



UNIVERSITY OF MIAMI  
MILLER SCHOOL  
of MEDICINE

Department of  
Physiology and Biophysics

# CELLULAR PHYSIOLOGY & MOLECULAR BIOPHYSICS

## GRADUATE PROGRAM HANDBOOK



Revised August 2018

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# WELCOME TO THE DEPARTMENT OF PHYSIOLOGY AND BIOPHYSICS

## ABOUT THE PHS DEPARTMENT

The members of the Department of Physiology and Biophysics use state-of-the-art approaches to study physiological questions mainly at the cellular and molecular levels. The Department's primary faculty comprises 15 scientists whose research achievements are internationally recognized. In addition, the Department's faculty and students interact closely with the faculty and students in the Interdepartmental Neuroscience Program, The Miami Project to Cure Paralysis, The Bascom Palmer Eye Institute, and in the Departments of Neurology, Cellular and Molecular Pharmacology, Biochemistry and Molecular Biology, and Cell Biology and Anatomy.

The Departmental Ph.D. program trains highly qualified students for successful careers in research, teaching and industry. All students are supported by stipends and tuition waivers throughout their graduate training. A high faculty to student ratio assures that each student receives individualized help from the faculty together with access to the latest scientific instrumentation.

Student training is enhanced by research seminars and student-oriented discussions presented by world-renowned visiting scientists, as well as by participation in in-house research seminars and weekly research discussion groups. The Department seeks to provide a congenial and supportive environment in which each student develops to the fullest his/her abilities to reason critically, design and conduct incisive experiments, and communicate research results effectively in both written and oral formats. The faculty's wide collective experience as successful researchers, teachers, journal editors, and peer reviewers is available to help graduates prepare for and attain research and teaching positions in academia and industry.



## GRADUATE PROGRAM DIRECTOR'S WELCOME



Welcome to the PHS Graduate Program at University of Miami Miller School of Medicine!

My name is Dr. Peter Larsson and I am the Graduate Program Director for the PHS Graduate Program. If you have any questions about the PHS Graduate Program, please e-mail me at [Plarsson@med.miami.edu](mailto:Plarsson@med.miami.edu), call me at 305-243-1021, or come to my office RSMB 5123.

## CELLULAR PHYSIOLOGY & MOLECULAR BIOPHYSICS PhD PROGRAM

Cellular Physiology and Molecular Biophysics studies how the human organism functions by applying principles of physics to the underlying molecules and cells. The training and research emphasis in the Graduate Program in Cellular Physiology and Molecular Biophysics at the University of Miami School of Medicine is directed at determining the molecular mechanisms underlying physiological functions, such as how does the heartbeat, how does the brain work, and how do we see, smell, and taste, using biophysical techniques and analyses. More specifically, research facilities and guidance for graduate work are available in developmental neurobiology, sensory receptor mechanisms, axonal electrophysiology, ionic mechanism of the nerve impulse, electrophysiological and molecular aspects of synaptic and neuromuscular transmission, mechanisms of ion channel gating, selectivity and conductance, metabolic aspects of nervous function, molecular neuroscience, neuroimmunology, protein structure-function studies, molecular recognition, ligand-receptor interactions, axonal growth, neurotrophic factors, cytokines, gene targeting, neuronal apoptosis, nerve regeneration, molecular adhesion, and regulation of muscle contraction.

The Graduate Program in Cellular Physiology and Molecular Biophysics trains its students to use state-of-the-art biophysical techniques (as well as develop new ones) to address fundamental questions related to molecular and cellular physiology and biophysics and developmental and molecular neuroscience. In addition, the students receive training in related biological disciplines and also in systemic physiology in order to obtain a broad viewpoint. This training prepares the students for future careers in research and teaching in academic institutions and also for careers in industry.

## **CELLULAR PHYSIOLOGY AND MOLECULAR BIOPHYSICS RESEARCH SPECIALTIES**

The Department offers training leading to a Ph.D. degree in Cellular Physiology and Molecular Biophysics. Our graduate program is a research program, with specialties covering all levels of physiology and biophysics, including:

- Ion channels and transporters
- Molecular structure and modeling
- Electrophysiology/Neurophysiology
- Sensory Mechanisms
- Signal Transduction
- Neuroimmunology
- Muscle Physiology

## **FACILITIES**

Each of the faculty members in the department have their own laboratories fully equipped with the latest state-of-the-art equipment related to their line of research. In addition, the department has its own confocal microscope facility, machine shop, electronics shop, darkroom, library, and additional standard common facilities. There are also core facilities for common supplies (e.g., disposable plastics, media, restriction enzymes), DNA sequencing center, and transgenic animals in adjacent buildings. The Calder medical school library is in a separate building convenient to the research buildings.

## **GRADUATE CURRICULUM IN CELLULAR PHYSIOLOGY AND MOLECULAR BIOPHYSICS**

### **Overview**



During their first two years, the students take advanced courses in membrane physiology and biophysics, cellular physiology, neurophysiology and systemic physiology, as well as a core course in cell molecular biology and interdisciplinary biomedical sciences.

During the first year, the students choose several laboratories in which to do brief, introductory research projects (rotations). After the student's selection of a faculty mentor the main emphasis of training shifts to the design and proposal of a dissertation research project, and, with its approval, laboratory research. Students report periodically on their research in discussions with other students and the faculty.

Since the Department aims to prepare its graduates for careers in research and teaching, all students in the Department are expected to participate in teaching; these teaching activities typically require no more than 1-2 weeks per year.

A detailed description of graduate student responsibilities is described in the "Progress to Graduation".

### **Invited Seminar Speaker Series**

The Department has an active visiting speaker seminar program. Scientists of international reputation are invited to present their research findings to the Department. These visiting speakers usually spend a day participating in informal discussions, including a meeting with the graduate students. Visiting speaker programs open to students are also available through other departments.

### **Departmental Seminars and Journal Clubs**

Students participate in one or more of the four journal clubs including "Ion Channels", "Neuroscience and Molecular Development" and Journal Class. Students also attend departmental seminars, and present a research seminar each year. Student research seminars are based on rotation research for the first year and dissertation research in subsequent years.

## SAMPLE CURRICULUM

Year One: Fall Semester		
Course	Description	Credits
PIBS 701	Introduction to Biomedical Sciences	5 credits
PIBS 702	Scientific Reasoning	3 credits
PIBS 731	Laboratory Research	1 credit per rotation
PIBS 700	Journal Club	0 credit
PIBS 780	Research Ethics	0 credit
PIBS 782	Professional Development: Skills for Success 1	0 credit
Year One: Spring Semester		
Course	Description	Credits
EPH 601	Medical Biostatistics I	3 credits
PIBS 731	Laboratory Research	1 credit per rotation
PIBS 700	Journal Club	0 credit
PIBS 783	Professional Development: Skills for Success II	0 credit
PHS 741	Principles of Membrane Physiology and Biophysics I	2 credits
PHS 742	Principles of Membrane Physiology and Biophysics II	2 credits
PHS 610	Cell Physiology and Biophysics	2 credits
PHS 611	Neurophysiology	2 credits
PHS 612	Systemic Physiology (Cardiovascular, Renal, Respiratory)	4 credits
Year One: Summer Semester		
Course	Description	Credits
PIBS 830	Doctoral Dissertation	1 - 12 credit(s)
Year Two: Fall Semester		
Course	Description	Credits
PHS 700	Research Seminar / Journal Club	1 credit
PHS 830	Doctoral Dissertation	1-12 credit(s)
Year Two: Spring Semester		
Course	Description	Credits
PHS 700	Research Seminar / Journal Club	1 credit
PHS 830	Doctoral Dissertation	1-12 credit(s)
Year Two: Summer Semester		
Course	Description	Credits
PIBS 830	Doctoral Dissertation	1 - 12 credit(s)
Year Three: Fall Semester		
Course	Description	Credits
PHS 700	Research Seminar / Journal Club	1 credit
PHS 840	Doctoral Dissertation	1-12 credit(s)

<b>Year Three: Spring Semester</b>		
<b>Course</b>	<b>Description</b>	<b>Credits</b>
PHS 700	Research Seminar / Journal Club	1 credit
PHS 840	Doctoral Dissertation	1-12 credit(s)
<b>Year Three: Summer Semester</b>		
<b>Course</b>	<b>Description</b>	<b>Credits</b>
PHS 840	Doctoral Dissertation	1-12 credit(s)
<p><b>Years Four – Five</b></p> <p>During the last two years, students are advised into a combination of the following courses with variable credits that complete their degree requirements:</p> <ul style="list-style-type: none"> <li>• PHS 840 - Research in Residence (post-qualifying exam, pre-defense)</li> <li>• PHS 850 - Doctoral Dissertation (register in defense semester)</li> </ul>		



## **REQUIRED COURSES**

Students must have a B grade or better in all core courses, and maintain an overall GPA of 3.0.

### **First Year:**

PIBS 701	Advanced Biomedical Sciences
PIBS 702	Scientific Reasoning
PHS 741/742	Membrane Physiology and Biophysics I and II
EPH 701	Medical Biostatistics
PHS 610	Cellular Physiology and Biophysics
PHS 611	Neurophysiology
PHS 612	Systemic Physiology (Cardiovascular, Renal, Respiratory)

### **Core Courses (Descriptions)**

**Medical Biostatistics EPH 601** (3 credits). Introduction to probability and statistics including descriptive statistics, tests of hypothesis, regression analysis, contingency tables, nonparametric tests, and life tables. Students gain hands-on experience in the analysis of medical data using several computer systems and at least one of the different statistical packages such as: BMDP, SAS, PSAT, SYSTAT, and Minitab.

**Cell Physiology and Biophysics PHS 610** (2 credits). General principles of cell physiology, chemical and physical structure of membranes, membrane transport and electrical phenomena, action potentials, muscle contraction, energy transduction, nerve impulse conduction and synaptic transmission.

**Neurophysiology PHS 611** (2 credits). Physiology of the mammalian nervous system. It is usually scheduled as an intensive course, adapted to the schedule of the medical curriculum and comprising roughly five hours of lecture and four hours of conference weekly for five to six weeks. A lecture course coordinated with neuroanatomy. Prerequisite: PHS 510 or 641, or an equivalent; permission of the Departmental Graduate Studies Committee,

**Systemic Physiology PHS 612** (4 credits). Physiology of the mammalian cardiovascular, respiratory, and renal systems. Respiratory and renal lectures and laboratories are taught by program faculty, clinical correlations by medical faculty.

**Program in Biomedical Sciences PIBS 701** (5 credits). Protein structure, enzymology, nucleic acid chemistry, genome structure and regulation, recombinant DNA methodologies, genetics, transport across biological membranes and membrane electrical potential.

**Program in Biomedical Sciences PIBS 702** (4 credits). Students are taught with a combination of lectures, scientific reasoning and methods classes, and small group sessions devoted to primary literature. **Prerequisite:** Permission of the instructor.

**Membrane Physiology and Biophysics PHS 741** (2 credits). Chemical and physical structure of membranes; model systems; permeability and transport; membrane potential; ionic channels; excitability in nerve and muscle; ionophores; active transport; membrane receptors.

**Membrane Physiology and Biophysics II PHS 742** (2 credits). Osmosis and cell volume; tracer analysis of permeability and compartmentation; theory of channels and carriers; cable properties; Hodgkin-Huxley formalism; Na, K and Ca ion channels; regulation of cellular Na, Ca activities; single-channel analysis; chemical synapses; membrane receptors; cell junctions; excitation and E-C coupling in muscle.

**Research Ethics PHS 780** (0 credits). The NIH Guide for Grants and Contracts stipulates that Institutions receiving support for National Research Service Award Training Grants are required to develop a program in the principles of Scientific Integrity. This program should be an integral part of the proposed training effort. The University of Miami School of Medicine has chosen to respond to this requirement with this course. This course must be taken during the first semester in the Program. This is a six-hour course and will be given in two sessions of three hours each. **Prerequisite:** Permission of the graduate advisor or program director.

## Elective Courses

**NEU 761 Neuroscience I** (2 credits). An introduction to neuronal physiology, including synaptic transmission and integration, sensory neurobiology, and cellular learning and memory.

**NEU 762 Neuroscience II** (4 credits). This course is designed to teach Neuroscience to individuals engaged in basic neuroscience research. This course provides comprehensive coverage of Neuroscience. Neuroscience II covers Network Neurobiology and Higher Nervous System Function. The course concentrates on the experimental basis for our understanding of nervous system function. Course utilizes didactic lectures and discussions of current research literature.

**Cell Biology CBA 751** (3 credits). Structure, function, and biogenesis of cellular organelles and the cytoskeleton, including their regulation and dynamic interactions.

**Developmental Biology PHS 752** (3 credits). Continuation of CBA 651. Early developmental events, including fertilization, changes in transcriptional and translational activity, cleavage and gastrulation, nuclear-cytoplasmic interactions, and intercellular recognition. These events are treated at both the molecular and cellular levels, including changes in gene expression.

**Molecular and Cellular Pharmacology MCP 752** (3 credits). Recent advances in the molecular biology of cellular activation by hormones and neurotransmitters. Hormone-regulated signal transduction mechanisms and the manner in which they interact to control cellular responses as they pertain to the pharmacology of drug and hormone action.

**Developmental Neurobiology PHS 763** (3 credits). Development of the nervous system in all its aspects: origins of neurons and glia; nerve cell differentiation; cellular interactions during neurogenesis; formation of synaptic connections and neuronal circuits; development of nervous functions and ontogeny of behavior; mechanisms of repair and reorganization in the nervous systems; and theories of neuronal plasticity.

**Nerve and Synapse PHS 769** (2 credits). An advanced seminar course in the basic mechanisms underlying the propagated nerve impulse and synaptic transmission, including second messengers, neuromodulation, memory mechanisms, and integrative mechanisms underlying behavior.

**Neuroanatomy CBA 605** (3 credits). Introduction to the major structures and pathways of the human central nervous system. The student dissects a whole brain and examines transverse sections of the brain stem and spinal cord.

**Cellular and Molecular Neurobiology CBA 732** (2 credits). The expression of neuronal phenotypes at the molecular and cellular level. The molecular organization and composition of synapses; the biosynthesis and regulation of synaptic components; axoplasmic transport and the targeting of neuronal membrane proteins; and the biochemistry of neurotransmitter synthesis, termination, and regulation. Background in cell biology, biochemistry, and/or molecular biology.

**Neuropharmacology PHS 768** (3 credits). An intensive seminar course for advanced students covering the mechanism of action of drugs on basic neural processes, including action potentials,

neurotransmission (storage, release, reception and metabolism of transmitters), and central nervous activity, taught jointly by staff members of Pharmacology and Physiology/Biophysics.

**Pharmacology and Therapeutics MCP 705** (6 credits). Mechanisms underlying the therapeutical and pharmacodynamic properties of pharmacological agents. Emphasis will be placed on cellular and molecular aspects and the quantitative factors governing equilibration within multicompartement systems and drug control of nervous and muscular function in relation to therapeutic action.

**Proteins and Enzymes BMB 607** (2 credits). Structure, function and action of enzymes and other proteins. An exposition is given of the kinetics, specificities, mechanisms, and active centers of enzymes, concentrating on well- studied examples. An analysis of structure and function based primarily on chemical techniques is correlated with data obtained by physical methods. The genetic implications of many studies are critically appraised. The modification of function resulting from interacting of protein subunits is discussed.

**Multiple Regression and Multivariate Statistics Psych 732** (3 credits). Techniques for the analysis of multiple quantitative measurements including multiple regression, multivariate analysis of variance, discriminant analysis and canonical correlation. Computer application of these techniques to the behavioral sciences.

## MEET OUR FACULTY MEMBERS



**Ellen Barrett, Ph.D.**

Professor, Physiology and Biophysics

### **Research Summary**

We use fluorescent indicator dyes and a confocal microscope system to study changes in cytosolic and mitochondrial  $[Ca^{2+}]$ , mitochondrial membrane potential and vesicular release in motor terminals.



**John Barrett, Ph.D.**

Professor, Physiology and Biophysics

### **Research Summary**

Our laboratory studies how mammalian central neurons respond to environmental stresses.



**Laura Bianchi, Ph.D.**

Professor, Physiology and Biophysics

### **Research Summary**

sensory perception and neurodegeneration



**Nirupa Chaudhari, Ph.D.**

Professor, Physiology and Biophysics

### **Research Summary**

We study mechanisms of transduction and cellular communication in sensory and other cells. We develop transgenic mouse models and fluorescent reporters to visualize cell function in real time. We also analyze patterns of gene expression in complex tissues to understand the roles and differentiation of diverse cell types.



**Kevin Collins, Ph.D.**

Assistant Professor, Department of Biology

### **Research Summary**

Our fundamental goal is to understand how neurons communicate in circuits to establish an appropriate level of activity that produces a robust, stable behavior.

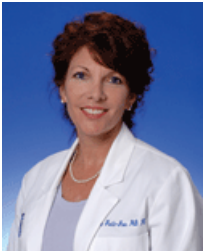


**Gerhard Dahl, M.D.**

Professor, Physiology and Biophysics

**Research Summary**

Dr. Dahl's research interests concentrate on ways of intercellular communication through gap junctions and calcium waves. Presently the focus is on the role of pannexin channels as ATP release pathway.

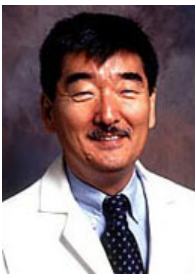


**Edelle Field-Fote, Ph.D., P.T.**

Professor, Physical Therapy and Neurological Surgery

**Research Summary**

The studies in the Neuromotor Rehabilitation Research Laboratory cross the boundaries of basic neurophysiology of the brain and spinal cord and applied neurophysiology related to neuroplasticity and motor learning



**George Inana, M.D., Ph.D.**

Professor, of Ophthalmology, Physiology and Biophysics

**Research Summary**

The Inana laboratory uses molecular, cellular, genetic, and physiologic approaches to uncover the genes that cause retinal degeneration, including macular degeneration, to elucidate the mechanism by which defects in these genes lead to retinal/macular degeneration, and to develop the best treatment or cure for these diseases.



**Robert Keane, Ph.D.**

Professor, Physiology and Biophysics

**Research Summary**

"My research focuses on the initiation of inflammation, autophagy and apoptosis in the CNS after traumatic brain and spinal cord injury."



**W. Glenn L. Kerrick, Ph.D.**

Professor, Physiology and Biophysics

**Research Summary**

Regulation of cell motility by Ca<sup>2+</sup> and protein phosphorylation



**Mason Klein, Ph.D.**

Assistant Professor, Department of Physics

My lab's research is in biophysics and neuroscience. We use insect model systems to better understand the transformation from sensory input to motor output, a fundamental goal of systems neuroscience.



**Peter Larsson, Ph.D.**

Associate Professor, Physiology and Biophysics

**Research Summary**

Molecular mechanisms of voltage-gated ion channels and neurotransmitter transporters, using electrophysiology and fluorescence techniques



**Karl Magleby, Ph.D.**

Professor and Chairman, Physiology and Biophysics

**Research Summary**

Biophysics; mechanisms of ionic channel activity.



**Fabrice Manns, Ph.D.**

Professor of Biomedical Engineering and Ophthalmology

**Research Summary**

Dr. Manns research activities include the development of optical laser and optical instrumentation for the treatment and diagnosis of eye diseases, and studies on the optics of the eye to help optimize vision correction procedures.



**Vincent Moy, Ph.D.**

Professor, Physiology and Biophysics

**Research Summary**

Our lab uses the atomic force microscope to measure forces involved in biological processes, such as the adhesive events that occur during cell migration or during cell-cell interactions. Force measurements are also employed to elaborate on the energetics of vesicle fusion.



**Kenneth Muller, Ph.D.**  
Professor, Physiology and Biophysics

**Research Summary**

Neuroscience; neuronal signaling; axon growth and synapse formation; nerve repair.



**Suhrud Rajguru, Ph.D.**  
Assistant Professor, Department of Biomedical Engineering  
Department of Otolaryngology

**Research Summary**

Neuroprosthetics, Neural Engineering, Neurophysiology



**Stephen D. Roper, Ph.D.**  
Professor, Physiology and Biophysics

**Research Summary**

"I study the molecular and cellular physiology of sensory organs. Specifically, my research focuses on signal transduction and signal processing in taste buds. I use functional imaging with voltage-, pH-, and ion-sensitive fluorescent dyes, confocal microscopy, and electrophysiology."



**Richard Rotundo, Ph.D.**  
Professor, Molecular Cell and Developmental Biology

**Research Summary**

My laboratory studies the biogenesis and regulation of acetylcholinesterase (AChE), the enzyme responsible for terminating neurotransmission at cholinergic synapses, as a marker for nerve-muscle interactions.



## ADMISSIONS AND APPLICATION INFORMATION



The University of Miami Miller School of Medicine has a centralized admissions point that allows students to explore multiple research areas of interest before deciding on a specific program to complete their dissertation work. All students are admitted through the **Program in Biomedical Sciences (PIBS)** for the PhD programs in Biochemistry & Molecular Biology, Cancer Biology, Microbiology & Immunology, Molecular Cell & Developmental Biology, Molecular & Cellular Pharmacology, Neuroscience, Physiology & Biophysics, and Human Genetics & Genomics. The PIBS Admissions Committee will review applications as they are received. We encourage all applicants to submit their application by December 15th.

Students interested in the Cellular Physiology and Molecular Biophysics program are encouraged to make preliminary contact with the **Graduate Program Director** and to complete the **on-line application** for admission to the PIBS Program.

Students whose interests are in Neuroscience may specialize in these areas while obtaining a degree in Cellular Physiology and Molecular Biophysics, or they may obtain a degree in Neuroscience through an interdisciplinary **Neuroscience Program**. Inquiries are also invited from those wishing to pursue **a dual M.D./Ph.D. degree program**.



### **Suggested Prerequisites**

Students are admitted into the Cellular Physiology and Molecular Biophysics program for the degree of Doctor of Philosophy. Before entering the program, the student should have a strong record in a biological discipline, chemistry, electrical engineering or physics; and GRE scores preferably in the eightieth percentile or higher.

Students interested in pursuing a Ph.D. degree in Cellular Physiology and Molecular Biophysics are well advised to take at courses in calculus, physics, organic chemistry, physical or biological chemistry, general biology, and molecular biology.

## **GRADUATION REQUIREMENTS**

Required course credits	36 cr.
Dissertation Research credits	24 cr.
<b>Total All Years:</b>	60 credits

The academic calendar has specific deadlines for graduation. It is the student's responsibility to be aware of the exact dates and to coordinate the dissertation defense accordingly after submission of a final thesis is accepted by the Graduate School. Questions regarding deadlines, graduation fees and other requirements or regulations concerning the details of preparation and submission of the thesis dissertation should be directed to:

### **Doreen Yamamoto**

Dissertation Editor

Phone: (305) 284-4154

Email: [dyamamoto@miami.edu](mailto:dyamamoto@miami.edu)

## **INTERVIEWS WITH FACULTY, LAB ROTATIONS, AND SELECTION OF A MENTOR**

The choice of a faculty research advisor is perhaps the most important choice you as a student make in graduate school. To facilitate this choice the department has an open house where you can meet with each primary faculty member. You will conduct laboratory rotations with three faculty before picking a research mentor.

Lab rotations typically last 10 weeks, and are designed to expose you to the science and the personality of the lab mentor and personnel. You must complete three rotations even if you decide on a mentor before all your rotations have been completed. Once you and a mentor have agreed for you to join the mentor's lab, you must submit your choice of mentor to the Graduate Studies Committee and department chair for approval.

## **PARTICIPATE IN SEMINARS, JOURNAL CLUBS AND TEACHING**

You as a PHS student should attend all departmental seminars. In some cases you will be expected to read scientific papers in advance and attend a discussion prior to the invited seminar.

During your first year, you will present to a student audience a research seminar based on your rotation projects at the end of each rotation. Beginning in the second year, you will make an annual

presentation to the department on research you have done. The topic of this talk is decided between you and your mentor, and you are encouraged to practice your presentation with your mentor and senior students or post-docs in your lab. The talk will be given to the students and faculty of the department, and will include a question and answer period at the end.

There are several journal clubs hosted by the department, including the Ion Channel journal club, Neuroscience journal club, and Molecular Physiology journal club. PHS students are required to participate in at least one of these journal clubs and present at least one paper every year.

After your second year you are required to participate in teaching in the conferences and laboratories of medical school courses offered by the department (e.g. PHS 510). The course coordinators will contact you about scheduling.

## **QUALIFYING EXAMINATION**

After choosing a research mentor you will begin dissertation research. Before the end of the second year in the program you will present a doctoral research proposal to the department. The written proposal and a subsequent oral examination by your Supervisory Committee will constitute the qualifying examination. The oral examination will also test your knowledge and ability to think in areas related to your field.

This Supervisory Committee must be comprised of at least four members, including your mentor and one member from outside the department. Prior to your qualifying examination you and your mentor may suggest names of members of this committee. The list of members will be reviewed and perhaps changed by the Graduate Studies Committee and then appointed by the chair of the department. Your mentor may be present during the examination but shall not ask questions or participate in the committee's deliberations, which will be held in the mentor's absence.

The written proposal should be a concise original approach to a specific problem in the field of interest you have selected in consultation with your research mentor. The proposal should be written in NIH format with the following sections:

- i) Title Page with the title of the project and the subtitle "A Doctoral Research Proposal", your name, and the date submitted.
- ii) Specific Aims: List the broad, long-term objectives and what the specific research proposed in this application is intended to accomplish. State the hypotheses to be tested. (What do you intend to do?). Do not exceed one page.
- iii) Background and Significance: Briefly sketch the background to the present proposal, evaluate existing knowledge, and identify gaps in the knowledge that the current proposal is intended to fill. State the importance of the research, relating the specific aims to broad, long-term objectives. (Why is the work important?).
- iv) Preliminary Studies: An account of your work on the project prior to this proposal. (What have you already done?).

- v) Research Design and Methods: Describe the research design and the procedures used to accomplish the specific aims of the project. Include the means by which the data will be collected, analyzed, and interpreted. Describe any new methodology and its advantage over existing methodologies. Discuss the potential difficulties and limitations of the proposed procedures and alternative approaches to achieve the aims. (How are you going to do the work?)
- vi) Literature cited. Include all citations referred to in the body of the proposal.

Apart from the emphasis on conciseness, no guidance can be offered as to an ideal length. The total length of the text (excluding figures) for items ii-v may not exceed 10-15 typed double-spaced pages (11-12 point font). The submitted proposal is to be written by you, the student, in consultation with your advisor.

The purpose of the proposal and its defense is to develop your capacity to carry out research: to pose pertinent questions, to marshal the scientific literature bearing upon the specific problem at hand, to exercise sound critical judgment, to plan a suitable course of investigation, to select appropriate experimental methods, and to anticipate the possible pitfalls. The oral examination by the Supervisory Committee will also test your knowledge and ability to think in areas related to your field.

The date set for the oral defense shall not be less than one week after the proposal distributed to the committee members. You should present the oral proposal using the written proposal as a guide, presenting the relevant background literature, the aims of the project, preliminary data, and the proposed experiments. No precise guide can be given for the length of the talk, but it should not exceed 50 minutes.

Your understanding of the subject matter of the proposal should show depth, including knowledge of relevant original literature and physiological principles, and of the capabilities and limitations of the experimental methods to be used. The emphasis throughout the defense will be on the substance of the proposal. Details of both the specific proposal and your general grasp of the subject will be explored. You should be prepared to discuss critically the significance of the proposed work for the fields to which it relates.

Successful completion of the qualifying examination is required for you to remain in the graduate program. If you fail the qualifying examination you may be allowed to retake the examination if the Supervisory Committee deems you capable of making up any deficiencies. After successfully passing the qualifying examination you will be admitted to Ph.D. candidacy.

## **DISSERTATION COMMITTEE**

This committee is formed after the doctoral research proposal has been successfully defended. Usually the committee is identical in membership with the supervisory committee. Nomination is by the chair of the department in consultation with the student and with the mentor (principal advisor), appointment is by the Dean of the Graduate School. The committee comprises at least four members, including the principal advisor and at least one member from outside the department. The department

chair will designate a committee moderator who is not the principal advisor. The committee moderator chairs all meetings of the committee and submits the progress summaries described below. To comply with the University of Miami Graduate School rules, the principal advisor should be listed as the Chairperson of the Dissertation Committee on the Application for Admission to Candidacy for the Ph.D. and on the signature page of the completed dissertation. The committee meets at least once per year to receive and discuss an oral presentation by you, the student, to review your research progress. At the end of each meeting, you are temporarily excused while the committee briefly summarizes your progress towards the Ph.D. degree. The summary is then discussed with you and amended to take account of pertinent comments you might have. Finally, the summary is submitted to the chair of the Graduate Studies Committee and to you.

When you have completed your research and are ready to begin drafting the dissertation, you should schedule a meeting with your Dissertation Committee to make sure you fulfill the Sufficiency Requirements. You must provide each member of the committee with a detailed outline of the proposed dissertation at least two weeks before this meeting. After the committee hears, discusses, and approves your presentation of your work you may begin writing the dissertation unless more than one member of the committee disagrees.

## **SUFFICIENCY REQUIREMENTS**

1. *Grade point average of 3.0 or better.*
2. Completion of 36 credit hours of required courses.
3. Successful completion of research work with at least one first author published and/or accepted manuscript (not review article). However, the student's dissertation committee can waive this rule if the committee feels that the student has done scholarly work and made significant progress.
4. Students have 4 months to write and defend the thesis work starting from sufficiency date.

**Please note:** In addition to the 36 course credit hours a student will need a minimum of 12 dissertation credit hours and a total of 60 credit hours for defense.

## **DISSERTATION AND DEFENSE**

When you are ready to schedule your dissertation defense you and your mentor should arrange for an external examiner (a scientist in your area of expertise from outside the University of Miami) to be present at your public presentation and in your final examining committee. You, the candidate, will circulate copies of the completed dissertation to the committee members and the external examiner for review and comment. When you have prepared the final version of the dissertation and have distributed (unbound) copies to the members of the committee and made one copy available to the department, your public oral defense is scheduled and announced, for a date not less than two weeks after distribution of the announcements. The committee functions as a final examining committee immediately after the public presentation. In order for you, the Ph.D. candidate, to receive the degree at a particular commencement, you must successfully defend your dissertation, and submit three final copies of the approved dissertation to the Office of Graduate Studies and one copy to the chair of the department at least one month before commencement. Additionally, in the semester before you

expect to graduate, you must make a formal application for graduation to the graduate school.

## **FORMS FOR YOUR DEFENSE**

All students must complete the Certificate of Defense Approval form following the defense. Please fill out the form, taking care to enter accurate information for all committee members as each will be emailed and asked to sign the form electronically. The completed form will be submitted automatically to the Graduate School. Please be sure to also submit the final materials needed to complete your ETD submission after you have uploaded a final PDF to the ETD database. You may access the Certificate of Defense Approval using the following link:

<https://grad.miami.edu/policies-and-forms/forms/index.html>

## **SUBMITTING THE DISSERTATION TO THE GRADUATE SCHOOL**

In order for the student to graduate, the Graduate School must accept the dissertation. The Office of the Graduate School has a set of extremely detailed rules regarding the format of dissertations. The student should obtain the most up to date guidelines when beginning to write the dissertation. The Graduate School's detailed dissertation guidelines may be found at:

<https://grad.miami.edu/electronic-thesis-and-dissertation/index.html>

Please review the guidelines prior to beginning work on the dissertation and strictly adhere to them because it is the Graduate School's ultimate decision to accept your dissertation. If the Graduate School does not accept the dissertation, the student will not be eligible to graduate in that semester

## POLICIES AND PROCEDURES

### **Plagiarism**

Plagiarism is explicitly outlawed at University of Miami Miller School of Medicine (UMMSM). The PHS graduate program will not tolerate Plagiarism. Students who are found to have plagiarized may be asked to withdraw from the program. Plagiarism is not always easy to define; students who are unsure whether a particular practice is acceptable are urged to discuss the issue with the faculty instructor or mentor.

### **Leave of Absence/Vacation Policy**

This statement applies to full time Ph.D. students in good academic standing at the University of Miami Miller School of Medicine (UMMSOM) In general, trainees may receive stipends during the normal holiday periods observed by UMMSOM (New Year's Day, M.L. King's Birthday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and the day after, and Christmas Day). Ph.D. students may also receive stipend support for up to 15 calendar days (includes weekends) of sick leave per year.

Parental leave requires that the student apply for a paid leave of absence. The leave of absence form should be submitted to the graduate school several months before the intended leave. The mentor must pay the first month of leave and OGPS will assume responsibility for 2 additional months. **A student may only be on paid leave for a total of three months. Any leave in excess of three months will be unpaid.**

Individuals requiring periods of time away from their research training experience longer than specified here must seek approval from their program director for an unpaid leave of absence. At the beginning of a leave of absence, the trainee must submit a written request which includes the reason for the request as well as the date the leave will begin and end. This request, once approved by the Program Director, should be submitted to the Office of Graduate Studies which will seek the necessary approval from the Associate Dean.

### **Dismissal and Appeals Policy**

Students can be dismissed by the Program for academic or professional reasons. Decisions on dismissal are made by majority vote of the Steering Committee. To appeal a major programmatic decision (e.g., dismissal, denial of degree, termination of stipend), students should first present their reasons for appealing to the Graduate Program Director and Steering Committee. This appeal will be given a fair and impartial hearing followed by a decision made by majority vote. If the student remains dissatisfied with the result of this appeal, the student may appeal the program decision, in writing, to the Associate Dean for Graduate Studies, within 30 days of the program's final decision. Decisions by the Associate Dean are appealable to the Dean of the Graduate School through the filing of a formal Graduate School Grievance.

<http://bulletin.miami.edu/graduate-student-handbook-online-students/disciplinary-grievance-procedures-graduate-students/>

In the event a student is dismissed from a mentor's lab due to irreconcilable differences, the GPD may request in writing for OGPS to provide emergency stipend coverage for up to six weeks (or a maximum of two months if a second rotation is necessary to find a new mentor). OGPS will review the request and make determinations on a case-by-case basis. Emergency support is contingent upon

funding availability and not guaranteed. If the student is still unable to find a mentor after being placed on emergency support, he/she will be dismissed from the program due to lack of funding.

## **My UM**

MyUM is UM's interactive one-stop information hub for personalized, university-related information for students, faculty, and staff. To log in, go to <https://myUM.miami.edu/> and review your employee tab to confirm status of stipend, health insurance, and tuition.

## **STUDENT COUNSELING CENTER**

The University Student Counseling Center has personal counselors who can help students effectively cope with the challenges of college life and facilitate learning, growing, and socializing. The Counseling Center offers a wide range of services, including short-term individual counseling, career and educational counseling, outreach programs, and various groups aimed at enhancing personal growth and development. The center is staffed by an experienced team of professionals from the fields of psychology, psychiatry, mental health counseling and social work. Students can contact the center Monday-Friday between the hours of 9 a.m. to 5 p.m. by calling 305-284-5511. The center is located in Bldg. 21-R of the Center for Student Services on Gables Campus. If a crisis occurs after hours counselors can be reached by calling the University of Miami Police department at 305-284-6666.

## **THE GRADUATE STUDIES BULLETIN**

The official rules of the University regarding the Doctor of Philosophy degree are published each year in the Graduate Studies Bulletin. Students should read and adhere to these rules. [www.miami.edu/umbulletin](http://www.miami.edu/umbulletin).

## **GRADUATE STUDENT ASSOCIATION**

The Graduate Student Association (GSA) represents graduate students of the University of Miami, in order to provide a means for responsible and effective graduate student participation in the planning and conduct of University affairs. For more information please visit the GSA website at:

<https://www.um-gsa.org/>



## **IMPORTANT NUMBERS**

### **Graduate Program Director**

Dr. Peter Larsson - (305) 243-1021

### **Graduate Program Coordinator**

William Orta - (305) 243-3368

### **Graduate School**

Dissertation Editor, Doreen Yamamoto (305) 284-4154

### **Student Accounts Services**

The Office of Student Account Services processes all financial information of a student's account during their enrollment at the University of Miami. Staff members are available to assist and answer inquiries by phone (305) 284-6430 Option 5, email ([saccounts@miami.edu](mailto:saccounts@miami.edu)), or in person.

**Hours:** 8:30am - 5pm