

GENETICS, PHD

Degree: Doctor of Philosophy (PhD)

Field of Study: Genetics

General Requirements

- Students meet twice per year with Thesis Committee
- Students meet once per year with Genetics Graduate Education Committee
- Genetics Student Seminar (weekly attendance, yearly presentation)
- Genetics Journal Club (weekly attendance, yearly presentation in spring semester)
- Genetics Retreat (yearly participation, organized by students)
- Two first-author, peer-reviewed publications

Admissions

Admissions to the Genetics program may be obtained through the integrated Biomedical Sciences Training Program, by direct admission to the department or via the MSTP program. The following summary pertains to most incoming PhD students, regardless of the route through which they enter the program. Exceptions are occasionally made to reflect previous educational experiences (e.g., a prior MS degree).

Students are admitted to this PhD program through the Biomedical Sciences Training Program (BSTP) or the Medical Scientist Training Program (MSTP).

Biomedical Sciences Training Program (BSTP)

The BSTP offers a common entry point to most of the School of Medicine's biomedical PhD programs. BSTP students can choose among research mentors in many different PhD programs in the School of Medicine.

Medical Scientist Training Program (MSTP)

Students in the MSTP earn the dual MD/PhD degree. MSTP students also have the choice of mentors in many different PhD programs. The admission requirements of those programs can be viewed on their pages in the Bulletin. Program requirements for the dual can be found on the Medical Scientist Training Program, PhD/Medicine, MD program page.

PhD Policies

For PhD policies and procedures, please review the School of Graduate Studies section of the General Bulletin.

Program Requirements

The major activities of first year students are coursework, rotations in at least three laboratories, participation in seminars, journal clubs, and research meetings. During the fall term, most students take core courses in Cell and Molecular Biology (IBMS 453 Cell Biology I/IBMS 455 Molecular Biology I) that are offered for Biomedical Sciences Training Program departments. Laboratory rotations begin in early July and the choice of a thesis advisor is usually made at the end of December (see below for more details on Choosing an Advisor).

During the spring term, PhD students take the core Advanced Eukaryotic Genetics course sequence (GENE 500/GENE 504). This core course

is designed to acquaint students with fundamental principles and methodologies used in modern genetic research. The focus is on similarities and differences between different model organisms used in genetics research. Also during the Spring term and continuing into the summer, students begin formulating a doctoral research proposal.

During the second year, students participate in a Proposal Writing Workshop (GENE 511) and take other advanced elective courses based on the academic background and interest of the student. The remaining elective credits can be satisfied by choosing from the courses offered by departmental faculty or participating training faculty from other departments (see List of Courses below). At the end of the second academic year, students must pass an oral proposal defense in order to advance to candidacy for the PhD degree.

Biomedical Sciences Training Program (BSTP) Requirements

Coursework

Students take integrated courses in Cell and Molecular Biology (IBMS 453, IBMS 455). They also complete a course in biostatistics (IBMS 450) and a literature based reading course (IBMS 456A). These four courses, offered in the fall semester, emphasize the molecular approaches that form the basis of modern biology. We also seek students with strong quantitative training who may have majored in physics or math, and offer alternative courses for these students to acquire foundations in biology. Qualified students also may take more specialized elective courses. All students take IBMS 500 On Being a Professional Scientist: The Responsible Conduct of Research.

Research Rotations

The research rotations allow students to explore research areas and become familiar with faculty members and their laboratories. The main purpose of these rotations is to aid students in selecting a laboratory for their thesis work. Students are encouraged to begin their rotations in July. Doing so gives them the opportunity to complete rotations during the summer before classes begin at the end of August. Students must complete at least three rotations.

Choosing a Thesis Advisor

During the first year, students select an advisor for their dissertation research. Each student also joins the PhD program with which their advisor is affiliated. Once students choose a PhD program, the requirements of that program are followed to obtain the PhD. The emphasis of the PhD work is on research, culminating in the completion of an original, independent research thesis and publishing the results in the scientific literature. PhD programs also focus on educating students to work as professional scientists.

Sample Plan of Study

First Year

Fall		Hours
IBMS 453	Cell Biology I	3
IBMS 455	Molecular Biology I	3
Complete 3 lab rotations (July 1 to Dec 15)		
Choose Ph.D. mentor (end December)		
GENE 601	Research in Genetics	1
CBIO 456		1

IBMS 450	Fundamental Biostatistics to Enhance Research Rigor & Reproducibility	1	IBMS 501	Responsible Conduct of Research for Advanced Trainees	0
Hours			Hours		
9			3		
Spring			Total Hours		
			54		
GENE 500 or GENE 504	Advanced Eukaryotic Genetics I or Advanced Eukaryotic Genetics II	3	* IBMS 501 is offered every spring semester (beginning 2020). The SOM requires that PhD students who are 4 years beyond their initial RCR training in IBMS 500, register for IBMS 501.		
Ph.D. Comprehensive exam (end of May or early June)					
GENE 504	Advanced Eukaryotic Genetics II	3			
GENE 601	Research in Genetics	3			
Hours					
9					
Summer					
Program Directors meet with students to discuss status, mentor; students begin assembling PhD thesis committee					
Hours					
0					
Second Year					
Fall					
GENE 511	Grant Writing and Reviewing Skills Workshop	3			
Elective course (Genetics or other)					
3					
GENE 601	Research in Genetics	3			
Hours					
9					
Spring					
Elective course (Genetics or other)					
3					
GENE 601	Research in Genetics	3			
Oral Defense of Thesis Proposal (to be completed by June 1)					
3					
Hours					
9					
Third Year					
Fall					
Either semester 1 elective course (Genetics or other)					
GENE 701	Dissertation Ph.D.	3			
Hours					
3					
Spring					
Either semester 1 elective course (Genetics or other)					
GENE 701	Dissertation Ph.D.	3			
Hours					
3					
Fourth Year					
Fall					
GENE 701	Dissertation Ph.D.	3			
Hours					
3					
Spring					
GENE 701	Dissertation Ph.D.	3			
Hours					
3					
Fifth Year					
Fall					
GENE 701	Dissertation Ph.D.	3			
Hours					
3					
Spring					
GENE 701	Dissertation Ph.D.	3			