GENETICS, PHD

Graduate training in genetics emphasizes study and research leading to a PhD degree in genetics.

The goal of the genetics graduate training program is to train the next generation of professional geneticists. This includes selecting the most promising university graduates for admission to the program and training those students in the methods and logic of genetic analysis. Such analyses are increasingly important in contemporary biological and biomedical research. The curriculum includes:

1. Coursework on the principles of genetics and on the methods of genetic and genomic analyses, and
2. Original research in a specialized area, which culminates in the writing and defense of a doctoral thesis.

The genetics graduate program is supported by the oldest and one of the largest NIH-funded genetics training grants in the country.

The strength of genetics research at Wisconsin derives in large part from the Laboratory of Genetics, but state-of-the-art genetics research is conducted in many campus departments and centers. Mentoring faculty of the genetics PhD program includes over 80 mentors selected from 22 campus departments and schools based on the strength of their scholarly genetics research. A key feature of the mentors is that they conduct genetic research, using any number of tools, and can therefore provide students with a solid foundation of genetic knowledge and experiences. The genetics research pursued on campus provides an exceptional community.

Genetics PhD students choose one of the mentoring faculty as the graduate thesis advisor and mentor. Genetics graduate students spend time during the first semester of graduate school rotating in the laboratories of three or four faculty mentors, selected by the student. Following rotations, a graduate thesis advisor is chosen by mutual consent of both student and mentor. Students are expected to acquire a broad and fundamental knowledge of genetics during their coursework, after which they conduct independent scholarly research based on individual interests and under the guidance and mentoring of the thesis advisor. Formal coursework requirements are modest, and independent study that includes original research is of paramount importance in the program. Students choose an individualized thesis advisory committee that approves formal coursework and provides scientific and career development advice throughout a student's graduate career.

LABORATORY OF GENETICS

The Laboratory of Genetics is the oldest and one of the finest centers of genetics in the nation. It is highly regarded for its research contributions in the areas of disease genetics (https://genetics.wisc.edu/disease-biology/), cell biology (https://genetics.wisc.edu/cell-biology/), neurogenetics (https://genetics.wisc.edu/neuro-and-behavioral-genetics/), developmental genetics (https://genetics.wisc.edu/development/), gene expression (https://genetics.wisc.edu/gene-expression/), genomics (https://genetics.wisc.edu/genomics-and-proteomics/), evolutionary and population genetics (https://genetics.wisc.edu/evolutionary-and-population-genetics/), and computational biology (https://genetics.wisc.edu/computational-systems-and-synthetic-biology/). The laboratory consists of two departments: Genetics, in the College of Agricultural and Life Sciences; and Medical Genetics, in the School of Medicine and Public Health. Although administratively distinct, these two departments function as one at both the faculty and student levels.

ADMISSIONS

ADMISSIONS

Please consult the table below for key information about this degree program's admissions requirements. The program may have more detailed admissions requirements, which can be found below the table or on the program's website.

Graduate admissions is a two-step process between academic programs and the Graduate School. ***Applicants must meet* the minimum requirements (https://grad.wisc.edu/apply/requirements/) *of the Graduate School as well as the program(s).*** Once you have researched the graduate program(s) you are interested in, apply online (https://grad.wisc.edu/apply/).

Requirements	Detail
Fall Deadline	December 1
Spring Deadline	The program does not admit in the spring.
Summer Deadline	The program does not admit in the summer.
GRE (Graduate Record Examinations)	Not required but may be considered if available.
English Proficiency Test	Every applicant whose native language is not English, or whose undergraduate instruction was not exclusively in English, must provide an English proficiency test score earned within two years of the anticipated term of enrollment. Refer to the Graduate School: Minimum Requirements for Admission policy: https://policy.wisc.edu/library/UW-1241 (https://policy.wisc.edu/library/UW-1241/).
Other Test(s) (e.g., GMAT, MCAT)	The GRE Biology or related subject test is not required, but applicants may provide scores if available.
Letters of Recommendation Required	3

Applicants in genetics choose to attend UW-Madison because of their commitment to the discipline of genetics and because of Wisconsin's strength in that area. For admission to graduate study in genetics, the applicant should have earned a grade point average of 3.0 or better and completed a BS or BA degree from an accredited college or university. There are no specific requirements in supporting fields, but applicants are encouraged to acquire adequate background in mathematics, physics, and biology. There is no formal language requirement for the PhD in genetics. Undergraduate research experience is also strongly recommended in order to be competitive.

Admission to the genetics PhD program is highly competitive. A committee of the Laboratory of Genetics reviews applications each fall, invites meritorious applicants for personal interviews each January and February, and accepts approximately 15 percent of the total applications received. An application for admission consists of:

1. resume,
2. personal statement that discusses the reasons for pursuing a genetics PhD,
3. transcript of undergraduate college or university coursework,
4. three or more letters of recommendation,
5. report, if appropriate, of scores received on English proficiency exams, and
6. any other information or documentation that would help the admissions committee evaluate an applicant's potential for success in graduate study.

FUNDING

FUNDING

GRADUATE SCHOOL RESOURCES

Resources to help you afford graduate study might include assistantships, fellowships, traineeships, and financial aid. Further funding information (https://grad.wisc.edu/funding/) is available from the Graduate School. Be sure to check with your program for individual policies and restrictions related to funding.

PROGRAM RESOURCES

The Genetics Training Program is supported by an NIH Training Grant. Domestic students receive 1–2 years of funding, typically their first year and second or third year. We encourage students to apply for fellowships. Other funding sources include professors' research grants and university fellowships. The Genetics Training Program nominates competitive applicants for fellowships including the Advanced Opportunity Fellowships (https://scimedgrs.wisc.edu/) and Wisconsin Distinguished Graduate Fellowships (https://ecals.cals.wisc.edu/2024/05/01/winners-of-wisconsin-distinguished-graduate-fellowships-announced/). Funding includes a stipend, health care benefits, and tuition costs. Students must be making satisfactory progress toward their degree.

Prospective students should see the program website (https://genetics.wisc.edu/prospective-ph-d-students/) for funding information.

REQUIREMENTS

MINIMUM GRADUATE SCHOOL REQUIREMENTS

Review the Graduate School minimum academic progress and degree requirements (http://guide.wisc.edu/graduate/#policiesandrequirementstext), in addition to the program requirements listed below.

MAJOR REQUIREMENTS

MODE OF INSTRUCTION

Face to Face	Evening/ Weekend	Online	Hybrid	Accelerated
Yes	No	No	No	No

Mode of Instruction Definitions

Accelerated: Accelerated programs are offered at a fast pace that condenses the time to completion. Students typically take enough credits aimed at completing the program in a year or two.

Evening/Weekend: Courses meet on the UW–Madison campus only in evenings and/or on weekends to accommodate typical business schedules. Students have the advantages of face-to-face courses with the flexibility to keep work and other life commitments.

Face-to-Face: Courses typically meet during weekdays on the UW-Madison Campus.

Hybrid: These programs combine face-to-face and online learning formats. Contact the program for more specific information.

Online: These programs are offered 100% online. Some programs may require an on-campus orientation or residency experience, but the courses will be facilitated in an online format.

CURRICULAR REQUIREMENTS

Requirement	Detail
Minimum Credit Requirement	51 credits
Minimum Residence Credit Requirement	32 credits
Minimum Graduate Coursework Requirement	26 credits must be graduate-level coursework. Refer to the Graduate School: Minimum Graduate Coursework (50%) Requirement policy: https://policy.wisc.edu/library/UW-1244 (https://policy.wisc.edu/library/UW-1244/).
Overall Graduate GPA Requirement	3.00 GPA required. Refer to the Graduate School: Grade Point Average (GPA) Requirement policy: https://policy.wisc.edu/library/UW-1203 (https://policy.wisc.edu/library/UW-1203/).
Other Grade Requirements	n/a
Assessments and Examinations	At the end of their coursework, student's complete Preliminary A, a written examination. The purpose of the Preliminary A Examination is to evaluate the student's general knowledge in genetics, their competency in critically analyzing original genetic literature and their ability to formulate experimental solutions to genetic problems. Doctoral students are required to take a comprehensive preliminary/oral examination after they have cleared their record of all Incomplete and Progress grades (other than research and thesis). This Preliminary B Examination should be completed by December 15 of the student's 3rd year. Deposit of the doctoral dissertation in the Graduate School is required.
Language Requirements	No language requirement.
Graduate School Breadth Requirement	All doctoral students are required to complete a doctoral minor or graduate/professional certificate. Refer to the Graduate School: Breadth Requirement in Doctoral Training policy: https://policy.wisc.edu/library/UW-1200 (https://policy.wisc.edu/library/UW-1200/).

REQUIRED COURSES

Code	Title	Credits
GENETICS 701	Advanced Genetics	3
GENETICS 702	Advanced Genetics II	3
GENETICS/ MD GENET 707	Genetics of Development [1]	3
GENETICS/ MD GENET 708	Methods and Logic in Genetic Analysis [1]	3
ONCOLOGY 715	Ethics in Science [2]	1
Elective: Any graduate level Genetics course (including special topics) [3]		
Four seminars		
Specialized elective coursework at the discretion of your thesis committee		
Total Credits		**51**

1. GENETICS/MD GENET 707 Genetics of Development and GENETICS/MD GENET 708 Methods and Logic in Genetic Analysis are taken by the first and second years together; GENETICS/ MD GENET 707 is offered one year and GENETICS/MD GENET 708 the next.
2. Permission must be obtained to register from the cancer biology department.
3. Students wishing to take a course outside of Genetics course offerings may petition the Graduate Program Committee.

POLICIES

GRADUATE SCHOOL POLICIES

The Graduate School's Academic Policies and Procedures (https://grad.wisc.edu/acadpolicy/) provide essential information regarding general university policies. Program authority to set degree policies beyond the minimum required by the Graduate School lies with the degree program faculty. Policies set by the academic degree program can be found below.

MAJOR-SPECIFIC POLICIES

PRIOR COURSEWORK

Graduate Credits Earned at Other Institutions

For well-prepared advanced students, the program may accept prior graduate coursework from other institutions toward the minimum credit requirement and minimum graduate coursework (50%) requirement. The minimum graduate residence credit requirement can be satisfied only with courses taken as a graduate student at UW–Madison. Coursework earned ten or more years prior to admission to a doctoral degree is not allowed to satisfy requirements.

Undergraduate Credits Earned at Other Institutions or UW-Madison

Refer to the Graduate School: Transfer Credits for Prior Coursework (https://policy.wisc.edu/library/UW-1216/) policy.

Credits Earned as a Professional Student at UW-Madison (Law, Medicine, Pharmacy, and Veterinary careers)

Refer to the Graduate School: Transfer Credits for Prior Coursework (https://policy.wisc.edu/library/UW-1216/) policy.

Credits Earned as a University Special Student at UW–Madison

Refer to the Graduate School: Transfer Credits for Prior Coursework (https://policy.wisc.edu/library/UW-1216/) policy.

PROBATION

Refer to the Graduate School: Probation (https://policy.wisc.edu/library/UW-1217/) policy.

ADVISOR / COMMITTEE

When students have identified a major professor and joined their lab, that professor will assume the duties of their advisor. At that time students will form a PhD Advisory Committee consisting of three to five faculty members (ultimately it must be five) three of whom must be Genetics trainers, including two members of the Laboratory of Genetics faculty, and one minor advisor, if needed. One member must also be from a different department (all 5 cannot be Genetics faculty members). The PhD Advisory Committee should be established no later than the end of the second semester. Under normal circumstances, the committee membership will remain in effect for the entire tenure of the student's graduate career.

The PhD Advisory Committee will advise the student with regard to major and minor requirements. It will also act as their Prelim B Examination Committee and as the Final Oral PhD Examination Committee. After the advisor, this committee is the primary monitoring instrument to assure satisfactory progress toward degree. The PhD Advisory Committee will meet with the student at least once per year. During these annual meetings anticipated timelines for progress of the thesis project will be discussed and concrete guidance will be given about completing the thesis. The student will complete an annual committee meeting form each year during the meeting. The annual meeting will address the assessment of the student's progress and outline any suggestions or recommendations, in addition to verifying the discussion of the student's Individualized Development Plan (https://grad.wisc.edu/pd/idp/).

CREDITS PER TERM ALLOWED

15 credits

TIME LIMITS

Refer to the Graduate School: Time Limits (https://policy.wisc.edu/library/UW-1221/) policy.

GRIEVANCES AND APPEALS

These resources may be helpful in addressing your concerns:

- Bias or Hate Reporting (https://doso.students.wisc.edu/bias-or-hate-reporting/)
- Graduate Assistantship Policies and Procedures (https://hr.wisc.edu/policies/gapp/#grievance-procedure)
- Hostile and Intimidating Behavior Policies and Procedures (https://hr.wisc.edu/hib/)
  - Office of the Provost for Faculty and Staff Affairs (https://facstaff.provost.wisc.edu/)
- Employee Assistance (http://www.eao.wisc.edu/) (for personal counseling and workplace consultation around communication and conflict involving graduate assistants and other employees, post-doctoral students, faculty and staff)

- Employee Disability Resource Office (https://employeedisabilities.wisc.edu/) (for qualified employees or applicants with disabilities to have equal employment opportunities)
- Graduate School (https://grad.wisc.edu/) (for informal advice at any level of review and for official appeals of program/departmental or school/college grievance decisions)
- Office of Compliance (https://compliance.wisc.edu/) (for class harassment and discrimination, including sexual harassment and sexual violence)
- Office Student Assistance and Support (OSAS) (https://osas.wisc.edu/) (for all students to seek grievance assistance and support)
- Office of Student Conduct and Community Standards (https://conduct.students.wisc.edu/) (for conflicts involving students)
- Ombuds Office for Faculty and Staff (http://www.ombuds.wisc.edu/) (for employed graduate students and post-docs, as well as faculty and staff)
- Title IX (https://compliance.wisc.edu/titleix/) (for concerns about discrimination)

College of Agricultural and Life Sciences: Grievance Policy

In the College of Agricultural and Life Sciences (CALS), any student who feels unfairly treated by a member of the CALS faculty or staff has the right to complain about the treatment and to receive a prompt hearing. Some complaints may arise from misunderstandings or communication breakdowns and be easily resolved; others may require formal action. Complaints may concern any matter of perceived unfairness.

To ensure a prompt and fair hearing of any complaint, and to protect the rights of both the person complaining and the person at whom the complaint is directed, the following procedures are used in the College of Agricultural and Life Sciences. Any student, undergraduate or graduate, may use these procedures, except employees whose complaints are covered under other campus policies.

1. The student should first talk with the person at whom the complaint is directed. Most issues can be settled at this level. Others may be resolved by established departmental procedures.
2. If the student is unsatisfied, and the complaint involves any unit outside CALS, the student should seek the advice of the dean or director of that unit to determine how to proceed.
   a. If the complaint involves an academic department in CALS the student should proceed in accordance with item 3 below.
   b. If the grievance involves a unit in CALS that is not an academic department, the student should proceed in accordance with item 4 below.
3. The student should contact the department's grievance advisor within 120 calendar days of the alleged unfair treatment. The departmental administrator can provide this person's name. The grievance advisor will attempt to resolve the problem informally within 10 working days of receiving the complaint, in discussions with the student and the person at whom the complaint is directed.
   a. If informal mediation fails, the student can submit the grievance in writing to the grievance advisor within 10 working days of the date the student is informed of the failure of the mediation attempt by the grievance advisor. The grievance advisor will provide a copy to the person at whom the grievance is directed.
   b. The grievance advisor will refer the complaint to a department committee that will obtain a written response from the person at whom the complaint is directed, providing a copy to the student. Either party may request a hearing before the committee. The grievance advisor will provide both parties a written decision within 20 working days from the date of receipt of the written complaint.
   c. If the grievance involves the department chairperson, the grievance advisor or a member of the grievance committee, these persons may not participate in the review.
   d. If not satisfied with departmental action, either party has 10 working days from the date of notification of the departmental committee action to file a written appeal to the CALS Equity and Diversity Committee. A subcommittee of this committee will make a preliminary judgement as to whether the case merits further investigation and review. If the subcommittee unanimously determines that the case does not merit further investigation and review, its decision is final. If one or more members of the subcommittee determine that the case does merit further investigation and review, the subcommittee will investigate and seek to resolve the dispute through mediation. If this mediation attempt fails, the subcommittee will bring the case to the full committee. The committee may seek additional information from the parties or hold a hearing. The committee will present a written recommendation to the dean who will provide a final decision within 20 working days of receipt of the committee recommendation.
4. If the alleged unfair treatment occurs in a CALS unit that is not an academic department, the student should, within 120 calendar days of the alleged incident, take his/her grievance directly to the Associate Dean of Academic Affairs. The dean will attempt to resolve the problem informally within 10 working days of receiving the complaint. If this mediation attempt does not succeed the student may file a written complaint with the dean who will refer it to the CALS Equity and Diversity Committee. The committee will seek a written response from the person at whom the complaint is directed, subsequently following other steps delineated in item 3d above.

OTHER

n/a

PROFESSIONAL DEVELOPMENT

PROFESSIONAL DEVELOPEMENT

GRADUATE SCHOOL RESOURCES

Take advantage of the Graduate School's professional development resources (https://grad.wisc.edu/pd/) to build skills, thrive academically, and launch your career.

LEARNING OUTCOMES

LEARNING OUTCOMES

1. Demonstrate a broad understanding in the principles of genetics and heredity in all organisms. They will develop particular expertise in at least one of the broad subject areas of the doctoral program.
2. Demonstrate a broad understanding of major current and past theories, research findings and methodologies and techniques in genetics, with particular expertise in their area of concentration, both orally and in writing.
3. Develop critical thinking skills. They will retrieve and examine scientific literature, evaluate evidence for and again hypotheses, identify

knowledge gaps, strengths and weaknesses in existing literature, synthesize knowledge, develop conclusions, and formulate plans for moving the current state of knowledge forward.

4. Develop and complete original research that advances a specific field of study within one of the broad areas subject areas in genetics.
5. Retrieve, evaluate and interpret professional peer-reviewed literature and use this information to develop theoretical frameworks, testable hypotheses, and predictions for their own research projects.
6. Design research projects that are feasible, based on well-designed and internally controlled experiments, and address important unsolved problems in genetic or biomedical research.
7. Conduct independent research, critically evaluate and interpret the resulting data, and, based on that analysis, design future experiments that advance the state of the field.
8. Write, edit, and assemble manuscripts resulting from their independent research and submit these for publication in peer-reviewed professional journals.
9. Communicate effectively to diverse audiences in writing, through oral presentations, and during formal and informal discussions.
10. Write clear and concise research articles for publication in professional journals.
11. Present at scientific conferences and in both formal and informal seminars.
12. Master methods of communicating and interacting effectively with professional colleagues, and will prepare successful applications for research grant support.
13. Articulate their research and its significance both formally and informally to diverse audiences.
14. Give and receive feedback on communication skills both orally and in writing.
15. Be provided with opportunities to engage in public outreach and education.
16. Effectively teach the principles of genetics and the methods used in contemporary genetic research.
17. Receive in-class educational training by serving as teaching assistants for at least one semester of an undergraduate genetics course.
18. Be provided with opportunities to mentor other students (for example, undergraduate students) in a laboratory research setting. Interested students will have opportunities to perform outreach activities in which they educate school-age students or individuals from other fields on the principles of modern genetics.
19. Be provided with diverse training that will prepare them for a range of flexible and sustainable careers in, for example, academia, industry, government, science policy, administration, commerce, journalism, law, education and community outreach.
20. Develop broadly applicable skills in critical thinking and problem solving.
21. Be provided with opportunities for teamwork, written and oral communication skills and collaborations.
22. Receive training in professional ethics and the responsible conduct of science.
23. Be trained to use scientific rigor when designing experiments, collecting and analyzing data, and interpreting and reporting results.
24. Discuss and formulate opinions on the many situations that working scientists encounter involving professional ethics and conflicts of interest.
25. Receive training in laws, regulation, permits and licenses, occupational health, safety standards and best practices, will demonstrate understanding of such and adhere to compliance.

PEOPLE

PEOPLE

PROFESSORS

Pelegri, Francisco (Chair); Chang, Qiang; Drummond-Barbosa, Daniela; Gasch, Audrey; Hittinger, Chris; Ikeda, Aki; Masson, Patrick; Payseur, Bret; Perna, Nicole; Pool, John; Prolla, Tom; Schwartz, David; Skop, Ahna; Wassarman, David; Yin, Jerry

ASSOCIATE PROFESSORS

Anderson, Matt

ASSISTANT PROFESSORS

Brunkard, Jake; Richardson, Claire; Schrodi, Steven; Sharp, Nathaniel; Werling, Donna; Wolter, Justin