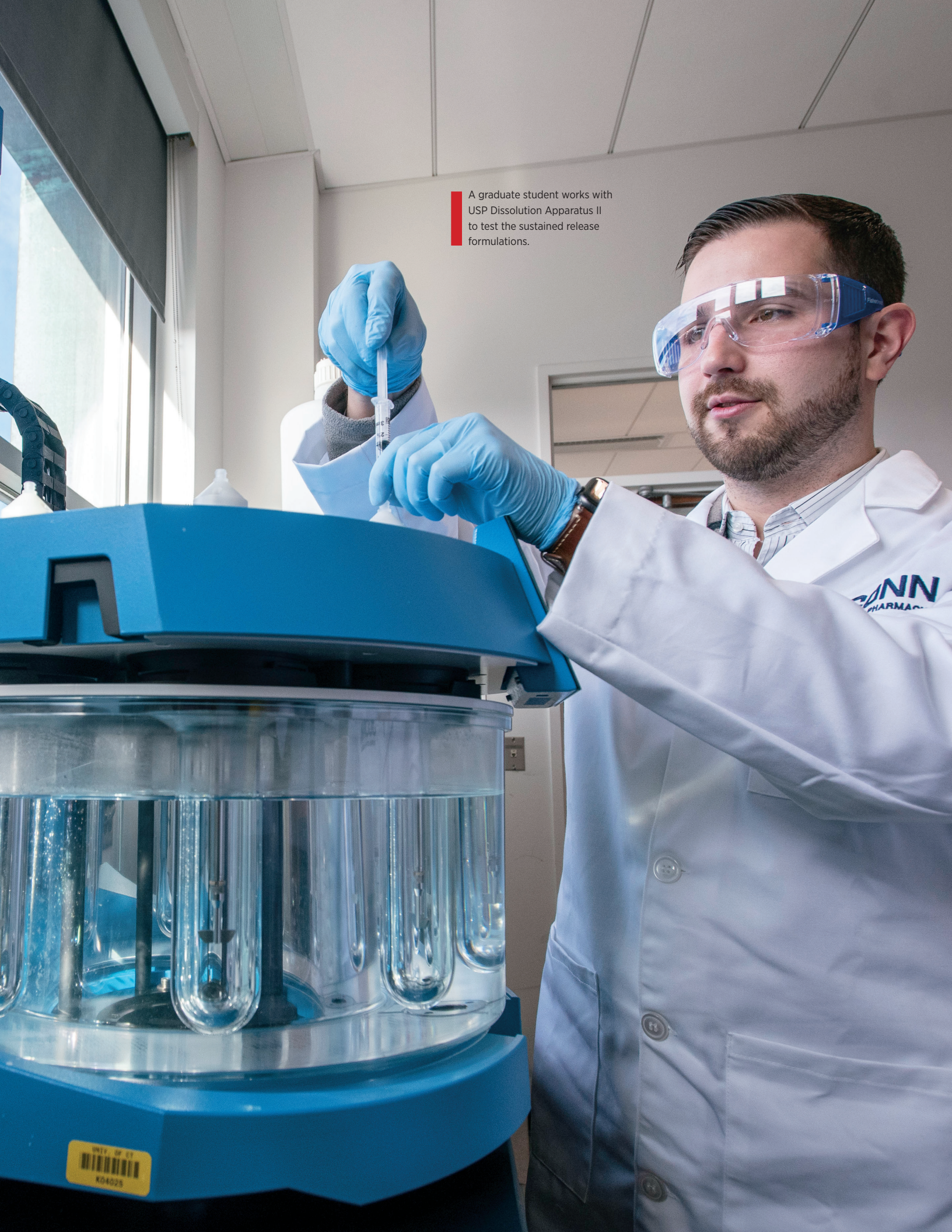




# **Department of Pharmaceutical Sciences**



A graduate student works with USP Dissolution Apparatus II to test the sustained release formulations.





## Pharmaceutical Sciences at UConn: Innovative, Entrepreneurial, Connected to the World

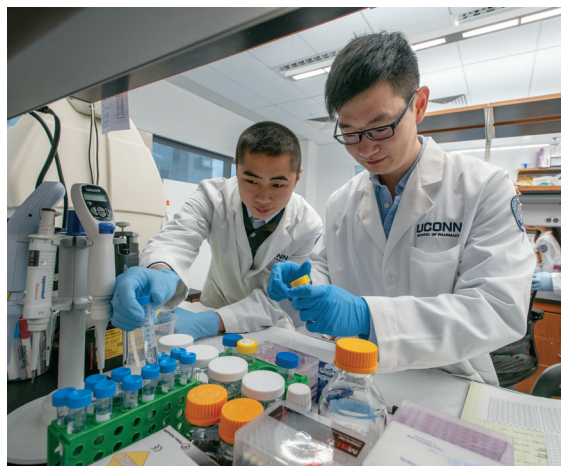
**P**art of the nationally acclaimed School of Pharmacy, UConn's Department of Pharmaceutical Sciences allows our graduate students to customize their studies to align with their research interests, collaborate with world-renowned faculty, and pursue specialized training to complement their core studies.

With nineteen faculty members, UConn's Department of Pharmaceutical Sciences offers expertise in Pharmaceutics and Medicinal Chemistry, as well as Pharmacology and Toxicology. Our faculty, whose research and discoveries have resulted in patents, contracts and improved health worldwide, are eager to mentor those who share their passion to contribute to the global scientific community. At UConn, our graduate students enjoy a robust partnership with their faculty mentors.

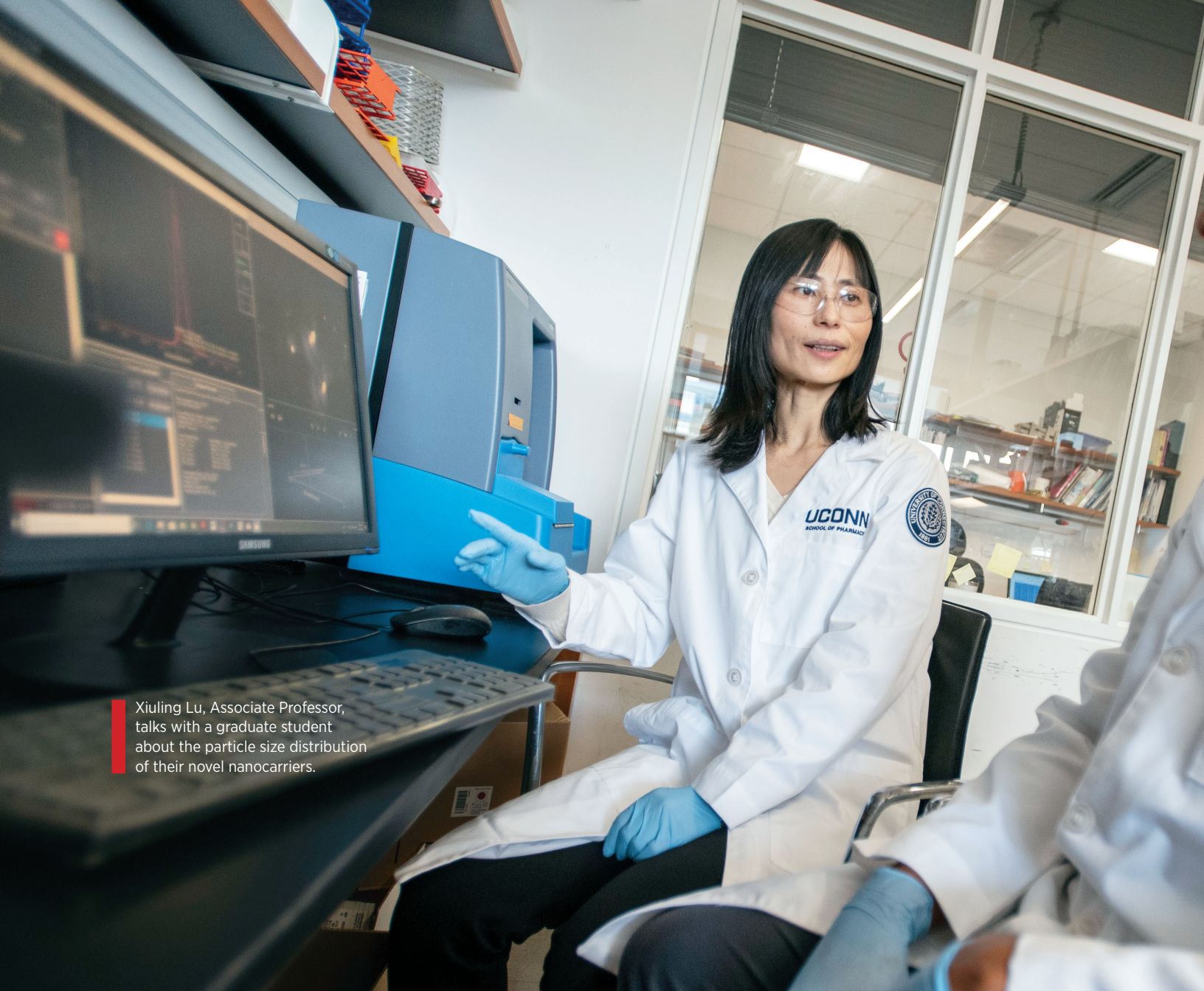
In addition to specialized research training in areas such as drug discovery, mode of action, drug formulation, and safety, all disciplines have unique core courses providing fundamental concepts critical to each discipline. Our department enjoys significant success in placing our Pharm.D. and Ph.D. graduates both locally and nationally in government, industry, and academia.

The flexibility of our program also allows Pharm.D. candidates to customize their studies to garner additional expertise within pharmaceutical sciences and related research. Designed for students who want to work as a pharmacist for a pharmaceutical company or are planning to pursue a joint Pharm.D./Ph.D. degree, this course of study allows a wide range of options and offers easy integration with existing science minors and UConn's pharmacy program.

Graduate students in Zhong's lab use hepatocyte cells to determine drug-drug interactions.







Xiuling Lu, Associate Professor, talks with a graduate student about the particle size distribution of their novel nanocarriers.

## Pharmaceutics

**P**harmaceutics, the science and engineering of drug dosage form design, is a multi-disciplinary field requiring expertise in chemistry, engineering, pharmacy, material science, mathematics, and the biological sciences. Research areas range from fundamental studies of the physiochemical properties of drugs and related molecules to

dosage form design, processing and manufacturing, as well as dosage form in vitro and in vivo characterization and performance testing.

At the cusp of innovation, pharmaceutics sets the stage to make beneficial contributions to patients' healthcare as well as to the scientific community. Pharmaceutical scientists are





### **Raman Bahal**

Assistant Professor

Research Focus: New delivery strategies for synthetic nucleic acid analogues and natural product derived molecules. Develop and optimize novel gene editing based strategies, selectively targeting microRNAs for treating malignant and non-malignant diseases.

### **Robin Bogner**

Professor

Research Focus: Freeze-drying process modeling and optimization, formulation and performance of pharmaceutical solids — both freeze-dried parenterals and oral dosage forms, amorphous drug solubility, reconstitution of lyophilized protein therapeutics, stability of compounded preparations.

### **Diane Burgess**

Distinguished Professor, Pfizer Distinguished Chair of Pharmaceutical Technology

Research Focus: Drug delivery (microspheres, nanoparticles, liposomes, emulsions, hydrogels); in vitro and in vivo performance testing; continuous manufacturing of complex parenterals; implantable sensors for metabolic monitoring.

### **Bodhi Chaudhuri**

Associate Professor

Research Focus: Pharmaceutical technology, multi-scale modeling of pharmaceutical and biomedical systems, transport phenomena in complex fluids, discrete element method, powder technology, and 3D printing.

### **Xiuling Lu**

Associate Professor

Research Focus: Formulation development, characterization and assessment, drug delivery systems, multifunctional nanocarriers for improved cancer therapy, theranostic nanomedicine.

currently developing new materials and formulations for improved drug delivery systems, and engineering new systems to improve and expedite the drug development process. Active research is crucial in this graduate program and emphasizes the physical, chemical and engineering aspects of pharmaceuticals. Our graduate

students also have the opportunity to participate in the highly acclaimed Kildsig Center for Pharmaceutical Processing Research ([cppr.uconn.edu](http://cppr.uconn.edu)).

Pharmaceutics graduate students typically do a summer internship in the pharmaceutical industry and obtain employment in the industry, government or academia upon graduation.



## Medicinal Chemistry

**A**t the intersection of chemistry and biology, Medicinal Chemistry is a robust area of research and study focused on the development of new drugs to treat human diseases. Key areas of concentration within the discipline are structural biology, including the determination of drug target structures using X-ray crystallography and nuclear magnetic resonance (NMR); the design, synthesis, and evaluation of new therapeutic agents; the isolation and identification of marine natural products, and elucidating cellular signaling pathways with small molecule probes.

Current research projects span the development of small molecule therapeutics for cancer, infectious disease, and a variety of neurodegenerative disorders. Additional ongoing projects are aimed at understanding signaling as it relates to cell proliferation, adhesion and trafficking, and exploring the interactions between the cannabinoid receptor and its cytosolic regulatory proteins.

Ph.D. graduates are intellectual leaders in drug development, discovery and research, investigating both medicinal agents found in plants and new synthetic drug possibilities.

### **Marcy Balunas**

Associate Professor

Research Focus: Host-associated microbial communities as unique sources for natural products drug discovery, using these to search for new, targeted drug leads and to address critical questions within the broader field of chemical ecology. Advanced analytical techniques such as mass spectrometry/metabolomics, high throughput screening, flow cytometry-based assays, one- and two-dimensional nuclear magnetic resonance, and state-of-the-art chromatographic separation techniques.

### **M. Kyle Hadden**

Associate Professor

Research Focus: Early stage drug development focusing on the design, synthesis, and evaluation of small molecules as therapeutic agents for the treatment of cancer.

### **Debra Kendall**

Distinguished Professor

Research Focus: Cannabinoid receptor activation by ligands including allosteric modulators, biased signaling, and signaling transduction. G-protein coupled receptor activity in pain.

### **Olga Vinogradova**

Associate Professor

Research Focus: Structural biology, protein-protein/protein-ligand interactions, rational drug design, integral membrane proteins and across-membrane signal transduction, nanodiscs, NMR.

### **Andrew Wiemer**

Associate Professor

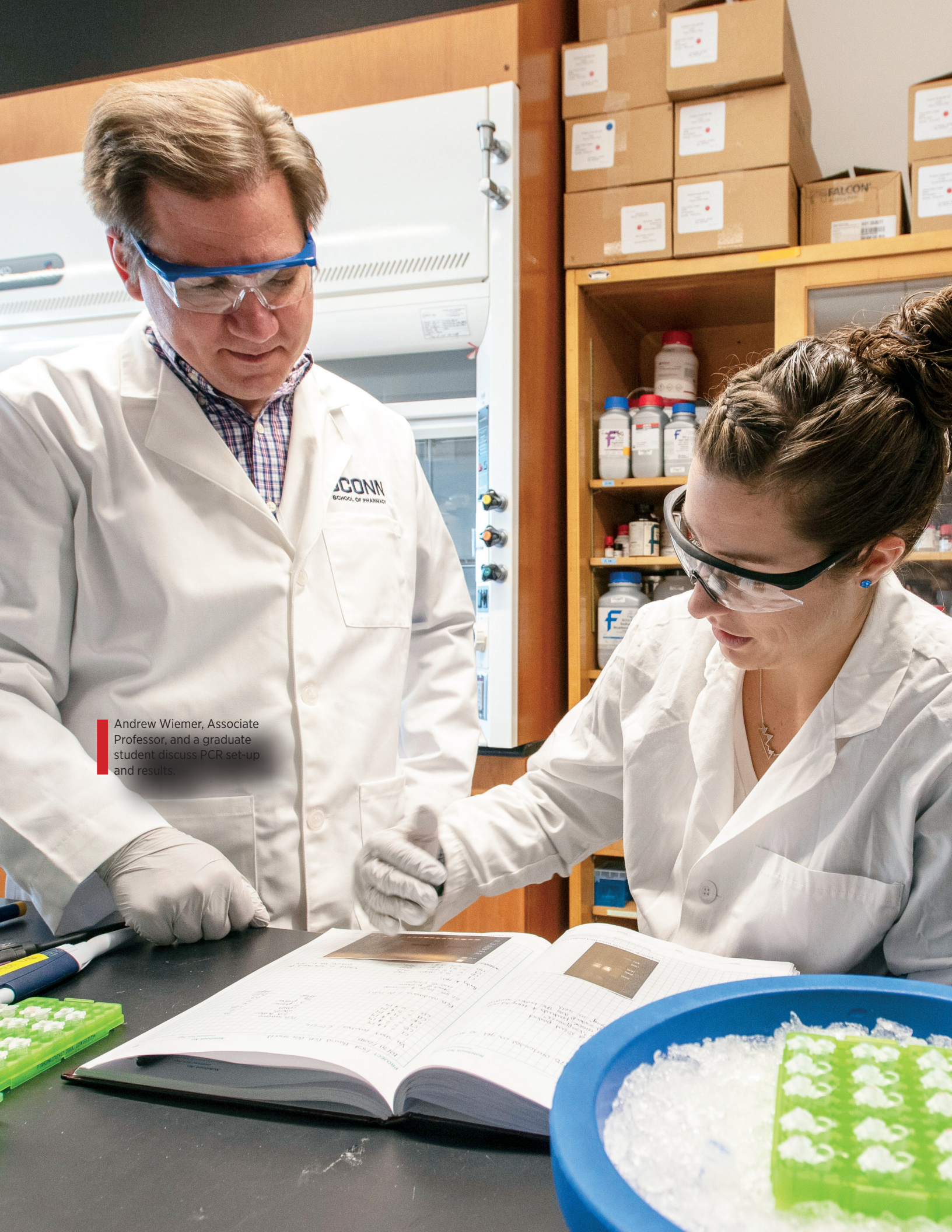
Research Focus: Discovery of drugs and drug targets related to cancer and immunology

### **Dennis Wright**

Professor

Research Focus: The design, synthesis and development of small molecule therapeutics primarily for the treatment of infectious disease and cancer.

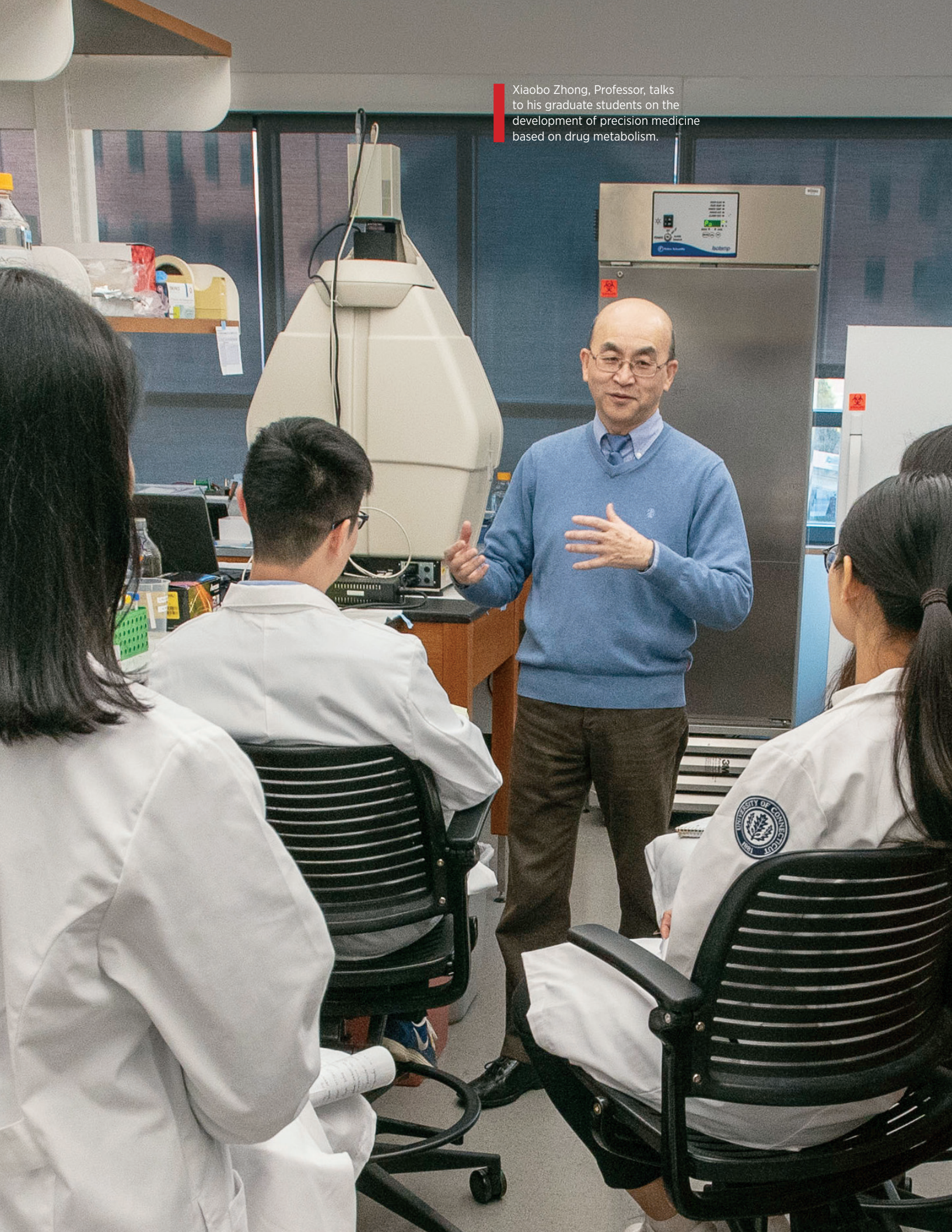




Andrew Wiemer, Associate Professor, and a graduate student discuss PCR set-up and results.



Xiaobo Zhong, Professor, talks to his graduate students on the development of precision medicine based on drug metabolism.





## Pharmacology & Toxicology

**T**he Pharmacology & Toxicology discipline aims to understand the molecular, cellular, and behavioral effects of drugs, chemicals, and environmental toxicants on biological systems. Students in the Pharmacology & Toxicology graduate program receive didactic and research training in a collaborative, multidisciplinary environment. Our overall research goals are to

identify and understand molecular mechanisms of disease pathology and to develop better diagnostic tools and pharmacological therapies. Current areas of research include: drug metabolism, hepatotoxicity, metabolomics, epigenetics, non-coding RNA, inflammation, nuclear receptor signaling, teratology, substance use disorder, behavioral pharmacology, and personalized medicine.

Gregory Sartor and his postdoctoral research associate examine mouse brain sections on the fluorescence microscope.

### Brian Aneskievich

Associate Professor

Research Focus: Molecular pharmacology of cell membrane and nuclear receptor signaling control over regulation of gene expression relevant to chronic inflammatory diseases, defects in differentiation, and cancer proliferation.

### David Grant

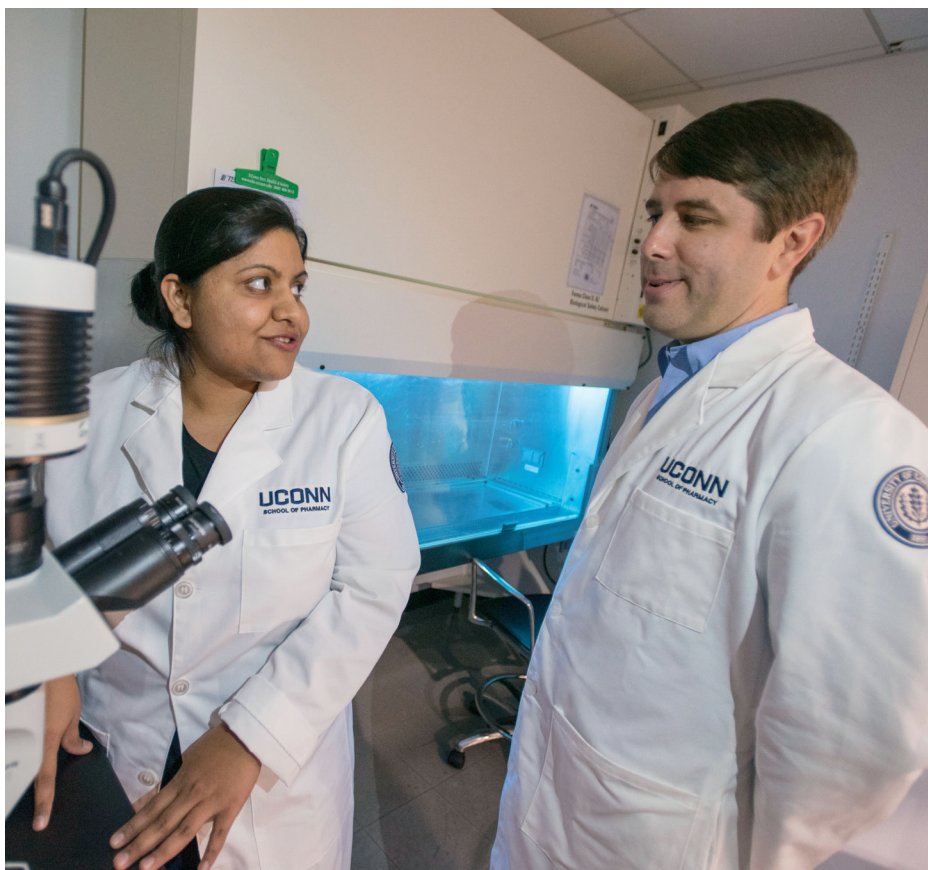
Professor

Research Focus: Development of analytical and computational tools that allow high-throughput chemical structure determination. These tools advance research in metabolomics, biomarker identification, and drug design.

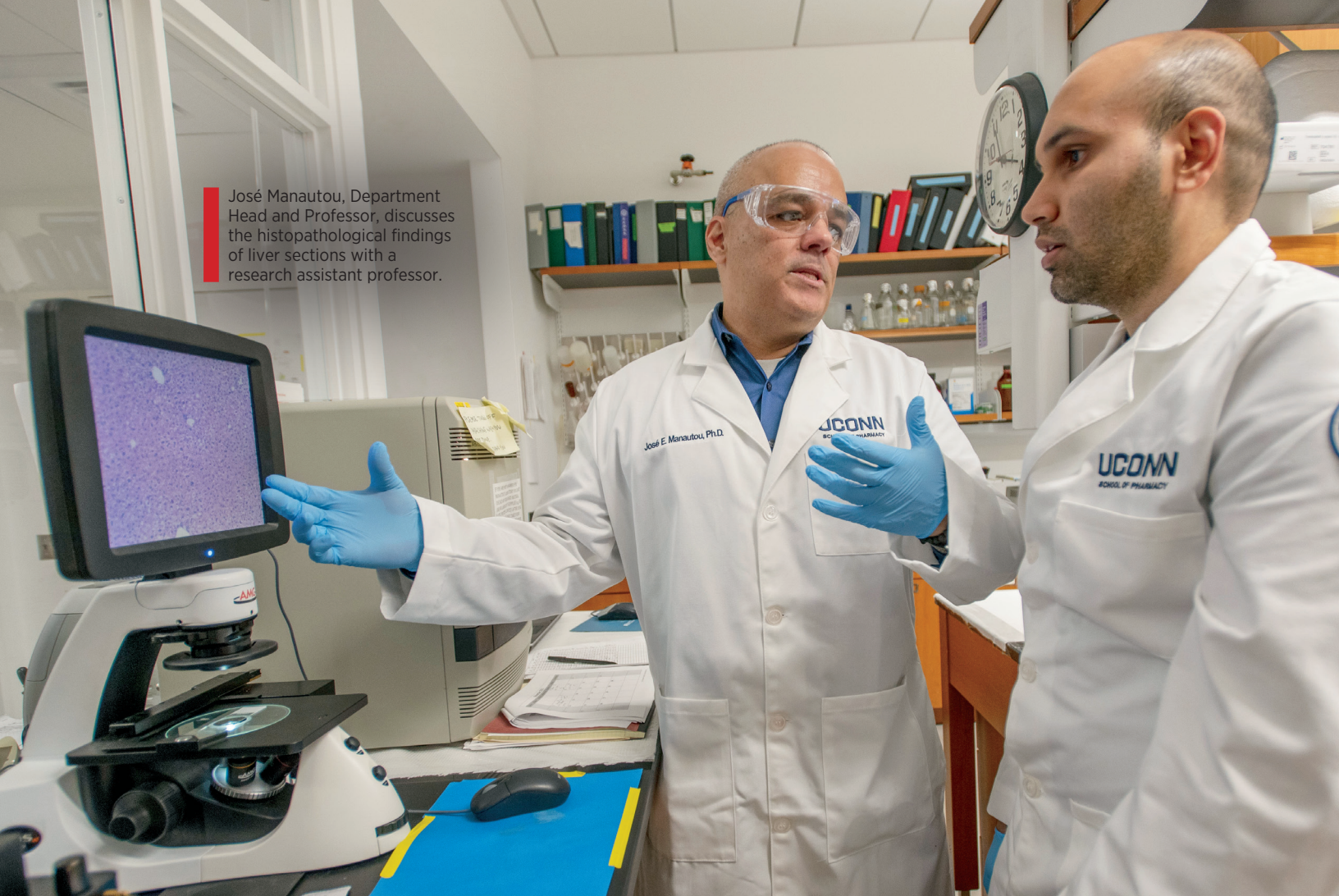
### James Halpert

Professor

Research Focus: Structural basis of cytochrome P450 specificity; importance for prediction of drug metabolism and of individual susceptibility to environmental toxicants.







José Manautou, Department Head and Professor, discusses the histopathological findings of liver sections with a research assistant professor.

### **Andrea Hubbard**

Associate Professor

Academic Focus: Areas of basic and pharmacologically applied immunology, effect of xenobiotics on immune function (immunotoxicology) and effects of air pollutants on pulmonary immunology.

### **José Manautou**

Department Head and Professor

Research Focus: Identification and characterization of novel genetic determinants of susceptibility to chemical hepatotoxicity, regulation of liver transporters, and chemical models of hepatoprotection.

### **Theodore Rasmussen**

Associate Professor

Research Focus: Personalized medicine, stem cell research, and epigenetics as related to cholesterol dysfunction, birth defects, and reproductive biology.

### **Gregory C. Sartor**

Assistant Professor

Research Focus: Animal models of drug addiction; epigenetics, cell type-specific analysis, and drug discovery.

### **Xiaobo Zhong**

Professor

Research Focus: Mechanistic roles of long non-coding RNAs in postnatal liver maturation, alteration of drug metabolism in adults by drug exposure at early life, interindividual variations on drug metabolism and personalized medicine.



## Join our World-Renowned Team

**L**ocated at our main campus in Storrs, the School of Pharmacy features state-of-the-art labs, easy access to New York, Boston, Hartford, and Providence, and robust interdisciplinary collaboration. Ranked among the top twenty-five public research universities in the nation, UConn is dedicated to human health and scientific research. Our Innovation Partnership Building at Tech Park houses business partners from around the globe who partner with our faculty to conduct innovative, cross-disciplinary research in fields ranging from manufacturing to biomedical engineering to cybersecurity. At nearby Farmington, our UConn Health campus, also home to Jackson Laboratories, is an integrated

academic medical center that is entering an era of unprecedented growth in all three areas of its mission: academics, research, and clinical care.

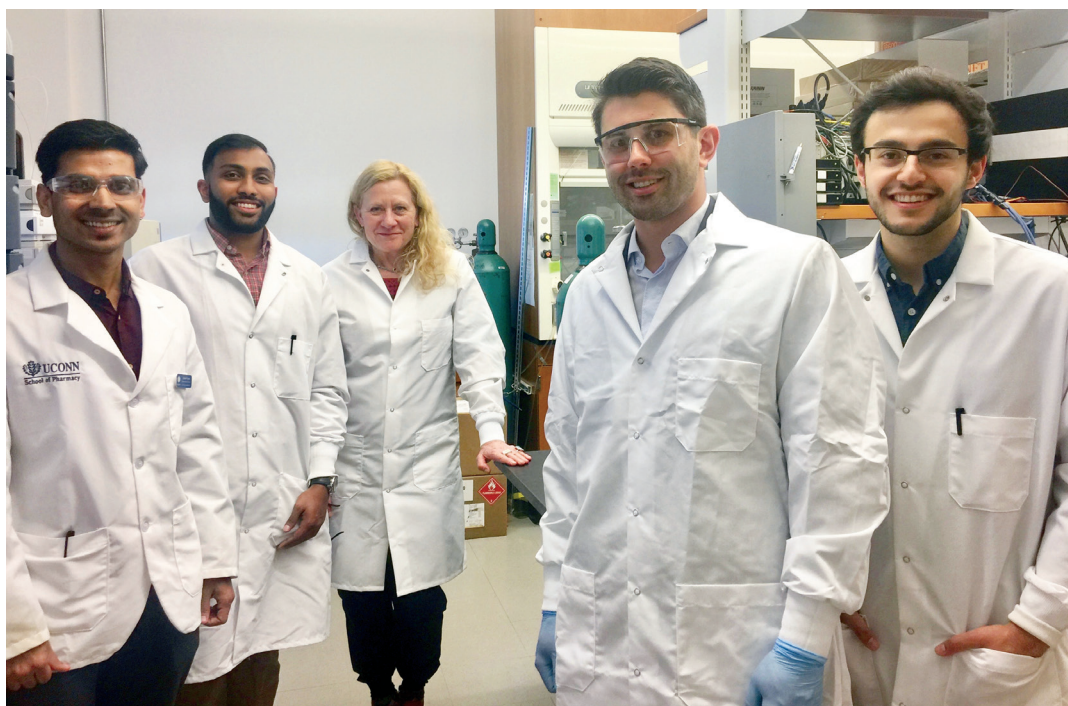
### Application portals:

**PhDgrad.uconn.edu**

Pre-pharmacy  
**admissions.uconn.edu** (please check pre-pharmacy on the application)

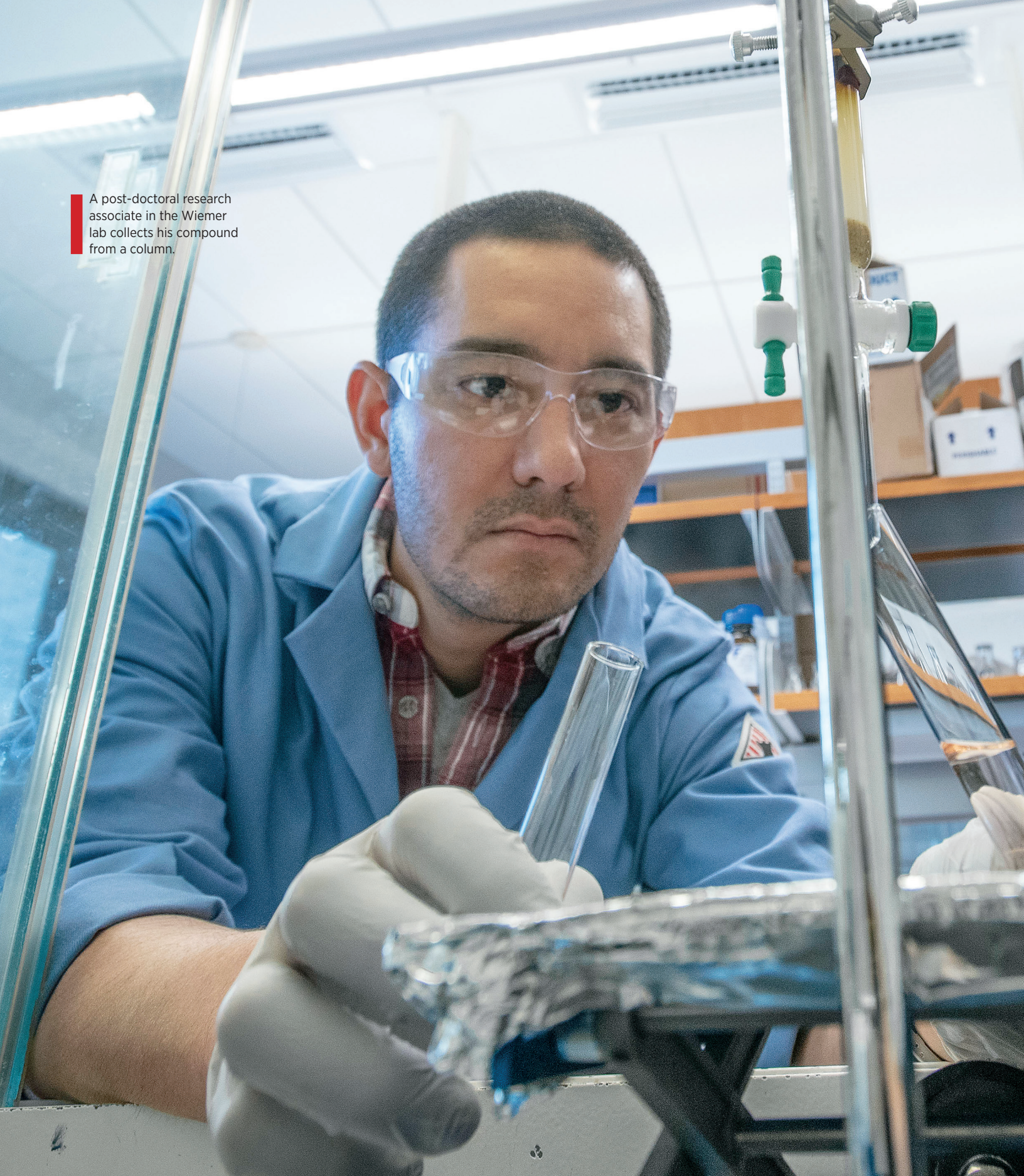
PharmD  
(use PharmCAS. Transfers will also apply through **admissions.uconn.edu**)

PhD  
**grad.uconn.edu**



Diane Burgess, Distinguished Professor, Pfizer Distinguished Chair of Pharmaceutical Technology, and members of her complex parenterals continuous manufacturing research team during a site visit from the F.D.A.





A post-doctoral research associate in the Wiemer lab collects his compound from a column.