College of Pharmacy
The University of Texas at Austin

Faculty Research Initiatives

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 realize 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.

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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 found 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 medicinal chemistry, pharmaceutics, 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 uniquely 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 through the college. 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 about graduate studies opportunities at the College of Pharmacy by visiting our website at:

http://www.utexas.edu/pharmacy/edutrain/graduate.html
Jamie C. Barner, Ph.D.
• Examining the impact of pharmacy services (primarily medication therapy management services) on patient outcomes
• Assessing and comparing medication adherence as well as factors that impact adherence
• Understanding factors that affect 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

Kentya H. Ford, Dr.PH, M.S.
• Cancer prevention
• Tobacco use prevention and cessation
  - Predictors of tobacco use in adolescents and young adults
  - Clinician role in tobacco use cessation counseling
• Health disparities
• Social determinants of health

Kenneth Lawson, Ph.D.
• Economics of pharmacy and other health care services
• Health care systems

Karen Rascati, Ph.D.
• Economics of pharmacy services
• Outcomes evaluation for disease states
• Pharmacoeconomics

Marvin Shepherd, Ph.D.
• Importation of pharmaceuticals
• Pharmaceutical marketing
• Managed care pharmacy
• Economics of pharmacy services
• Pharmacoeconomics
• Counterfeit medications and prescription drug diversion and theft

James Wilson, Ph.D.
• Pharmacoepidemiology
• Pharmacoeconomics
• Management of clinical programs
MEDICINAL CHEMISTRY DIVISION

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

Hungh-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

Sean Kerwin, Ph.D.
• Design and synthesis of DNA- and protein-binding agents and molecular probes
• Synthetic and mechanistic studies of alkyne cyclization reactions
• Natural product synthesis and biological studies
• Anticancer drug discovery

Christian Whitman, Ph.D.
• Evolution of enzymes and enzymatic activities
• Biosynthesis of pyrrolo[1,4] benzodiazepine natural products
**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

**James McGinity, Ph.D.**
- Physical and chemical properties of drugs and other adjuvants used in pharmaceutical dosage forms
- Controlled release technologies
- Polymeric drug delivery systems

**Hugh Smyth, Ph.D.**
- Pulmonary drug delivery
- Biomedical devices
- Nanoparticle drug delivery
- Lung cancer, cystic fibrosis, asthma, COPD, RNAi
- Drug delivery in infectious disease, biofilms

**Salomon A. Stavchansky, Ph.D.**
- Principles of biopharmaceutics, pharmacokinetics and drug metabolism to evaluate and design drug delivery systems to ensure safety and efficacy of drug products
- Bioequivalence of generic drug products and biosimilars
- Bioequivalence of highly variable drugs and complex drug products
- Delivery of drugs through nanostructures platforms
- Permeability, solubility and molecular descriptors to predict drug absorption
- Reduction of ischemia/reperfusion injury by caffeic acid phenethyl amide derivatives
- Implication of heme oxygenase-1 and transcriptional changes

**Debadyuti (Rana) Ghosh, Ph.D.**
- Cancer nanotechnology
- Drug delivery of the tumor micronenvironment
- Molecular imaging
- Optical and magnetic nanomaterials
- Physiochemical characterization of drug delivery systems
Janet C. Walkow, Ph.D.
• Pharmaceutical entrepreneurship
• Drug development
• Proof of concept and preclinical studies
• Web lab incubator for entrepreneurs
• eLearning tools for students, scientists and lifetime learners
• Regulated preclinical studies

Alan Watts, Ph.D.
• Pediatric respiratory drug delivery
• Aerosols for delivery of biologic and combination products
• Models and formulations for preclinical drug development
• Particle engineering for improved drug delivery

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 classes 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/TOXICOLOGY DIVISION

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

Rueben Gonzales, Ph.D.
- Neurochemical basis for ethanol drinking behavior
- Effects of ethanol on basic dopaminergic neuronal activity in vivo
- Involvement of dopamine and glutamate 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 optogenetics
- 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

Richard Morrisett, Ph.D.
- Role of neurotransmitter systems and synaptic transmission in alterations that underlie a variety of neural functioning and pathologies
- Alcohol-related disorders
- Learning and memory
- Neuronal development
- Development of epilepsy

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

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

Casey Wright, Ph.D.
- Inflammatory signaling pathways in cancers of the immune system with emphasis on the activity of the pleiotropic transcription factor nuclear factor-κB (NF-κB)
- Identification of the complex molecular mechanisms regulating the NF-κB signaling module, providing insights for the development of therapeutics to treat NF-κB-related disease
- Role of NF-κB in immune disease development and/or progression arising from environmental toxin exposure
PHARMACOTHERAPY DIVISION

Bryson Duhon, Pharm.D., BCPS
• Outcomes research
• Infectious diseases
• Anticoagulation

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

Leroy Knodel, Pharm.D.
• Health education and outcomes evaluation
• Community-based education
• Pharmacoepidemiology

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, R.Ph., 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
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)

Robert Talbert, Pharm.D., FCCP, BCPS

- Clinical trial research in stroke prevention
- Application of nanoparticle technology to improve the absorption of poorly water soluble drugs for a variety of conditions
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College of Pharmacy
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M. Lynn Crismon, Dean
Carlton K. Erickson, Associate Dean for Research and Graduate Studies
Susan Brown, Assistant Dean for Development
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www.utexas.edu/pharmacy