



GRADUATE EDUCATION

The University of Mississippi School of Pharmacy offers the M.S. and Ph.D. degrees in the Pharmaceutical Sciences with emphasis areas in Environmental Toxicology, Medicinal Chemistry, Pharmacognosy, Pharmacology, Pharmaceutics, and Pharmacy Administration. Each of these programmatic areas offers multi-disciplinary opportunities to study with nationally recognized research scientists in state-of-the-art laboratories.

The programs prepare students for teaching and research positions in universities and colleges and research positions in the pharmaceutical, chemical, agrochemical and administrative food industries, government, and research institutions.

Environmental Toxicology

Faculty associated with the Environmental Toxicology Program currently conduct research and educational activities that seek to identify and resolve problems related to environmental health issues. Through research and course work, students will have the opportunity to understand the effects of environmental contaminants and stressors on human health and environmental quality. It is with this understanding that the necessity for high quality, basic, and applied research becomes apparent in order to set environmental policy and regulations. The program goal is to contribute scientific information that will allow economic growth to occur in a climate of quality, cost-effective health services, and ecologically meaningful environmental stewardship. Specific research interests of the faculty include the quantitation of environmental contaminants, such as pesticides, industrial chemicals, and heavy metals and assessing their impact on environmental quality and the health of humans and aquatic and marine species. Fish models are also being used to better understand cancer, endocrine disruption, and fetal alcohol diseases.

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Medicinal Chemistry

Medicinal Chemistry is a multidisciplinary chemistry-centered science involved in applying both chemical and biological principles to a study of chemical substances capable of exerting specific effects on a biological system. In practice, the medicinal chemist is involved in designing, synthesizing,

and characterizing medicinal agents intended for the management and/or therapy of disease states.

The multidisciplinary approach to studying the chemistry of biologically active agents requires basic knowledge of both chemical and biological sciences. The design of medicinal agents requires an understanding of biophysical principles in order to facilitate a rational approach to discovering novel therapeutic agents and to understand and predict their physical properties. Bioactive molecules must have physical properties that provide the substances with drug-like attributes.

Areas of current faculty interest include: antimicrobial and anticancer chemotherapy, cardiovascular drugs, CNS-active agents, drugs affecting the endocrine system, toxicological aspects of drug or drug-like molecules in biological systems, computer modeling, and simulation.

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Pharmaceutics

The Department of Pharmaceutics offers both undergraduate and graduate programming leading to bachelor's, master's, and doctoral degrees with emphasis in Pharmaceutics. The needs and interests of each student within the broad area covered by pharmaceutics determine the nature of the individual academic program; emphasis is placed upon the total development of each student as an independent research scientist to qualify students for positions in academia, industry, or government. Ongoing research projects funded by various federal agencies, private pharmaceutical industry grants and contracts, and funds from other sources offer the student opportunities for research in all phases of pharmaceutics. The departmental laboratories are designed and equipped to conduct research projects in a variety of areas. These presently include the general areas of pharmacodynamics, product research and development, drug metabolism, drug dependence and tolerance, solid-state characterization studies, molecular modeling of physical processes, preformulation, formulation, and novel drug delivery systems.

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Pharmacognosy

Pharmacognosy (chemistry and biology of natural products) is the study of bioactive natural substances found in terrestrial and marine organisms (plants, animals, or microbes). Nearly half of all therapeutic agents either come directly from plants, microbes or animals, or are derived from “chemical ideas” that are based upon substances produced by living organisms. Research in pharmacognosy is important because it leads to new forms of biotechnology; new types of therapeutic agents; new molecular probes that can be used to study molecular/cell biology; new pest controls to help protect crops; increased understanding of the pharmacological, ecological and biochemical roles of molecules produced by nature; information on herbal medicines; and new methods for the analysis of drugs, toxins, and herbal preparations.

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Pharmacology

Pharmacology and toxicology represent the study of chemical agents of therapeutic value (drugs) or with potential toxicity (toxicants) on biological systems. Research studies in these disciplines use drugs and chemicals to discover the underlying basis for treating diseases or for adverse effects (toxicity). Faculty members specialize in determining the effects of drugs on the brain, heart, blood vessels, fat, and other tissues.

RESEARCH ENVIRONMENT

Graduate students also have opportunities to conduct research projects under the guidance of scientists within the School of Pharmacy’s Research Institute of Pharmaceutical Sciences (RIPS). Graduate research assistantships are available to support projects consistent with the mission of RIPS. The institute, formed by act of the Mississippi Legislature in 1964, is comprised of two major research entities: The National Center for Natural Products Research and The Center for Pharmaceutical Marketing and Management.

Center for Pharmaceutical Marketing and Management

The Center for Pharmaceutical Marketing and Management (CPMM) is a center of excellence that advances research, teaching, and service in the areas of marketing and management of products and services in all segments of the pharmaceutical industry. Scientists affiliated with the center, conduct theoretical and applied research to advance the efficiency and effectiveness of distributing, marketing, reimbursing, and consuming pharmaceuticals. CPMM provides an environment where governmental agencies, national associations, businesses, and academia can come together to pursue and exchange real-world research ideas, results, and information.

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Specific areas of research interests include the studies of the effects of drugs on atherosclerosis (hardening of the arteries), high blood pressure, obesity, diabetes, and diseases of the brain (Parkinson’s, Alzheimer’s disease, schizophrenia). Another specialty area involves research on drug addiction.

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Pharmacy Administration

The Department of Pharmacy Administration is comprised of social and behavioral scientists who apply and develop theories to understand aspects of the health care arena and its participants. Examples of specific areas of inquiry include the marketing and economics of pharmaceuticals, patient and provider behaviors in the health care system, management strategies within health systems, the health outcomes associated with using pharmaceuticals, and the roles of pharmacists in delivering and managing health care. This scientific discipline is particularly interested in how these areas are influenced by pharmacists and other health care providers, pharmaceutical manufacturers, governmental entities, and pharmaceuticals.

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National Center for Natural Products Research

The National Center for Natural Products Research was created to bring together an alliance of academia, government, and pharmaceutical and agro-chemical industries to integrate research, development, and commercialization of potentially useful natural products. The center conducts basic and applied multidisciplinary research aimed at identifying pharmaceuticals, dietary supplements, and agrochemicals from natural resources; understanding the chemistry and biology of medicinal plants for human consumption; and development of medicinal plants as high value crops. The center also conducts research on natural resources and the environment, including environmental toxicology, which conducts research to identify and resolve problems related to environmental health issues. The center is housed in a modern, well-equipped laboratory facility that opened in 1995.

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