

# Interested in Drug Delivery?

## GRADUATE STUDIES IN PHARMACEUTICS



**COLLEGE OF PHARMACY**

**UNIVERSITY OF MINNESOTA**

**Driven to Discover<sup>SM</sup>**



Are you fascinated by the physiochemical properties of drugs?

Do you have a passion for understanding the delivery of drugs to the body and for applying that understanding to enhancing health through research?

If so, the University of Minnesota's graduate programs in **Pharmaceutics** may be just what you're looking for!

## What is Pharmaceutics?

Pharmaceutics focuses on the development and evaluation of drug delivery systems. Pharmaceutical scientists engage in a variety of important work including:

- characterizing physical properties of drugs
- developing dosage forms for drugs in the context of physiochemical properties and desired route of administration
- exploring the relationship between dosage form and drug availability to the site of action
- quantitatively evaluating drug absorption, distribution, metabolism, excretion, and pharmacological activity in the living organism

## Other Frequently Asked Questions

### **What is the difference between pharmaceutics and pharmacology?**

Pharmaceutics is concerned with the quantitative aspects of drug delivery, and involves the design, development, and evaluation of drugs in combination with an appropriate dosage form. Pharmacology is the study of how drugs interact with biological targets in order to exert their effects on living systems.

### **Do I need to have a master's degree to apply?**

A bachelor's degree is sufficient. If you are admitted, any missing prerequisites will be built into your program of study.

### **What if I don't have a pharmacy background?**

Many pharmaceutics students have non-pharmacy backgrounds in areas such as chemistry, chemical engineering, biology, neuroscience, and mathematics.

### **How long will it take to earn a degree?**

A PhD degree in Pharmaceutics averages four to five years and an MS degree in Pharmaceutics averages two to three years.

### **What is it like to live in Minnesota?**

Minnesota has four truly beautiful seasons that offer enjoyable indoor and outdoor activities throughout the year. When spring arrives you will find people of every age and ability strolling, running, and biking on groomed paths. Summer brings outdoor sports, music, and free movies in the parks, and many enjoy canoeing and picnics on the connecting lakes located right in the middle of the city. It's not far to the north woods of Minnesota for camping, fishing, and viewing the abundant wildlife. Fall brings dazzling leaf colors throughout the state, and winter is celebrated with outdoor festivals, skiing, and ice skating, along with indoor activities that are available year-round.

## PHARMACEUTICS DEPARTMENTAL FACULTY

### **William F. Elmquist, PharmD, PhD**

Distinguished Professor

*Membrane transporters, CNS drug delivery, pharmacokinetics*

### **Carolyn A. Fairbanks, PhD**

Professor and Associate Dean for Research

*Neuropharmacology of pain, analgesia, CNS drug delivery*

### **Karunya Kandimalla, PhD**

Professor and Associate Dean for Graduate Education

*Nanomedicine, cellular pharmacokinetics, protein biophysics, pharmacokinetic data analysis and modeling*

### **Ameya Kirtane, PhD**

Assistant Professor

*Drug delivery, nanomedicine, devices, mRNA*

### **Hongbo Pang, PhD**

Assistant Professor

*Disease-targeting peptides, tumor immunology, cargo transport machineries*

### **Ronald A. Siegel, ScD**

Professor and Director of Graduate Studies

*Polymeric drug delivery, hydrogels, intranasal delivery, mathematical modeling*

### **Changquan Calvin Sun, PhD**

Distinguished McKnight University Professor and Associate Department Head

*Materials science and engineering, particle design, powder compaction and flow, manufacturing science*

### **Raj G. Suryanarayanan, PhD**

Professor, Peters Endowed Chair, and Department Head

*Materials sciences, solid-state pharmaceuticals, pharmaceutical technology*



## TOP-RANKED PROGRAM

The University of Minnesota College of Pharmacy's PhD and MS programs in Pharmaceutics are among the best in the nation. Our comprehensive combination of coursework and research gives us a reputation for preparing skilled, independent, and innovative scientists. The breadth of expertise within the department offers students abundant opportunities to pursue a course of study that fits their unique interests in areas such as physical chemistry, chemical engineering, biochemistry, pharmacology, computer sciences, and statistics. We choose our students carefully, and create a community of scholars and thinkers dedicated to pursuing new knowledge and advancing drug delivery for the benefit of humanity.

### **Our program is both rigorous and rewarding.**

When our students complete their course of study, our highly sought-after graduates enjoy a 100 percent placement rate. Most accept positions as scientists in the pharmaceutical or biotechnology industries. Those who pursue an academic career often enter post-doctoral training in prestigious laboratories.

## A TRADITION OF INNOVATION

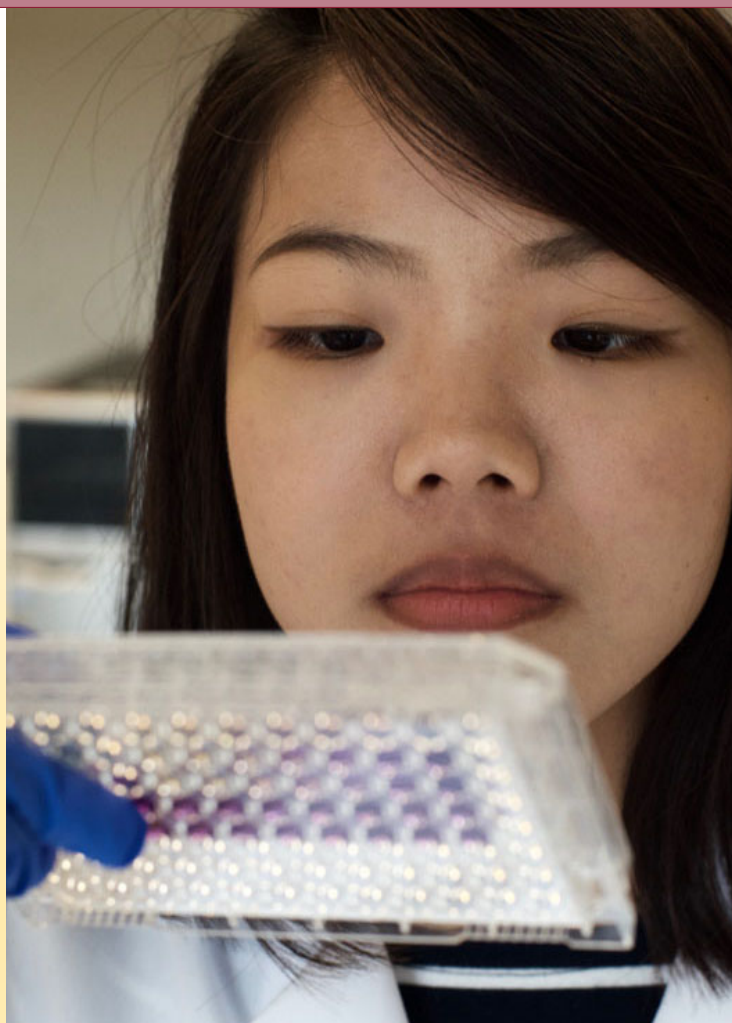
The Department of Pharmaceutics has a rich tradition of innovation and a strong commitment to advancing health through generating new knowledge. Our faculty members have made significant contributions to enhancing understanding of drug action and delivery. As part of the University's Academic Health Sciences (AHS), the department has access to an abundance of intellectual and physical resources, including the Cancer Center, Supercomputing Institute, superb NMR facilities, and the Biomedical Imaging Process Lab. Our Bioanalytic and Pharmacokinetic Services facility provides a valuable connection with the pharmaceutical industry for clinical and preclinical trials.





The University of Minnesota College of Pharmacy, the only school of pharmacy in the state of Minnesota, offers programs on the Twin Cities and Duluth campuses. Founded in 1892, the College of Pharmacy educates pharmacists and scientists, and engages in research and practice to improve the health of the people of Minnesota and society.

The University of Minnesota is committed to the policy that all persons shall have equal access to its programs, facilities, and employment without regard to sex, age, marital status, disability, public assistance status, veteran status, or sexual orientation.



## DEPARTMENT OF PHARMACEUTICS

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