What starts here changes the world
NEW PARTNERSHIPS
Thanks to the discoveries of earlier research scientists, many diseases that plagued our ancestors have been eradicated. We stand as the beneficiaries of these efforts. Yet today, other diseases and pathogens continue to threaten our health and well being. Discovery’s journey is long and costly. To achieve success, contemporary researchers rely upon collaborations with individuals and organizations that share a similar vision – a better world for us and for generations to come. I invite you to partner with us. Together, you and The University of Texas at Austin College of Pharmacy can turn dreams to reality and realize a healthier world for all of us. What starts here changes the world.

NEW INITIATIVES
Thinking outside the box may be a cliche, but it’s a process that has led to remarkable discoveries. From finding useful applications for bacteria to turning the resilient cold virus into an effective transport for drug therapies, innovative solutions often are discovered when viewing old problems in new light. Faculty researchers at The University of Texas at Austin College of Pharmacy stand outside the traditional realms, tapping their own unique perspectives to see opportunity in challenge and potential in problems. Whether their field is cancer, substance addiction, hypertension or Ebola, these scientists stand poised at the cutting edge of discoveries that will turn elusive answers into effective treatments. I invite you to read about their initiatives and to join them in their work that holds new promise.
GRADUATE STUDIES
A wealth of programs and study focuses are available to students interested in pursuing graduate education within the College of Pharmacy.

The college offers advanced training and education leading toward the Ph.D. via several tracks including chemical biology and medicinal chemistry, molecular pharmaceutics and drug delivery, pharmacology and toxicology, pharmacotherapy, health outcomes and pharmacy practice. In addition, an interdisciplinary studies program and a translational sciences program are available to interested students. The translational sciences program features the collaboration of four universities offering a single joint doctoral degree, a collaboration unique in the UT System. In each track, research and scholarly work leading to the Ph.D. are developed specifically for each student as part of his/her plan.

Eight collaborative areas of research excellence showcase the particular strengths of the college. These include: oncology; chemical biology/drug discovery; outcomes research; translational research in drug delivery; infectious disease; neuropharmacology/addiction; neurobiology and development; and toxicology and environmental disease. Each of these areas is headed by internationally-recognized leaders in interdisciplinary research. Student programs can be designed to involve a mixture of study in more than one of these areas.

A sequential Pharm.D./Ph.D. degree track is offered. It combines the features of a professional Pharm.D. degree with the advanced training and research of a pharmaceutical sciences Ph.D. degree.

Most students are awarded assistantships, fellowships or scholarships to support them while they are pursuing graduate degrees.

LEARN MORE
Learn more about graduate programs at UT Austin by contacting, Char Burke, administrative manager in the graduate office.
Telephone: (512) 471-6590
Email: char.burke@austin.utexas.edu
http://sites.utexas.edu/adrgs/graduate-studies/
Kevin Dalby, Ph.D.
- Chemistry – Anticancer drug development
- Biochemistry – Mechanisms of regulation of signaling enzymes
- Cell biology – Signaling pathways that promote cancer

Walter Fast, Ph.D.
- Enzyme mechanisms, anticancer and antibiotic drug discovery
- Studies of enzymes that regulate nitric oxide production
- Studies of enzymes that block bacterial quorum sensing
- Studies of enzymes that promote antibacterial resistance

Seongmin Lee, Ph.D.
- Mechanistic and structural studies of platinum-based anticancer agents, base excision DNA repair, and translesion DNA polymerases
- Development of cephalostatin-based chemotherapeutics
- Design and synthesis of epigenetic chemotherapeutics

Hung-wen (Ben) Liu, Ph.D.
- Mechanistic studies of novel enzyme reactions
- Biosynthesis of natural products
- Metabolic pathway engineering
- Design and synthesis of enzyme inhibitors
- Studies of ADP-ribosylation of proteins

Christian Whitman, Ph.D.
- Evolution of enzymes and enzymatic activities
- Biosynthesis of pyrrolo[1,4] benzodiazepine natural products
HEALTH OUTCOMES DIVISION

Jamie C. Barner, Ph.D.
- Assessing medication adherence as well as factors that impact adherence
- Examining the clinical and economic impact of pharmacy services on patient outcomes
- Assessing factors that impact health care utilization and outcomes

Carolyn Brown, Ph.D.
- Cultural and social elements that impact both quality of care and outcomes in diverse populations
- Patient decision-making related to medication adherence and use of complementary and alternative medicine

Tyler Gums, Pharm.D., M.S.
- Improve the physician-pharmacist collaborative management model
- Find bioinformatic solutions for medication nonadherence
- Focus on undertreated health disparities

Kenneth Lawson, Ph.D.
- Economics of pharmacy and other health care services
- Health care systems
- Analysis of Medicaid and other large databases

Leticia R. Moczygemba, Pharm.D., Ph.D.
- Collaborations between communities and health systems to mitigate health disparities
- Developing patient-centered interventions to optimize medication-related health outcomes
- Utilizing quantitative techniques and quality improvement principles to assess clinical, economic and humanistic impact of emerging care models

Karen Rascati, Ph.D.
- Economics of pharmacy services
- Outcomes evaluation for disease states
- Pharmacoeconomics
- Analyses of large databases

Kristin M. Richards, Ph.D.
- Health care resource utilization and costs
- Medication adherence and persistence
- The Texas Medicaid system and related issues

James Wilson, Pharm.D., Ph.D.
- Pharmacoepidemiology
- Pharmacoeconomics
- Management of clinical programs
Molecular Pharmaceutics and Drug Delivery Division

Maria Croyle, Ph.D.
- Development of novel synthetic methods to hide/mask recombinant viral vectors from the immune system
- Investigation of host-pathogen interactions and their role in hepatic and renal drug metabolism
- Development of large-scale production methods for clinical use of viral vectors for immunization and genetic therapies
- Development of formulations and novel dosage forms that enhance the physical stability of viral vectors
- In vitro/in vivo testing of novel formulations/delivery methods to enhance gene expression
- Development of designer synthetic vaccines against dangerous pathogens
- Evaluation of the impact of common dietary supplements on the innate immune response against microbial pathogens

Zhengrong (Rong) Cui, Ph.D.
- Anticancer drug delivery and targeting
- Nanotechnology to overcome tumor chemoresistance
- Microneedle-mediated transcutaneous immunization against infectious disease
- Development of nanoparticle platforms for vaccine delivery
- Cancer gene therapy

Mohammed Maniruzzaman, Ph.D., SRPharmS, MAS
- Pharmaceutical process engineering
- Continuous manufacturing
- 3D printing of medicines
- 3D bioprinting of scaffolds and smart medical implants
- Ultra-portable drug delivery devices

Hugh Smyth, Ph.D.
- Advanced drug delivery systems
- Biomedical devices
- Nano medicine
- Gene delivery/gene editing
- Infectious diseases, biofilms, mucus, cancer

Debadyuti (Rana) Ghosh, Ph.D.
- Cancer nanotechnology
- Drug delivery of the tumor microenvironment
- Molecular imaging
- Optical and magnetic nanomaterials
- Physicochemical characterization of drug delivery systems

Janet C. Walkow, Ph.D.
- Pharmaceutical entrepreneurship
- Drug development
- Proof of concept and preclinical studies
- Wet lab incubator for entrepreneurs
- eLearning tools for students, scientists and lifetime learners
- Regulated preclinical studies

Robert O. Williams III, Ph.D.
- Formulation, development, optimization and delivery of small organic compounds, peptides and proteins by a variety of routes of administration including depot drug delivery, oral drug delivery (e.g., immediate and modified release) and pulmonary/nasal drug delivery
- Nanoparticle technology for inhalation, oral and parenteral drug delivery
- Physicochemical characterization of inactive and active ingredients
• Thermal processing related to development of pharmaceutical delivery systems
• Amorphous, crystalline and co-crystal to modify pharmacokinetic and pharmacodynamic properties

**Feng Zhang, Ph.D.**

• Novel manufacturing processes and formulation compositions to prepare amorphous dispersions of BCS Class II and IV compounds in order to improve these compounds’ pharmacokinetic performance
• Analytical methodologies to study short and medium range order of amorphous solid dispersions
• Two screw extrusion in a wide range of pharmaceutical manufacturing processes
• Abuse deterrence drug delivery technologies
• Taste masking drug delivery technologies
PHARMACOLOGY AND TOXICOLOGY DIVISION

Sharon DeMorrow, Ph.D.
- Neurological changes associated with either acute liver failure or chronic liver disorders
- These alterations range from changes in neuropeptide hormone expression to severe cognitive impairment and hepatic coma (termed hepatic encephalopathy)
- Determining the signaling molecules released from an impaired liver that may alter brain function is a focus of ongoing studies

John DiGiovanni, Ph.D.
- Cancer development
- Identifying novel cancer targets, mechanisms and strategies for cancer prevention
- Gene-environmental interactions regarding cancer
- Obesity and cancer, particularly childhood cancers

Christine Duvauchelle, Ph.D.
- Behavioral and neurochemical approaches to the study of the brain’s reward circuitry in relation to drug addiction
- Ultrasonic vocalization as a tool to assess motivational properties of drugs and associated environments
- Animal models of excessive alcohol intake

Laura Fonken, Ph.D.
- Targeting neuroinflammatory responses in the aged brain to improve cognitive function
- Circadian regulation of neuroimmune function
- Neuroimmune interactions during brain development and aging, with a focus on behavioral outcomes

Rueben Gonzales, Ph.D.
- Neurochemical basis for ethanol drinking behavior
- Effects of ethanol on basic dopaminergic neuronal activity in vivo
- Involvement of neurotransmitters (dopamine, glutamate, GABA, acetylcholine, norepinephrine) and peptides in ethanol self-administration behavior

Andrea Gore, Ph.D.
- Neuroendocrine control of reproduction
- Role of the hypothalamus in sexual differentiation, reproductive development, and aging
- Estrogen actions in the aging female brain
- Environmental endocrine disruptor perturbation of neuroendocrine and reproductive function

Adron Harris, Ph.D.
- Structure and function of ion channels with emphasis on molecular mechanisms responsible for alcohol and drug actions.

Dawit Kidane, Ph.D.
- DNA repair and genomic instability
- Infection-mediated inflammation and cancer
- DNA damage response in preeclampsia
- Screening DNA repair genes as a novel biomarkers for predicting preeclampsia.
Michela Marinelli, Ph.D.
- Neurophysiological bases for drug addiction
- Functional anatomy of brain circuits, using electrophysiology and optogenics
- Effect of stress, drugs, and age on dopamine neuron activity and its relationship to addiction

Robert O. Messing, M.D.
- Disturbances in signal transduction that contribute to addiction, emotional disorders, and pain with the goal of identifying new treatments

John Mihic, Ph.D.
- Molecular mechanisms of glycine and GABA-A receptor activation and desensitization
- Allosteric modulation of ligand-gated ion channel function by alcohols, anesthetics, inhalants and benzodiazepines
- Development of novel peptidergic modulators of ligand-gated ion channels

Edward Mills, Ph.D.
- Regulation of normal mitochondrial metabolism and metabolic physiology
- Signaling mechanisms linking mitochondrial dysfunction to age-related metabolic diseases
- Development of mitochondrially-targeted therapies for the prevention and treatment of obesity, type II diabetes, and cancer

Somshuvra Mukhopadhyay, M.B.B.S., Ph.D.
- Cell biology of membrane trafficking and metal ion homeostasis in the context of both normal cellular physiology and human disease

Kimberly Nixon, Ph.D.
- The role of adult neural stem cells in alcoholic neuropathology and recovery in abstinence
- The role microglia play in the adolescent’s enhanced susceptibility to developing an alcohol use disorder
- Collaborative drug discovery work focused heavily on novel neuroprotectants but also target-agnostic screening of novel compounds and natural products to treat alcohol and nicotine co-abuse

John Richburg, Ph.D.
- Molecular and cellular mechanisms that initiate testicular germ cells to undergo apoptosis after injury by environmental or chemotherapeutic agents

Carla Van Den Berg, Pharm.D.
- Growth factor signaling in breast cancer
- Intracellular kinases in breast cancer metastasis using mouse models
- Normal mouse mammary gland development
- Mouse models for anti-cancer drug development

Karen Vasquez, Ph.D.
- Mechanisms of genomic instability
- DNA damage and mechanisms of repair
- Role of DNA structure in human disease, focused on cancer-relevant chromosomal translocations
- Development of novel therapeutic strategies for treating cancer
**PHARMACOTHERAPY DIVISION**

**Kirk Evoy, Pharm.D., BCACP, BC-ADM, CTTS**
- Diabetes management
- Smoking cessation
- Prescription drug abuse
- Health outcomes

**Christopher Frei, Pharm.D., M.S., FCCP, BCPS**
- Clinical epidemiology
- Translational research
- Comparative-effectiveness research
- Drug safety
- Community-based research
- Infectious diseases

**Elizabeth Hand, Pharm.D., BCPS**
- Outcomes research in infectious disease
- Pediatrics

**Jim Koeller, M.S.**
- Outcomes research
- Pharmacoeconomics
- Cancer care economics
- Cancer pathway development and economic assessment
- Cancer outcome measures and economics assessment
- Genomic outcomes and economic assessment

**John G. Kuhn, Pharm.D., FCCP**
- Oncology drug development
- Cancer Pharmacogenomics Research (cPR)
- Pharmacokinetics/Pharmacodynamics of anti-cancer agents

**Francis Lam, Pharm.D., FCCP**
- Ethnic and genetic differences in drug metabolism, response and susceptibility to biological disorders
- Mechanisms and clinical implications of drug-drug interactions
- Correlation of pharmacokinetics and pharmacodynamics in clinical pharmacology
Grace Lee, Pharm.D., Ph.D., BCPS

- Clinical and molecular epidemiology of *Staphylococcus aureus* infections
- Integrated translational approach to develop innovative *S. aureus* prevention and treatment strategies

Kelly R. Reveles, Pharm.D., Ph.D., BCPS

- Prevention and treatment of *Clostridium difficile* infections
- Large database design and analysis
- Clinical epidemiology
- Comparative-effectiveness research

Stephen R. Saklad, Pharm.D., BCCP

- Retrospective database analysis of clinical use and outcome of psychotropic agents
- Evaluation of the impact of pharmacists on patient process and outcome metrics
- Development of innovative and effective teaching methods and practices
- Phase III and IV clinical trials of serious and persistent mental illness (SPMI)
The seven established Collaborative Areas of Research Excellence (CARE) within the College of Pharmacy illustrate college faculty members’ core areas of research focus. Detailed information concerning each of the CARE groups as well as the associated centers, institutes and core facilities can be found at: http://sites.utexas.edu/adrgs/research-areas/

**Chemical Biology and Drug Discovery**  
(Dr. Kevin Dalby, group leader)  
This collaborative research area is focused on the discovery and optimization of novel chemical leads targeted to disease-related proteins for research tools and therapeutics, and the training of the next generation of drug discovery scientists.

**Environmental and Developmental Mechanisms of Health and Disease**  
(Dr. Andrea Gore, group leader)  
Environmental toxicants, pollutants, and chemicals can profoundly affect health and disease. Together with an individual’s genome and other influences (social, behavioral, hormonal), exposures to exogenous environmental factors predispose for cancer, endocrine disorders, and neurobehavioral and physiological disturbances. Developmental exposure is particularly problematic due to the propensity of toxicants to cause epigenetic, genetic, and molecular reprogramming changes that set the stage for subsequent disease. Faculty in this collaborative research area have a common goal of determining effects of environmental exposures on physiology, pathophysiology, and behavior, and deciphering the underlying cellular, biochemical, and molecular responses.

**Health Outcomes, Economics and Equity Research**  
(Dr. Carolyn Brown, group leader; Dr. Chris Frei & Dr. Karen Rascati co-leaders)  
The overall goal of the research of this collaborative group of faculty is to improve the public’s health and outcomes through the efficient use of scarce health care resources, and to reduce health disparities through practice-, population-, and policy-based research.

**Infectious Disease**  
(Dr. Walt Fast, group leader)  
This group of pharmacy faculty has focused research efforts in the area of infectious disease to understand pathogenic mechanisms, to discover and develop protein and small molecule therapeutics, and to develop other anti-infective technologies including novel vaccination methods.
Molecular Mechanisms of Cancer  
(Dr. John DiGiovanni, group leader)  
The goal of research in this focus area is to conduct basic research on mechanisms of how cancer develops and progresses and to identify new molecular targets for cancer prevention and treatment. In addition, researchers are also involved in developing novel agents and drug delivery systems for cancer prevention and treatment. Finally, there is an emphasis on training the next generation of cancer researchers.

Neuropharmacology and Addiction  
(Dr. Rueben Gonzales, group leader)  
The goal of research in this focus area is to conduct basic research on mechanisms of how drugs of abuse, particularly alcohol, produce their rewarding and behavioral effects through changes in brain function at multiple levels of analysis: molecular, cellular, circuit, systems, neurochemical, and behavioral. By producing fundamental new knowledge on these mechanisms, new and improved therapies could be developed for addiction and other brain diseases. In addition, the faculty in this area are committed to recruiting, training, and retaining the next generation of diverse researchers in neuropharmacology and addiction.

Translational Research in Drug Delivery  
(Dr. Bill Williams III, group leader)  
This collaborative research area is focused on bridging basic science and clinical therapeutics leading to the discovery of new drug delivery systems that can brought to market.
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www.utexas.edu/pharmacy