



Department of Physiology

Graduate Guidelines for Molecular and Translational Physiology

2019-2020

Adopted 4/2019

Contents

1. Overview of the Department of Physiology
2. Academics
 - 2a. Basic information, requirements, and time table
 - 2b. Exceptions to the general student timetable
 - 2c. Academic standards
 - 2d. Required courses & electives
3. Admission and Selection
4. Technical Standards and Accommodations
5. Curriculum Summary and (Typical) Sequence for Physiology PhD Students
6. Waiver of Required Courses
7. Laboratory Rotations
8. Student-Led Activities
 - 8a. Journal Clubs
 - 8b. Annual Retreat
 - 8c. Physiology Open House
 - 8d. New Student Welcome Reception
 - 8e. Student Seminars
9. Departmental Seminars
10. Dissertation Committee
11. Student Leave of Absence Policy
12. Master's Degree Exit-Option
13. Exit Survey
14. Candidacy Examination
 - 14a. Purpose
 - 14b. Timing
 - 14c. Process
15. Grade Point (GPA) Requirement
16. Admission to PhD Candidacy
17. Research Mentor Selection
18. Expectations from Mentors
19. Dissertation Preparation Resources
20. Deadlines
21. Research, Electronic Dissertation, and Oral Defense
 - 21a. Research accomplishment
 - 21b. Dissertation requirements, content, and style
 - 21c. Publication requirement prior to oral dissertation defense
 - 21d. Dissertation defense/oral examination
22. Changes to Physiology Graduate Guidelines

Appendices

Appendix A: PhD Checklist and Degree Requirements

Appendix B: Goals and Expectations (Student Self-Evaluation)

Appendix C: Student Awards and Scholarships

Appendix D: Faculty Mentors in the Department of Physiology

Appendix E: Secondary and Affiliated Faculty

Appendix F: Description of Physiology Courses

1. Overview

Physiology considers processes that control and regulate the functioning of systems within intact organisms. Basic physiological processes underlie all fields in biomedical science. Understanding and exploiting the specific actions of drugs can also furnish a way to probe physiological and biochemical processes in both normal and pathological circumstances. Research in physiology provides challenging and exciting opportunities for graduate study.

The Department of Physiology at the University of Tennessee Health Science Center (UTHSC) provides an active and intellectually stimulating environment and a wide variety of course options. We take pride in having a long tradition of being one of UTHSC's premier departments, and we have been consistently ranked #2 or #3 in the country (among nearly 150 Physiology departments and programs) by the American Physiological Society. Our department has maintained annual budgets of over \$15 million and has dedicated and well-funded faculty who serve on prestigious editorial boards of top-tier journals such as the *American Journal of Physiology*, *Circulation Research*, and the *Journal of Biological Chemistry*. Our faculty also provide distinguished service by contributing to NIH Study Sections and organizing committees of distinguished national and international conferences. Four of our faculty hold endowed professorships, and our faculty also include the Dean of the College of Graduate Health Sciences and the Senior Executive Associate Dean of Faculty Affairs in the College of Medicine.

One major goal of the Department of Physiology is to provide students with advanced training through our integrated, interdisciplinary, research-oriented Molecular and Translational Physiology graduate program, whose primary objective is to provide outstanding training across the broad discipline of physiology. Our program gives students an in-depth knowledge of the fundamental mechanisms and processes that underlie circulatory, renal, pulmonary, and smooth muscle function in wellness and in disease. Graduates of our program are prepared to contribute to achieving long-term goals of developing improved strategies for prevention and control of these diseases.

The Department of Physiology doctoral graduate program, which culminates with the PhD in Biomedical Sciences (IBSP), is designed primarily to prepare students for a research career in basic and applied physiology. It supports and promotes an academic "success-network" that propels students from training in different disciplines to becoming leaders in solving global problems. Our PhD program does so by using cutting-edge methods with continuous innovation, engaging in a highly collaborative, interdisciplinary environment, and fostering a culture of excellent through mentoring and discovery.

2. Academics

2a. Basic Information, Requirements, and Time Table

All Department of Physiology graduate students are required to follow the curriculum as outlined in this guideline. Students are required to register for their classes via the Banner system. In case of any issues, students should approach departmental support staff for assistance.

Prior to selecting a Research Mentor, the Physiology Graduate Committee Chair will serve as ad-hoc advisor. In order to assure a student's smooth transition into the Physiology graduate program, the Graduate Committee Chair will meet with each student at minimum two times in the first year, once in the first semester and once in the second semester. During these meetings, each student's current coursework, lab rotations, and overall performance will be discussed. Any difficulties indicated will be resolved in concurrence with the Physiology Graduate Committee Members.

After a student selects an advisor, the Physiology Graduate Committee Chair will meet regularly with each student to review progress of dissertation research, progress on elective course work and any additional concerns. These meetings are to be typically held once each year with each student.

A typical graduate student is expected take between 4 and 5 years to complete the doctoral program. Students who continue onto the sixth year and further will require approval from the Graduate Committee.

A **sample timetable** for a typical student is as follows:

Year 1

Fall Semester

Core Curriculum Coursework
Lab Rotations 1 & 2
Graduate Committee Chair Meeting #1

Spring Semester

Core Curriculum Coursework
Lab Rotations 3, 4 & 5
Graduate Committee Chair Meeting #2

Summer Semester

Select Research Mentor & Lab

Year 2

Fall Semester

Elective Courses
Begin Preliminary Research Work
Begin Dissertation Committee Selection Process

Spring Semester

Elective Courses (optional)
Complete Preliminary Research Work
Candidacy Exam Preparation
Complete Dissertation Committee Selection

Summer Semester

Schedule & Complete Candidacy exam
Dissertation Committee Meeting #1

Year 3

Dissertation Research
Present Student Seminar #1
Dissertation Committee Meeting #2

Year 4

Fall Semester

Dissertation Research

Spring Semester

Wrap-up Dissertation Research
Dissertation Committee Meeting #3
Begin Dissertation Write-up

Summer Semester

Complete Dissertation Draft
Schedule & Complete Dissertation Defense
Process & Submit Dissertation to College of Graduate Health Sciences
Graduate!

2b. Exceptions to the general student timetable

Direct entry students, who enter the program with a pre-designated Research Mentor, do not rotate among physiology laboratories. These students begin their research work beginning in the first semester of attendance in the program. Direct entry students can schedule their candidacy exams, after completing the required elective courses in their second year of residency in the program.

2c. Academic standards

Students in the program must maintain a minimum cumulative grade-point average of 3.0 as the standard for successful progress.

2d. Required courses & electives

Students in the program must complete the **core course curriculum** (16 credit hours) listed below with a **minimum grade of B** in each course. Biostatistics (BIOE 845) is considered as part of the core curriculum, but not the Integrity in the Conduct of Scientific Research course (IP 801).

The Medical Physiology (PHYS 612) course **requires a B grade or better**. Students must retake the course if they do not meet this minimum requirement.

In consultation with their Research Advisor and the Physiology Graduate Committee Chair, all students must select a **minimum of six elective credit hours** from the list of elective courses found in Appendix A (PhD CHECKLIST AND DEGREE REQUIREMENTS) to supplement the core curriculum.

3. Admission and Selection

Applications for the PhD in Biomedical Sciences (Molecular and Translational Physiology concentration) are normally accepted from students with a biological or physical science-related bachelor's or advanced degree from an accredited college or university; degrees in other fields of study are acceptable with appropriate preparation. The normal admission time for new students is in the fall term, which begins about mid-August. Most students apply before December, and those applying before January 15 will be given priority status. The final application deadline is March 1. Applications are reviewed as received. The admission requirements are:

A minimum grade point average of 3.0

A minimum revised Graduate Record Examination (GRE) combined verbal and quantitative score of 300.

Any applicant to the graduate program whose first language is not English and who has earned neither a bachelor's nor a master's degree from a college or university in an English-speaking country must have achieved a TOEFL score of at least 213/79 on the computer-based/Internet-based exam or an IELTS score of 6.5 (earned within 2 years prior to application). Any applicant whose first language is not English but who has earned a baccalaureate or advanced degree from a college or university in an English-speaking country where instruction was in English may be exempted from the requirement for the TOEFL or IELTS examination.

Three letters of recommendation.

Transcripts from any non-US institution must be verified and certified to generate a grade point average (GPA) based on a 4.0 scale. Verification must be completed before March 1.

Program (concentration) admission committees recommend their selections to the IBS Program Director. Offers of admission are made by the IBS Program Director with approval by the Dean of the College of Graduate Health Sciences.

4. Technical Standards and Accommodations

The minimum abilities for eligibility to participate successfully in educational programs and activities by students enrolled in the College of Graduate Health Sciences are listed below. All persons who wish to enter one of the programs in the College should be aware of the minimum abilities required for success. Admission decisions for the College programs do not take disabilities into consideration; students may disclose their disabilities after admission.

Minimum abilities are as follows:

- To make proper assessments and ethical judgments regarding research and professional decisions.

- To communicate effectively with colleagues and professional staff.
- To acquire necessary information developed through classroom instruction, laboratory experience, independent learning, and consultation.
- To search and evaluate articles in the scientific literature.
- To obtain, interpret, and accurately document research data.
- To complete computer-based assignments and use computers.
- To understand and carry out safety rules and precautions in the laboratory.
- To handle emergencies in the laboratory, including fire, exposure to dangerous agents, and explosions.

These abilities may be accomplished through direct student response, use of prosthetic devices, or personal assistance (e.g., readers, signers, and note takers). Upon admission, students are invited to disclose any disabilities (with certification) to the Student Academic Support Services and Inclusion (SASSI) <https://www.uthsc.edu/sassi/>. The college will provide reasonable accommodations, as required by the student's documented disabilities with SASSI, and at the student's written request to the Dean of the College of Graduate Health Sciences. Purchase of prosthetic devices to aid the student in meeting these requirements is the responsibility of the student. On a case-by-case basis and upon written request of the student, the College may assist in providing attending services.

5. Curriculum Summary and (Typical) Sequence for Physiology PhD Students

In addition to required and elective didactic coursework, completion of a doctoral dissertation describing a research investigation is required.

Fall 1

IP 806 - Biochemistry Credit Hours: 3

IP 810 - IPBS Seminars Credit Hours: 1

IP 841 - Essentials of Cell Biology Credit Hours: 3

IP 900 - Doctoral Dissertation and Research Credit Hours: 1-9

PHYS 919 - Physiology Seminar Credit Hours: 1

Total: 9 credit hours

Spring 1

IP 801 - Integrity in the Conduct of Scientific Research Credit Hours: 1

IP 805 - Essentials of Molecular Biology Credit Hours: 3

IP 900 - Doctoral Dissertation and Research Credit Hours: 1-9

PHYS 612 - Physiology and Biophysics (**Medical Physiology**) Credit Hours: 5

PHYS 919 - Physiology Seminar Credit Hours: 1

Total: 11 credit hours

Fall 2

BIOE 845 - Biostatistics for Integrated Biomedical Sciences Credit Hours: 2

IP 900 - Doctoral Dissertation and Research Credit Hours: 1-9

PHYS 919 - Physiology Seminar Credit Hours: 1

Total: 12 credit hours

Spring 2

IP 900 - Doctoral Dissertation and Research Credit Hours: 1-9

PHYS 919 - Physiology Seminar Credit Hours: 1

Total: 10 credit hours

Fall 3

IP 900 - Doctoral Dissertation and Research Credit Hours: 1-9

PHYS 919 - Physiology Seminar Credit Hours: 1

Total: 10 credit hours

Spring 3*

IP 900 - Doctoral Dissertation and Research Credit Hours: 1-9

PHYS 919 - Physiology Seminar Credit Hours: 1

Total: 10 credit hours

Total for the Degree: 62 credit hours[†]

*Repeats until degree requirements are met

[†]Additional credit hours may be required to maintain full-time status. Continuous registration for dissertation research is required until the degree requirements are met.

6. Waiver of Required Courses

If an equivalent graduate course has been taken and completed with a grade of B or better at another institution, a waiver of a required course may be granted and credits of the course may be transferred into the Physiology Graduate program. The number of credit hours that may be transferred will be determined by the Chair of the Physiology Graduate Committee, but at least 50% of credit hours for the program must be earned at UTHSC. Transferred courses must be approved by the Physiology Graduate Committee Chair and the student's Dissertation Committee and listed on the student's Admission to Candidacy form. Credits transferred into the program will not affect the minimum residency requirements and normally will not be included in calculations of the student's grade-point average.

7. Laboratory Rotations

The purpose of laboratory rotations is to select a Research Mentor and lab to complete the student's dissertation research. Thus, only students who enter the program without having selected a Research Mentor can undertake laboratory rotations. Direct entry students who have already selected a laboratory and Research Mentor do not undertake general laboratory rotations. Students begin laboratory rotations in the middle of the first semester of residence and continue through the second semester until they select their Research Mentor. Each rotation lasts six weeks. A maximum of six rotations are allowed per student. Under exceptional situations, additional rotations may be allowed. However, these requests will be evaluated on a case-by-case basis.

Each student is expected to participate in a minimum of three laboratory rotations with faculty whose primary appointment is in the Department of Physiology. The remaining three rotations can be with faculty outside the department. Students can select their Research Mentor after their second rotation. Students who wish to choose a mentor from an external department will be required to submit a written justification to the Physiology Graduate Committee. The Physiology Graduate Committee will discuss the merits of the request and provide their recommendation to the Department of Physiology Chair. The Chair must approve the recommendation. If the student-selected Mentor is not a secondary faculty in the Department of Physiology, then procedures to transfer the student to the selected Mentor's department will be initiated.

8. Student-Led Activities

8a. Journal Clubs

Students will organize a monthly journal article review session. Research articles will be selected by the students themselves and rotate among topics of research conducted in the Department of Physiology. The Department will actively promote and support this student-led initiative

8b. Annual Retreat

An annual meeting organized by the students will highlight student research in the Department of Physiology. The meeting could be held as a stand-alone meeting or in conjunction with the Department's annual Research Retreat.

8c. Physiology Open House

In order to expose students to the wide range of research done in the Department of Physiology, the Department will host a student-supported open house. The general public and students interested in graduate studies from Memphis-area universities will be invited to visit department labs and preview the research. Physiology students will be available in each lab to hold demonstrations highlighting the most interesting aspects of the research in the lab.

8d. New Student Welcome Reception

Students currently in the Department of Physiology will host a welcome event for new students entering the program in August. The event will be a social event organized by the student in consultation with the Physiology Graduate Committee.

8e. Student Seminars

The main purpose of student seminars is to provide doctoral candidates in the Department of Physiology an opportunity to present their research findings in a formal manner. These seminars will be presented during the normal seminar hour (3:30-4:30pm) and thus be one-hour long. These seminars are open to all faculty,

students and members of UTHSC as well as other institutions interested in the research presented. Thus, the seminars also help train the student in responding to questions from a wide-ranging audience.

Doctoral students are expected to present two seminars via this mechanism over the course of their dissertation research. Typically, the first seminar is to be presented during the third year of study or two years after candidacy, whichever is later. The second seminar is the formal seminar presented as part of the student's dissertation defense.

In addition, the College of Graduate Health Sciences holds a Quarterly Scientific Meeting to highlight student research around campus. During this meeting, three students from various disciplines present their research highlights in increments of 20 minutes each. Students from the IBS program present at every meeting on a rotational basis. Thus, students in the Department of Physiology are expected to present in this forum. If more than one student is available to present, the Physiology Graduate Committee will select the student.

9. Departmental Seminars

The Department of Physiology has designed curricula that focuses on physiological processes that help prepare students for success in an ever-changing world. In this regard, departmental seminars provide a forum for close interaction and first-hand learning from a diverse set of professionals and scholars who are experts in designing and implementing physiology- and pathophysiology-based research.

Each Physiology graduate student is required to register for 1 credit hour of PHYS 919 (Physiology Seminar) every semester until they graduate. Physiology seminars are typically on Thursdays from 3:30 PM to 4:30 PM. Students should attend all physiology departmental seminars. Students unable to attend any seminar will need to email a detailed explanation to the Seminar Coordinator. The student's Mentor should write in support of the student's explanation.

Department of Physiology faculty typically host speakers from other institutions outside the Memphis area to present at the Physiology seminars. **All graduate students should participate in lunch meetings with these invited guest speakers.** Departmental administrative personnel will communicate the time and location of lunch meetings to students. Mentors are expected to ensure that students attend these lunch meetings. During seminars and lunch meetings, students are expected to ask questions and participate in a robust discussion with invited guests.

10. Dissertation Committee

The Dissertation Committee in the Department of Physiology is an integral part of the graduate student's training. This Committee is to be extremely proactive in planning the student's curriculum and providing an appropriate breadth in the student's research experience. To that end, while the student's Mentor provides guidance in developing the dissertation research plan, the Dissertation Committee has the additional responsibility of assuring that the student's research design will provide appropriate results for the proposed hypotheses.

After selection of the student's Mentor, the student's Dissertation Committee will be determined. The purpose of the Dissertation Committee is to assist the student and ultimately to approve the student's dissertation. The Committee does this by: (1) guiding the student through the course of their research and offering suggestions when difficulties arise; (2) making sure the student's research is of enough quality and originality with the ability to be published in a peer-reviewed scientific journal; and (3) helping wrap-up the research process when enough progress has been achieved.

The Dissertation Committee for PhD students must have at least five members and will contain the student's Mentor (as Chair), at least three Departmental faculty members, and at least one Graduate Faculty member from outside the Department. All must be appointed as Members of the College of Medicine graduate faculty. In cases where the student's Mentor holds a primary appointment in a department other than the Department of Physiology, a Departmental faculty member must be selected as Co-Mentor by the student's Mentor and the student. The Co-Mentor will also serve on the student's Dissertation Committee. Approval of committee membership by the Director of Graduate Studies and the Dissertation Committee Chair will be contingent upon the potential role of each committee member in the training or career plans of the student.

To document the satisfactory progress of Physiology PhD students, each Dissertation Committee must hold at least two mandatory meetings (one each semester) to receive a report on the student's progress (presentations, publications, grades and research progress). The Mentor will submit a written report to the Director of Graduate Studies who will collate and distribute these reports to the faculty. Students will also keep the

Dissertation Committee up to date on the progress of their research. The College of Graduate Health Sciences requires that students have at least one documented meeting each year with their Dissertation Committee. A Dissertation Committee meeting report, accompanied by a signed Annual Student Progress Report form (generated through the College of Graduate Health Sciences website), must be submitted to the College of Graduate Health Sciences.

The College of Graduate Health Sciences has compiled a document (<http://uthsc.edu/grad/FacultyInfo/index.php?page=TandDCommittees>) to help both advisors and those who serve on faculty committees with knowing the College's expectations and how to meet those expectations.

11. Student Leave of Absence Policy

Students are considered research trainees and are granted two weeks of vacation days (40 hours) per academic year in addition to specific administrative closings or holidays in their working environment. Prior approval must be obtained by the student before going on leave. Preferably, approval must be obtained one week in advance of taking the requested leave. Additional holidays, including religious holidays, may be taken after discussion and approval from the mentor. Students wishing to take more than two weeks off will need to work out a plan with their mentor to accrue additional days by working on administrative holidays or forgoing leave. Leave in excess of four weeks must be approved by the Chair of the Department of Physiology, the IBS program and the College of Graduate Health Sciences. Note that students going on leave for more than four weeks without permission will be withdrawn from the program. Additional policy information on leave of absence and annual leave can be found at

<https://cghs1.uthsc.edu/exist/apps/CGHSwebsite/data/CollegeInfo/Policies/Annual-Leave.pdf>

For leave of absence due to special circumstances such as birth or adoption of a child, care for family members with serious health problems, and for serious health conditions that temporarily prevent the student from fulfilling program requirements, College of Graduate Health Sciences policy allows up to 60 calendar days (equivalent to eight work weeks) of leave. For additional information of this topic, consult the following policy document: <https://cghs1.uthsc.edu/exist/apps/CGHSwebsite/data/CollegeInfo/Policies/Family-Medical-LLeave.pdf>

Students wishing to take a leave of absence must fill out a Student Leave Request Form, gather the appropriate signatures, and submit the completed form to the College of Graduate Health Sciences. This form is available at https://cghs1.uthsc.edu/exist/apps/CGHSwebsite/data/StudentInfo/Forms/Student_Leave_Request_Form.pdf

International students must consult with the International Affairs office prior to commencing leave to ensure that their visa status remains unaffected due to any leave of absence.

12. Master's Degree Exit-Option

A student who has satisfactorily completed a minimum of 30 credit hours can, after the end of the first year, decide to seek a Master's degree and graduate with a Master of Science (MS) in Biomedical Science degree instead of a doctoral degree. This option requires notification of the College of Graduate Health Sciences with a request for admission to MS degree candidacy the semester prior to the term in which the student intends to graduate. Completion of the MS degree requires full-time registration and an oral and written analysis of the work completed. A student seeking a Master's degree is required to complete three elective credit hours in addition to the first-year curriculum, select a Research Mentor and put together a committee. This committee should include the Mentor, one Physiology faculty member, and one member from an outside department. The student should then meet with their committee to outline research objectives. Research conducted by the Master's degree-seeking student is expected to be publication quality, though not necessarily sufficient for stand-alone publication. Master's students are required to write a thesis and defend their research in an open oral presentation, followed by a question-and-answer session with their committee. Additional information is available at <http://www.uthsc.edu/grad/StudentInfo/>

13. Exit Survey

Upon finishing or leaving the Department of Physiology graduate program, each student must complete a mandatory exit survey. Information from the survey will be used in a confidential manner to help enhance the graduate program for future graduate students and mentors. Additional information can be found in the UTHSC Academic Bulletin (Catalog) and CenterScope (Student Handbook) at <http://catalog.uthsc.edu/index.php>

14. Candidacy Examination

14a. Purpose

The College of Graduate Health Sciences requires that, for students to be formally admitted to PhD candidacy, they must pass both a written and oral examination. The oral candidacy examination is open only to the student and appointed members of the student's Dissertation Committee. The primary objective of the examination is to determine the student's preparedness to pursue the doctoral dissertation.

14b. Timing

The student should initiate the candidacy examination process toward the end of their second year. The entire examination process must be completed by May 15th of the student's second year.

14c. Process

As part of their candidacy examination, students are required to write a National Institute of Health (NIH)-style grant proposal like a NIH predoctoral (F31) fellowship. Current NIH guidelines indicate that the F31 fellowship applications include a 6-page Research Description, an additional Abstract/Aims page, and two-year project scope. It is expected that the topic of the student's research proposal will be generated by each student independently. However, the student is free to consult other individuals including his/her mentor for formulating the proposal. The complete proposal will include the scientific background underlying the project, specific aims, any preliminary findings associated with the project, and an experimental plan.

The student must send their completed proposal to the Dissertation Committee at least two weeks before the examination. The examination will include an oral presentation of the proposal by the student in front of the Dissertation Committee. The oral examination is expected to establish the following: (1) the student's knowledge of the chosen research topic; (2) a scholarly understanding of the scientific background relevant to the proposal; (3) a deep understanding of the experimental plans proposed; and (4) an adequate statistical background to analyze and interpret the potential results.

The examination will be graded as pass/fail, and each member of the Dissertation Committee will vote pass or fail. A simple majority determines the vote. Students who are unsuccessful in their first attempt are permitted one re-examination by the same committee in the same examination format during the Fall semester of the third year.

Students who have successfully passed the qualifying exam should obtain the signature of each Dissertation Committee member on the Application for Admission to Candidacy form found at <http://www.uthsc.edu/grad/StudentInfo/Forms/index.php?page=Candidacy>. In addition, a summary of the examination must be written, and the completed Candidacy form, examination summary, and a copy of the student's unofficial transcript must be submitted to the Director of the Integrated Biomedical Sciences (IBSP) Program.

15. Grade Point (GPA) Requirement

Students must maintain a 3.0 grade point average or greater throughout their time in the Physiology program.

16. Admission to PhD Candidacy

The student must apply for PhD degree candidacy no later than two terms prior to the term in which the dissertation is presented. A comprehensive examination (oral and written) covering the fields indicated by the program must be passed prior to admission to candidacy. In the event of failure, the candidate may not appear for reexamination until permission is granted by the program. The result of the second examination is final.

Admission to candidacy for this degree depends upon the student's (1) passing the required comprehensive examination, (2) demonstration of research potential and accomplishment at least equivalent to that for completion of a master's thesis, (3) certification by the student's Dissertation Committee and the Department of Physiology Chair, and (4) approval by the Dean of the College of Graduate Health Sciences. Upon admission to candidacy, all graduate students, including those who have been enrolled part-time, must be enrolled full-time for the remainder of their program, unless an exception is approved by the Dean.

17. Research Mentor Selection

Each student must select a Research Mentor to guide his/her dissertation research. Upon completion of mandatory laboratory rotations, a student could select a Research Mentor. However, the student has the option of waiting till the completion of all his/her laboratory rotations to select a Mentor. In all situations, the selection of the Mentor should be completed by the end of the student's first year in the Physiology program.

Once the student has selected her/his Mentor, the selection should be mutually accepted by both student and Mentor. The student should then convey the decision to the Physiology Graduate Committee Chair. The final approval of the student's Mentor is contingent on the following: (1) the Mentor is a Physiology primary or adjunct faculty; (2) the Mentor must be certified by the Graduate Studies Council of the College of Graduate Health Sciences to direct doctoral research; (3) sufficient funds must be available and at the Mentor's disposal to support the student's stipend and research; and (4) approval of the Mentor by the Chair of the Department of Physiology. Mentors **MUST** be credentialed in the College of Graduate Health Sciences before they can direct a graduate course and serve on students' faculty committees OR supervise the research of students working toward degrees awarded through the College of Graduate Health Sciences. Please refer to <http://grad.uthsc.edu/CollegeInfo/index.php?page=Bylaws#Faculty> for more information on the credentialing process.

In the event a student chooses a faculty member who does not have a primary or adjunct appointment in the Department of Physiology as his/her Research Mentor, the student must provide a full written justification of the same to the Physiology Graduate Committee. The committee will consider the student's request and approve one of the following: (1) a student transfer to the home department of the student's chosen faculty; (2) a request to the chosen faculty to seek adjunct faculty status in the Department of Physiology; or (3) in consultation with the student-chosen faculty, the selection of a co-Mentor with primary appointment in the Department of Physiology.

18. Expectation from Mentors

Research Mentors have wide leeway in guiding their students through the dissertation process. While the Mentor provides substantial advice and guidance throughout the student's dissertation research, Mentors should ensure that the student is the driving force. The Mentor should encourage the student to seek advice from the Dissertation Committee when situations or conflicts arise. In these scenarios, the Committee members should act in an advisory capacity only and not request specific experiments.

19. Dissertation Preparation Resources

The process of writing and submitting the dissertation begins with the oral defense. Upon approval of the Research Mentor and the Dissertation Committee, the student schedules an oral defense of their dissertation proposal. Once the oral defense is successfully completed, the Research Mentor and Dissertation Committee members will approve the research project and recommend to the College of Graduate Health Sciences that the student be admitted to Candidacy by signing the Admission to Candidacy Form for the student. Admission to candidacy for the Ph.D. degree must be granted at least two semesters prior to the date on which the dissertation is to be submitted.

20. Deadlines

Students must follow the deadlines set by the College of Graduate Health Sciences in completing their dissertation research. According to current policy, students should complete all doctoral degree requirements **within five years** of passing their candidacy exam. Under exceptional situations, as defined by the College of Graduate Health Sciences, students may request an extension.

21. Research, Dissertation and Publication Requirements, and Dissertation Defense

21a. Research accomplishment

Research accomplishment is a principal requirement for the degree of Doctor of Philosophy, and the dissertation must show substantial evidence of independently achieved and original results. This research and preparation of the dissertation must in each case be conducted in accordance with general College policies and under the immediate direction of the student's Research Mentor and Dissertation Committee.

21b. Dissertation requirements, content, and style

The dissertation is written after completion of experiments or other graduate studies designed to answer the questions posed by the statement of the problem. The scientific content and style of the dissertation are the responsibility of the student and student's Dissertation Committee. The dissertation must be formatted and delivered according to the electronic thesis and dissertation policies outlined in these bylaws under "ET/D Program Policies."

21c. Publication requirement prior to oral dissertation defense

Publication of a minimum of at least one first-author, peer-reviewed research paper based on the student's dissertation research is one of the minimum requirements for scheduling the oral dissertation defense. A student who is designated as a co-first-author on a publication will be considered as the first author. An official letter of acceptance from the journal will be considered sufficient proof of publication. Only in extenuating circumstances will this publication requirement be relaxed. If such an exception is needed, the student and the mentor must provide a full explanation to the Dissertation Committee members. This exception must be approved by the Chair of the Department of Physiology.

21d. Dissertation defense/oral examination

The student must submit a rough draft of their written dissertation to the Dissertation Committee and their Research Mentor three weeks before the oral examination. The oral examination consists of a seminar in which the student presents his/her dissertation research, and a separate session in front of the Dissertation Committee. The seminar presentation is open to students, faculty, and those interested from UTHSC and other institutions. The seminar presentation will be followed by a question and answer session by those in attendance. Following this, the student's Research Mentor and Dissertation Committee members conduct a closed-door questioning session with the student. The Dissertation Committee members will then vote on the outcome of the examination and indicate any changes that need to be made to the dissertation. Students should remember to take the "Report of Final Examination" form (www.uthsc.edu/grad/StudentInfo/Forms/FinalExam.doc) to the defense to obtain signatures from the Dissertation Committee.

After the student has successfully defended, they should make an appointment with the College of Graduate Health Sciences Office to discuss graduation requirements and to complete paperwork. On or before the dissertation deadline, the student should deliver one signed copy of the "Report of Final Examination" form with original signatures of their Dissertation Committee to the College of Graduate Health Sciences Office. All committee members must have signed. Note: the form can be taken or mailed to the College of Graduate Health Sciences Office. **Faxes or e-mailed copies are not permitted.**

22.Changes to the Physiology Graduate Guidelines

These guidelines will be in effect until June 2021 and renewed every four years thereafter by vote of the Department of Physiology faculty. However, the Department of Physiology reserves the right to change these guidelines without notice. All changes must be approved by departmental faculty. Of note, any and all content contained in these Graduate Guidelines can be superseded at any time by information contained in the Graduate Student Handbook provided by the College of Graduate Health Sciences.

APPENDIX A: PhD CHECKLIST AND DEGREE REQUIREMENTS

Department of Physiology, College of Medicine

Checklist & Degree Requirements

Name: _____ I.D.# _____ Advisor: _____

Address (local): _____ Telephone: _____

Master's Degree _____ Hours Transferred _____

	Post BA/BS		Post MA/MS	
Core Courses	Credits	Date Taken	Credits	Date Taken
IP 806 Biochemistry	3		3	
IP 810 IBS Seminars	1		1	
IP 841 Essentials of Cell Biology	3		3	
PHYS 612 Medical Physiology	5		5	
BIOE 845 Biostatistics	2		2	
IP 801 Integrity in the Conduct of Scientific Research	1		1	
PHYS 919 Physiology Seminar (can be repeated until degree requirements are met)	1		1	
Required Electives				
PHYS 912 Advanced Physiology	2		2	
Dissertation Hours				
			1-9	
Optional Electives (must choose a minimum of six elective credit hours)				
MSCI 861 Cell Signaling (spring semester only)	3		3	
MSCI 934 Cell Biology Techniques (Spring semester only)	2		2	
MSCI 814 Bioinformatics I (Spring semester only)	2		2	
MSCI 815 Bioinformatics II (Spring semester only)	1		1	
CMED 711 Essentials of Animal Experimentation (Fall semester only)	2		2	
MSCI 812 Physical Biochemistry and Applications in Structural Biology (Spring semester only)	3		3	
MSCI 928 Principles of Mass Spectrometry (Fall semester only)	2		2	

Planned Comprehensive Exam Date: _____

Pass _____ Fail _____ Date _____

Planned Proposal Defense Date: _____

Pass _____ Fail _____ Date _____

Planned Dissertation Defense Date: _____

Pass _____ Fail _____ Date _____

APPENDIX B: GOALS AND EXPECTATIONS (Student Self-Evaluation)

Department of Physiology, College of Medicine

Goals & Expectations

Year 1:

Learning goals:

Performance expectations/required tasks (work schedule, responsibilities, supervision format):

Year 2:

Learning goals:

Performance expectations/required tasks (work schedule, responsibilities, supervision format):

Year 3:

Learning goals:

Performance expectations/required tasks (work schedule, responsibilities, supervision format):

Year 4:

Learning goals:

Performance expectations/required tasks (work schedule, responsibilities, supervision format):

Year 5:

Learning goals:

Performance expectations/required tasks (work schedule, responsibilities, supervision format):

APPENDIX C: Student Awards and Scholarships

Department of Physiology, College of Medicine

Graduate Student-of-the-Year Award

Each year the Department of Physiology Graduate Committee selects one graduate student who has demonstrated excellence in academic performance, research, and service in the preceding year. Awards will be given out during the Departmental Year End Review in the fall. The student may choose to use the monetary portion of the award toward travel to a scientific meeting the following year.

Eligibility: A candidate must be a current graduate student pursuing a PhD and working in the laboratory of a faculty member in the Department of Physiology.

Qualifications: The Physiology Graduate Committee will select the winning candidate based on criteria including, but not limited to: grades, meetings, publications, service, student statements, rotations and/or Thesis Advisor's statement(s), presentations and/or seminars, etc. Mentor recommendations are also factored in the selection process. Send completed applications to the Physiology Graduate Committee Chair.

Applications Open: October 1st

Applications Close: November 30th

Student Scholarships

Quigley Scholarships

The **Quigley Fellowship** will be awarded to the student working in the lab of a faculty member with a primary appointment in the Department of Physiology who has the highest GPA in the core courses required by the Integrated Biomedical Sciences Program. This fellowship is designed to be awarded to a student entering their third year of study in the PhD program. The criteria for the Quigley Fellowship is as follows:

Eligibility: To be eligible, students must have completed ALL the core courses required by the Integrated Biomedical Sciences Program. In addition, students must have passed their written comprehensive qualifying exam (qualifying part I). Students must also provide a letter of support from their mentor. Students who wish to be eligible must submit a copy of their UT graduate transcripts to the head of the Physiology Graduate Committee. Students should also disclose any external funding support they are receiving. All materials must be submitted electronically.

Selection: The Physiology Graduate Committee will select the winning candidate based on the combined GPA of their Integrated Biomedical Sciences Program core courses. In instances of identical GPA scores, the committee will take into account other application materials and may solicit opinions from other faculty members of the Department of Physiology.

Award: The Quigley Fellow will receive a plaque at the annual Departmental Year End Review in the fall, along with a check for \$1,000. The fellowship will also pay \$9000 towards one year of their stipend (departmental/ mentor contribution). In the case of a tie, each student will receive \$1000 checks, but the stipend award will be split among the winners.

Application Deadline: Completed applications are due by June 15, unless otherwise noted. Send completed applications to the Physiology Graduate Committee Chair.

Gerwin Scholarships

The **Dorothy K. and Daniel L. Gerwin Graduate Scholarship** was officially started in 1991. The Department of Physiology Gerwin Fellowship will be awarded to the top senior graduate student who is working towards their PhD in the laboratory of a faculty member whose primary appointment is in the Department of Physiology. The criteria for the Gerwin Scholarship are as follows:

Eligibility: To be eligible, the student must have been admitted to candidacy for their PhD and must be nominated by their mentor via a letter to the Physiology Graduate Committee. The nominee must provide the committee a CV and their UTHSC graduate transcripts and write a one page (or less) essay describing their prior and current scientific endeavors and honors, as well as where they plan to be in the future. Students

should also disclose any external funding support they are receiving. All materials must be submitted electronically.

Selection: The Physiology Graduate Committee will vote to pick the winning candidate based on the nomination letter and the materials provided by the candidates.

Requirements: The Gerwin Fellow will be **required to give a Departmental Seminar** the year he/she receives the fellowship. A thesis defense alone will not fulfill the seminar obligation.

Award: The Gerwin Fellow will receive a plaque at the annual Departmental Year End Review in the fall, along with a check for an additional \$2,000. In addition, the fellowship will pay for 1 year of their stipend (departmental/mentor contribution).

Application Deadline: Completed applications are due by **June 10**, unless otherwise noted. Send completed applications to the Physiology Graduate Committee Chair.

In addition, the **College of Graduate Health Sciences** also offers several Scholarships and Awards:

Lee and Jennie Beaumont Endowment Fund

Fellowships are awarded for research in the field of arthritis and connective tissue diseases.

Belz Family Scholarship Endowment Fund

Scholarships are awarded to incoming students based on scholastic ability, leadership potential, and dedication to the health sciences as a career and profession.

CGHS Travel Awards/John Autian Student Enrichment Fund

A limited number of travel awards (TA) to national meetings are available for students in the College of Graduate Health Sciences. To be considered, students must be registered full-time; students admitted to PhD or MS candidacy at the time the application will be given priority. TAs will be awarded only to students who have been accepted to present a paper, abstract, or poster. Recipients are limited to two (2) travel awards per academic year. Applications can be found here: (<https://cghs1.uthsc.edu/exist/apps/CGHSwebsite/data/StudentInfo/Funding/TravelAward.pdf>) and should be received in the Dean of the College of Graduate Health Sciences Office at least 3 weeks (21 calendar days) before the travel. The form can be submitted to Assistant Dean Felicia Washington in the College of Graduate Health Sciences office.

Morton H. and Myra M. Friedman Scholarship Endowment Fund

Scholarships are awarded to students in the interdisciplinary program and whose research advisor is in the Department of Anatomy and Neurobiology. The awards are based on scholastic ability, financial need, dedication to anatomy as a career or profession, and community involvement.

Edward and Bernice Humphrey Scholarship Endowment Fund

Scholarships are awarded to incoming students based on scholastic ability, leadership potential, and dedication to health science research as a career and profession.

Alma and Hal Reagan Endowment Fund

Fellowships are awarded to students working in the area of cancer research. To be considered, a student must be in the second through fourth year of study and involved in research into the causes of and possible cures for cancer. Applicants should submit the following to their Program Graduate Training Committee:

- Completed application form
- Curriculum vitae
- Transcript (undergraduate and graduate)
- Two letters of recommendations (one from the student's research advisor)
- All programs/tracks in the College may submit one finalist per year. The application is due in the Dean of the College of Graduate Health sciences' office by **September 1** of each year.

More details about the Alma and Hal Reagan Fellowships, including application criteria, can be found here: (<https://cghs1.uthsc.edu/exist/apps/CGHSwebsite/data/StudentInfo/Funding/ReaganFellowship.pdf>)

Please contact the Dean of the College of Graduate Health Sciences' Office for further information about any of these fellowships and scholarships.

APPENDIX D: Faculty Mentors in the Department of Physiology

Department of Physiology, College of Medicine

**Adebowale Adebisi, PhD	C207 Coleman Building aadebiyi@uthsc.edu ; 901-448-1868
Julio Cordero-Morales, PhD	330K TSRB jcordero@uthsc.edu ; 901-448-8206
Ioannis Dragatsis, PhD	319 TSRB idragatsis@uthsc.edu ; 901-448-3615
**Zheng Fan, PhD	329 TSRB zfan@uthsc.edu ; 901-448-2872
Polly A. Hofmann, PhD	Office of the Dean of the College of Medicine phofmann@uthsc.edu ; 901-448-2464
Jonathan H. Jaggar, PhD	507 Link Building jjaggar@uthsc.edu ; 901-448-1208
**Salvatore Mancarella, PhD	318J TSRB smancare@uthsc.edu ; 901-448-7348
Helena Parfenova, PhD	E332B Coleman Building hparfeno@uthsc.edu ; 901-448-8319
**Kaushik Parthasarathi, PhD	E332A Coleman Building kparthas@uthsc.edu ; 901-448-2682
Gadiparthi N. Rao, PhD	310J TSRB rgadipar@uthsc.edu ; 901-448-7321
Radhakrishna Rao, PhD	S303 Van Vleet Building r Rao2@uthsc.edu ; 901-448-3235
Zhongjie Sun, MD, PhD, FAHA (Department Chair)	C302B Coleman Building zsun@uthsc.edu ; 901-448-2679
Donald B. Thomason, PhD	College of Graduate Health Sciences dthomason@uthsc.edu ; 901-448-7224
Gabor J. Tigyi, PhD	C326 Van Vleet Building gtigyi@uthsc.edu ; 901-448-4793
**Valeria Vasquez, PhD	330J TSRB vvasquez@uthsc.edu ; 901-448-7223

** Denotes Physiology Graduate Committee Members

APPENDIX E: Secondary & Affiliated Faculty

Department of Physiology, College of Medicine

Joint Faculty

Stephen Alway, PhD, FACSM

930 Madison Building, Suite 633
salway@uthsc.edu; 901-448-7951

William Cushman

5159 Veterans Affairs Medical Center
1030 Jefferson Avenue
wcushman@uthsc.edu; 901-577-7357

Steven Goodman

910 Madison Building, Suite 608
sgooma5@uthsc.edu; 901-448-7125

Joan Han

309R Le Bonheur Research Center
50 N Dunlap St
jhan14@uthsc.edu; 901-448-6408

Massroor Pourcyrous

E201 Rout Center for Women and Infants (The Med)
853 Jefferson Avenue
mpourcyrous@uthsc.edu; 901-448-5950

Weiqiang Zhang

309R Le Bonheur Research Center
50 N Dunlap Street
wzhang16@uthsc.edu; 901-287-5367

APPENDIX F: Description of Physiology Courses

Department of Physiology, College of Medicine

PHYS 612 Physiology and Biophysics (Medical Physiology)

Director, Zheng Fan, PhD

This course consists of a closely integrated series of lectures, conferences, and laboratory experiences presenting the physical underpinnings and functional properties of living matter and its reactions to internal and external stimuli. The physiology of the body's various systems is detailed, as is their integration into a coordinated functional unit. (didactic, lecture)

PHYS 919 Physiology Seminar

Coordinator, Salvatore Mancarella, PhD

Presentations by visiting scientists, local faculty, fellows, or graduate students are made weekly. All students are required to attend and participate in all seminars. (didactic, seminar)

PHYS 912 Advanced Topics in Physiology

Coordinator, Kaushik Parthasarathi, PhD

A series of advanced courses (1-2 per semester, which may include appropriate laboratory exercises) in endocrinology, cardiovascular physiology, gastrointestinal physiology, neurophysiology, respiratory physiology, renal physiology, etc. (didactic, lecture lab)