Research Faculty Handbook

UC RIVERSIDE
School of Medicine

Family Medicine



Moazzum Bajwa, MD, MPH (Associate Clinical Professor, Health Sciences; Director, Longitudinal Ambulatory Care Experience (LACE); Director, HEAL Social Medicine Fellowship

Research Areas: Medical Education, health equity, community health



Kenneth Ballou, MD (Program Director, Family Medicine Residency and Health Sciences Clinical Professor; Clerkship Director, Family Medicine)

Research Areas: Clinical skills, family medicine, medical education



Michelle Bholat, MD, MPH (Professor & Chair, Family Medicine, UC Riverside School of Medicine)

(Former Vice Chair for Clinical Affairs and Justice, Equity, Diversity, and Inclusion [JEDI], David Geffen School of Medicine at UCLA)

Research Areas: Pre-residency pipeline programs, Public and Population Health, Substance Use Disorders, Graduate Medical Education

Dr. Bholat's research focuses on strengthening pre-residency pipeline programs, advancing public and population health, and expanding graduate medical education for underserved communities. Board certified in Family Medicine and board eligible in Addiction Medicine, she has served as site director and Principal Investigator for grants and clinical trials addressing physician workforce diversity, chronic disease, and substance use disorders, including pharmacologic and behavioral interventions for methamphetamine, cocaine, and opioid use disorders. As co-founder and former Executive Director of the UCLA International Medical Graduate (IMG) Program, she built a pathway integrating bilingual, Spanish-speaking physicians into California family medicine residencies and safety-net clinics and helped expand several ACGME-accredited programs in family medicine. She is particularly interested in interdisciplinary collaborations involving pre-residency pipeline development, graduate medical education, substance use disorders, physician workforce development, health equity, and community-engaged research.



Marc Debay, MD, MPH, PhD (Health Sciences Clinical Professor)

Research Areas: Patient-centered primary care, program evaluation, quality improvement

Dr. Debay's extensive international public health expertise includes reproductive, maternal and child health, HIV/AIDS and other infectious diseases, behavior change communication, and health systems strengthening. He has broad experience in program design, implementation, and evaluation at the community, district, national and international levels with a variety of government, academic and private organizations. He has served in more than 30 countries in Africa, Asia and the Middle East.



Hanh The-Trinh Nguyen, MD, FAAFP (Clinical Professor, Health Sciences; Associate Dean for Career Advising)

Research Areas: Graduate and Undergraduate student mentorship, Pipeline programs

Dr. Nguyen is passiontate about the mentorship of residents, medical students, undergraduate students applying to medical school and high school students interested in careers in medicine. At UCR School of Medicine, he has mentored students through UCR Mini Medical School (MMS) and helped guide other students applying to medical school.

Medicine



Rajesh "Robby" Gulati, MD (Senior Associate Dean, Graduate Medical Education; Designated Institutional Official, UCR SOM; Chief Educational Liaison, RCH/UCR SOM; Sub-I Clerkship Director; Interim Chair, Department of Medicine)

Research Areas: Medical education, residency training, internal medicine, public health

Dr. Gulati's research interests span clinical medicine, medical education, and public health. His scholarly work includes publications in peer-reviewed journals on topics ranging from anticholinergic cognitive impacts to clinical complications related to chemotherapy. He has been involved in quality improvement projects and has contributed to the training of the next generation of physicians through his mentorship and guidance.

A passionate advocate for diversity and inclusion in medical education, Dr. Gulati has actively worked on initiatives to enhance opportunities for underrepresented students and

faculty in medicine. His contributions to UCR, coupled with his dedication to patient care and education, continue to shape the next generation of healthcare providers and leaders.



Remus Popa, MD (Clinical Professor)

Research Areas: Quality improvement, high value care, health systems science



Michelle Porche, **Ed.D.** (Professor-in-Residence; Director Clinical Faculty Research Development and Scholarly Activity)

Research Areas: mental health across the lifespan, health services research, trauma and ACEs, substance-use disorders, justice involvement and health outcomes, discrimination including immigrant and refugee experiences, structural determinants of health, community engaged research

Dr. Porche has conducted numerous studies to investigate the impact of adverse childhood experiences (ACEs) and trauma on both youth and adult mental health and life course outcomes. These include investigation of the impact of interpersonal, community-based, and political violence-related trauma experiences, substance use disorders and justice involvement, and the impact of discrimination and structural determinants of health. Current work includes NIH and SAMHSA funded projects, as well as a faculty role on a T-32 for early career investigators in addiction medicine. She has expertise in working on complex mixed methods studies individuals across the lifespan, as well as investigations using secondary data, with a strong track record of successful and productive collaboration with leaders in various fields for multi-disciplinary projects examining early and ongoing adversity related to mental health, health services use, and psychological outcomes.



Robert M. Rodriguez, MD (Associate Dean for Clinical Research)

Research Areas: Public health, emergency medicine, clinical decision rules, cardiac resuscitation, trauma, vaccine surveillance and health, Latino/a and Indigenous population health, immigrant health

Dr. Rodriguez recognizes the pivotal role emergency departments play as the “safety net of the safety net.” Much of his research centers on emergency healthcare access and public health interventions for underserved populations. He is also the PI of the NEXUS network of trauma center investigators, which has developed the NEXUS clinical decision instruments to guide selective imaging in trauma.

Maternal Family Medicine



Brenda Ross-Shelton, MD (Associate Clinical Professor, Maternal-Fetal Medicine, Interim Chair Department OBGYN, Director UCR Breastmilk Depot)

Research Areas: Maternal-fetal medicine, wellness among disenfranchised women, maternal health disparities, breastfeeding outcomes, intrauterine metformin exposure

I am passionate about conducting research that promotes wellness among disenfranchised women and reduces maternal-child health disparities. My interests include improving breastfeeding outcomes among women of color, addressing barriers to maternal health, and exploring how prenatal factors such as intrauterine metformin exposure shape neonatal immune function and future health outcomes.

Pediatrics



Sasidharan Ponthenkandath, MD, FAAP (Chair and Professor of Clinical Pediatrics; Professor of Pediatrics and Founding Chair)

Research Areas: Pediatrics, Neonatal outcome based research, role of vitamin D deficiency in preterm infants, novel therapeutic approaches to Congenital Diaphragmatic Hernia, neuroprotective strategies in neonatology

Dr. Sasidharan's research work addresses a wide range of pediatric and neonatal subjects. His research interests were in neonatal control of breathing and pulmonary mechanics.

Psychiatry and Neuroscience



Lama Al-Khoury, MD (Full Clinical Professor of Neurology)

Research Areas: Stroke & Cerebrovascular Disease, Stroke prevention, Headaches

Dr Lama Al-Khoury is a board-certified neurologist who is fellowship trained in Stroke and Cerebrovascular disease and who is UCNS board certified in Headache Medicine. She is the Director of the Neurology Clerkship for the third-year medical students at UCR School of Medicine (UCR SOM), Director for Palliative Care Thread at UCR SOM, and Block-5 co-director for the first-year medical students at UCR SOM. Dr Al-Khoury is a voting member on various administrative and education committees at UCR SOM and is an

effective member on the Curriculum Enhancement task force at UCR SOM (EVOLVE). In addition to her administrative roles, she has been heavily involved in medical education, as a very effective faculty teacher/instructor in the outpatient and inpatient setting and as an assigned mentor/advisor for medical students and residents.

Dr Al-Khoury has been involved in research projects in Stroke & Cerebrovascular disease, Headache Medicine, Vascular Dementia, and other neurological conditions.



Dennis B. Alters, MD (Health Sciences Clinical Professor, Director for Continuing Medical Education, Co-chair for Neuroplasticity Planning Committee)

Research Areas: psychodynamic, cognitive, behavior, family systems, play, art, psychopharmacology; inpatient, residential and outpatient psychotherapy for children, adolescents and families, neuroplasticity, swimming dynamics

He is the founder of Wizard's Way Publications, a full-therapy management program for children ages 4 to 14 that combines cognitive, behavioral and psychodynamic treatments into a playful game like adult and child friendly format.



Robert Castaños, MD (Health Sciences Associate Clinical Professor)

Research Areas: Trans-cultural psychiatry, refractory and bipolar depression, and health disparities

Dr. Castaños has interests in trans-cultural psychiatry, the treatment of refractory and bipolar depression, and health disparities and access. He has presented posters on "Pharmacogenetic Testing to Illustrate Unique Response to Opiates in Refractory Depression." "A Review of the Challenges of Treating Bipolar Depression," and “Acute, atypical psychosis suggestive of temporal lobe epilepsy following single injection of diphenhydramine and prednisolone” at meetings of the American Psychiatric Association.



Deborah Deas, MD, MPH (Vice Chancellor for Health Sciences & Dean; Mark and Pam Rubin Dean of the School of Medicine)

Research Areas: Pharmacotherapy, psychosocial treatment of substance use disorders, ADHD, anxiety disorder

Her research interests include pharmacotherapy and psychosocial treatments for adolescents and adults with substance use disorders, attention deficit hyperactivity disorders (ADHD) and anxiety disorders. She has received NIH funding (R01) as well as industry funding for her research and has published articles in several peer-reviewed journals.



Christopher G. Fichtner, MD (Health Sciences Clinical Professor; prior Interim Chair of Psychiatry and Neuroscience)

Research Areas: Community Psychiatry and medical administration, real-world practice, naturalistic outcome

Involved from the outset in developing the UCR psychiatry residency training program in collaboration with Riverside County, Dr. Fichtner has a longstanding interest in public-academic partnerships to improve mental health services. In alignment with the UCR School of Medicine mission, he and his colleagues at UCR Health are working to expand healthcare access for underserved communities through telepsychiatry and physician workforce development.



Lisa R. Fortuna, MD, MPH, M.Div (Chair and Professor)

Research Areas: Equity, diversity and inclusion; pediatric mental health; adverse childhood experiences; mental health and substance use; digital health; health disparities; health, immigration, substance use, race-ethnicity, racism and anti-racism, families; immigrant youth and families; religion

Her career has focused on improving access to mental health services for traditionally underserved communities. She has over 100 publications and has been a principal investigator of national and international research, funded by the NIH, PCORI and foundations. This research includes innovative models for addressing mental health care for PTSD and substance use disorders and, digital health interventions for adults, youth, and immigrant families. Community partnered research is at the center of her work and in 2023 this has culminated in an NIH funded Community Partnerships for Science and Society (ComPASS) Award titled, Somos Esenciales: Community Revitalization and Health through Latino Arts and Entrepreneurship.



David Franklin, PsyD, MHA (Health Sciences Full Clinical Professor)

Research Areas: Treatment of stuttering, concussions, and dementia

Franklin has conducted research in the use of Pagoclone, Olanzapine and Risperidone in the treatment of stuttering as well as on concussions and dementia. He was the assistant director of the UCI Stuttering Center and co-founding director of the UCI Comprehensive Sport Concussion Program.



Kevin Gutierrez, MD, MS (Assistant Professor of Health Sciences; Program Director, Public Psychiatry Fellowship Program)

Research Areas: social movement psychiatry; critical health humanities in medical and psychiatric education; decolonial and liberatory approaches to psychiatry; dialectical methodology in psychiatry

Dr. Gutierrez is a psychiatrist, individual and group psychotherapist, and critical health humanities scholar whose work has focused on the integration of critical health humanities disciplines into the clinical practice of psychiatry and medical/psychiatric education. His current work orients towards the conceptualization of a social movement psychiatry – a reformulation of psychiatry from individual patient care to the care of entire communities as they engage in self-determined social movement (particularly in immigrant justice).



Mahsa Khayat-Khoei, MD (Assistant Professor of Clinical Neurology)

Research Areas: Stem cell and regenerative medicine; regenerative and translational research with an emphasis on disease mechanisms; immunology; autoimmune diseases of the central nervous system

Dr. Mahsa Khayat-Khoei is a fellowship-trained neuroimmunologist dedicated to advancing care for patients with multiple sclerosis (MS), neuroimmunological conditions, and headaches. Her approach to medicine is rooted in compassion, collaboration, and empowering patients to take an active role in their health. In addition to her clinical practice, Dr. Khayat-Khoei conducts research focused on the pathology of MS and the development of new treatments through immunology and regenerative medicine. Her research has been focused on using human stem cell-derived neuronal cells to model and study human diseases in vitro using microelectrode array systems.



Richard J. Lee, MD (Health Sciences Associate Clinical Professor; Program Director, Child and Adolescent Psychiatry Fellowship Program)

Research Areas: Psychopathology, autism, post-traumatic stress disorder (PTSD), cross-cultural psychiatry



Stephen M. Stahl, MD, Ph.D., D.Sc., D.Med.Sci (Health Sciences Clinical Professor; Distinguished Health Sciences Clinical Professor of Psychiatry and Neurosciences)

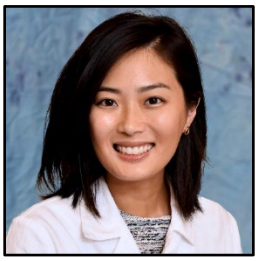
Research Areas:



Peter Ureste, MD (Health Sciences Associate Clinical Professor; Residency Program Director)

Research Areas: Geriatric psychiatry, academic medicine

His professional interests include professional identity formation, trauma-informed medical education, public psychiatry, and mentoring trainees from historically excluded backgrounds.



Toshia Ann Yamaguchi, MD (Health Sciences Associated Clinical Professor)

Research Areas: Whole-person psychiatry, child and adolescent psychiatry, medical education, diversity, LGBTQ+ mental health care.

Social Medicine, Population, and Public Health



Brandon J. Brown, MPH, PhD (Professor; Faculty Director of CAMP, Board Chair of TruEvolution)

Research Areas: Ethics of participant payment, HIV and aging, impact of grant terminations, journey in science, enhancing community engagement in research

Brandon Brown teaches public health and biomedical ethics, mentors students, leads the Louis Stokes Alliance for Minority Participation (CAMP) program at UCR, and conducts community based participatory research on HIV. Brandon is particularly interested in decision making for payment to participants in research, and recently worked to update the international HIV prevention research ethics guidelines.



Michelle C. Burroughs, DHA, MPH (Director of Community Engagement and Outreach for the Center for Healthy Communities; Health Sciences Assistant Clinical Professor; Faculty, Community Engagement & Partnership, the Program in Medical Education (PRIME) LEAD-ABC

Research Areas: Trauma, health inequity, Black perspectives



Ann M. Cheney, PhD (Professor; Director, Designated Emphasis in Medical Spanish; Faculty Director, Coachella Valley Free Clinic)

Research Areas: Structural inequalities in health; Latino and Indigenous Mexican immigrant health; farmworker health; mental health and substance use

Dr. Cheney has conducted research with disadvantaged populations in rural communities, including African Americans, Latino immigrants, and indigenous Mexicans. Her work addresses structural inequality in health and she uses community based participatory methods to empower grassroots leaders to use research as a vehicle to activate communities and change narratives of health and wellbeing. Dr. Cheney's current work focuses on the impact of structure in health with a focus on Latinx and Indigenous Mexican immigrant farmworkers in rural southern California.



Mario Sims, PhD, FAHA (Distinguished Professor; Faculty Director of the Master of Public Health Program)

Research Areas: Social epidemiology, health disparities, cardiovascular disease epidemiology, social determinants of health

Dr. Sims' current research focuses on understanding the social and psychosocial determinants of cardiovascular disease (CVD) disparities, with a specific interest in examining the extent to which racism, stress, residential segregation, and psychosocial factors (e.g., resilience) influence CVD disparities. He has been the PI of NIH funding related to the social determinants of health and resilience and CVD among African American adults.



Andrew Subica, PhD (Professor)

Research Areas: The intersection of health and mental health disparities among vulnerable populations; indigenous-colonized group health; persons of color health; psychiatric disability and health; survivors of trauma; individuals experiencing homelessness, refugee health

Dr. Subica is particularly concerned with improving evidence-based treatments, services, and public policies for underserved individuals using community-based participatory action research, deliberative, and mixed methodologies. Other areas of study include cultural trauma, multiracial identity and well-being, clinical assessment, and spirituality for culturally responsive stress coping and wellness.



Rosemary Tyrrell, EdD (Director of the Office of Faculty Development; Health Sciences Associate Clinical Professor)

Research Areas: Scholarship of teaching and learning

Dr. Tyrrell's scholarship focuses on the design and study of pedagogical approaches that improve teaching and learning in medical education, with particular interests in faculty development, inclusive teaching, and educational change. As part of an international research team, she has contributed to defining immersive learning as a distinct pedagogical practice and examining its application in education. Her collaborative scholarship also addresses student resistance to learning, the use of artificial intelligence to support learning and assessment, and psychological safety in learning environments. Additional work focuses on curriculum development and educational strategies designed to create more inclusive learning environments, including preparing learners to better meet the needs of deaf and hard of hearing patients.



Mark Wolfson, PhD (Chair and Professor; William R. Johnson Jr. and S. Sue Johnson Endowed Chair)

Research Areas: Public health; prevention; policy; community organizing; health equity; Alcohol, Tobacco, and other Drug Use and Problems; social movements

My research focuses on the role that structural factors--such as public policies--play in understanding patterns of substance misuse and related problems at the population level. My sustained interest in this area stems from my doctoral training as a sociologist, as well as my conviction that these structural factors can (1) exert a powerful influence on

behavior, and (2) be modified in order to change harmful patterns of behavior and reduce health inequities. I have led a number of multi-community intervention trials that partnered with local communities to implement and test the effectiveness of community-level changes. I strive to conduct research that will have a favorable impact on policy and on public health.

Biomedical Sciences



Devin Binder, MD, PhD, Professor, Biomedical Sciences

Research Areas: Neuroscience, astrocytes, seizure, Fragile X, neurological treatment, neurological disease

Our laboratory mission is to apply new discoveries from the basic sciences of glial-neuronal interactions and neurophotonics to create new ways to diagnose and treat neurological diseases. In the collaborative environment of UCR, we are pursuing multiple basic and applied science projects to this end.

https://www.binderlab.com/



Monica Carson, PhD, Professor and Chair, Biomedical Sciences; S. Sue Johnson Presidential Endowed Chair in Glial-Neuronal Interactions

Research Areas: Glial-neuronal interactions, microglia, neurodegeneration, autoimmunity

We integrate both molecular and systems based approaches to define microglial contributions toward onset, progression and severity of classic neurologic and neurodegenerative diseases as well as to identify molecules and pathways that could be targeted therapeutically. Specifically, as part of discovery-based and hypothesis-based approaches, we use *in vivo, ex vivo* and *in vitro* model systems as well as human IPSC-derived microglia from individuals with and without mutations in microglial expressed genes. By contrasting microglial responses across the lifespan, we seek to define clinically relevant measures of microglial responses predictive of age-dependent risk and age-specific consequences contributing to poor progression following infection, traumatic brain injury and environmental exposure.

https://microglia.ucr.edu/

https://cgni.ucr.edu/



Djurdjica Coss, PhD, Professor, Biomedical Sciences; Associate Vice Chancellor for Research

Research Areas: Endocrine system, hormonal systems, neuroendocrine, pubertal disorders, hypothalamic-pituitary-gonadal axis, fertility, PCOS

Our research goal is to understand how the endocrine cell integrates the panoply of neuroendocrine and peripheral hormonal signals, in addition to metabolic cues and environmental insults, to result in the precise rhythm of synthesis and a delicate balance of hormones that regulate homeostasis. In particular, the Coss lab is interested to elucidate the regulation of reproductive function and studies the hormones of the hypothalamic-pituitary-gonadal axis and their cross talk with metabolic or inflammatory pathways in regulation of fertility. We aim to uncover fundamental processes controlling pubertal development, reproductive cyclicity in the female, and steroidogenesis and gametogenesis, to better understand disorders that lead to infertility, such as premature ovarian failure and polycystic ovarian syndrome (PCOS), that may lead us to identify prevention and treatment strategies. We are using a variety of in vitro and ex vivo approaches in cell lines and primary cells with integrative genome-wide, biochemical and cell and molecular biology methodologies to understand the regulation of reproductive fitness at the molecular level; and in vivo mouse models, knockouts and wildtypes, at the whole animal level to define the strategies used by the endocrine system to regulate the physiology of the organism.



Nicholas DiPatrizio, PhD, Professor, Biomedical Sciences; Director, UCR Center for Cannabinoid Research

Research Areas: Cannabinoids, endocannabinoids, obesity, metabolic conditions, gut-brain axis

The DiPatrizio Laboratory investigates the complex neurobiological and physiological mechanisms governing food reward, sensory processing, and energy balance, with a specific focus on how these pathways malfunction in metabolic disorders. To explore these systems, the lab utilizes a multidisciplinary approach encompassing advanced analytical chemistry (such as UPLC-MS/MS), cutting-edge genetics (including novel organ-selective knockout mice), and a variety of biochemical, surgical, pharmacological, and behavioral techniques. A primary research focus is on the endocannabinoid system and its influence on appetite, energy regulation, and reward, alongside the effects of cannabis exposure on health and disease. Ultimately, the lab aims to leverage these insights to develop safe, innovative therapies for metabolic disorders and related conditions.

https://cannabinoid.ucr.edu/



Iryna Ethell, PhD, Professor, Biomedical Sciences; Professor, Biomedical Sciences (Neuroscience)

Research Areas: Neuronal network development, neurodevelopmental disease, neurodegenerative disease, synapse formation

Research in my lab focuses on understanding how neuronal networks develop and maintain in the brain, with the goal of applying this knowledge to the development of therapeutics for neurodevelopmental and neurodegenerative diseases. We utilize new molecular and imaging approaches in neuroscience and mouse genetics to conduct research on the molecular and cellular basis of neurologic diseases. In particular, we are interested in molecular and cellular mechanisms that govern the synapse formation and plasticity in the brain areas that play a critical role in learning, memory and development.

https://ethell.ucr.edu



Martín I. García-Castro, PhD, Professor, Biomedical Sciences

Research Areas: Neural crest cells, neurodegenerative disorders, birth defects

Our laboratory focuses on understanding the cellular and molecular mechanisms that govern the formation and differentiation potential of neural crest cells (NCCs), a distinct population with a huge differentiation potential which is unfortunately associated with a large number of pathologies. We aim to uncover and characterize the time, tissues and molecular pathways regulating NCC formation. We have pioneered work analyzing earlier events in the formation of NCC in amniotes. We identified Pax7 as a critical transcription factor during early avian neural crest development. We developed a human model to investigate human NCC formation based in pluripotent stem cells and we are currently exploiting multiomic approaches to identify new players in NCC formation and their possible impact in associated pathologies. Our research challenges current dogmas and has established new paradigms for studying NCC development in diverse species (chick, mouse, rabbit, and human).



Xuecai Ge, PhD, Associate Professor, Biomedical Sciences

Research Areas: Neural development, neurological disorders, primary cilium, signaling errors, birth defects

We study the molecular and cellular mechanisms underlying neural development and their implications in neurological disorders. We focus on the primary cilium, a hair-like, microtubule-based organelle. Once dismissed as an evolutionary relic, the primary cilium is now recognized as the “antenna” of the cell that senses and transmits

extracellular cues into intracellular cell signaling to dictate cell behavior. Disruption of ciliary function leads to ciliopathies, a diverse group of genetic disorders frequently characterized by brain malformations and cognitive deficits. Despite this clinical link, the precise molecular roles of primary cilia in brain development and function remain poorly understood. Ultimately, we aim to elucidate the fundamental mechanisms of brain formation and uncover the molecular etiology of developmental disorders.

https://xgelab.org



Adam Godzik, PhD, Professor, Biomedical Sciences; Bruce D. and Nancy B. Varner Presidential Endowed Chair in Cancer Research

Research Areas: Structural bioinformatics, computational biology, AI, innate immunity, metagenomics, cancer

Dr. Godzik studies protein folding, power of distant homology recognition, the combination of structural and systems biology, the rules of evolution, and understanding diseases such as cancer through protein structures.



Milton Hamblin, PhD, Associate Professor, Biomedical Sciences; Vice-Chair, Division of Biomedical Sciences; Director, Biomedical Sciences Master's Program

Research Areas: Vascular biology, abdominal aortic aneurysms, stroke

Dr. Hamblin's research focuses on vascular biology and vascular remodeling-related pathophysiological diseases, including abdominal aortic aneurysms, vascular lesion formation, and stroke.

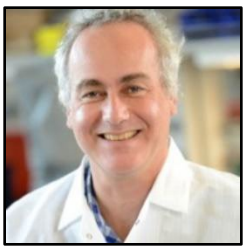


Erica Heinrich, PhD, Assistant Professor, Biomedical Sciences

Research Areas: Hypoxia, integrative physiology, control of breathing, high-altitude medicine, dyspnea, pulmonary physiology

The Heinrich Lab investigates physiological responses to hypoxia and high altitude. Understanding the diversity of physiological responses to high altitude will provide insights into how we respond to chronic hypoxia as a result of disease. Our primary goal is to determine how inflammatory pathways and immune cell phenotypes change during acute and chronic high-altitude exposure. Inflammation and tissue hypoxia are tightly linked, and hypoxia-induced inflammation may contribute to altitude-related diseases, cognitive impairments, and the process of acclimatization.

https://hypoxialab.ucr.edu/



Marcus Kaul, PhD, Professor, Biomedical Sciences

Research Areas: Infectious and inflammatory disease, neuroscience, neurodegenerative diseases, HIV-associated neurocognitive disorders and dementia, NeuroCOVID

Dr. Kaul and his laboratory study cellular and molecular mechanisms of host-virus interactions linked to neurodegenerative diseases, such as HIV-associated neurocognitive disorders and dementia, and NeuroCOVID. The research addresses mechanisms of chronic HIV infection and persistence, neuronal injury and death as well as neuroprotection, the role of interferon-β (IFNβ), cytokines, chemokines, acute phase proteins, such as lipocalin-2, lipid mediators, such as cysteinyl leukotrienes, and their receptors, the contribution of macrophages, microglia, and astrocytes, and their cellular signal transduction. Another focus is the influence of drug abuse on neural plasticity and host-pathogen interactions, in particular HIV-1 infection. A more recently evolving research area is mechanism of virus assembly.



Lidia Kos, Professor Biomedical Sciences, and Vice Provost and Dean of Graduate Studies

Research Areas: Developmental Biology, Pigment Cell Biology, Melanoma, Cardiovascular Biology, Heart Valves, Elastogenesis

My research uses the neural crest as a model system to understand the process of cellular differentiation. The primary focus is on melanocyte development and its associated pathologies — including pigmentation disorders and melanoma, where we study how melanocyte-lineage cells escape normal developmental controls to drive tumor growth, metastasis, and dormancy. In parallel, we maintain a strong interest in the cellular components of heart valves, particularly melanocytes, and their role in shaping valve structure and function during both development and homeostasis. Together, these two lines of work are united by a shared interest in how neural crest-derived cells are specified and functionally integrated across diverse tissues, and what happens when that regulation is disrupted.



Jean-Pyo Lee, PhD, Assistant Professor, Biomedical Sciences

Research Areas: Aging, neurological disease, inflammation, blood-brain barrier damage, neurovascular dysfunction

In Dr. Lee's laboratory, a primary focus lies in studying the intricate relationship between inflammation and different stages of neurodegenerative and neurovascular diseases. The team also explores the effects of stem

cells or drugs on neuroinflammation, emphasizing the importance of early administration of these interventions to attenuate neurovascular and neurodegenerative injuries. To achieve these objectives, the team employs a multidisciplinary approach, incorporating cellular, pharmacological, and genetic methods to effectively reduce inflammation and mitigate neurovascular injury during the initial stages of the diseases. The findings from these studies will contribute to the identification of novel drug targets for neurological diseases.



David Lo, PhD, Distinguished Professor of Biomedical Sciences; Director, BREATHE laboratory

Research Areas: Health disparities, environmental exposure, asthma, M cells, mucosal immune surveillance, mucosal epithelial barrier, transcytosis machinery, needle-free vaccine

In the region surrounding the Salton Sea, asthma is a significant medical burden among residents, who are predominantly Mexican immigrant agriculture workers. While there are a number of social and economic disparities that could potentially contribute to this health issue, we are testing the hypothesis that environmental exposure to dusts and related aerosols generated at the drying Salton Sea may be an important factor.

At mucosal surfaces, epithelial cells provide a tight barrier to entry into the body, but the immune system also induces the development of specialized epithelial cells called M cells to detect the presence of infectious organisms. These M cells are selective gatekeepers that capture particles such as viruses and bacteria for delivery to cells of the immune system waiting below the epithelial layer. Our laboratory has been studying the development of M cells and the mechanisms used by M cells in their surveillance of the mucosal tissues. Further uptake and transport of these particles remains to be fully understood, but we have shown that specific cellular machinery including tight junction proteins such as claudins are actively recruited into the uptake process. We have developed technologies to exploit this phenomenon for M cell targeting of mucosal vaccines, essentially providing a route for “needle-free” vaccination.



Declan McCole, PhD, Professor, Biomedical Sciences

Research Areas: Epithelial barrier function, inflammatory bowel disease, epithelial-macrophage cross-talk

Our lab uses a multidisciplinary approach to better understand the effects of inflammation on epithelial barrier function. We incorporate electrophysiology, molecular biology, biochemical and imaging approaches to better understand epithelial barrier and tight junction regulation in both *in vitro* and *in vivo* model

systems. We also translate our studies to human disease using intestinal biopsies from human IBD patients. In addition, we are investigating novel treatments to restore barrier function.



Meera Nair, PhD, Professor, Biomedical Sciences; Associate Dean for Biomedical Research

Research Areas: Immune response, immune dysfunction, metabolic disorders, inflammatory diseases, protective vs. pathogenic immune mechanisms

My lab investigates the immune response to injury, infection, and metabolic perturbations. This research area has high public health significance and relevance to multiple diseases because immune dysfunction is a main underlying component of infection, inflammatory diseases such as asthma and inflammatory bowel disease, but also metabolic disorders, such as obesity and diabetes. We aim to distinguish protective from pathogenic immune mechanisms that can be targeted for new therapies in infection, inflammation, and metabolic disease. As a scientist trained in both the fields of Microbiology and Immunology, my research has contributed to our understanding of host-pathogen interactions and immune mechanisms underlying optimal immunity to infection, inflammation and metabolic function.



Andre Obenaus, PhD, Professor, Biomedical Sciences

Research Areas: Traumatic brain injury, Alzheimer's disease, epilepsy, stroke (neonatal and adult), magnetic resonance imaging

The Obenaus research interests encompass mechanistic studies in a variety of acquired brain injuries, including neurotrauma, stroke, epilepsy, early life adversity, and Alzheimer's Disease (AD). We have strong interests in how the cerebrovasculature responds to brain injury and aging. We utilize state-of-the-art neuroimaging (magnetic resonance imaging; MRI; functional ultrasound, fUSI) in combination with molecular and cellular approaches to elucidate disease progression and putative interventions.



Scott Pegan, PhD, Professor, Biomedical Sciences; Associate Dean of Pre-Clerkship Medical Education

Research Areas: Drug discovery, infectious diseases, gene regulation,, systems biology, drug discovery, microbiology, immunology, structural biology, protein X-ray, molecular toxicology

Dr. Pegan's current research focuses on vaccine and therapeutic development against emerging and persistent pathogens of concern to the U.S. military and global communities. Dr. Pegan's approach involves gaining a greater understanding of the mammalian innate immune response and how it is modulated by often-fatal human pathogens such as certain nairoviruses and coronaviruses. His laboratory utilizes this knowledge to develop monoclonal antibody, vaccine and small molecule platforms for antiviral therapy development. Dr. Pegan also leverages structure based drug discovery to assist with therapeutic development for nerve and pesticide agent poisoning as well as cancer through collaborative efforts. Dr. Pegan uses various biochemical and biophysical methods to generate novel biologic and small molecule molecules of therapeutic value in order to address the current medical shortcomings.



Maurizio Pellecchia, PhD, Professor, Biomedical Sciences; Danieal Hays Endowed Chair in Cancer Research; Director, Center for Molecular and Translational Medicine; Pharmacology Thread Director

Research Areas: Drug discovery, cancer therapeutics, neuroprotection, protein-protein interactions in disease, chemical biology, pharmacology

Our laboratory focuses on the design, synthesis, and evaluation of novel pharmacological tools in the areas of cancer, neurodegeneration, and potentially other disease areas, using innovative drug discovery approaches. The overall goal of the laboratory is to bring together basic sciences including modern nuclear magnetic resonance spectroscopy (NMR) techniques, X-ray crystallography, computer modeling, medicinal synthetic chemistry, and cellular and in vivo pharmacology to elucidate the molecular basis of disease and to design novel pharmacological tools that serve for target validation and to develop novel therapeutic agents. A central theme of our laboratory is the development of novel methodologies to tackle protein-protein interactions (PPIs) as targets for drug discovery, and to further advance our most promising agents into potential therapeutics.



Rakesh Singh, PhD, Associate Professor

Research Areas: Neuroinflammation, psychoparmacology, GLP-1 agonists, gut-brain axis signaling

A trained pharmacist with a Ph.D. in Pharmacology from the University of Kansas, Dr. Singh specializes in medical education and translational research. His expertise includes curriculum development, integrated teaching methods, and fostering clinical reasoning. His research focuses on neuroinflammation,

psychopharmacology, GLP-1 agonists, and gut-brain axis signaling, with an emphasis on human-subjects studies to enhance student engagement.



Seema Tiwari-Woodruff, PhD, Professor, Biomedical Sciences; Director of Biomed Graduate Program

Research Areas: Neurodegeneration, inflammation, neural repair, multiple sclerosis, remyelination

Currently available immunomodulatory therapies for multiple sclerosis (MS) fail to ameliorate the pathogenesis of established axon degeneration and are only partially effective in preventing the onset of permanent disability. Identifying a drug that stimulates endogenous remyelination and spares axon degeneration would theoretically reduce the rate of, or even halt, disease progression. The Tiwari-Woodruff lab investigates mechanisms of demyelination-induced neurodegeneration and therapeutic neuroprotection using two demyelinating mouse models of MS: immune-mediated experimental autoimmune encephalomyelitis (EAE) and non-immune-mediated toxic cuprizone diet. Additionally, through continued collaborations with researchers at UIUC, UCLA, and pharmaceutical companies, the lab investigate therapeutic efficacies and mechanisms of action of various approved and potential MS drugs.



Emma Wilson, PhD, Professor, Biomedical Sciences; Associate Dean for Graduate Division

Research Areas: Immunology, parasitology, neuroscience

The primary focus of the lab is the immune response in the brain following *Toxoplasma gondii* infection. This is a common protozoa pathogen that infects all mammals and can cause severe pathology in the immune compromised human host. The parasite exists as intracellular cysts in the brain. There are currently no drugs that can remove cysts and the host is infected for life. Reactivation of cysts to fast replicating parasites causes cell death and fatal disease.

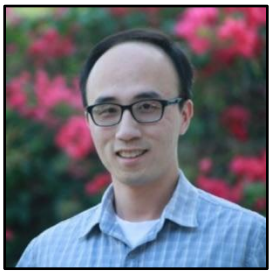
Toxoplasma infection is a rare example of a finely tuned immune response in the brain where there is a balance between control of the parasite and immunopathology. Understanding the mechanisms that control this balance may improve our ability to control an inappropriate immune response in the CNS.



Joy Xiang, PhD, Assistant Professor, Biomedical Sciences

Research Areas: Protein-RNA interactions, RNA viruses, nucleic acids chemistry, chemical biology, synthetic biology, functional genomics, high-throughput sequencing data analysis

Her current research focuses on understanding protein-RNA interactions and networks in virus infections, and developing novel nucleic acid based and RNA-targeting therapeutics. The Xiang Lab employs and develops transcriptomic methodologies, synthetic biology principles, and massively parallel reporter assays to tackle the complexities underlying disease-causing virus-host interactions.



Sika Zheng, PhD, Professor, Biomedical Sciences; Director, Center for RNA Biology and Medicine

Research Areas: Neuronal longevity, RNA, alternative splicing, nonsense-mediated mRNA decay, ribogenomics, neuroscience, neural development, axon, neural degeneration, cell death

We aim to determine RNA coding of phenotypic variability and cell-specific attributes, e.g., what makes neurons so different from any other cell types. We study how the RNA codes and cell-specific attributes are altered in neurological diseases (e.g., Alzheimer's disease) and aim to leverage our knowledge for potential therapeutic treatment. Our studies have revealed the regulation and function of neural-specific splicing and NMD for neurons' two unique attributes: 1. Axonogenesis. Only neurons but no other cell types have an axon. 2. Neuronal longevity. Neurons are the most long-lived cell types. We embrace and develop new technologies to tackle these fundamental questions at the intersection of neuroscience and RNA biology.



Changcheng Zhou, PhD, Professor, Biomedical Sciences

Research Areas: Cardiovascular disease, obesity, endocrinology and diabetes, environmental exposure, endocrine disrupting chemicals, stem cells, small non-coding RNAs.

His research program focuses on the "gene-environment interactions" in human health and disease, specifically the molecular mechanisms of cardiometabolic diseases. The Zhou Lab has revealed important new functions of several key proteins and novel small non-coding RNAs in the regulation of inflammation, xenobiotic metabolism, lipid homeostasis, atherogenesis, obesity, insulin resistance, and metabolic dysfunction-associated steatotic liver disease.



Natalie Zlebnik, PhD, Assistant Professor, Biomedical Sciences

Research Areas: Neuroscience, endocannabinoid system

Her independent research program examines how drugs of abuse exploit neural mechanisms of motivated behavior to promote relapse and facilitate the transition to drug addiction. The goal is to identify molecular and circuit-level targets for the development of novel therapeutics to reduce drug craving and minimize the propensity to relapse.