records. The study will expand to other Siteman breast cancer clinics to identify barriers that limit access to new therapies and use this knowledge to design, test, and share solutions that improve treatment equity nationwide.

HEMATOPOIETIC DEVELOPMENT AND MALIGNANCY

Ju-Fang Chang, PhD
Assistant Professor
Department of Medicine
Division of Oncology

Title: Protein Engineering to Enhance CAR-T Cell Function in Treating Blood Cancers

Summary: CAR T-cell therapy uses the body's own immune cells to find and destroy cancer and has been very effective for some blood cancers like leukemia and lymphoma. But many types remain difficult to cure because the modified T cells often lose strength before the cancer is fully eliminated. One reason is that they may not receive enough "co-stimulation" signals—molecular boosts that help them stay active. A key signal, called 4-1BB, is built into many current CAR designs, but evidence shows it could work better. This project will create a new, optimized version of 4-1BB to help CAR T cells last longer and work more effectively, with the goal of improving treatment for blood cancers that do not respond well to current therapies and advancing the design of future CAR T-cell treatments.

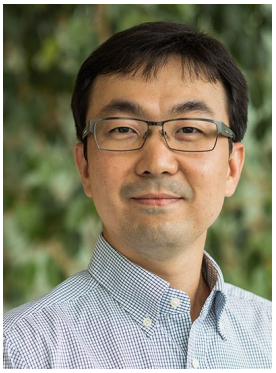
MECHANISMS OF CANCER BIOLOGY

Xue-Yan He, PhD
Assistant Professor
Department of
Cell Biology & Physiology

Title: Decoding Stress-Induced Tumor Innervation in Colorectal Cancer

Summary: Stress not only affects mental health but can also influence cancer progression. It is linked to inflammatory bowel disease (IBD), a major risk factor for colorectal cancer (CRC), which is one of the most common and deadly cancers in the United States. A particularly aggressive form, colitis-associated CRC (CAC), develops in more than 20% of IBD patients over 30 years. Stress can damage the gut wall, causing inflammation and genetic changes, but its role in CAC is not well understood. Recent work in a mouse model showed that stressed mice developed more and larger tumors, along with increased nerve growth in tumors—a finding also tied to poorer survival in human CRC patients. This study will investigate how stress-related nerves in the tumor environment drive CAC, identifying nerve types and their role in tumor growth. The goal is to uncover new ways to treat aggressive CAC by targeting the interactions between nerves and cancer.

ONCOLOGIC IMAGING



Gyu Seong Heo, PhD
Instructor
Department of Radiology
Principal Investigator

Kian-Huat Lim, MD, PhD
Professor
Department of Medicine
Division of Oncology
Co-PI

Title: Novel peptide-drug conjugate for PDAC targeted therapy

Summary: Pancreatic ductal adenocarcinoma (PDAC) is one of the deadliest cancers and is projected to become the second leading cause of cancer deaths in the U.S. Because it is hard to detect early and current treatments are often ineffective, most patients with advanced PDAC live less than a year after diagnosis, and the long-term survival rate is nearly zero. This project is developing a new treatment approach using peptide-drug conjugates (PDCs)—drugs linked to small proteins that guide them directly to cancer cells. The PDC will target a protein called CD163, found in abundance on immune cells surrounding PDAC tumors, to deliver the drug more precisely and reduce side effects. A small amount of radioactive copper will be included so doctors can track the drug's location in the body with imaging, confirming it reaches the tumor. This early work will lay the foundation for more effective, targeted treatments for PDAC.

Allan Thomas, PhD
Assistant Professor
Department of Radiology
Principal Investigator

Richard Laforest, PhD
Professor
Department of Radiology
Co-PI

Title: Enhancing Theranostics with Patient-Derived Phantoms and AI-Driven Imaging Corrections

Summary: Theranostics combines medical imaging and therapy—often for cancer—to select the best patients for treatment, guide how therapy is delivered, and track its success. Nuclear medicine imaging is a key part of this process, helping confirm that treatment is targeting the right place in the right amount. While modern imaging methods work well, they are not perfect, and errors can make it harder for doctors to make confident decisions. This project will use 3D-printed models of tumors and organs, based on real patient scans, that can be filled with the same radioactive materials used in care. These "phantoms" will make it possible to test and refine imaging approaches in a controlled setting. They will also be used to train artificial intelligence tools to detect and correct errors in patient images, improving the accuracy of measurements doctors use to assess treatment success. By making imaging more reliable, this work will help match patients with the most effective treatments and design therapy plans that give every patient the best possible outcome.

PREVENTION AND CONTROL

Alex Ramsey, PhD
Associate Professor
Department of Psychiatry

Title: Community-engaged scale-out of tailored tobacco treatment (Communi-T3)

Summary: In some Missouri communities, nearly one in three adults smoke, and lung cancer rates are far higher than the national average. While personalized tobacco treatments in primary care exist, they have not reached the communities most affected by smoking-related cancer. People are more motivated to quit when given information based on their genetics and nicotine metabolism—showing their personal risks, expected benefits, and the treatments most likely to work with the fewest side effects. Currently, this tailored approach is only available to patients whose primary care providers participate in the program, leaving out many who could benefit most. This project aims to bring these personalized tools directly into communities with the greatest need by testing different delivery methods—such as 2-1-1 helplines and mobile outreach vans—and working closely with community partners to design effective, accessible programs. The goal is to connect more people with treatments that are tailored to them, ultimately reducing the burden of smoking-related cancers.

Michelle Silver, PhD, ScM
Assistant Professor
Department of Surgery
Division of
Public Health Sciences

Title: Understanding Gaps in Lung Cancer Survivorship Care

Summary: Lung cancer is the leading cause of cancer death in the U.S., but earlier detection, better treatments, and prevention efforts have led to more people surviving the disease. These survivors need ongoing, well-coordinated care to monitor for recurrence and for new lung cancers, which occur in about 10% of survivors. Follow-up is especially difficult for people in rural or underserved urban areas, who face barriers such as limited access to health care, fewer specialists, socioeconomic challenges, and higher smoking rates. Survivorship care involves multiple providers—surgeons, oncologists, pulmonologists, and primary care physicians—which can make coordination challenging. Gaps in follow-up care are common and can delay the diagnosis of returning or new cancers. This project will study how lung cancer survivorship care is currently delivered, identify when and where these gaps occur, and explore strategies to ensure patients receive timely, effective follow-up.

SOLID TUMOR THERAPEUTICS

Angela Hirbe, MD, PhD
Associate Professor
Department of Medicine
Division of Oncology

Title: Exploring Therapeutic Implications of Chromosome 8 Gain

Summary: Neurofibromatosis type 1 (NF1) is a genetic condition that affects about 1 in 3,000 people and increases the risk of certain cancers, including malignant peripheral nerve sheath tumors (MPNST). Treatments for MPNST are very limited, in part because traditional mouse models don't reflect the complexity of human tumors. Our team developed new models using patient-derived tumor cells grown in mice, which better mimic the disease. Using these models, we found that many MPNST tumors have extra copies of a part of chromosome 8, which helps the cancer survive, and identified 57 genes that may drive tumor growth. By comparing tumors with and without this chromosome change, we discovered potential drug combinations that could be more effective for different patients. We are now testing these therapies in our new models to see which approaches might work best. The goal is to develop more personalized treatments that improve outcomes for people with NF1-related cancers and provide hope where few options currently exist.

Yesol Kim, PhD
Instructor
Department of Medicine
Division of Oncology

Title: Understanding RAMS11-Dependent R-Loops Driving Chemoresistance in Colorectal Cancer

Summary: Colorectal cancer is one of the most common and deadly cancers, and many patients have changes in a gene called p53, which normally protects cells from becoming cancerous. When p53 isn't working, standard chemotherapy drugs often don't work as well, leaving patients with fewer treatment options. We are studying a molecule called RAMS11, which does not make a protein but helps cancer cells grow, survive, and resist chemotherapy. RAMS11 is much more active in cancers with p53 mutations and appears to interfere with DNA repair, allowing cancer cells to keep growing even after treatment. It also promotes genomic instability, which can make tumors more aggressive, and may help explain why some cancers respond poorly to chemotherapy. By understanding how RAMS11 works, we hope to uncover new ways to improve treatments not only for colorectal cancer but also for other cancers where p53 is disrupted. Our findings could ultimately inform the development of therapies that work better for patients with the hardest-to-treat tumors.

TUMOR IMMUNOLOGY

Brett Herzog, MD, PhD
Assistant Professor
Department of Medicine
Division of Oncology

Title: Cancer-associated fibroblasts in response to immune-checkpoint inhibition in non-small cell lung cancer (NSCLC)

Summary: Lung cancer is the leading cause of cancer-related deaths worldwide. Immune-based therapies, like Keytruda, have improved survival for some patients, but most people with advanced lung cancer still die from the disease. There are many reasons why tumors fail to respond or stop responding to these therapies, and one key factor we've identified is fibrosis, or scarring within and around the tumor. This scar tissue can block the immune system and protect the cancer, so understanding how fibrosis affects immune cells is critical for developing new treatments. We are studying cells in the tumor to see how different parts of the fibrotic tissue interact. We focus on adenocarcinoma and have collected samples from patients who did and did not respond to immunotherapy. By mapping how cells that contribute to fibrosis interact with immune cells, we hope to understand why some patients respond while others do not. Ultimately, our work could help more lung cancer patients benefit from these lifesaving treatments.

Naoka Murakami, MD, PhD
Assistant Professor
Department of Medicine
Division of Nephrology

Title: Understanding the mechanisms of immune-related adverse events (irAE) in kidney

Summary: Cancer immunotherapy revolutionized cancer therapies, but they can cause side effects. One of the side effects is inflammation in kidney, a vital organ that purifies metabolites and toxins and maintains fluid balance of our bodies. Immunotherapies work by activating immune system to attack cancers, but the activated immune system can also attack kidneys by mistake. My project aims to find out the way to control the traffic of immune cells to their correct destination: guiding immune cells to cancer sites only, and not to kidneys. By closely looking at the tissue microenvironment at a molecular level, using a sophisticated microscope, we hope to learn what is attracting immune cells to kidneys vs. cancers. If we could guide immune cells correctly to the cancer only, but not to other unwanted organs or tissues, we will be able to use cancer immunotherapies more safely. By doing so, more patients with cancer can benefit from cancer immunotherapies worldwide.