Faculty Mentors and Research Projects

Dr. Jiri Adamec, *Department of Interdisciplinary Oncology, LSUHSC*

Cancer Proteomics and Metabolomics.

Research Interest: Dr. Jiri Adamec's research focuses on taking integrated proteomics, metabolomics, and analytical approaches to identify molecular mechanisms of disease, its biomarkers and develop technologies for their detection and accurate quantification. Particularly interest is in irreversible modifications of proteins and metabolites and their potential interference with cellular processes. These activities include both development of new analytical methods and their application on specific aging related diseases such as cancer, neurodegeneration, and autoimmune disorders. In translational research, we have recently introduced a plasma separation device used to volumetrically collect a plasma aliquot independent of whole blood application volume. This process requires no power and circumvents requirements for venipuncture-phlebotomy training, needles, special vials and equipment, refrigeration, and centrifugation normally associated with traditional plasma methods. The air-dried plasma aliquot can be inexpensively transported with minimal biohazard to a centralized laboratory for quantitation of biomarkers for disease or physiological function.

Dr. Suresh K. Alahari, *Department of Biochemistry and Molecular Biology, LSUHSC*

Cancer Cell Signaling, Novel Cancer Therapies and Identification of New Diagnostic/Prognostic Markers

Dr. Alahari's lab conducts research on various aspects of cancer including understanding the role of Nischarin, a novel protein discovered by him, and microRNAs in breast cancer. Recently his lab discovered four different novel small molecules that are effective in breast cancer therapies, and they are currently being tested in animal models. In addition, Dr. Alahari's lab has shown for the first time that a tiny piece of RNA (miR-27b)deregulates energy metabolism, an emerging hallmark of cancer. Furthermore, Dr. Alahari's lab has shown that a combination of drugs already approved by the FDA for other cancers may be effective in treating chemo-resistant triple-negative breast cancer. Recent Research conducted by Dr. Alahari, has found that metformin, a commonly prescribed drug for Type 2 Diabetes, may be effective in treating cancers that lack a protein called Nischarin. The discovery that the effectiveness of certain drugs, such as metformin, are influenced by the level of Nischarin expression could help identify specific patients in whom it is most likely to prove beneficial. Dr. Alahari identified some novel drugs that seem to activate Nischarin expression leading to suppression of breast cancer growth. Currently his laboratory is trying to understand the mechanism of this activation of these drugs, mainly through the epigenetic pathways. Finally, Dr. Alahari is trying to identify novel microRNA markers from breast cancer patients' blood, and it is an ongoing project with our clinicians. Through this we aim to find diagnostic/prognostic markers for Louisiana breast cancer patients.

Dr. Victoria Belancio, *Department of Structural & Cellular Biology, Tulane University*

Transposons, Genomic Instability, Genetic Variation, and Disease Risk/Outcomes.

Research Interest: Dr. Victoria Belancio's multidisciplinary research focuses on contribution of transposable elements to normal age-associated decline in genome integrity and their impact on risks of developing human diseases. Specifically, she studies the LINE-1 retrotransposon induced genomic instability and its involvement in development or progression of cancer. Additionally, a significant effort is dedicated to understanding how various environmental stimuli such as light exposure at night and heavy metal exposures modulate LINE-1 expression and mutagenic potential. To pursue these interests, various genetic, molecular biology, and bioinformatics techniques are applied to carry out basic and preclinical studies using human cells, transgenic animal models, and patient samples.

Dr. Hamid Boularis, *Department of Interdisciplinary Oncology, LSUHSC*

DNA Repair, Defects and Cancer.

Research Interest: Dr Hamid Boularis' research interest is on the role of DNA repair enzymes in inflammatory processes including those related to cancer, cardiovascular and lung diseases. We strive to understand the mechanisms by which these factors participate in disease processes and develop strategies to block their function. We use a variety of techniques including animal models of diseases, methods to analyze DNA, RNA, proteins, and cell-free systems with purified proteins among many others. Students have the opportunity to learn research techniques from basic to complex and participate in discussions that tackle obtained results and outline new directions. Most of our work is hypothesis-driven but some can be discovery-based.

Dr. Matthew Burow, *Department of Medicine, Tulane University Cancer*

Cell Signaling, Gene Expression and Drug Resistance.

Research Interest: The acquisition of therapeutic resistance in both liquid and solid tumors remains a significant challenge in treating and curing advanced and disseminated cancers. Dr. Burow's work has focused on defining the molecular mechanisms of cancer progression to a therapeutically resistant phenotype. Dr. Burow has begun to identify the role of kinases and nuclear hormone receptor signaling as targets for understanding and treating the resistant phenotype. Dr. Burow's lab focuses on defining the key regulatory networks that drive cancer cells to resistance and developing small molecule inhibitors useful in treating resistance. Our work has defined several novel pathways and classes of targeted small molecule inhibitors useful in targeting the cancer phenotype. More recently, this work has focused on defining the role of morphological changes in disseminated neoplastic cells as they seed secondary tissues. Through this, we aim to identify the cell signaling and gene expression networks that regulate cancer cell–stromal cell interaction that mediates the development of a cancer cell resistance niche.

Dr. Michael D. Celestin Jr.*, *Behavioral and Community Health Sciences Program, School of Public Health, LSUHSC

Cancer Prevention, Tobacco Cessation, Health Services Research, Implementation Science, and Behavioral Intervention Development.

Research Interest: Dr. Michael Celestin's population health research aims to prevent cancer by promoting tobacco cessation at the patient, clinic, and system levels of healthcare. He uses novel methods and innovative study designs for behavioral intervention research and dissemination and implementation science for his health services research. His research projects focus on underrepresented high-prevalence tobacco users at greater risk of developing tobacco-related diseases. His recently funded projects include the development of cessation interventions for 1) pregnant and postpartum smokers served by Women, Infant, and Children (WIC) clinics and 2) African American smokers diagnosed with Chronic Obstructive Pulmonary Disease, and 3) the development of implementation strategies to improve treatment of tobacco use for patients served by Federally Qualified Health Centers (FQHCs). He is also interested in research on integrating low-dose computed tomography (LDCT, i.e., lung cancer screening) and tobacco cessation services, and tobacco cessation in patients diagnosed with cancer and tobacco-related chronic diseases to reduce health disparities.

Dr. Andrew Chapple *Department of Interdisciplinary Oncology, LSUHSC*

Cancer Clinical Trials.

Research Interest: Dr. Andrew Chapple's main area of research is adaptive clinical trial design, particularly Bayesian designs. These designs more efficiently sort through treatments in a trial, allocate patients more ethically, and advance science faster than typical clinical trial designs. Dr. Chapple also has interest in statistical methodologies involving Bayesian clustering. Dr. Chapple performs applied statistical analyses for many researchers in different areas and analyzes longitudinal observational databases. Dr. Chapple's research is highly computational in nature, requiring a solid understanding of coding and mathematics."

Dr. Denise Danos ***Department of Behavioral and Community Health Sciences, School of Public Health, LSUHSC***

Observational Human Subject Research.

Research Interest: Dr. Denise Danos's research is in experimental design and data analysis for observational human subject research, with expertise in large scale data collection and consolidation, generalized linear models, and multilevel models. As an academic researcher, she has focused on leveraging population-based data to study social determinants of health disparities in cancer and other chronic conditions. In addition to public health research, I collaborate with the School of Medicine, providing statistical support for quality improvement and clinical outcomes research.

Dr. Wu-Min Deng ***Department of Biochemistry and Molecular Biology, Tulane University***

Tumor Initiation, Evolution and Tumor-Host Interactions.

Summary: The research in Dr. Wu-Min Deng's laboratory bridges cancer biology, genetics, bioinformatics and developmental biology. Using the genetically tractable *Drosophila* model, we seek to understand how cell growth, proliferation and polarity are regulated during development, and how their deregulation may result in uncontrolled growth, loss of tissue integrity, and neoplastic tumor transformation. Currently, we focus on the following research projects: (1) Characterization of "tumor hotspots", the tissue microenvironment for tumorigenesis; (2) Sex dimorphism in tumor growth, progression and evolution; (3) Tissue homeostasis through cell competition, phagaptosis, and compensatory cellular hypertrophy; (4) Cachexia, innate immunity and metabolic regulation in tumorhost interactions.

Dr. Maryam Foroozesh ***Chemistry Department, Xavier University***

Cancer Drug Design, synthesis and Screening Targeted at P450 Inhibitors and Ceramides.

Research Interest: Dr. Maryam Foroozesh's research is on two distinct projects; one aiming to design and synthesize ceramide analogs for the reversal of chemo-resistance in breast cancer; and the other, aiming to design and synthesize mechanism-based inhibitors for cytochrome P450 enzymes involved in carcinogenesis. Undergraduate research students are involved in every aspect of these projects, from the design, synthesis, purification, and structural analysis of the target compounds to their *in vitro* and *in vivo* biological studies. Dr. Foroozesh has mentored over 95 research students in these research projects to date.

Dr. Loren Gragert ***School of Medicine, Tulane University***

Immunogenetics, Cellular Therapy, and Transplantation.

Research Interest: Dr. Loren Gragert's research is focused on translational clinical informatics using immunogenetics data. Our lab has developed novel approaches for conducting and interpreting genetic association studies involving the major histocompatibility complex (MHC), a highly polymorphic and gene dense region of the human genome. We are especially interested in understanding immunemediated diseases such as leukemias, lymphomas, and post-transplant lymphoproliferative disorders. The laboratory collaborates with national registries in stem cell and solid organ transplantation to improve how immunogenetics data is applied for clinical decision making. We also perform population genetics modeling to support development of cellular therapies that are transforming cancer treatment.

Dr. Michael Hagensee ***Departments of Medicine Section of Infectious Diseases, LSUHSC***

Human Papillomavirus Infection and Their Role in Oral and Anogenital Cancer.

Research Interest: Dr. Michael Hagensee's research interests are focused on the prevention of HPVrelated cancers in the oral cavity or anogenital sites. Projects include the development of biomarkers to find those individuals who are at the highest risk for the development of cancer, especially in people living with HIV/AIDS. These include detection of HPV and other biomarkers from clinical samples. In addition,

in-vitro cell culture and animal models that mimic the clinical course are utilized to correlate to the clinical findings. Additional projects are to find ways to bring more people into cancer prevention programs including vaccination, determining the barriers to care and solutions to these barriers. The overall goal is to prevent all HPV-related cancers through primary prevention though vaccination and secondary measures by early detection of those at highest risk and treated and removal of precancerous lesions.

Dr. Chiung-Kuei Huang ***Department of Pathology and Laboratory Medicine, Tulane University***

Molecular pathogenesis of liver cancers.

Research Interests: Dr. Huang's lab has been working on deciphering the molecular pathogenesis of liver malignancy with specific focuses on alpha-ketoglutarate dependent enzymes, including aspartate betahydroxylase (ASPH), which functions in catalyzing hydroxylation of aspartate and asparagine residue of EGF like domain, and Tet methylcytosine dioxygenase 1 (TET1) which catalyzes the formation of 5hydroxymethylcytosine leading to DNA demethylation. He has identified that ASPH is highly expressed in cholangiocarcinoma (CCA) but barely detectable in bile ducts. His recent research findings further reveal that several potential compounds which target ASPH enzymatic activity could robustly suppress CCA progression. He and his team members are working on further characterizing the therapeutic potential of these compounds in multiple preclinical CCA models. His lab is also involved in the TET1-mediated epigenetic modification in alcoholic liver disease (ALD) associated hepatocellular carcinoma (HCC) progression. His group is investigating the role of TET1 in ALD/HCC by using cell specific TET1 knockout mice. Characterizing molecular pathogenesis of liver tumors will yield results toward identifying potential therapeutic targets for these deadly diseases.

Dr. Jun-yuan Ji ***Department of Molecular Biology and Biochemistry, Tulane University***

Cancer biology, Transcriptional Regulation of Lipid Metabolism, Developmental Genetics.

Research Interest: Dr. Jun-yuan Ji's research aims at understanding the regulatory mechanisms of how the transcriptional machinery is fine-tuned by signaling pathways and environmental perturbations in different developmental, physiological, and pathological contexts. Using the fruit fly *Drosophila melanogaster* and cultured mammalian cells as the experimental systems, the laboratory combines genetic, cell biological, and biochemical approaches to elucidate the conserved molecular and genetic regulatory circuits that control gene expression, lipid homeostasis, cell growth and proliferation during normal development and tumorigenesis. One major project focuses on elucidating the context-specific functions of the CDK8 module, a highly conserved module of the transcription cofactor Mediator complex, which bridges DNA-bound transcription factors and RNA polymerase II in eukaryotes. In parallel, we also study the role of Wnt signaling in regulating lipid homeostasis. These two projects are independent but capable of significant synergy.

Dr. Hari Koul ***Departments of Interdisciplinary Oncology, Biochemistry & Molecular Biology, and Urology, LSUHSC***

Genito Urinary Oncology and Prostate Cancer.

Research Interest: Dr. Hari Koul's research includes basic and clinical/translational research in GU Oncology and diseases affecting the urogenital tract. A majority of his work has focused on prostate cancer progression and therapy resistance. Specially on the role of: SPDEF, an Ets factor; oxygen species; stress kinase pathways; epigenetic mechanisms and small molecules. The laboratory uses multidisciplinary approaches that include biochemical, molecular biologic and genomics to understand mechanisms of prostate cancer progression and therapy resistance We are interested in exploring these pathways to identify critical targets that could be explored as novel targets to enhance impact of current therapies, understand the biology of prostate cancer health disparities, and aid in distinguishing lethal prostate cancer form an indolent disease.

Dr. Anup Kundu ***Biology Department, Xavier University***

Cancer Drug Delivery Development Using Nanoparticles and Emulsions, and Screening and Testing.

Research Interest: Dr. Anup Kunda's research is in highly interdisciplinary areas of nanoparticle formulation, characterization and targeted delivery of drugs and genes into breast cancer cells. The development of multidrug resistance (MDR) in cancer cells is of grave concern, limiting the efficacy of anticancer agents and, hence, the failure of breast cancer therapy. Clinical research and application revealed that in spite of its potential anticancer effects, doxorubicin is highly toxic, and its long-term application may cause dose-dependent irreversible cardiomyopathy, severe cardiac toxicity, or liver damage, thereby limiting its application in breast cancer treatment. As such, the greater potential of using doxorubicin as anticancer therapeutic depends on the availability of a targeted delivery vehicle, which will not only enhance the killing of cancer cells but also minimize the off-target toxicity to non-cancerous cells. The goal of Kundu lab at Xavier University of Louisiana is to enhance the delivery of doxorubicin by formulating an aptamer-labeled liposomal nanoparticle delivery system that will carry and deliver doxorubicin specifically into chemo resistant breast cancer cells.

Dr. Sean Lee ***Department of Pathology and Laboratory Medicine, Tulane University***

Molecular Mechanisms of Fusion Oncoprotein-Driven Cancer.

Research Interest: Dr. Sean Lee's research is focused on understanding the molecular mechanisms underlying pediatric cancers driven by chromosomal fusion oncoproteins. One of these cancers, desmoplastic small round cell tumor (DSRCT), is caused by a chromosomal translocation that generates the EWSR1-WT1 fusion, which functions as an oncogenic transcription factor. The lab uses an interdisciplinary approach, utilizing the latest techniques in molecular biology, genetics, biochemistry and bioinformatics, to understand the functions of the fusion oncoprotein. Recently, the lab has identified a number of EWSR1-WT1-regulated genes that encode kinase enzymes, and the lab has shown that these kinases are potential therapeutic targets in DSRCT, a cancer that is currently without an effective therapy with extremely poor survival.

Dr. Zhen Lin ***Department of Pathology and Laboratory Medicine, Tulane University*** **Viral Non-Coding RNA.**

Research Interest: Dr. Lin's research mainly focuses on non-coding RNA during host-pathogen interaction. His lab utilizes genome-wide molecular, biochemical, and bioinformatics-based strategies such as spatial omics to identify and characterize targets and cell signaling pathways that are regulated by viral and cellular RNAs during the course of herpesvirus and papillomavirus infection and associated pathogenesis.

Dr. Bolin Liu ***Department of Interdisciplinary Oncology, LSUHSC***

Cell Signaling and Epigenetic Regulation of Cancer Progression.

Research Interest: Dr. Bolin Liu's research program focuses on receptor tyrosine kinases (RTKs)-initiated cell signaling in cancer progression and noncoding RNAs (miRNAs and lncRNAs)-mediated epigenetic regulation of drug resistance and tumor metastasis. The laboratory utilizes cell culture systems, animal models, and dataset analyses to understand the signaling pathways and epigenetic mechanisms in the progression of human cancers, including HER2-positive breast cancer and triple-negative breast cancer (TNBC) as well as non-small cell lung cancer (NSCLC). The long-term goal is to identify novel molecular targets and develop effective combinatorial strategies for cancer treatment.

Dr. Hongbing Liu ***Department of Pediatrics, Tulane University***

Epigenetic Regulation of Kidney Development and Disease.

Research Interest: The laboratory of Dr. Hongbing Liu is interested in understanding the epigenetic mechanisms, especially histone acetylation and deacetylation, responsible for kidney formation and abnormality. In addition to understand the regulation of renal development by histone deacetylases and epigenetic reprogramming of chronic kidney disease, his lab is also studying the novel molecular mechanisms of epigenetic modulators in the tumorigenesis of Wilms tumor. Genetic, biochemical, cell biological, and molecular biological approaches will be employed to address the critical roles of histone deacetylases (HDACs) in cell and mouse models. Current projects also include the analysis of RNA-Seq, ChIP-Seq/CUT&Tag, and ATAC-Seq data with single-cell resolution in the spatial and temporal dimensions.

Dr. Hua Lu ***Department of Biochemistry and Molecular Biology, Tulane University***

Cancer Biology, Metabolism, Mechanisms, and Therapeutics Discovery.

Research Interest: The laboratory of Dr. Hua Lu is interested in understanding the molecular and biochemical basis that underlies physiological and pathological signaling pathways (growth, metabolic, hypoxia, or DNA damage signals), which lead to gene expression and subsequent cell growth arrest, differentiation, senescence, autophagy, or apoptosis. Specifically, his lab has been focusing on two pathways involved in the tumor suppressor p53 and the oncoprotein c-Myc that are highly associated with all types of human cancers. Diverse approaches including quantitative and analytical protein biochemistry, chemical biology, proteomics, metabolomics, immunological tools, gene microarray, RNA seq, single cell RNA seq, molecular and cellular biological methods as well as genetic methods (such as murine model, organoid, orthotopic and PDX tumor model systems) will be employed in these studies. We will also pursue translational research by screening anti-cancer drugs targeting the above pathways

and examining molecular alternations of these pathways in human cancers. The effort will be complemented by collaborating with other groups on and off the campus.

Dr. Heather Machudo Department of Biochemistry and Molecular Biology, Tulane University

Mammary Gland Development, Breast Cancer Tumor Immunology, Stromal-Epithelial Interactions in Development and Disease.

Research Interest: Mammary gland development and breast cancer progression relies on the complex interplay between numerous cell types, such as immune cells, fibroblasts, epithelial cells, matrix proteins, and vasculature. The Machado laboratory focuses on understanding how alterations in mammary gland development contribute to breast cancer risk and progression. There are critical windows during breast development, such as puberty, pregnancy and involution (post-lactation) that are highly susceptible to mutagenic events. The Machado lab aims to understand these mechanisms with the long-term goal of therapeutic and preventive strategies targeted to a specific window of development. A second research effort involves understanding how breast tumors evade the immune system during tumor initiation and progression. The Machado lab has built tools to study how cancer cells escape immune surveillance. The goals of these studies are to develop therapeutic strategies that will render tumor cells visible to the immune system, enhancing current immune therapy efforts and improving efficacy.

Dr. Giblert Morris Department of Medicine, Tulane University

Role of gherpesviruses in the Pathogenesis of Lung Adenocarcinoma.

Research Interest: Inhalation of established human lung carcinogens, such as cigarette smoke or asbestos, elicits Type 17 inflammation in the lungs of mice. These carcinogen-associated inflammatory cytokines are also induced by gherpesviruses. Overexpression of either Type 17 cytokine, IL-17A or IL22, accelerates growth of murine lung tumors and correlates with a worse prognosis in non-small cell lung cancer in humans. Our goal is to use our experience from murine lung tumor models to better understand the health effects of gherpesviruses. A theme of these experiments is that gherpesviruses alter lung inflammation, which drives lung tumorigenesis and augments the tumor-promoting immune response to other environmental exposures. A better understanding of these immune alterations provided by developing a murine model will improve our attempts to determine the lung cancer risks of gherpesvirus and its interaction with environmental exposures.

Dr. Francesca Peruzzi Department of Medicine, LSUHSC

Epigenetic and Metabolic Reprogramming of Monocytes in Chronic HIV Infection.

Research Interest: People living with HIV (PLWH) are at high risk of developing secondary illnesses including cancer. Although combined antiretroviral therapy (cART) reduces the viral load and increases the life span of these patients, it does not fully restore the full function of immune cells, sensitizing them to secondary infections and other pathologies. Recent studies indicate the presence of specific epigenetic and metabolic changes in monocytes of PLWH that are associated with dysfunctional immune responses observed in these cells. While analyses of epigenetic changes of innate immune cells of HIV^+ individuals could reveal novel mechanisms underlying cancer development and/or progression, this area

of research requires further investigation. Dr. Peruzzi's experimental research model involves isolation of $CD14^+$ monocytes from HIV^+ patients and healthy age- matched controls and the *in vitro* analysis of these cells following their polarization toward a pro-inflammatory (M1-like) macrophage phenotype. When exposed to environmental signals, such as β-glucan or lipopolysaccharide (LPS) endotoxins, normal monocytes will execute two types of innate programming called "trained immunity" and "tolerance" characterized by either hyper-responsiveness or hypo-responsiveness to secondary stimuli, respectively. Our data show that this delicate balance between trained immunity and tolerance is defective in monocytes of PLWH. Our current project investigates the molecular mechanisms linking epigenetic modifications and metabolic reprogramming to a dysfunctional immune response in HIV^+ individuals with low or undetectable viral load.

Dr. Monica Rak ***Department of Interdisciplinary Oncology, LSUHSC***

Gene/vaccines Delivery, Cancer Invasiveness and Epigenetics, Human Endogenous Retroviruses (HERVs).

Research interest: Dr. Monika Rak's research includes basic and translational research in non-viral DNA/RNA delivery as well as cancer development, progression, and therapies. A majority of her work has focused on innovative lipofection systems and vaccines carriers. Additionally, she engaged in research exploring cancer cell migration, invasiveness and epigenetic therapies. Her current project topic is the role of Human Endogenous Retroviruses (HERVs) in the development and progression of glioblastoma. Research approach includes *in silico*, *in vitro* and *in vivo* strategies.

Dr. Krzysztof Reiss ***Department of Interdisciplinary Oncology, LSUHSC***

Cancer Cell Signaling, Metabolism, Drug Development and Animal Models.

Research Interest: Dr. Krzysztof Reiss' research interest is on glioblastoma cells using 3-D glioblastoma cell culture models and patient-derived intracranial glioblastoma models. These models are being used to test different drug delivery systems, basic drug pharmacokinetic parameters (time of drug retention in tissues and in the tumor mass, drug metabolites and clearance, maximal tolerated dose, and systemic toxicity). The laboratory presently focuses on signaling pathways activated by severe stress and severe deficit of intracellular ATP, which initially triggers AMPK phosphorylation and AMPK-induced survival responses, which in turn may contribute to drug resistance. Another research focus is on different energy-producing pathways, which are activated in glioblastoma cells following a severe energy deficit. In particular on new drug candidates, which primarily target mitochondrial respiration, are subsequently causing compensatory activation of glycolysis first, and later Krebs cycle, glutaminolysis, pentose cycle, and autophagy -mediated regeneration of metabolic/energy substrates.

Dr. Maria Sanchez-Pino ***Department of Interdisciplinary Oncology, LSUHSC***

Inflammation, Obesity, and Cancer.

Research interest: Dr. Maria Sanchez-Pino's research has focused on understanding mechanisms in different chronic inflammatory diseases, but more recently in obesity and cancer. Given the significant impact of regulatory immune cells in chronic inflammation, she has been studying the role of Myeloidderived suppressor cells (MDSC) as a biological link between obesity and cancer risk in the past few years. She is Identifying the major obesity-associated factors that promote MDSC expansion and immunosuppressive function. She is characterizing the major pathways associated with cellular metabolism in the obese and tumor microenvironments as critical regulators of the inflammatory and

immunosuppressive function of MDSC. She is also elucidating the transcriptional regulatory network responsible for activating the immunosuppressive gene expression program of MDSC induced by the obese microenvironment to uncover pharmacological targets to reprogram the function of MDSC granting a protective anti-tumor immune response. Her approaches involve using mouse and human samples, and *in vivo* mouse models of diet-induced obesity and cancer (breast and prostate) are performed in her lab to understand the biological, cellular and molecular mechanisms to allow the development of new strategies for lowering cancer incidence in patients with obesity by targeting inflammatory key players.

Dr. Tiffany Seagroves School of Medicine, Tulane University

Targeting Hypoxia-Driven Metastatic Progression in Breast Cancer

The research in my laboratory is focused on utilizing pre-clinical, syngeneic transgenic mouse models or patient-derived xenograft (PDX) models of metastatic breast cancer (MBC) to understand how genes impact the tumor microenvironment and to screen novel therapeutics that treat late-stage MBC. **Our current areas of research** are: **1)** to identify novel or understudied hypoxia-dependent genes that promote metastasis in breast cancer and to understand how they induce metastasis or promote therapeutic resistance; **2)** to perform pre-clinical screens to discover interventions that block the hypoxic response for the treatment of MBC; **3)** to test novel colchicine-binding site tubulin inhibitors (CBSIs) for efficacy in taxane-sensitive and taxane-resistant MBC models; **4)** to develop novel treatment regimens to treat breast cancer brain metastasis.

Dr. Qiang Shen Department of Interdisciplinary Oncology, LSUHSC

Cancer Driver Genes, Carcinogenesis and Metastasis, Cancer Prevention and Therapy Development.

Research Interest: Dr. Qiang Shen's research includes basic and translational research in cancer biology, cancer prevention, and cancer therapy development. Primary research interests of the laboratory are to identify novel molecular targets and develop effective small molecule drugs for the prevention and treatment of cancers and other metabolism-related diseases and conditions. Ongoing projects focus on the role of STAT3 and AP-1 transcription factors, anti-apoptotic protein Bax, metastasis-promoting kinases in normal and cancer cells. **A majority of Dr. Shen's work focused on** the development of small molecule drugs for preventing cancer development, blocking cancer progression and metastasis, restoring sensitivity and overcoming resistance of cancer cells towards chemotherapy and radiotherapy, and intervening other disease conditions associated with aberrant metabolism. The laboratory employs approaches including molecular and cellular biology, targeted anticancer drug development, and animal models of human breast cancer and other cancers for the studies of blocking carcinogenesis and controlling metastasis.

Dr. Jayalakshmi Sridhar Chemistry Department, Xavier University

Cancer Drug Design, Synthesis, and Screening Targeted at Kinase Inhibitors.

Research Interest: Dr. Jayalakshimi Sridhar's research is on the structure-based design and development of small molecule inhibitors as ATP-competitive agents that selectively inhibit kinases. The kinases regulate several signaling pathways through phosphorylation in the cell that are involved in cell function and growth. The aberrant expression of protein kinases is a hallmark of cancers including breast cancer, prostate cancer, other metastatic cancers. Our inhibitors target S6K1 protein kinase and Estrogen

receptor alpha expression in breast cancer cells. Two classes of inhibitors have been developed in my research group as potential breast cancer therapeutics. The first class of inhibitors belong to the phthalimide class of molecules that inhibit p70S6K1 which is the principal effector downstream of mTOR. The second class of inhibitors belong to the naphthoquinone class of compounds as HER2 kinase inhibitors. Design and synthesis of inhibitors of Casein kinase 1d/e (CK1d/e) is also being pursued. Students will be trained in the methods of organic synthesis (reaction set-up, isolation, purification, and characterization of the product) as well as in molecular modeling methods used in drug design.

Dr. Xiaochao Tan Department of Medicine, Tulane University

Lung Cancer, Golgi Organelle, and Cancer Treatment.

Research Interest: Lung cancer remains the leading cause of cancer death. Dysregulation of the Golgi apparatus has emerged as a significant factor driving the initiation and progression of human cancer. My primary objective is to unravel the mechanisms through which oncogenic somatic mutations impact the structure and secretory functions of the Golgi organelle. This research will ultimately contribute to the development of innovative therapeutic approaches based on a deeper understanding of these processes. In addition to Golgi-related investigations, my laboratory is actively exploring the roles of endocytic recycling pathways in human cancer. Our ongoing projects encompass two key areas: 1) Investigating the functional roles of amplified Golgi genes in cancer initiation and progression and 2) Identifying potential therapeutic Golgi targets and developing novel strategies for lung cancer treatment.

Dr. Tung-Sung Tseng Department of Behavioral and Community Health Sciences, School of Public Health, LSUHSC

Cancer Disparities, Behavioral Intervention, Community and Population Health.

Research Interest: Dr. Tung-Sung Tseng's research focuses on understanding the disparities and elucidating the determinants of health behaviors to change unhealthy/risky behaviors among ethnic minorities and underserved populations. His expertise includes cancer, tobacco control, obesity, health disparities, genetic and behavioral interactions, community-based participatory research (CBPR), implementation sciences, intervention, and evaluation methods (social media, big data, GIS, and smart devices). In addition, Dr. Tseng serves as a principal investigator or co-Investigator on several university-, state- and NIH-funded grants to integrate research and practice in public health. The example of these projects includes "Using Low-Dose Computed Tomography (LDCT) lung cancer screening to increase smoking cessation among African Americans," "Louisiana Tobacco Control Initiative," "Obesity & Asthma: Determinants of Inflammation and Effect of Intervention," "Community-Based Strategies for Colorectal Cancer Control," and "Dietary monitoring and control using Augmented Reality (AR) Glasses for colorectal cancer prevention in African Americans."

Dr. Edward Trapido ***Department of Epidemiology and Public Health, School of Public Health, LSUHSC***

Cancer Epidemiology.

Research Interest: Dr. Edward Trapido's research is on cancer risk factors. There is a geographic region in Louisiana noted by President Biden, the EPA, and the United Nations for having a high risk of cancer due to industrial pollution. This area, known as "Cancer Alley," has gained notoriety for being among the worst for environmental justice since toxic emissions from the manufacturing plants impact sizable Black populations that have resided in these areas for generations. The area is also referred to as the "Industrial Corridor" (I.C.). The I.C. is an 85-mile-long tract of land from Baton Rouge to New Orleans by the Mississippi River. It houses 150 oil refineries, plastics plants, and chemical facilities. This area is part of the Mississippi Delta and includes agricultural land and tributaries to the Mississippi River. The purpose of this summer's research project will be to catalog all the carcinogenic chemicals being released in the Industrial Corridor. It will introduce the student to IARC and ATSDR carcinogen lists and require the student to search the internet for listings of all of the factories and refineries in the 11-parish area and compile a listing of chemicals released. Then they will determine whether these chemicals are carcinogenic and summarize and map what they have found. If time permits, the student will use PubMed to see which cancer sites are associated with each carcinogen. This will be used for preliminary data for grant applications.

Dr. For Yue Tso ***Department of Interdisciplinary Oncology, LSUHSC*** **Infectious**

Viral Diseases, Oncology & Immunology.

Research interest: Dr. For Yue Tso's research focuses primarily on HIV-1, Kaposi's sarcoma-associated herpesvirus (KSHV), and more recently on SARS-CoV-2. Dr. Tso's studies on HIV-1 involved viral evolution, pathogenesis and latent reservoirs. His recent projects have been focused on HIV-related cancers such as Kaposi sarcoma (KS). KS is a soft-tissue tumor caused by KSHV and is one of the major forms of cancers among AIDS patients. Dr. Tso's research on KSHV and KS aims to develop methods to prevent KS development by eliminating KSHV infected cells, develop vaccine to prevent KSHV infection, and to set up *in-vitro*/*in-vivo* models to better study KSHV/KS pathogenesis.

Dr. Terry Watt, ***Chemistry Department, Xavier University***

Deacetylase Mechanisms in Cancer Signaling.

Research interests: Dr. Watt's research focuses on understanding the biological roles of lysine deacetylases (KDACs) and the biochemical mechanisms underlying those functions. Metal-dependent lysine deacetylases (KDACs, also known as histone deacetylases or HDACs) are multi-functional proteins that mediate control of numerous cellular processes and have been implicated in many cancers. Specific programs include (i) evaluating the role of KDAC activity on morphology and migration of cancerous cells, (ii) characterizing the specificity of KDAC inhibitors in cells, (iii) characterizing the molecular determinants of specific substrate and regulatory interactions of KDACs, and (iv) identifying substrates of particular KDACs. We utilize a range of biochemical, cell-based, and computational techniques in each of those projects.

Dr. Charles Wood ***Department of Interdisciplinary Oncology, LSUHSC***

Infectious Cancer Viruses, HIV, Immune Responses and Viral Pathogenesis.

Research Interest: Dr. Charles Wood's research includes basic and clinical/translational research in immunology, and virology. A majority of his work has focused on infectious viral diseases. Specially on HIV/AIDS and its associated cancer, Kaposi's sarcoma (KS), and its etiologic agents the Kaposi's sarcoma associated herpesvirus (KSHV). More recently on cervical cancers and the human papilloma virus (HPV). The research topics are on how these viruses are transmitted, viral latency upon infection, the immune response, and how the infections can lead to cancers. The laboratory engages various approaches, from public health to cellular and molecular studies, immunological and genomics approaches to understand how these viruses cause disease, so that strategies including vaccines can be developed to prevent infections and ultimately cancer development.

Dr. Xiaocheng Wu ***Louisiana Tumor Registry, Department of Epidemiology, School of Public Health, LSUHSC***

Cancer Epidemiology, Cancer Surveillance, Quality and Patterns of Cancer Care, Health-Related Quality of Life, Cancer Disparities.

Research Interest: Dr. Xiao-Cheng Wu's research includes cancer epidemiology and surveillance research. Her work has primarily focused on cancer disparities in etiology, early detection, quality and patterns of cancer care, patient-reported health-related quality of life, other cancer outcomes, and comparative effectiveness research. The research topics are the geographic determinant of cancer risks, the impact of diabetes and modifiable risk factors on cancer outcomes, racial/ethnic differences in cancer incidence by histology and subsite, health care service needs, and health status among adolescents and young adults with cancer, sociodemographic factors, insurance, and hospital types on guideline adjuvant cancer, disparities in guideline-concordant treatment and cancer outcomes, Medicaid expansion impact on early detection and cancer treatment, the association of different treatment modalities with patient-reported quality of life, risk of cancer death by comorbidity severity and chemotherapy, and sociodemographic disparities in access to care. Her primary areas of expertise are cancer registry administration and operations, population-based cancer research, and the use of registry infrastructures to collect patient-reported data, saliva samples, and biospecimen samples. Dr. Wu is currently a PI or co-investigator for multiple NIH-funded grants. She is the LSU PI for the NCI-SEER and CDC-NPCR grants.

Dr. Xiaojiang Xu ***Department of Pathology and Laboratory Medicine, Tulane University***

Single Cell Sequencing, Spatial transcriptome and Bioinformatics.

Research Interest: Dr. Xiaojiang Xu's research includes developing new bioinformatics algorithms and pipelines, and application of bioinformatics algorithms and pipelines to answer biology questions. New tools are made to design, integrate and interpret large molecular data sets, including next generation sequencing, single cell RNA-seq and spatial transcriptome data. My recent research focuses on new algorithms and software to analyze spatial transcriptome/proteomics data and multi-omics single cell data, including scRNA-seq, scATAC-seq, CITE-Seq, TCR/BCR-seq, Perturb-seq and Spatial Transcriptomics. We will use these in-house and public tools and pipelines to study how cellular heterogeneity (temporal

and spatial) encodes the molecular structure, function, and regulation of complex biological systems. We are happy to collaborate with both basic and clinical research scientists to investigate different biology questions. We are working on more than 30 projects using single cell sequencing technology and got more than 15 papers published last three years. Recently, we are applying powerful tools in statistical inference and machine-learning (AI) to Spatial Transcriptomics and spatial proteomics data, especially pathology and disease/clinical data.

Dr. Zongbing You ***Department of Pathology and Laboratory Medicine, Tulane University*** **Inflammation and Prostate Cancer.**

Research Interest: The laboratory of Dr. Zongbing You is interested in understanding how inflammation promotes prostate cancer initiation and progression. Specifically, his laboratory has been focusing on interleukin-17 (IL-17), a proinflammatory cytokine. Prostate inflammation (prostatitis) is very common in urological patients and prostate cancer is the most common cancer in American men. Dr. You's laboratory uses prostate cancer cell lines and mouse models of prostate cancer as well as human prostate tumor tissues to investigate how IL-17-mediated signaling promotes the development and progression of prostate cancer. The long-term goal is to identify new targets and therapeutics for the prevention and treatment of prostate cancer.

Dr. Qingzhao Yu ***Department of Biostatistics, School of Public Health, LSUHSC*** **Biostatistics, Data Analysis, and Health Disparity.**

Research Interest: Dr. Qingzhao Yu's research includes data analysis and statistical method development in basic, public health and clinical/translational research. A majority of her work has focused on adaptive clinical trial designs and causal inferences. The research topics includes methods to differentiate interactive effects from environmental, genetic, and other risk factors that contribute to the prognosis and treatment of chronic diseases, and related health disparities; clinical trials that help reduce enrollment of patients and optimally distribute resources; and data mining methods that deal with highdimensional datasets (e.g. gene data analysis). Her primary areas of expertise are multi-level analysis, Bayesian modeling, causal effect analysis, data mining and machine learning, gene analysis, spatial analysis, and survey research. Dr. Yu is currently a PI/Co-Investigator of multiple NIH grants.

Dr. Jovanny Zabalata ***Department of Interdisciplinary Oncology, LSUHSC***

Cancer Genomics.

Research Interest: Dr. Jovanny Zabaleta is interested in studying the genomics of cancer in underserved/underrepresented groups, including minorities (African American and Hispanics). His main focus has been gastrointestinal cancers (colorectal, gastric) and breast cancer. Dr. Zabaleta maintains an active collaboration with centers and Universities in Latin America and keeps a continuous flow of students in his laboratory (B.S., M.S., Ph.D.). Dr. Zabaleta directs the LSUHSC-Cancer Center's Translational Genomics Core where many techniques for the study of the human genome and transcriptome are carried out, including whole genome and transcriptome-seq, microRNA-seq, ChIP-seq, ATAC-seq, microbiome analysis, among others.

***Dr. Arnold Zea** Department of Microbiology, Immunology and Parasitology, LSUHSC*

Tumor Microenvironment

Research Interest: Dr. Zea studies mechanisms by which L-Arginine and L-Glutamine regulate tumor growth and inhibition, immune responses, and tumor resistance. Since tumor resistance to therapy in cancer have numerous factors, the aim of the lab's research is to define micro-environmental factors such as a) tumor burden, b) tumor growth and metastases, and c) tumor heterogeneity and their effect on the immune system. The lab is currently studying the role of L-Arginine, L-Glutamine, and L-Citrulline in the expression of NOS2 (inducible nitric oxide synthase) a key element in tumor progression and inhibition. This work is helping us to understand the mechanisms that will lead to developing new therapeutic strategies to control tumor growth, prevent metastases, and possibly tumor eradication.