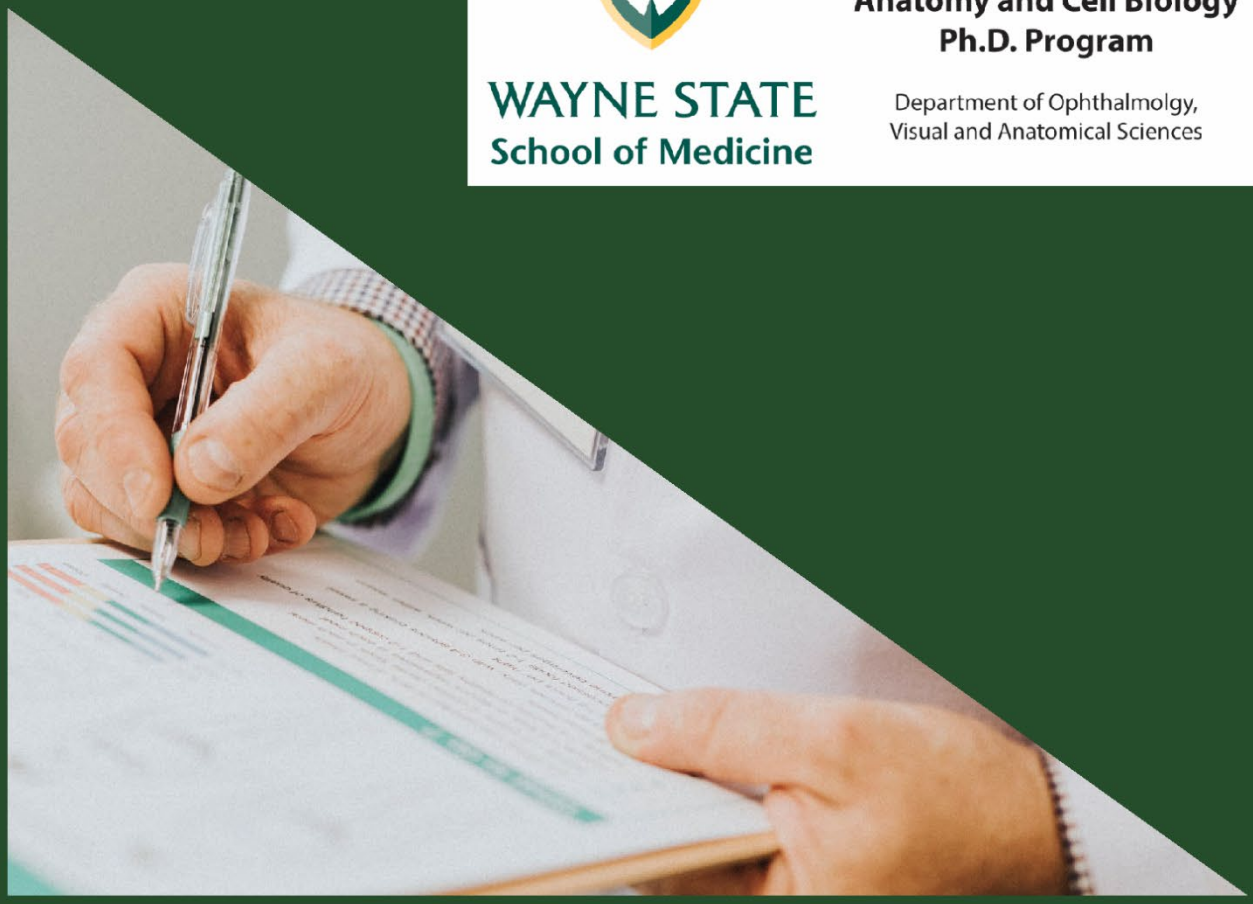
WAYNE STATE
School of Medicine

Anatomy and Cell Biology
Ph.D. Program

Department of Ophthalmolgy,
Visual and Anatomical Sciences



DOCTOR of PHILOSOPHY

in Anatomy and Cell Biology

Department of Ophthalmology, Visual and Anatomical Sciences (OVAS)

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*Note: the ability of a faculty member to accept a student in their lab is dependent on their research funding, which may fluctuate on a yearly basis. Therefore, the student should consult with the Graduate Director prior to making any final decisions in regards to joining a lab.

Mission Statement

The Doctor of Philosophy (PhD) Program in Anatomy & Cell Biology prepares doctoral students for research and teaching careers in various areas encompassed by Anatomy and Cell Biology. Goals include providing students with a basic background in biomedical science, expertise in multiple sub-disciplines of Anatomy & Cell Biology, competence in a variety of experimental techniques, ability to read and understand current scientific literature, and experience in the development and implementation of experiments to test specific hypotheses. We are seeking undergraduate or master's degree level students who show potential for future success as independent researchers and educators at the highest academic levels.

Program Description

The Department of Ophthalmology, Visual and Anatomical Sciences offers training primarily in the broad research areas of vision science and neuroscience. Specific areas of vision research include mechanisms of immunity and inflammation during ocular infections; the physiology and neurochemistry of retinal neurons; and blood flow, oxygen transport, and intracellular signaling cascades in ocular tissues. Neuroscience research includes studies of neurodegeneration, mechanisms of neural signaling, neural circuit formation, auditory and vestibular dysfunction, and the development and function of glial cells.

Quick Facts

PhD students in program per year: 10-15
PhD students accepted/enrolled per year: 1-3
PhD students completed program per year: 1-3
Success rate (2006-2021): 76%
Average Time-to-Degree: 4.7 years

Progression through the PhD Program

Financial Support
PhD student appointments at the School of Medicine are designated Graduate Research Assistants (GRAs) and are administered by student's home department (OVAS). During the first 2 years, the GRA appointment is supported by the SOM Office of Biomedical Graduate Programs. It is important to understand that the student's permanent advisor provides significant financial support beyond the second year of training. As such, it is critical that the advisor has sufficient funding to support the GRA position and the overall research project. The Department is under no obligation to provide any financial support for the student's GRA position or research project. Finally, there are no teaching obligations associated with the GRA appointment.

First Year Coursework
During the Fall of the first year, all PhD students enroll in the core course of the School of Medicine's Interdisciplinary Biomedical Sciences (IBS) curriculum (IBS 7015, Cr. 6) and a course in the Responsible Conduct of Research (GS 0900, Cr. 0). Students will also enroll in 1-2 additional courses in order to reach a total of 10 credits. During the Winter of the first year, PhD students can enroll in courses within the OVAS department (ANA courses) or outside of the department. In addition, students will enroll in ANA 7890 (Cr.1) to participate in the seminar series and ANA 7270 (credits vary) to complete their laboratory rotations.

Laboratory Rotations
Typically starting in the Winter of the first year, students are given the opportunity of three laboratory rotations (8-16 weeks each) prior to the selection of the permanent advisor. Depending upon the student's

coursework load and advisor availability, the rotation schedule can be made flexible, but should be completed by the end of the student's first appointment year (August). Laboratory rotations allow both student and potential faculty advisor to determine if the selection is a good match. Students must consult with the Graduate Director to plan each rotation since financial support is a critical factor to the student's success. At the beginning of each rotation, the student and rotation advisor should discuss expectations as well as the research grading policy (see below).

Selecting a Permanent Advisor

This is the most important decision of a student's graduate career. The advisor shapes the direction of the student's career and provides the environment for the PhD research project. Each advisor has a unique approach to the training of PhD students and it is the student's responsibility to discover the advisor's philosophy of mentorship during the laboratory rotations. Final approval of the permanent advisor is granted by the Departmental Chair in consultation with the Graduate Director after evaluation of resources needed to support the student's GRA appointment and overall PhD research project.

Plan of Work

The PhD program requires a completion of 90 graduate credits. This total must include 30 credits of ANA dissertation research. Students may not take more than 30 credits of ANA 7996 (Research) without a special override.

The Plan of Work (PoW) provides the student and graduate school with an official outline of the planned coursework that will satisfy 90 graduate credits. The PoW must be completed prior to completing 40 credits of coursework, but ideally should be submitted at the end of the first year of the PhD program. When selecting courses for each semester, students must be enrolled in a minimum of 8 credits in the Fall and Winter semesters and 2 credits in the Spring/Summer semester. Students should also be careful not to exceed the maximum number of credit hours covered by their appointment for tuition scholarship. This number may differ according to the student's funding source and semester enrolled, but is typically 10 credits for Fall and Winter semesters and 2 credits for the Spring/Summer semester. Students that exceed the maximum amount of credits covered by their agreement or who take a course outside of the approved PoW will be held responsible for tuition payments. After consultation and approval by the PhD advisor and the Graduate Director, students submit the PoW to the graduate school via the following link.
https://gradschool.wayne.edu/students/phd/forms

Selecting a Dissertation Committee

During the second year of the program, the student should assemble a Dissertation Committee to assist and advise the student through the remainder of the PhD. The committee is composed of the PhD advisor, two additional faculty from the department, and one faculty member who is external to the department. Note that all faculty members must have Graduate Faculty status. The student should consult with their advisor to select faculty members who have complementary expertise to the student's research and who are willing to serve on the committee.

Once assembled, the student should hold an initial meeting with the committee. At least one meeting should be held prior to the Prospectus Oral Exam. The student will likely not have a clearly focused project or a large amount of preliminary data to share with the committee at the initial meeting. However, student progress should improve over time, which will be assessed in subsequent meetings. From the date of the first meeting, students must meet with their dissertation committee once every 6-months in order to review progress made on the project. During each meeting, the student provides an oral presentation that reviews the central hypothesis and specific aims of the project and shows data obtained for each specific aim. The student answers questions posed by the committee as well as discusses the interpretation of the data. During the meeting, the advisor should not attempt to speak on behalf of the student. The dissertation committee may make suggestions designed to strengthen the project and it is the student's responsibility to respond to all suggestions. The Graduate Director (or another member of the Graduate Program

Committee) will attend these meetings and record committee suggestions and the student's progress.

Individual Development Plan (IDP)
The PhD Annual Review and IDP is a general requirement for all PhD students at Wayne State University. It should be filled out each year between April and October to reflect work completed during the prior academic year. The student should fill out the student sections of the IDP form, including their career objective, self-assessment, areas for development, and action plan. These sections should serve as a foundation for annual review and feedback from the PhD advisor. Following the review, the advisor should fill out the Advisor's Comments section of the form. The Graduate Director will also comment on the student's progress and goals for the future. Finally, the form should be submitted to the Graduate School via the following link.
https://gradschool.wayne.edu/students/phd/forms

Written Qualifying Exam
The Written Qualifying Exam must be passed prior to filing for PhD Candidacy (see below) and should be completed prior to entering year three of the Program. The format of the exam is as follows. The written qualifying examination will be based on research papers/articles given to the student by his/her committee members. A total of four research articles (one from each committee member) will be given to the student six weeks prior to the date of examination. The paper should deal with subjects that fall reasonably within the scope of the student's project. The exam questions will be based on material presented in the research articles. The student will have access to the research articles at the time of the written examination. The benefit of this format is that it will help students learn to interpret and critically evaluate scientific data. Each committee member (including the advisor) will submit two questions based on the chosen research articles. Out of the eight questions, the student must answer six questions (one question from the advisor and five of the other six questions). The student will be given a maximum of three hours to complete the written qualifying examination. Following the exam, each committee member will evaluate the response(s) to his/her question(s) and assign a numerical grade to each question. The student will need to receive an overall average of 75% to successfully pass the exam. If the student fails the exam the first time, he/she can retake the exam after four months have passed. During this period, it is expected that the student's graduate committee members will provide feedback/advice to the student. If the student fails the written exam twice, he/she will be expelled from the PhD program.

Prospectus
The University requires that each PhD student pass an Oral Qualifying Exam prior to obtaining PhD Candidacy status. Our program makes the Oral Qualifying Exam part of the Prospectus. The Prospectus must be completed after 50 credits of coursework and normally takes place at the end of the second year in the program, or early in the third year. Prior to taking the Prospectus, the student must have an approved Plan of Work and have passed the Written Qualifying Exam.

The written form of the Prospectus is the Dissertation Proposal. The student should consult with their advisor to construct a proposal based on their research project. The proposal should contain scientific background and significance of the project, a clear central hypothesis, specific aims, supportive preliminary data, experimental approaches, anticipated outcomes, and potential pitfalls and alternative strategies. The document must demonstrate the student's depth of knowledge about the overall project. It should be broad enough to test the student's general knowledge of their research area as well as specific enough to focus on underlying mechanisms that will be later studied. Do not exceed 50-pages excluding References. The usual size of the document is 20-30 pages. When the advisor is satisfied with the document, the student will submit it to all members of the dissertation committee for approval two-weeks prior to the scheduled oral exam portion of the Prospectus. Committee members will give the student feedback on the written document at the oral exam portion of the Prospectus.

The oral exam portion of the Prospectus is an oral defense of the Dissertation Proposal. During this meeting, the student gives a 45-50 minutes seminar that outlines the scientific background and rationale of the project, the specific aims, experimental design, preliminary studies, and predicted outcomes. The talk is immediately followed by a question and answer session between members of the dissertation committee and the student.

The Graduate Director (or another member of the Graduate Program Committee) also attends this meeting and usually acts as the mediator and student advocate. The Graduate Director is also afforded an opportunity to ask questions. This part of the meeting can last 1-2 hours and is probably the most intense experience the student will have in graduate school. After the question period is over, the committee decides whether the student has demonstrated sufficient mastery of the scientific background, experimental design and methods of their research project based upon the oral presentation and response to committee questions.
If the student passes the exam, the student progress into PhD Candidacy status. The Recommendation for Candidacy Status form should be signed by all the committee members and submitted to the graduate school. The Conflict of Interest form must also be submitted following the Prospectus. These forms can be found via the following link.
https://gradschool.wayne.edu/students/phd/forms

If the student fails, a second exam will be scheduled at a later date, but it cannot occur within the same semester as the first exam. Failure of the student to pass on second attempt is grounds for dismissal from the program.

Doctoral Dissertation Credits
The obtainment of PhD Candidacy status allows the student to register for Doctoral Dissertation credits during the third and forth year of the program. Students need 30 Doctoral Dissertation credits to achieve the PhD degree. These are obtained in 7.5 credit blocks (Doctoral Candidate Status I, II, III, IV), which much be taken and provide the students with full-time status. An override is required to register for these courses, which is done via the following link.
Graduate School Override Request - Wayne State University

These courses are typically taken during the Fall and Winter semesters of Years 3 and 4 as follows:

Fall Semester (Year 3)	ANA 9991 (7.5 cr)	Winter Semester (Year 3)	ANA 9992 (7.5 cr)
Fall Semester (Year 4)	ANA 9993 (7.5 cr)	Winter Semester (Year 4)	ANA 9994 (7.5 cr)

The student can enroll in ANA 9991 during the semester in which plan to take the oral exam portion of the Prospectus and obtain Candidacy. However, in order to register for ANA 9992, the approved PhD Candidacy form must be on file with the university.

Finally, if the student achieves ≥90 credits prior to the dissertation defense, they can continue to register for ANA 9995 (Maintenance Status, 0 cr). This allows the student's status to remain active at minimum cost while they are finishing their research project

PhD Dissertation Defense
When the dissertation committee and student have come to an agreement that the student can proceed to the final defense, the student should plan sufficient time to flush out important matters concerning the final defense. A 3-4 month period is strongly recommended to satisfy the following issues:

1. The student must adhere to the completion deadlines, guidelines, and forms that are required by the Graduate School. These can be found at the following link:
   Completion deadlines and graduation for Ph.D. students - Graduate School - Wayne State University
   Note that a format check of the written dissertation is required and must occur by a specific deadline established by the Graduate School for each particular semester.

2. It is important to understand that the committee shall have a minimum of 2-weeks to read the written document AFTER it has been approved by the PhD advisor. It is common for student to take several months to write the document and go through multiple rounds of revisions with their advisor prior to having the final version ready for submission to the committee. Guidelines for formatting the dissertation are found here:
   Microsoft Word - Complete Format Guidelines 6 2012.docx (wayne.edu)

3. Once each committee member has read and approved the contents of the dissertation, the Final Defense Report and Conflict of Interest forms must be submitted to the Graduate School. These forms can be found via the following link. https://gradschool.wayne.edu/students/phd/forms Note that these forms must be submitted two weeks prior to the dissertation defense. It is highly recommended that the final defense date not be scheduled prior to the approval of the written document and submission of these forms.

4. After all of the above issues are addressed, the student schedules the public defense. The oral lecture is presented in front of a public audience. Following the public lecture, the audience can ask questions to the student. Following these questions, the audience is dismissed and the student answers questions posed by the dissertation committee in a closed-door meeting. If the student passes this portion of the exam, as per University policy, the PhD degree is awarded.

Grading Policy for Research Credits

Expectations of both student and advisor should be discussed at the beginning of each research experience, whether a laboratory rotation or research conducted in the laboratory of the primary advisor. The below grading scale used by the advisor to assign grades:

A (outstanding). The student exceeded expectations and generated high-quality data that can be used in grants or manuscripts. Effort and time put into the project is considered exceptional.

A- (excellent). The student met all expectations. More work may be needed to make the data ready for submission, but considerable progress was made and the data is usable. Effort and time put into the project is considered excellent.

B+ (above average). The student put forth a quality effort and generated a small amount of usable data. Effort and time put into the project is considered very good.

B (average). The student put forth a quality effort but was not able to get the experiments to work for no fault of their own. Effort and time put into the project is satisfactory.

B- (needs improvement). The student was not able to get experiments to work. They may have tried, but there were times when they clearly needed to increase their effort on the project.

C (failure). The student did not devote enough time and energy into the project. Experiments failed and/or the student's effort on the project is deemed unsatisfactory.

Learning Outcomes (LO) and Assessments for the PhD Program

LO1: Produce and defend an original significant contribution to scientific knowledge.

- Ability to develop and execute an original research project that makes a significant contribution to scientific knowledge will be assessed by the dissertation advisory committee during semi-annual committee meetings and at the final dissertation defense.
- The primary advisor will also complete a series of evaluations documenting student progress in mastering research techniques and methodologies, as well as all necessary background knowledge pertaining to the dissertation project.
- External evidence of success will be assessed by original research publications, securement of post-graduate employment, and honors/awards relevant to the student's professional career path.

LO2: Demonstrate mastery of all subject material related to the program curriculum and dissertation project.

- Mastery of subject material related to the program curriculum will be assessed by exam testing and final grades obtained in coursework.
- Mastery of subject material related to the research area and dissertation project will be assessed by dissertation committee meetings and the final defense of the dissertation.
- Ability to critically read and evaluate pertinent literature will be assessed by seminar attendance, journal club participation, performance on qualifying exams, and dissertation committee meetings.

LO3: Conduct scholarly activities in an ethical manner, following the principles of the scientific process.

- Ethical conduct will be assessed through enrollment in BMS6010- Responsible Conduct in Biomedical Research.
- Potential instances of plagiarism will be monitored through the regular use of Safe Assign for written documents produced by the student.
- Students will participate in workshops on the scientific method and the proper use of statistics in the biological sciences.

LO4: Effectively communicate scientific material publicly in both written and oral formats.

- Ability to present scientific material publicly will be assessed by conference presentations of original research, journal club presentations, dissertation committee meetings, and the final dissertation defense.
- Demonstration of proficiency in scientific writing will be assessed by performance in written qualifying exams, primary authorship of original manuscripts, and the final dissertation document.