

# PHARMACEUTICAL SCIENCES AND PHARMACOGENOMICS (PHD)

Visit program website. (<https://pspg.ucsf.edu>)

**Degree Offered:** PhD

**Program Leadership:**

Su Guo, PhD, Co-Program Director

Aparna Lakkaraju, PhD, Co-Program Director

**Admissions Inquiries:**

Isaac Kaijankoski, Program Manager

## Program Description

The Pharmaceutical Sciences and Pharmacogenomics (PSPG) program educates students to address the major questions in the pharmaceutical sciences, teaches them the basic sciences needed to address these questions, and creates an environment where they can develop into independent and creative scientific problem solvers. This multidisciplinary graduate program has a dual focus on pharmaceutical sciences – including molecular and systems pharmacology, drug development and delivery, therapeutic bioengineering, and pharmacokinetics/pharmacodynamics – and pharmacogenomics, the application of genetics and genomics to drug action and disposition.

Large multidisciplinary research projects, focusing on membrane transporter pharmacogenetics and quantitative systems pharmacology, provide students with cross-disciplinary training in pharmacology, human genetics, and computational biology.

## Faculty

More than 60 faculty members are associated with the PSPG program across more than 20 departments at UCSF. The PSPG faculty developed the foundation for current principles regarding the kinetics of drug action and variability in drug response, and it includes members of the National Academy of Sciences.

The PSPG program is a member of the Quantitative Biosciences Consortium (<https://qbc.ucsf.edu/>) (QBC) at UCSF.

## Sub-Disciplines

- Pharmacogenomics and functional genomics
- Quantitative and systems pharmacology
- Computational genomics
- Molecular pharmacology
- Drug development sciences
- Therapeutic bioengineering

The PSPG program office is located at the Mission Bay campus. Visit the program website (<https://pspg.ucsf.edu/>) for more information.

The PSPG program is offered by the UCSF Graduate Division, administered by the UCSF School of Pharmacy, and delivered by faculty members in the UCSF schools of pharmacy and medicine.

## Learning Outcomes

- Find learning outcomes information (<https://pspg.ucsf.edu/about/>) on the program website.

## Additional Information

### Program Core Faculty

- Find a program faculty list (<https://pspg.ucsf.edu/people/faculty/>) on the program website.

### Career Outcomes

- Find career outcomes and other data on PhD programs (<https://graduate.ucsf.edu/program-statistics/#career>) on the Graduate Division website.

## Degree Requirements

- Minimum GPA of 3.0
- All core courses and required activities taken and passed
- Six quarters in residence including a minimum of three registered quarters after advancement to candidacy
- Pass qualifying examination
- Completion and submission of the dissertation
- For additional details, please see: [graduate.ucsf.edu/phd-degree](https://graduate.ucsf.edu/phd-degree) (<https://graduate.ucsf.edu/phd-degree/>)

Obtaining a PhD from UCSF signifies that a student has demonstrated the ability to perform and complete high-quality research that makes an original contribution to their field. In practice, the expectation is that at least one first-author paper is "in press" before the thesis is signed. Learning to respond to reviewer critiques is a critical part of graduate training. There is, however, no simple bureaucratic formula to determine what is sufficient, and often the body of work forming a thesis is reported in multiple first-author publications; there are way too many scenarios, and so we rely on the judgment of the thesis committees to make the evaluation of a substantial and original contribution to science.

**General Principles:** The thesis committee has broad authority to determine when a student has completed a sufficient body of scientific work to graduate, literally by "signing off" on the thesis. In rare cases, the Executive Committee and the program director may become involved in the process, e.g., if the student and his/her adviser do not agree on when it is appropriate for the student to graduate. In no case is it acceptable for a student to ask their committee to sign their thesis solely because they have accepted a job or wish to "move on" for one reason or another. The degree will not be granted until the thesis committee is satisfied that the requirements for graduation have been met, e.g., by completing the publication process for a critical portion of the thesis, regardless of whether the student remains "in residence" at UCSF.

## Core Courses

Course	Title	Units
<b>Year 1</b>		
<b>Fall</b>		
PHARMGENOM 245A	Basic Principles of Pharmaceutical Sciences	5
PHARMGENOM 206	Laboratory Rotation	2-8
PHARMGENOM 220	Student Research Seminar	1
PHARMGENOM 297	Pharmaceutical Sciences and Pharmacogenomics Journal Club	1
PHARMGENOM 223	Formal Seminar	1
BIOSTAT 273	Introduction to Biostatistics	1

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GRAD 202	Racism in Science	3
	<b>Units</b>	<b>14-20</b>
<b>Winter</b>		
PHARMGENOM 245B.1	Systems Pharmacology	2
PHARMGENOM 245B.2	Systems Pharmacology	2
PHARMGENOM 206	Laboratory Rotation	2-8
PHARMGENOM 220	Student Research Seminar	1
PHARMGENOM 297	Pharmaceutical Sciences and Pharmacogenomics Journal Club	1
PHARMGENOM 223	Formal Seminar	1
	<b>Units</b>	<b>9-15</b>
<b>Spring</b>		
PHARMGENOM 245C	Principles of Pharmacogenomics	3
PHARMGENOM 206	Laboratory Rotation	2-8
PHARMGENOM 220	Student Research Seminar	1
PHARMGENOM 297	Pharmaceutical Sciences and Pharmacogenomics Journal Club	1
PHARMGENOM 223	Formal Seminar	1
GRAD 214	Responsible Conduct of Research and Rigor & Reproducibility	1.5
	<b>Units</b>	<b>9.5-15.5</b>
<b>Year 2</b>		
<b>Fall/Winter/Spring</b>		
PHARMGENOM 250	Research	1-8
PHARMGENOM 220	Student Research Seminar	1
PHARMGENOM 297	Pharmaceutical Sciences and Pharmacogenomics Journal Club	1
PHARMGENOM 223	Formal Seminar	1
	<b>Units</b>	<b>4-11</b>
<b>Year 3 and Above</b>		
<b>Fall/Winter/Spring</b>		
PHARMGENOM 250	Research	1-8
PHARMGENOM 220	Student Research Seminar	1
PHARMGENOM 223	Formal Seminar	1
	<b>Units</b>	<b>3-10</b>
	<b>Total Units</b>	<b>39.5-71.5</b>

Two mini courses from any program as listed here: <https://minicourses.ucsf.edu>

## Non-course Core Requirements

- First Year Student-lead Bootcamp
- First Year Pizza Talks – Faculty share their research
- QBC Retreat
- PSPG Annual Alumni-Student Activity
- Qualifying Exam by June of year 2
- Thesis Meetings every 6-9 months

## Approved Electives

Code	Title	Units
<b>Fall</b>		
BIO MD INF 206	Statistical Methods for Bioinformatics	4
CHEMISTRY 243	Chemical Biology	5
MICROBIOL 204	Molecular and Cellular Immunology	3
EPIDEMIOLOG 263	Demographic Methods for Health	1.5
BIOMED SCI 225A	Biostatistics and Computational Biology	2.5
<b>Winter</b>		
BIO MD INF 203	Biocomputing Algorithms	4
CHEMISTRY 244	Reaction Mechanisms	3
BIOPHYSICS 204B	Methods in Macromolecular Structure	4
BIOMED SCI 225A	Biostatistics and Computational Biology	2.5
PHARMGENOM 271	Advanced Pharmacokinetics in Clinical Drug Development	4
PHARMGENOM 260A	Advanced Clinical Experience in Clin Pharm & Pharmacology (A - E available in all quarters)	1-3
<b>Spring</b>		