YOUR JOURNEY.
YOUR FUTURE.

GRADUATE STUDIES IN PHARMACEUTICAL SCIENCES

Nilay Thakkar, PhD (2015)
WHY PHARMACEUTICAL SCIENCES?

Pharmaceutical scientists are the lifeblood of health care.

When the summer sun shines, we enjoy its warmth without worry because a pharmaceutical scientist developed burn-preventing sunscreen.

When winter colds threaten to keep us away from family gatherings, we turn to therapies developed by pharmaceutical scientists to suppress the symptoms.

When we hear the emotional account of a mother who saved her child’s life with an overdose prevention medication, we are grateful that pharmaceutical scientists developed a safe and easy drug administration technique and advocated for its approval.

When cancer threatens the lives of our loved ones, we rely on the chemotherapies developed by pharmaceutical scientists to treat and eliminate their disease so they can live another day.

Our lives are longer, healthier, and happier because the brightest scientists in the world choose to dedicate their careers to the Pharmaceutical Sciences.

PHARMACEUTICAL SCIENCES ARE RIGHT FOR:

- INQUISITIVE DISCOVERERS
- INDIVIDUALS THAT WISH TO IMPACT PATIENT HEALTH THROUGH DISCOVERY
- CREATORS OF NEW KNOWLEDGE
CAREER EXPECTATIONS

In addition to finding their work personally fulfilling, pharmaceutical scientists are well compensated and enjoy better work-life balance than many health care professionals.

WHERE PHARMACEUTICAL SCIENTISTS PRACTICE

ACADEMIA

INDUSTRY

MANAGED CARE

REGULATORY ORGANIZATIONS

EXCELLENT COMPENSATION

ACADEMIA

Assistant Professor $70K–$85K
Associate Professor $85K–$100K
Full Professor $110K–$200K

REGULATORY ORGANIZATIONS

Entry Level $65K–$70K
Experienced Employees Up to $180K

INDUSTRY

Entry Level $85K–$100K
Senior Personnel $150K–$200K
Executives Up to $300K
Annual Bonus Up to 30%

TYPICAL WORK SCHEDULE

- Flexible work schedule
- Monday through Friday
- Day shift
- Holidays off

INNOVATORS AND ENTREPRENEURS

Each year, new pharmaceutical startups are born from discoveries made by entrepreneurial pharmaceutical scientists.

In 2015, 64% of new FDA-approved drugs originated at smaller biopharma companies.

Source: American Association of Pharmaceutical Scientists

Source: HBM Partners
LAUNCH YOUR PHARMACEUTICAL SCIENCES CAREER WITH US

Your Journey
The PhD program at the UK College of Pharmacy is designed to help you pursue the health care challenges you are most passionate about. Whether your personal passion is for preventing deaths related to drug abuse, lessening the suffering that comes with depression or mental illness, or making critical medications affordable and accessible for all, UKCOP will support you in your specific journey.

Your Future
At the UK College of Pharmacy, your future begins on day one of your studies. As a PhD candidate at UKCOP, you will have the opportunity to work side-by-side with world-renowned researchers on the most pressing health care issues of our time, access an unmatched network of resources and expertise, publish in the profession’s most respected journals, influence future health care policy, and open doors to career opportunities at start-up pharmaceutical companies.
LAUNCH YOUR PHARMACEUTICAL SCIENCES CAREER WITH US

LEADERS ARE BORN AT THE UK COLLEGE OF PHARMACY

100 PATENTS IN 10 YEARS
2005-2015

125 LICENSES TO INDUSTRY

30+ STARTUP COMPANIES
1980-PRESENT

HIGHLY RESPECTED INSTITUTION

#6 PHARMACY SCHOOL IN THE NATION
U.S. NEWS & WORLD REPORT

$26.5 MILLION IN COLLABORATIVE FUNDING

UKCOP-affiliated publications can be found in the profession’s most respected journals including Science, Nature, PLOS ONE, Proceedings of the National Academy of Science, Pharmacology, Biochemistry and Behavior, Neuroscience, Molecular Pharmaceutics, ACS Chemical Biology, Cancer Chemotherapy and Pharmacology, Pharmaceutical Research, and many more.

LAUNCH YOUR PHARMACEUTICAL SCIENCES CAREER WITH US
SCIENTIFIC TRACKS

Select the scientific track that you are most passionate about to set the direction of your future career. Earn a PhD with a specialization in one of these pioneering areas of research and study:

- CLINICAL AND EXPERIMENTAL THERAPEUTICS
- MEDICAL, BIOORGANIC AND COMPUTATIONAL CHEMISTRY
- PHARMACEUTICAL CHEMISTRY AND ENGINEERING
- PHARMACEUTICAL OUTCOMES AND POLICY
- PHARMACOLOGY AND EXPERIMENTAL THERAPEUTICS
The Clinical and Experimental Therapeutics program focuses on translational research—research that aims to improve health outcomes in all populations by translating discoveries made on the laboratory bench into practical therapies that can be applied at the patient bedside.

When viruses and bacteria attack, the human immune system goes to work to protect our bodies from these dangerous invaders. This is not the case with cancer. Cancerous cells evade our immune systems by making them think they are not dangerous. The immune system doesn’t attack and the cancer grows.

Cancer cells are smart, but not as smart as the pharmaceutical scientists at UKCOP. Researchers and students, including Sherif El-Refai, are leading groundbreaking research that has the potential to save thousands of lives.

“Traditional cancer treatments, like chemotherapy and radiation, target the cancer cells directly. These treatments can hurt normal cells, causing terrible side effects. Immunotherapy—which harnesses the power of our immune system to empower our body’s defenses to attack only cancer cells—has shown great promise. I am studying successful cases of long and durable responses in patients to understand why immunotherapy worked in those instances. If we know why immunotherapy worked for some, we will be able to figure out how to make immunotherapy effective for all. I look forward to the day that we can treat 100% of cancer patients with side effect-free immunotherapy.”
The Medicinal, Bioorganic and Computational Chemistry track is focused on new protein and nucleic acid based therapies and natural product drug discovery platforms. This track is ideal for students with interests in synthetic and biosynthetic approaches for drug discovery, development of novel computational tools for drug design, and the evolution of biologics for specific therapies or drug delivery.

MEDICINAL, BIOORGANIC AND COMPUTATIONAL CHEMISTRY

Exploring Florida’s coral reefs on family vacations and school field trips sparked Tyler Huber’s early interest in nature. Years later, Tyler learned he could combine his love of the environment and his passion for discovery as a professional. “An undergraduate professor with expertise in marine natural products encouraged me to consider a career dedicated to finding cures for disease in the natural world.” After earning a BS in Chemistry, Tyler chose to continue his education at UKCOP, studying under Dr. Jon Thorson, a world-renowned natural products researcher best known for the discovery of potential cancer cures in abandoned coal mines.

“There are many chemical processes in the human body that scientists don’t fully understand. We are working to decode one of the most important and least understood processes in the human body—DNA methylation—a process that impacts the formation of cancers, the development of mental illnesses like schizophrenia, and even the formation of memories. Our work could lead to the development of true cures for diseases that can only be managed today. As a student, I am exploring the final frontier of genetics!”

TYLER HUBER
PhD Candidate
UK College of Pharmacy
BS, Chemistry
University of North Florida
The Pharmaceutical Chemistry and Engineering track focuses on drug formulation, development and delivery. Areas of emphasis include the application of physical, physical-organic, and analytical chemistry to solve pharmaceutical problems, the design, development, and optimization of dosage forms for small and large molecules, and fundamental research in materials science and nanotechnology to advance drug delivery systems design.

While earning her undergraduate degree at the University of Kentucky, Ashley Lay weighed her post-graduation options. As a Chemical Engineer, she knew she could work at an oil refinery or plastics manufacturing facility, but the idea of working in those industries didn’t spark excitement. During the third year of her ChemE studies, Ashley met Dr. Eric Munson. “Dr. Munson opened my eyes to a world of possibilities I hadn’t considered. By combining my chemical engineering knowledge and my passion for research and discovery, I could develop new drug formulations that are easy to manufacture, store, and distribute to people in need.” Ashley is currently working to improve the stability of protein-based drug formulations through enhanced freeze drying methods. Improving the stability of protein based drugs makes the treatment of disease easier and more effective in parts of the world where refrigeration is not available to preserve the dosage forms prior to distribution.

“It’s exciting to know that my work could improve protein stability, which ultimately may be translated to help treat cancers, prevent the spread of diseases like Ebola, and ensure people that struggle with chronic diseases like diabetes will have access to effective medications, even during natural disasters.”
The Pharmaceutical Outcomes and Policy program focuses on the relationship between pharmacotherapy and health outcomes, pharmacoeconomics, pharmacoepidemiology, informatics, and pharmaceutical policy. Students study economics, epidemiology, policy, and econometrics to prepare for careers in the pharmaceutical industry, governmental positions related to pharmaceuticals, and academic positions focused on research related to pharmaceutical outcomes and policy.

After learning the importance of medication reviews as a PharmD student, Josh Brown decided to conduct a review of his grandpa’s medications. Josh was saddened to discover that his grandpa had 12 prescriptions, but chose not to fill some because he could not afford them. He also realized that some of his grandpa’s medications were causing unpleasant side effects. “My grandpa has several medical conditions that are treated with the help of a number of specialists and a variety of prescription drugs. We realized that some medications were prescribed to treat conditions that were really side effects of other drugs.”

This review inspired Josh to pursue a PhD focusing on Pharmaceutical Outcomes and Policies. “I knew that as a PharmD I could help individuals, but I wanted to address issues at the source before they became a problem. Dedicating my career to making medications more affordable and ensuring that medications are not over-prescribed ensures all patients will get the care that I want for my grandpa.”
PHARMACOLOGY AND EXPERIMENTAL THERAPEUTICS

The Pharmacology and Experimental Therapeutics track focuses on the discovery of therapeutics for diseases and disorders that deeply impact our communities including neurological disorders like epilepsy and Alzheimer’s disease, cardiovascular disease, cancers including gastrointestinal cancers and brain cancers, and topics related to infectious disease prevention including antibiotic and antiviral resistance.

Dr. Vince Venditto knows why the world’s top students and researchers flock to the UK College of Pharmacy—because interdisciplinary collaboration is barrier-free at UK.

“Our colleagues at the College of Medicine, the Markey Cancer Center, and the Chandler Hospital are literally across the street. They provide unique insight and critical, hard-to-get resources. Our lab is investigating the role of antibodies in cardiovascular disease, so the research we do requires blood samples for testing. When we need samples or the expertise of someone outside of pharmacy, all we have to do is walk across the pedway and ask.”

UK’s interdisciplinary collaborations are leading to quick success for Pharmacology and Experimental Therapeutics researchers and students. The Venditto group will be applying their findings to the development of treatments for cardiovascular disease and traumatic brain injuries—with the potential to apply this technology to treat a broad spectrum of conditions that afflict patients.
Dr. Alex Marshall earned his PhD in Pharmaceutical Sciences in 2013. As a Postdoctoral Scholar at the University of North Carolina at Chapel Hill, Dr. Marshall continued his research on the effects of alcohol on the neuroimmune system, publishing five manuscripts. He has gone on to become a professor of Pharmaceutical Sciences and has taught at Duke University, UNC-Chapel Hill, North Carolina Central University, and most recently, High Point University. Dr. Marshall has earned a number of professional awards, while continuing his research on the impacts of alcohol on the neuroimmune system and supporting not-for-profit organizations dedicated to reducing the STEM achievement gap.
Dr. Alex Marshall knew from a very young age that he wanted to be a professor.

“I wasn’t always the best of students. I earned straight As, but my classes weren’t very challenging. Things changed when I got to high school. I attended an academic magnet boarding school in my home state of South Carolina. It was intense! The classes were harder than anything I experienced before, but I had great teachers that helped me see that school isn’t just about getting good grades, or eventually a good job. It’s about the quest for knowledge.”

His newfound love of learning not only inspired Alex to become a professor; it also made him look at the world in a more inquisitive way. As an undergraduate student at the University of Florida, Alex became interested in the mechanism by which alcohol influences behavior and the biological reasons that some individuals become addicted to alcohol, while others remain social drinkers.

Alex learned about the exciting drug and alcohol addiction work that was happening at the UK College of Pharmacy and leaped at the opportunity to study and work with a team of faculty members and researchers focused on addiction and alcoholic neuropathology.

Alex applied for and accepted a spot with Pharmacology and Experimental Therapeutics immediately after completing his undergraduate studies, making him one of the youngest students in the program. He admits that at first he was worried that the work might be more than he could handle, but says, “I didn’t need to worry.”

“At the UK College of Pharmacy, unlike some other graduate programs, you are not the only student going through the program. I had a cohort of 15 students that I was able to lean on when I needed help with a particular topic. The student affairs staff helped me through some really tough times too. Without their guidance and kindness, I might have chosen a different path.”

One of the other benefits of studying at UK became apparent in Journal Club, a course that brings graduate students and researchers together from the University’s health care colleges to discuss research and publications. “We helped each other consider and understand aspects of addiction from our unique perspectives. My peers from the College of Medicine and the Psychology department of the College of Arts and Sciences helped me to understand the biological and psychological aspects of addiction. I helped them understand the pharmaceutical aspects.”
At the University of Kentucky College of Pharmacy, financial barriers do not prevent students from earning a graduate degree in Pharmaceutical Sciences. All students who are admitted to the Pharmaceutical Science Graduate Program receive fully paid tuition, a living stipend, and health insurance. Many UKCOP students increase their living stipend with extramural fellowship awards.

**TEACHING ASSISTANTSHIP**
As a Teaching Assistant (TA), you will serve as an extension of the faculty. TAs offer lectures, tutor students, lead small group discussions, provide support in the pharmacy practice lab, and assist professors with other tasks including grading.

**RESEARCH ASSISTANTSHIP**
UK College of Pharmacy research assistants support drug discovery and development efforts led by some of the profession’s most distinguished researchers. Research assistants may support efforts related to drug abuse, cancer, cardiovascular disease, infectious diseases, neurological disorders, and much more.

**GRADUATE SCHOOL FELLOWSHIP**
Graduate school fellowships are investments in your future. Fellowship sponsors provide financial support without teaching or research service requirements, making them the best grad school funding option for students that wish to focus solely on their studies.
LEXINGTON, KY

The University of Kentucky is located in the heart of Lexington, KY, a mid-sized city that offers both the liveliness and opportunity of a large metropolitan area and the serenity of a smaller community. Whether you enjoy cheering for a national championship winning basketball team or hiking through a nature sanctuary, taking in a Broadway performance at the Opera House or enjoying a meal and night out with friends, Lexington has something for you.

Inclusive Community

ENTERTAINMENT

OUTDOOR ACTIVITIES

LOW COST OF LIVING

XIRONG ZHENG
PhD Candidate

Xirong Zheng left her home in China to pursue a Master’s Degree in the United States. Moving to a new country is challenging enough, but for Xirong, moving to one of the largest cities in the northwest was overwhelming. “The city was crowded and loud, and the crime rate was so high. It was a very stressful place to live and study.”

Xirong found that Lexington is a place she could call home when she visited the UK College of Pharmacy three years ago. She felt at peace in Lexington, where the scenery is beautiful, especially in the spring and fall, the city is much safer, and the people are warm and welcoming.

Xirong has discovered Lexington offers more than she ever dreamed of. “There is a very supportive international community in Lexington. They have helped me navigate the city and the challenges of grad school,” she says. “One of the best things about Lexington is the low cost of living. My stipend covers the basics—rent, utilities, food—and I still have enough left over to have fun and set some aside for savings. It makes life more colorful!”