



THE UNIVERSITY OF ARIZONA
COLLEGE OF MEDICINE TUCSON

Cellular & Molecular Medicine

Summer Research Opportunities



Summer 2022

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Research Projects for Amrita Scholars

Hina Arif-Tiwari (in-person)

Associate Professor and Chief of the Division of Abdominal Imaging at University of Arizona, Department of Medical Imaging, University of Arizona Cancer Center

With a self-described “passion for science,” Dr. Arif-Tiwari’s mission is to improve the health outcomes of patients with severe and life-threatening abdomino-pelvic conditions. She specializes in image guided biopsies and interventions involving non-invasive, advanced MRI techniques. Her main areas of interest include rectal cancer, prostate cancer and Pancreatic Ductal Adenocarcinoma, an aggressive form of pancreatic cancer with a high fatality rate.

Alfred Bothwell (in-person)

Professor of Immunobiology, University of Arizona

Project 1: Immune Responses to Solid Tumors

Recent research has identified mechanisms that via Wnt signaling contribute to tumor formation and metastases. We will do literature reviews and discuss experiments to further test current hypotheses. Current experimental methods include genetic models of mouse tumorigenesis and experiments with human xenografts or organoids in immunodeficient mice.

Project 2: Identification of molecular structures driving chronic Leishmania major infection in BALB/c mice.

Mutations in parasites and in mice are used to identify the molecular structures and important cell types that regulate infections of parasites.

Zelieann R Craig (in-person)

Assistant Dean for Research, College of Agriculture and Life Sciences, Director of Graduate Studies - ACBS Program, Associate Professor School of Animal & Comparative Biomedical Sciences

Dr. Craig offers an in-person research opportunity to work on animal or human cell-based experiments aimed at understanding how human relevant exposures to phthalates affect ovarian gene and protein expression.

Anne Cress (in-person or virtual)

Deputy Dean for Research Affairs at the College of Medicine, Professor, Cellular and Molecular Medicine.

Blocking the muscle invasion of epithelial lethal cancers: Defining the molecular mechanisms of tumor invasion into and through muscle, this is a major gap in our knowledge for detection and prevention of high-risk forms of prostate, bladder and ovarian cancer. Dr. Cress studies an integrated mechanism whereby integrin mechano-sensing adhesion complexes are molecular switches responsible for cancer invasion into and through muscle to reach a metastatic destination.



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Nicholas Delamere (in-person)

Department Head and Professor of Physiology, Professor of BIO5 Institute and Ophthalmology

Dr. Delamere's research is focused on the eye, studying lens physiology, the control of intraocular pressure, and regulation of Na,K-ATPase activity. His laboratory is currently focused on the mechanosensitive properties of two ion channels TRPV1 and TRPV4, and connexin hemichannels. These channels enable cells to sense and responding to tiny distortions of the plasma membrane. They may serve as pressure sensors in the eye.

Carol Gregorio (in-person)

Department Head and Professor of Cellular and Molecular Medicine, Co-Director of the Sarver Heart Center, Director of Molecular Cardiovascular Research, Professor of BIO5 Institute and Molecular and Cellular Biology

Dr. Gregorio's research laboratory is focused on identifying the components and molecular mechanisms regulating cytoskeletal architecture in cardiac and skeletal muscle during normal development and in human disease.

Julie Ledford (in-person)

Associate Professor, Cellular and Molecular Medicine

Dr. Ledford has just discovered that the native Angiotensin-(1-7) peptide is protective against *Mycoplasma pneumoniae* infections by decreasing inflammation while promoting pathogen clearance by macrophages. The Ledford laboratory is now seeking to determine if: 1) Angiotensin-(1-7) analogs will be active in these areas as well, which could lead to new therapeutic development and 2) will this mechanism of action be applicable to different respiratory pathogens, such as rhinovirus. Experiments will involve live animal models, BSL2 agents and *in vitro* cell culture of macrophages.

Sriram Lyengar (Phoenix) (in-person)

Associate Professor of BIO5 Institute, COM (Phoenix)

Dr. Lyengar's research work has been focused on improving community health and addressing health inequity, in global and US contexts by technology mediated tools including mHealth on smart phones.

Ghassan Mouneimne (in-person)

Associate Professor of Cellular and Molecular Medicine, University of Arizona Cancer Center

Dr. Mouneimne's research is focused on understanding how the structural organization of the cytoskeleton influences the behavior of cells and how aberrations in this organization could promote pathological behaviors such as cancer cell invasion. Additionally, the laboratory is interested in how the cytoskeleton regulates the response of cancer cells to their microenvironment leading to long-term phenotypic changes that dictate their future metastatic behavior.



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Janko Nikolich-Zugich (in-person)

Department Head and Professor of Immunobiology, Co-director Arizona Center on Aging, Professor of BIO5 Institute

Dr. Nikolich-Zugich research interests include basic mechanisms of T-cell function, immunity to infection in older adults, vaccines and biomarkers of declining immunity in the elderly, immune rejuvenation, immune monitoring in chronic conditions of aging and the impact of inflammation and nutritional intervention in aging, immunity and metabolic disorders.

Ritu Pandey (in-person)

Research Assistant Professor of Cellular and Molecular Medicine, University of Arizona Cancer Center

The Pandey laboratory studies gastrointestinal tumors for underlying molecular events and biomarkers in tumor cells by integrated analysis of molecular data from multi-omics projects. It is a data driven research. The current project is to study molecular and immune markers in colon tumors that are stratified by key driver mutations and other tumor parameters. Basic familiarity with bioinformatics data analysis tools is preferred.

Gregory Rogers (in-person)

Associate Professor of Cellular and Molecular Medicine, Associate Head for Faculty Development, Associate Professor of Molecular and Cellular Biology and BIO5, University of Arizona Cancer Center

Dr. Roger's laboratory is interested in the molecular mechanisms that cells use to maintain stability of their genomes. Genomic instability is a hallmark of cancer. The Rogers laboratory studies how cells regulate duplication of the centrosome because cancer cells frequently alter their centrosome numbers, leading to defects in cell division, genomic instability and malignant transformation.

Gregory Thatcher (in-person)

Professor Pharmacology and Toxicology, Professor & R. Ken and Donna Coit Chair in Drug Discovery

Thatcher's trainees receive a multidisciplinary education in modern aspects of medicinal chemistry, chemical biology, and chemical toxicology: the underpinning of drug discovery and development. Students who graduate with expertise in synthetic medicinal chemistry will have competency in another area, such as drug metabolism and pharmacokinetics; and students who graduate with expertise in cell/molecular biology or biochemistry will be experts in bioassay design and have competency in drug discovery.

Curtis Thorne (virtual)

Assistant Professor of Cellular and Molecular Medicine, BIO5 Institute, University of Arizona Cancer Center

The Thorne laboratory is focused on discovering cellular communication mechanisms controlling cell fate, self-organization and disease progression of regenerative tissues by combining chemical biology and computer vision approaches.



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Live and Work in Tucson and the Southern Arizona Region

Tucson is situated in the Sonoran Desert ecoregion with a wealth of natural and cultural attractions and opportunities. A diverse community near an international border, anchored by the University of Arizona. A growing, yet affordable city with easy access to year-round outdoor opportunities.

<https://www.visitucson.org/>

Todd Vanderah (in-person or virtual)

Department Head of Pharmacology, Co-Director MD/PhD Dual Degree Program, Professor of Anesthesiology, BIO5 Institute, Neurology, Pharmacology and Physiological Sciences

Dr. Vanderah studies the mechanisms and pharmacology of acute and chronic models of pain; endogenous opioid systems; sensory neural systems; opioid tolerance; antinociceptive synergy between cannabinoids and opioids.

Donata Vercelli (in-person or virtual)

Professor of Cellular and Molecular Medicine, Associate Director of the Asthma and Airway Disease Research Center, Director of the Arizona Center for the Biology of Complex Diseases, Professor of BIO5 Institute and Genetics GIDP

Dr. Vercelli's research seeks to elucidate the impact of environment, genes and development on the pathogenesis of complex diseases, particularly asthma and allergy. To this end, Dr. Vercelli has developed powerful human models that link epigenetic modifications in neonatal immune cells to risk of asthma during childhood, and mouse models that identify and characterize asthma-protective environmental exposures.

Yana Zavros (virtual)

Professor and Associate Head for Research of Cellular and Molecular Medicine, Director of Tissue Acquisition and Cellular/Molecular Analysis Shared Resource

Dr. Zavros studies gastric wound healing, *Helicobacter pylori* pathogenesis and the mechanisms of gastric and pancreatic cancer development. The laboratory's translational projects have focused on generating 3-dimensional organoids from patient tissues and using these for: 1) studies of the tumor-immune cell interactions, and 2) the development of predictive models of targeted therapies for cancer patients.

Frederic Zenhausern (Phoenix) (virtual or in-person)

Interim Co-Chair of the Department of Basic Medical Sciences, Director of the Center for Applied NanoBioscience and Medicine

Dr. Zenhausern's research interests comprise of technology development for molecular diagnostics and advanced bioanalytical techniques for early detection, biomarkers discovery and assay development for studying human host-microbiome interactions, infections, neuroscience and cardiovascular diseases. Nanobioscience and microfluidics enable automation of sample preparation suitable for point-of-care diagnostics and global health. Radiomics and physical sciences in oncology also enable precision health.

