# BIOM 8040 Introduction to Faculty Research

The BCB program is the destination for students aspiring to make their mark as a future basic-translational researcher, with an emphasis on "precision medicine". Housed in a well-equipped and state-of-the-art research facility, BCB is a unique two-track graduate program where students can choose faculty mentors working in different disciplines. BCB mentors offer a diversity of projects and multi-disciplinary approaches to diagnose, prevent and treat a wide range of diseases that include malignancies of different organs, eye diseases, and disorders of inflammatory, immunological, and hematological origins. BCB students may choose either a biochemistry or a cancer-biology track to pursue their graduate thesis work. Students choosing the biochemistry track will be a part of the Department of Biochemistry and Molecular Biology. Students in the cancer-biology track will be a part of the Georgia Cancer Center. Both the Department of Biochemistry and Molecular Biology, and the Georgia Cancer Center work together to nurture a cohesive and collaborative atmosphere for achieving the same student learning objectives. At the heart of each track, is the same emphasis on students' training in basic and translational research. Biochemistry track has an emphasis on both benign diseases and cancer; whereas, the cancer-biology track focuses primarily on cancer. With motivated, enthusiastic and committed faculty, the BCB program is a home to bench-to-bedside researchers.

**Ande, Satyanarayana, PhD**
*Cancer Biology*, CN3150
Associate Professor of
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Biology

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Dr. Ande's lab investigates the regulation and function of specific transcription factors and tumor suppressors in liver tumorigenesis and liver tumor angiogenesis. His lab also studies adipose tissue metabolism and obesity and the molecular links between obesity and liver cancer by utilizing knockout and transgenic mouse models.

**Arbab, Ali, PhD, MBBS**
*Cancer Biology*, CN 3141
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Our laboratory creates different orthotropic animal models for human glioma. We use in vivo MRI, SPECT and optical imaging to determine the tumor growth, tumor vascular parameters, migration and accumulation of endogenous or exogenously administered stem/progenitor cells in the tumor neovascularization, and accumul-ation of laminin avid nanoparticle based contrast agents.

**Browning, Darren, PhD**
Director, Graduate Program in Biochemistry and Cancer Biology
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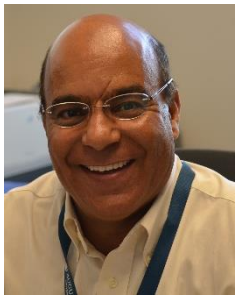
Our focus is cGMP signaling through protein kinases (PKG) in the gastrointestinal tract. My lab has characterized anti-tumor properties of PKG in colon cancer, including: blockade of proliferation, angiogenesis, and hypoxic adaptation. Using knockout mice, we showed that PKG2 regulates colon homeostasis and strengthens the mucosal barrier. The lab is currently testing PDE5 inhibitors for the treatment and prevention of colitis and colon cancer in preclinical models.



**Chadli, Ahmed, MS, PhD**
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Research in Dr. Chadli's laboratory focuses on
understanding the Hsp90 chaperoning machine and co-chaperones in the initiation and progression of breast and prostate cancers using *in vitro* and mouse conditional knockout models. Targeting the Hsp90 machine have been shown to disrupt the dysfunctional circuitries that underlie cancer. We have discovered new natural products that inactivate the Hsp90 machine. These compounds have a powerful immunotherapeutic impact through combination of Hsp90 machine inhibition and activation of T-cell response to eliminate tumors in mice.

**Cowell, John, PhD, DSc, FRCPath**
Director, Basic Science, Georgia Cancer Center
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Dr. John Cowell studies the molecular genetics of cancer using a variety of genomics, cell, and molecular approaches. He currently studies the role of the WASF3 gene in the promotion of cancer metastasis using *in vivo* models in mice and zebrafish. He also studies of the molecular etiology of Stem Cell Leukemia/Lymphoma (SCLL) syndrome which is characterized by chromosome 8p11 translocations activating the FGFR1 kinase.

**Daddacha, Waaqo, PhD**
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DNA double-strand break (DSB) repair and nucleotide metabolism are critical determinants of resistance to many types of cancer treatments, including chemotherapy and ionizing radiation (IR). Therefore, expanding our knowledge of both pathways is of considerable significance for discovering a novel therapy as well as improving the existing options. Our laboratory contributes to this effort by investigating the overlaps between the two pathways and implication to cancer. We mainly focus on delineating functions and regulation of genes like SAMHD1, a known player in nucleotide metabolism and DNA damage response, while determining its coordination with RNR, a well-established nucleotide regulator. Our ultimate goal is exploring the possibility of utilizing knowledge gained to identify biomarkers and therapeutic targets for cancers such as malignant glioma.

**Ding, Han-Fei, PhD**
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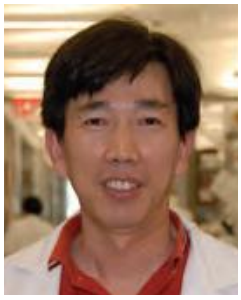
The research program of the Ding laboratory is to define the molecular and cellular basis of cancer development in select model systems. Ongoing projects include developmental biology of neuroblastoma and NF-kB2 signaling in the pathogenesis of lymphoma.



**He, Yukai, MD, PhD**
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Dr. He studies the basic mechanisms of how vaccines activate the immune system and the innovative design of cancer vaccines. His research focus is on creation of cancer vaccines for melanoma and hepatocellular carcinoma in mice and on translation of animal studies into clinical applications.

**Horuzsko, Anatolij, MD, PhD**
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Dr. Horuzsko's studies focus on organ transplantation and the role of Human Leukocyte Antigen-G (HLA-G). His aim is to improve allograft survival in patients and address allergy, autoimmune diseases and graft-versus-host disease. His work in transplantation is relevant to cancer, but he also studies the inflammatory mechanisms of host defense and carcinogenesis.

**Korkaya, Hasan, DVM, PhD**
*Cancer Biology*, CN 2136
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Dr. Korkaya develops mouse xenograft models of human malignancies and uses these models to investigate the mechanisms of metastasis and therapeutic resistance. He aims to identify drivers of epithelial to mesenchymal transition and self-renewal in cancer stem cells. His lab showed that high levels of IL6 in tumors, promotes the metastatic phenotype and blocking this pathway is therapeutic in mouse preclinical models.

**Li, Honglin, PhD**
*Biochemistry*, CN 2176
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Dr. Li studies the roles of the Ufm1 conjugation system (a novel ubiquitin-like system) and its associated proteins in animal development, signal transduction, stress response and tumorigenesis.

**Liu, Kebin, PhD**
*Biochemistry,* CN 1173
Professor of Biochemistry and Molecular Biology
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A graduate of the University of Oklahoma, Dr. Liu studies epigenetic and genetic regulation of tumor suppressor gene expression, molecular mechanisms of apoptosis resistance in tumor immune evasion and escape, and development of molecular target-based chemotherapy to enhance the efficacy of cancer immunotherapy.

**Lokeshwar, Bal, PhD**
Director, Graduate Program in Biochemistry and Cancer Biology
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The research program is focused on two aspects of cancer: cancer prevention using natural products and understanding the mechanism of cancer progression leading to metastasis. Current projects in his laboratory investigate the role of CXC chemokines and their receptors (CXCRs) that contribute to cancer progression and metastasis. The laboratory is engaged in translational research, where the group is investigating novel compounds isolated from dietary spices that may prevent cancer development and enhance response to existing therapy for prostate and breast cancers.

**Lokeshwar, Vinata, PhD**
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The major focus of the laboratory is to examine how extracellular matrix-driven tumor cell signaling promotes tumor growth, metastasis and angiogenesis. The emphasis is to discover and validate accurate diagnostic and prognostic biomarkers for prostate, bladder and renal cell carcinomas and to design biomarker-driven targeted treatments and chemodietary prevention strategies for metastatic cancers. The laboratory provides training in translational research and a collaborative atmosphere.

**Manicassamy, Kumar, PhD**
*Cancer Biology*, CN 4158A
Professor, Biochemistry and Molecular Biology

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Dr. Manicassamy is examining critical mechanisms that regulate adoptive immune responses at the mucosal surfaces of the gastrointestinal tract. His research will shed light on interactions between commensal microorganisms and how these interactions can become dysfunctional to cause increased risk of inflammatory bowel disease and colon cancers.

## Martin, Pamela, PhD

*Biochemistry,* CN 1160
Associate Professor, Biochemistry & Molecular Biology, and Ophthalmology
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Dr. Martin's focus is on the discovery and analysis of novel biochemical transporters and receptors in retina which may be useful in the development of new therapeutic targets in the treatment and prevention of diabetic retinopathy.

## Mivechi, Nahid, PhD

*Cancer Biology*, CN 3153
Professor, Radiology/Radiation Oncology, Molecular Chaperone Biology
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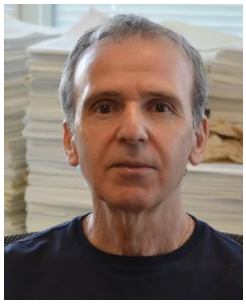
Dr. Mivechi's laboratory focuses on understanding the molecular mechanisms of stress response using genetically engineered mouse models and zebrafish. The comparison between conserved biochemical and molecular pathways in mice and zebrafish facilitates understanding of how animals and thereby humans respond and cope with their environment.



## Moskofidis, Dimitrios, MD

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Dr. Moskofidis explores basic processes in the immune response against acute and persistent viral infections in well-established mouse models, with long-term goals of developing or improving vaccination strategies for the prevention and treatment of viral infections in humans. He also studies molecular chaperones in cancer and neurodegenerative diseases.

## Munn, David, MD

Senior Advisor to Cancer Center Director
*Cancer Biology*, CN 4141
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Dr. Munn's lab studies mechanisms that suppress the immune system, making the body tolerant of a malignancy. He has identified the enzyme indoleamine 2,3-dioxygenase (IDO) as a linchpin for suppression and opened the way to novel strategies to block its activity. Research interests include macrophage and dendritic cell differentiation; regulation of T cell activation, IDO and trp metabolism; clinical trials of IDO inhibitors in cancer, HIV.

**Nagendra, Singh, PhD**
*Biochemistry*, CN 1176
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There are 10 times more bacteria in our gut than the total number of cells in our body. Within this "gut microbiota" are bad bacteria that can induce inflammation and cancer, but also good bacteria that are protective. Research in Dr. Singh's laboratory focuses on how metabolites from good bacteria interact with host genes such as Gpr109a, Gpr43 to induce anti-inflammatory mechanisms such as tolerogenic dendritic cells, induction of T-regs, inhibition of inflammatory cytokines.

**Pace, Betty, MD**
Francis J. Tedesco, MD Distinguished Chair in Pediatrics
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The Pace laboratory conducts research related to the developmental regulation of globin gene expression using primary erythroid progenitors. The major effort has been the role p38 MAPK cell signaling in drug-mediated fetal hemoglobin induction as a treatment for sickle cell disease. The laboratory also has conducted high throughput drug screens to identify novel gamma globin inducers. Genome-wide studies are being conducted to identify genetic modifiers of fetal hemoglobin.

**Prasad, Puttur, PhD**
*Biochemistry,* CN 1163
Prof of Obstetrics and Gynecology
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Dr. Prasad studies the nutrient and drug transporters in the placenta as well as post-partum depression.

**Saini, Sharanjot, PhD**
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Our research program is primarily focused on delineating the molecular mechanisms driving progression, recurrence and metastasis of urological malignancies, with a major focus on prostate cancer. Specific areas of interest include (i) Elucidating novel non-coding RNAs/microRNAs-mediated signaling pathways instrumental in cancer progression, recurrence and metastasis. (ii) Identification and validation of novel exosome/extracellular vesicle (EV)-based markers for better diagnosis and prognosis. Long term goals include identifying better biomarkers for advanced disease and seeding development of novel therapeutic strategies against metastatic disease.

**Sakamuro, Daitoku, PhD**
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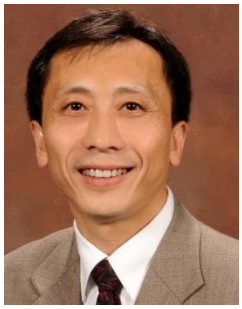
The Sakamuro laboratory is interested in the signaling mechanisms by which advanced cancer cells acquire resistance to DNA damage, p53-dependent apoptosis, and substratum dissoc-iation stress, and reverse EMT. One focus is the dual roles of the c-MYC transcription factor in genomic instability and DNA damage resistance. Another is the mechanisms of apoptosis induced by the p53 tumor suppressor in the presence of chromatin remodeling factors.



**Shi, Huidong, PhD**
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Dr. Shi studies epigenomics, and development of high-throughput technologies for dissecting the complex epigenetic regulation in normal and tumor cells. Epigenetics is heritable chromatin organization and gene expression not coded by DNA sequence. While epigenetics refers to the study of single genes or sets of genes, epigenomics is the global analyses of epigenetic changes across the genome.

**Thangaraju, Muthusamy, PhD**
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Dr. "Raju" is interested in the role of plasma membrane transporters in the uptake of histone deacetylase (HDAC) inhibitors into tumor cells; Relevance of these transporters to tumor suppression in mammary gland via HDAC inhibition; Physiologic role of these transporters in apoptosis during mammary gland involution; Epigenetic mechanisms for silencing of these transporters in breast cancer.

**Thompson, Stuart, PhD**
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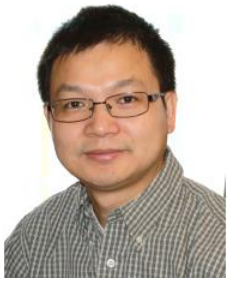
My lab studies Campylobacter and Helicobacter, bacteria that cause gastroenteritis and gastric cancer, respectively. We use molecular and biochemical techniques to elucidate the mechanisms by which these pathogens cause disease. Specifically, we study gene regulation events that link motility with formation of biofilms, bacterial communities that resist antibiotics and the host immune system.



**Yan, Chunhong, PhD**
*Cancer Biology*, CN 2134
Associate Professor
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Dr. Yan's lab utilizes biochemical approaches and genetically-engineered mouse models to study tumor suppressor networks and understand how cancer is generated and progressed. Current interests include the p53 pathway and protein modifications (e.g., ubiquitination and acetylation) in cellular responses to DNA damage and metabolic stresses. He is also interested in developing novel therapeutic strategies targeting aberrant protein translation in cancer.