



University of
Pittsburgh[®]



School of Medicine
Cell, Molecular and
Systems Biology

- **Graduate Program Leadership**

Director - Dr. Michael Tsang, tsang@pitt.edu

Co-Directors

Dr. Gerry Hammond

Dr. Judith Yanowitz

Dr. Andrey Parkhitko

Executive Committee

Dr. Neil Hukriede

Dr. Judith Yanowitz

Dr. Gerry Hammond

Dr. Alexander Sorkin

Dr. Fritz Roth

Dr. Harinder Singh

Admissions Committee

Dr. Gerry Hammond (chair)

Dr. Neil Hukriede

Dr. Suni-Sims Lucas

Dr. Deepika Vasudevan

Dr. Matthew Wohlever

Dr. Eldin Jasarevic

Dr. Youjin Lee

Dr. Daniel Gao

Milestones and Curriculum Committee

Dr. Judith Yanowitz

Dr. Gerry Hammond

Dr. Adam Kiawatkowski

Dr. Donghun Shin

Dr. Andrey Parkhitko

Table of Contents:

Introduction	4
I. Doctor of Philosophy Degree (Ph.D.)	
A. Admissions	7
B. Financial Aid	7
C. Academic Policies and Procedures	8
D. Laboratory Rotations	10
E. Courses	12
F. Comprehensive Examination	21
G. Doctoral Committee	27
H. Dissertation and Final Oral Examination	27
I. Teaching Opportunities	29
J. Masters of Science (M.S.) Degree	29
II. Credit requirements	
A. For PhD Students	31
B. For MS Students	32
C. For certificate students	32
D. Medical Scientist Training Program	33
III. General Information	33

Introduction

The Cell, Molecular and Systems Biology (CMSB) graduate program at the University of Pittsburgh School of Medicine trains biomedical scientists who are equally at home at the wet bench and at the keyboard. CMSB unites three established graduate programs: Integrative Systems Biology (ISB), Cell Biology and Molecular Physiology (CBMP), and Molecular Genetics and Developmental Biology (MGDB), into a single program built on a conviction that modern biology requires both experimental and computational skills.

This dual fluency in generating data at the bench and to interrogate it with quantitative and *in silico* rigor is built into the program from the first semester. All CMSB students take two core courses side by side: Foundations of Biomedical Science, which grounds them in the molecular, cellular, and systems-level biology at the heart of the field; and Bioinformatics, which equips them with the computational and quantitative methods to analyze modern biological data. These paired courses establish from day one that experimental and computational training are not alternatives, but two halves of a single competency. Students then carry that competency into the laboratory, where the program's true strength lies: an exceptionally deep and varied faculty whose research spans nearly the full range of contemporary biomedical science. Rather than being confined to a single methodological lane, CMSB students choose among laboratories pursuing very different questions and experimental systems and are free to combine bench experimentation with computational analysis in whatever proportion their science demands. Where a project calls for sustained expertise on both sides, students may pursue co-mentorship across experimental and computational laboratories.

This training is applied across a research landscape of exceptional breadth. CMSB faculty address the most pressing questions in biology and medicine: the molecular genetics of gene regulation, signal transduction, and DNA repair; developmental and reproductive biology from early embryonic patterning through organogenesis; stem cell biology and regenerative medicine; the integrated physiology of cells, organs, and whole animals; and the mechanisms underlying cancer, diabetes, neurodegeneration, renal disease, and inherited genetic disorders. Students engage this breadth with a correspondingly broad toolkit that includes imaging, genetics, biochemistry, structural biology, and physiological approaches alongside the "omics"-scale methods (genomics, transcriptomics, proteomics, metabolomics) and systems modeling that define contemporary biology.

Research Areas

CMSB faculty pursue an exceptionally broad range of questions in biology and medicine. Major areas of strength include:

Developmental and Reproductive Biology. Reproductive and developmental biology is anchored by faculty at the Magee-Womens Research Institute whose work spans the full arc of reproduction. Topics include germline formation, early embryogenesis, and the developmental programming of offspring health. Faculty dissect meiotic recombination and DNA repair in germ cells, errors in which drive miscarriage and infertility, reproductive aging and the ovarian reserve, spermatogonial stem cell transplantation and fertility preservation, and epigenetic reprogramming and genomic imprinting in early embryos. Others study how the maternal microbiome shapes offspring brain and metabolic development and how engineered genetic circuits can direct stem cells to self-organize into vascularized organoids. Much of this work is intrinsically quantitative and draws on single-cell genomics and computational modeling, and advanced imaging analysis.

Stem Cell Biology and Regenerative Medicine. CMSB faculty research centers on organ regeneration across many systems including liver, kidney, heart, and pancreas. Model systems to dissect the molecular mechanism of tissue and organ regeneration include: zebrafish and flies, powerful *in vivo* models of innate regenerative capacity; mice, a mammalian model for human regeneration. Faculty also engineer

regeneration from the bottom up, using synthetic biology and genetic circuits to direct iPSCs into vascularized organoids, combining quantitative imaging with theory to control the self-organization of brain, liver, kidney and cardiac organoids. Other faculty study stem cells in disease and repair, including germline stem cells, carcinoma-associated mesenchymal stem cells in the ovarian tumor microenvironment, tumor-virus effects on cancer cell stemness, and wound healing and tissue repair. Across the program, much of this work pairs experimental models with single-cell multi-omics and computational analysis.

Cancer Biology and Single Cell Oncology. CMSB's dual-fluency thesis is embodied by faculty who develop patient-specific tumor models and the computational methods to interpret them hand-in-hand. The experimental engine is increasingly patient-derived cancer organoids, which recapitulate a tumor's genotype, heterogeneity, and drug responsiveness far better than cell lines, enabling functional precision oncology. These models are converted into high-dimensional data through single-cell and spatial multi-omics, combined with quantitative imaging, and bioengineered microfluidic tumor-microenvironment platforms. Deep-learning models that predict drug sensitivity and genetic dependencies coupled with Large Language Models that integrate multi-omic data and large-scale clinical and genomic datasets.

Cell Biology and Integrated Physiology. This is the program's largest and most foundational research focus. Faculty are interested in understanding how cells are built and operate at the molecular level and how those mechanisms scale up to the physiology of tissues and organs. Its core themes include membrane and organelle dynamics involved in trafficking, lipid and receptor signaling, which connect to deep institutional strengths in epithelial and renal-electrolyte physiology (ion channels and transporters governing salt, water, and blood-pressure balance) and in cardiovascular and vascular cell biology. Cutting across these systems are mechanistic threads in the cytoskeleton, cell adhesion, and tissue mechanics; in metabolism, mitochondria, redox signaling, and aging; and in genome maintenance and gene expression, with further depth in the cell biology of sensory systems, reproduction, and host-pathogen interactions. The toolkit is mechanistic and increasingly quantitative with advanced microscopy, structural biology, model organisms, organ-on-chip systems, and spatial multi-omics.

Computational and Quantitative Method Development. CMSB includes a strong cohort of computational biologists whose core contribution is building new algorithms, tools, and theoretical frameworks. Their methods span structure-based drug design and molecular docking, deep mutational scanning and variant-effect prediction for clinical genome interpretation, and machine-learning frameworks that derive the governing equations of single-cell dynamics and cell-fate transitions. In addition, they develop tools for interpretable machine learning and high-dimensional immune and multi-omic data, as well as models of single-cell signaling dynamics. While these labs lead with algorithm development, many also run their own wet bench experiments to generate the data their methods exploit or may do so by co-mentoring PhD students.

Biology of Aging. CMSB has a vibrant research community anchored institutionally by the University of Pittsburgh Aging Institute that investigates why we age and how the rate of biological aging might be slowed. Its labs span the mitochondrial, metabolic, oxidative-stress, and autophagy pathways of mammalian aging, how endogenous DNA damage and genome instability drive cellular senescence, with efforts to develop molecular indices of biological age, the conserved transcription factors linking reproduction, metabolism, and longevity in *C. elegans*, the metabolic reprogramming of aging and neurodegeneration modeled in *Drosophila* and mice, and single-cell genomics of brain aging.

Systems Biology. The principle that biological function emerges from networks of interacting components is best understood by integrating quantitative measurement, computation, and modeling rather than studying parts in isolation. Faculty with a systems biology focus are in systems immunology, where gene-regulatory networks and transcription-factor circuits controlling immune-cell fate are assembled from functional genomics and computational modeling. Complementary strengths span systems and network physiology from pulmonary vascular disease to the systems genetics of congenital

heart disease. Other areas include synthetic, engineered biological systems built from gene circuits and reconstituted microenvironments.

I. Doctor of Philosophy Degree (Ph.D.)

A. Admission

All interested students seeking a Ph.D. degree are encouraged to apply for admission directly to the CMSB program from September 1st for admission to the subsequent fall term. The deadline for receipt of applications is December 1st. Early applications are encouraged and are reviewed by the admissions committee on a rolling basis. The program does not directly admit students for an M.S. degree.

Minimum requirements for admission include a baccalaureate degree in a natural or physical science or engineering program and three letters of recommendation. Candidates must possess a minimum grade point average of 3.0 (on a scale of 4) or its equivalent from an accredited institution. Details about the application process can be found at: [CMSB Application](#).

Prior research experience is highly desirable and letters of recommendation from faculty familiar with the applicant's research accomplishments are particularly valuable to the evaluation process.

Selected applicants will be invited for an interview via Zoom. Successful applicants will be invited to visit The University of Pittsburgh and funds to cover travel expenses are available.

Foreign applicants with undergraduate degrees from countries other than Canada, Australia, the United Kingdom and New Zealand are required to take the Test of English as a Foreign Language (TOEFL) and provide official score reports from both the spoken (TSE) and written (TWE) parts of the examination.

For more information to the University of Pittsburgh, School of Medicine Graduate School, please visit: [SOM graduate studies](#). For specific requirements for the admissions process please visit: [Admissions Process](#).

B. Financial Aid

Financial support with remission of tuition and fees is available to all graduate students in the program for the duration of their studies. Students may be supported from the following sources:

1. Dean's Fellowships. All students are supported through the Dean's office during the first year of study. Support consists of tuition remission and a stipend for the first year of graduate study.
2. Research grants to individual faculty members. Students involved in thesis research are frequently supported by research grants to their major advisor. It is the policy of the Program that the amount provided by faculty members for student support will be such that the total stipend received by the student from all departmental or medical school student support funds shall be neither greater nor lesser than the stipend level designated by the Cell, Molecular Systems Biology Graduate Program. Student stipend support by faculty research grants will begin at the conclusion of the Dean's Fellowship support.
3. Training Grants. A limited number of students involved in thesis research may be supported by training grants in specific programs. Students whose major advisor is a member of the training faculty of such grants are eligible to compete for such funds.

4. Foundation and Government Fellowships. Qualified first and second-year students are strongly encouraged to apply for these prestigious and highly competitive awards.

All Ph.D. degree candidate students are expected to receive their stipend and tuition remission each year regardless of the sources of support. If the amount of the stipend a student receives from any source is less than the current rate at the University of Pittsburgh, the sponsor of the student is expected to make up the difference.

The University will provide individual health insurance under the graduate student plan. An option to purchase family coverage is available at a cost, which is the difference between family coverage and individual coverage.

As part of the Program's intention to provide the greatest opportunity to develop scholarship and research skills, stipends are intended to support full-time commitment on the part of the student to successfully complete their graduate training in a reasonable period of time typically within 5 years.

C. Academic Policies and Procedures

Ph.D. Requirements

The general goal of the CMSB is to ensure that students have a strong foundation in biomedical science and computational analysis. A total of 72 graduate-level credits is **required** for the Ph.D. degree. It is important to note that 32 of the 72 credits **must** be satisfied through course work and directed study and the remaining 40 credits should be completed through the Ph.D. dissertation. Graduate students in joint programs, training programs or in special circumstances may require additional courses or an individualized course of study. The Milestones and Curriculum Committee will consider requests for changes or exemptions from program requirements on a case-by-case basis.

M.S. Requirements

Students are not directly admitted to the CMSB graduate program to attain a M.S. degree.

In certain cases, however, it may be necessary that a student in the Ph.D. program be transferred to a terminal M.S. degree program. Students pursuing a M.S. degree in CMSB will be required to complete the same course work as described for the Ph.D. program during the first two years and to prepare and successfully defend a Masters Thesis as agreed upon by the dissertation advisor and the program director (see below).

Advising and Academic Evaluations

Advising

- All incoming PhD students are required to have a faculty advisor/mentor assigned to them for their first year of study.

The program director will serve as your first-year advisor. The first-year advisor will help you identify individuals who can provide specialized advice on research rotations, advise you of the

various milestones that are part of the CMSB, assist you in decisions regarding course electives, and sign all your enrollment forms until you formally transfer to your advisor's lab. This is usually in the Spring term of the students' first year.

Evaluations

- Student academic evaluations are required for PhD students and must occur annually.

The Preliminary Examination will be conducted either at the end of the spring term or during the summer to review the first-year students' performance in courses as well as written evaluations by the faculty members involved in the laboratory rotations.

Annual Academic evaluations for students in their second and subsequent years will be conducted at the end of the spring term or during the summer to assess their performance in courses, thesis committee reports, as well as through written evaluations by their faculty mentors. One of three decisions will be made for each student after the annual academic evaluations:

- o The student may be advanced to the following academic year in good standing
- o The student may be conditionally advanced; they would then be directed to specific courses or other requirements that would address the committee's concerns
- o The student may be placed on probation for a specified period, and if the conditions of the probation are not satisfied, dismissed from the program for poor academic performance.

Thesis Committee Meetings are mandatory **every six months**. At these meetings, the students will present their progress and receive feedback from their thesis advisory committees. Students whose performance is not satisfactory could be placed on academic probation for a defined period with guidance on how to return to good academic standing.

Student Worker Evaluation for Graduate Student Researchers (GSRs) – In addition to the annual academic assessment conducted by the CMSB Graduate Program, Graduate Student Researchers (GSRs) also undergo annual employment evaluations as required by University policy and the collective bargaining agreement between the University of Pittsburgh and the Graduate Student Union. Students should refer to current University guidance for information regarding the evaluation process and timelines.

Registration – the CMSB graduate program will register their students for their first fall term's coursework. After their first term, in consultation with their advisors/mentors, students will complete an Enrollment Form with their signature along with their advisors' /mentors' signature and submit it to their Program Coordinator (Shari Murphy: sas101@pitt.edu). The Program Coordinator will remove the advising hold placed by the Office of the University Registrar each term, and then the student can proceed to self-register. Students are required to be registered for each term by the designated registration deadline.

Full-time registration requires between 9-15 credits in the fall and spring terms. Ph.D students are required to register for a minimum of 3 credits in the summer term and can take up to 9 credits.

D. Laboratory Rotations

Laboratory research is the major component of any biomedical Ph.D. program. The CMSB supervises the process of research rotations during the first year. Students are expected to complete three research rotations by the end of the first semester. At the end of each rotation, the student is required to complete a written report. Students will obtain a document at the beginning of each rotation describing the requirements for the report. When the written report is complete, the rotation mentor will review the performance of the student and assign a letter grade for the rotation. It is expected that the three rotations will be performed in different laboratories of the CMSB training faculty in order to provide the student with an adequate opportunity to identify an area of research interest and to establish a relationship with a potential dissertation advisor. It is possible for students to take a fourth rotation if necessary. Requests to modify the rotation requirements must be made, in writing, to the Graduate Program Director. Students are responsible for submitting a copy of the rotation report to the Rotation Advisor by the date indicated below. Students and Rotation Advisors are asked to discuss the rotation as well as the report and to complete an evaluation form. The completed evaluation form (with all signatures) should be submitted to Shari Murphy at (sas101@pitt.edu) The laboratory rotation schedule for academic year 2026 is listed below.

Rotation Schedule

Rotation Begins	Rotation Ends & Report Due	Evaluation Form Due
September 8, 2026	October 7, 2026	October 9, 2026
October 12, 2026	November 11, 2026	November 13, 2026
November 16, 2026	December 14, 2026	December 16, 2026

As stated above, a student may petition the CMSB Director for permission to take a fourth rotation, which will be a 4-week rotation in the Spring term of their first year. At the end of the fourth rotation, the student in consultation with the advisor and CMSB training faculty will identify their training laboratory i.e. their mentor and in some instances a co-mentor.

In rare cases, a final fifth rotation can be petitioned. During this rotation you will be placed on academic probation. Your rotation advisor will submit an evaluation of your rotation to the CMSB Director and make a recommendation as to whether you should continue your dissertation research in their laboratory. If you match with their laboratory and your rotation evaluation is satisfactory, your probation status will be removed, and you will become a student in good standing.

However, if the fifth rotation does not work out, your performance will be considered unsatisfactory, and you will be subject to dismissal by the CMSB Milestones and Curriculum Committee from the CMSB PhD program and hence the University of Pittsburgh.

Performance in the lab rotation will be evaluated based on effort in the lab, ability to think independently, communicate effectively with the advisor and lab members, good citizenship in the lab, and a broad understanding of ongoing research in the laboratory. A well-written rotation report summarizing the experiments performed, results obtained, as well as an explanation of the progress of the research participated in, and why or why it did not succeed. It is recognized that some rotation projects emphasize concepts and techniques rather than generating a large volume of data. Thus, considerable flexibility in the style and content of the report is possible. The main goal is to generate a written, scholarly account of the scientific principles, questions, and activities undertaken during the rotation period. Rotation advisors will read, comment upon, and discuss changes to the rotation report with the student. When the written report is complete, the rotation supervisor will review the performance of the student and assign a letter grade for the rotation on the evaluation form provided by the Graduate Studies Office.

To receive an “A” grade in a rotation, a student must have performed at an excellent level in at least half of the criteria described above. Special emphasis for grading should be put on: effort in the lab, an understanding of the ongoing research that the student is engaged in, interpersonal skills, and a well-written rotation report.

A “B” grade is appropriate when a student has performed at least to an acceptable level in most/all the criteria.

To receive a “C” grade or below, a student must have performed at an unacceptable level in a number of above criteria.

- Prior to choosing a laboratory, you should speak with the CMSB program director and examine the list of faculty who have space and funding available to take a student in their laboratory.
- After the completion of the third rotation, a student is expected to have identified a dissertation advisor based on their rotation experiences and mutual agreement with a faculty member. You should initiate your research in your chosen advisor’s laboratory no later than January 12, 2026.
- CMSB allows for a fourth and fifth rotation if necessary for students to identify a suitable advisor and laboratory for their dissertation research. See above rules for the fifth rotation.
- Identification of a dissertation advisor for thesis research **is a requirement in order to pass** the preliminary examination at the end of first year of a PhD program (see below).

Milestones

- The University tracks your progress toward the degree by means of a series of Graduate Milestones. Successfully completing each milestone is a university requirement for the PhD degree

- The Preliminary Examination – Successful completion of preliminary examination requires that the student must have identified a mentor for their dissertation research, passed their courses and be in good academic standing. The Program Director must sign the Preliminary Examination milestone form.
- The Comprehensive Examination – A extensive outline of the comprehensive exam is presented below in section F.

E. COURSES

The curriculum of the CMSB program consists of two introductory courses to programming and Foundations of Biomedical Science, the Ethics core course, Grant writing course, Biostatistics and electives that satisfy the minimum of 32 credits.

CORE COURSES

Fall Semester First Year:

1. **Foundations of Biomedical Science (6 credits)**
2. **Introduction to Bioinformatics Programming in Python (3 credits)**
3. **Laboratory Rotations (3 credits)**
4. **CMSB conference (1 credit)**

Spring Semester First Year:

1. **Course Elective(s).** Students choose two to three electives for total of **6-8 credits**.
2. **Directed Study (4-6 credits)**
3. **CMSB conference (1 credit)**

Summer First Year or Fall Second Year

1. **Scientific Ethics and Responsible Conduct of Research (1 credit)**
2. **Directed Study (2 credits)**

Fall Semester Second Year

1. **Grant Writing for Graduate Students (3 credit)**
2. **Introduction to Statistical Methods (3 credit)**
3. **Course Elective(s) (2-3 credits)**
4. **One of the following:**
 - CMSB Conference/Research in Progress (1 credit)**
 - or**
 - Experiments and Logic in Cell Biology (1 credit).**

Course Descriptions:

Required Courses:

Foundations of Biomedical Science

Primary objectives of the course are to convey knowledge of the molecular and cellular mechanisms controlling cell, tissue and organ function, and to develop an understanding of the experimental evidence supporting these concepts through an integrated presentation of material from biochemistry, structural biology, cell biology, molecular genetics, pathology, pharmacology, and physiology. The development of critical thinking skills will be emphasized through an evaluation of experimental evidence and reading of the primary literature.

Introduction to Bioinformatics Programming in Python

This course will introduce students to a selection of popular python packages used in bioinformatics and computational and systems biology. Students will be graded on programming assignments. Each assignment will explore a different sub-discipline of computational biology and introduce students to a new python package. Optional recitations will be available for students with programming and will assist in the development of basic programming skills.

Grant Writing

All scientific writing all has the same goal, i.e. the writer wishes to present their ideas and data such that the reader can evaluate the validity of the results and conclusions based on the facts presented. Whether as part of an abstract, review, scientific article or grant application, the reader should be able to easily follow the methods used to generate the data as well as the logic used to draw the reported conclusions. With this in mind, the course will focus on a) honing the precision with which we write to avoid confusing the reader such that they cannot grasp critical aspects we are attempting to convey; b) increasing the clarity with which we present our scientific ideas to avoid confusing the reader; and c) maintaining the objectivity with which our ideas are presented. Thus, we anticipate this course will be of interest to anyone interested in furthering their grant writing skills as a prelude to their future careers.

Scientific Ethics and Responsible Conduct of Research

The course is an introduction to the basic ethical issues which arise in the course of conducting scientific research. It is intended for graduate students and fellows in the biomedical sciences who have completed at least one year of graduate work. The course will be composed of informal lecture presentations followed by discussion of issues in small groups.

Introduction of Statistical Methods

Discusses techniques for the application of statistical theory to actual data. Topics include probability theory, estimation of parameters, and tests of hypothesis for both the discrete and continuous case.

One of the following from Years 1-3

CMSB Conference/Research in Progress

This course will present an opportunity for students to become familiar talking about critical aspects of being a researcher that they deem important including but not limited to, current scientific literature, biological, biostatistical, or computational principles, laboratory techniques, and research-in-progress (RIP) reports. Each week, two students will lead 30 minute discussions either on their own primary research, or on topics of their choosing. For each presenter, time is allocated for questions and discussion of the relevant conclusions to allow development of presentation skills.

Or

Experiments and Logic in Cell Biology

The purpose of Experiments and Logic in Cell Biology (ELCB) is to engage the students in Cell Biology research laboratories in a self-directed seminar structured to stimulate the students' ability to think scientifically and critically as future scientists. The iterative, collaborative, and collegial process of ELCB is the same used by teams of collaborating scientists to develop and solve biomedical projects. Fall and Spring semesters.

Elective Courses

Cell Biology of Normal and Disease States

This course is required for all CBMP graduate students. It is taught through both lecture and in class discussion of primary literature and explores the cellular basis of multiple disease states. At the end of the course students will have an increased understanding of normal cellular function and how research in cell biology can lead to a deeper understanding of diseases that impact millions of people each year. Spring semesters.

The semester-long course in cell biology and physiology of normal and disease states will explore three exciting topics in current day cell biology and physiology. The course, which meets twice a week (1.5 h each session), will be taught through both lectures and in class discussions of primary literature and will cover basic biology, the cellular basis of disease processes, and recent advances in translational research that may lead to cures for common disease processes. The section on stem cell biology, diabetes, and translational research will focus on understanding how cells divide and how all of the body's different tissues stem from a master cell with the potential to generate all of the different cell types present in the body. In addition to understanding normal stem cell biology, the potential for use of stem cells to regenerate organs and to cure ailments such as diabetes will be explored. The section on cellular polarity will explore early events in polarity establishment including endocytic signaling and establishment of specialized membrane domains in epithelia and neurons. Further discussion will focus on disease processes such as autosomal dominant kidney disease, an ailment characterized by altered and dysfunctional polarity. The third section will examine ion channels and disease: CFTR and cystic fibrosis. This section will explore the role of RAD in protein quality control, the traffic and transport of CFTR, the

functional role of CFTR and the epithelial sodium channel in the lung, and promising new therapies to alleviate the morbidity and mortality associated with CFTR mutations.

Cell & Systems Modeling

A graduate-level introduction into mathematical modeling and analysis of biological systems on the cellular and other levels. This condensed and broad course conveys the unity of the modeling methodology in biology. It spans a range of perspectives derived from the different disciplines from which this new area of research originated: biology, mathematics, engineering, and computer science. The systems covered include quantitative physiology, quantitative cell biology, biological networks, dynamic systems, cell mechanics, and systems modeling of critical illness. The quantitative physiology topics to be covered include hemodynamics, musculoskeletal systems, endocrinology, neuroendocrinology, gastrointestinal/renal, transport phenomena, and pathophysiological conditions. Quantitative cell biology topics surveyed are mathematical models of the cytoskeleton dynamics, intracellular transport, cell locomotion, spatially-distributed models of cell signaling, approaches to whole-cell modeling, and role of modeling in cell-biological research. Models of cellular mechanics will also be addressed. Mathematics of dynamic systems is presented in application to enzyme reactions, biostability in cellular signaling, programmed cell death, and the mechanisms behind the circadian and cell-division rhythms. Biological network theory is presented as it applies to metabolism, protein interactions, regulation of gene expression, and reverse engineering of the biological systems. Theoretical aspects of application of systems modeling to clinical research are also presented on an example of quantitative systems approach to inflammation, sepsis, and trauma. In addition, the course will survey computational methods and models that are broadly useful across the various system types examined. These will include random walk models, master equations, and continuous and discrete models of chemistry within the cell. Finally, the course will include a presentation of general discrete and continuous models broadly useful in cell and systems modeling as well as computational methods for optimization and parameter tuning on such models. Across the entire range of topics, the universality of the systems modeling methodology and its role in biomedical research are emphasized.

Cellular Physiology of the Kidney

This summer course will provide an introduction to the kidney and lower urinary tract, with emphasis on kidney structure and function. The course, which meets once a week (two hours each session), will be taught through both lecture and in class discussion of the primary literature. Discussion of how bench top findings can be translated to treatments in the clinic will be facilitated by a diverse faculty that includes both basic and physician scientists. You will first learn about the specialized cell types that comprise the kidney and lower urinary tract. Subsequently, you will be introduced to renal stem cells and how they lead to kidney development. Next, you will learn the functions of the kidney, including regulation of water and ion balance. This will be followed by a discussion of the lower urinary tract. Finally, you will learn how drugs can be used to treat kidney dysfunction and how kidney transplants can be used to treat those patients with end-stage renal disease.

Developmental Mechanisms of Human Disease

This course covers principles of developmental biology and how embryonic developmental pathways impinge on human disease. The course is comprised on two lectures related to each organ system, one focused on the basic developmental principals and the other on the clinical manifestations and treatments. Topics include congenital organ related disease, stem cell based reproductive events relating to disease. Prerequisites: Foundations of Biomedical Science or permission of the course director.

Genome Instability and Human Disease

Mechanisms that maintain genome stability allowed the origin of species. DNA damage is omnipresent and DNA repair and DNA damage tolerance mechanisms are interwoven in systems that control transcription, replication, cell division, signal transduction, cell death and evolution. More than 40 distinct human diseases are caused by defects in DNA repair, including syndromes of impaired development, immunodeficiency, cancer predisposition, neurodegeneration, and premature aging. This course will emphasize the molecular biology and biochemistry of DNA repair, placing these mechanisms into the context of other cellular processes as they pertain to health and disease. Environmental, clinical and endogenous sources of DNA damage will be discussed. An understanding of the fundamental role of DNA repair mechanisms in immunology, oncology, neurology, and aging will be central to all lectures.

Histology

Histology is the microscopic study of body tissues and how these tissues are organized to form functioning organs and organ systems. This course will give you an appreciation of the architectural complexity of the human body and help you to develop a mastery of its microanatomy through the microscopic study of tissue sections. This course will also equip you with a broad understanding of core concepts of cell biology and physiology and introduce you to the histological changes that accompany certain disease states (histopathology).

Upon successful completion of this course, you will be able to do the following:

1. Describe the morphological features of all of the major tissue types and organs in the body, know their functions, and identify them by light and/or electron microscopy
2. Understand the basic physiology of various organ systems and the cells that comprise them
3. Describe the underlying pathophysiology of common disease states and recognize histological changes in the affected tissue(s)

Students who complete this course successfully may have the opportunity to obtain a teaching experience to teach histology to first year medical students during a portion of the Fall semester under the direction of Dr. Truschel. Teaching experiences are offered to interested students based on various factors, including but not limited to, performance of the student in the course, and in agreement with the student's principal investigator. The experience is supported by the Department of Cell Biology, so students within the department are first considered. Inquire with Dr. Truschel for more details.

Imaging Cell Biology in Living Systems

The focus of this course will be to study relevant problems in Cell Biology, Immunology, Developmental Biology and Neurobiology and how they have been solved using imaging approaches. The use of techniques such as TIRF and high-speed confocal microscopy to address basic problems in endocytosis will be discussed at the organism level. Multiphoton, confocal, FRET, and other approaches will be discussed to understand aspects of cell biology in cell polarity, respiration and organ development in *C. elegans*, *Drosophila*, zebrafish and mice. In each case the application will focus on how imaging tools are used to study defined problems in living systems. The course will follow Lecture/Demo/Journal Club format. Lectures will be two part, the first 1/3 will be a description of the technology, how it was developed and how it works (10-15 minutes) followed by description of the scientific problem and how it was solved. This will be followed by lab demonstrations showing the approach in action. Lectures will be interspersed with a journal club discussion of a relevant paper on each technology. Students will prepare the Journal Club presentations in an alternating fashion. Examination will be a combination of class participation, journal club and written exam.

Model Organisms

This course covers the use of vertebrate and invertebrate model organisms in biomedical research. Topics include the use of several models including mouse, rat, zebrafish, *Xenopus*, *C. elegans*, and *Drosophila*. Special emphasis will be placed on the strengths that specialized techniques of each organism provide to the research community in understanding the etiology of disease.

Molecular Mechanisms of Longevity and Aging

Aging is a fascinating biological process and a topic of profound public-health significance. While humans have searched for the “Fountain of Youth” since times immemorial, the last three decades have created a phenomenal expansion in our knowledge of the biology of aging. Classical genetic studies in laboratory models coupled with advances in molecular biology, genomics and systems biology have provided unprecedented insights into the molecular mechanisms underlying the age-related decline of our cells, tissues and bodies. These discoveries have provided the solid foundation for the emerging field of Geroscience and the discovery of therapeutic and environmental approaches to delay or even reverse aging. This is a course for those interested in obtaining in-depth knowledge and critical understanding of the molecular underpinnings of aging and the current state of Geroscience research. The course will be conducted in four modules. Module 1 will provide a historical perspective on aging research with a focus on major discoveries in model organisms and human studies. Module 2 will involve detailed examination of the molecular hallmarks of aging and Module 3 will focus on the links between cellular, tissue and organismal senescence. In Module 4, contemporary studies on “quality of life”/Healthspan and advance in anti-aging therapies will be explored.

Regulation of Membrane Trafficking

The focus of this course is to analyze membrane/protein traffic along both the biosynthetic and endocytic pathways. The general goal is to teach students how to read and interpret the literature. The course is updated each year to include topics in which new and interesting developments have occurred.

Emphasis is placed on how membrane traffic is regulated and how it is disrupted or subverted during disease processes. Alternating Summer semesters.

Reproductive Development

This course focuses on the molecular aspects of the transition from gamete to a reproductive organism. The course progresses through the building of germ cells, fertilization and stem cell participation to sex determination, gonad morphogenesis, puberty, menopause and pregnancy. This course highlights both human and model organisms to bring together diverse aspects of the cell and developmental biology of reproductive tissues and their impact on disease pathology.

Scalable Machine Learning for Big Data Biology

Machine learning (ML) has become an integral part of computational thinking in the era of big data biology. This course will focus on understanding the statistical structure of large-scale biological data sets using ML algorithms. We will cover the basics of ML and study their scalable versions for implementation on a distributed computing framework. We will pursue distributed ML algorithms for: matrix factorization, convex optimization, dimensionality reduction, clustering, classification, graph analytics and deep learning, among others. The course will be project driven (3 to 4 mini projects) with source material from genomic sciences, structural biology, drug discovery, systems modeling and biological imaging. There will be one final project, along with a presentation. Students will be expected to design, implement and test their ML solutions in Apache Spark.

Other Courses:

Relevant courses can be selected as electives for enrollment. Such courses must be approved by the Milestones and Curriculum Committee. Other courses can be found at: <https://catalog.upp.pitt.edu/index.php>.

CMSB Courses/Curriculum based on timeline

First Year – Fall (Required)		
Foundations of Biomedical Science	INTBP 3000	6 credits
Introduction to Bioinformatic Programming in Python	MSCBIO 2025	3 credits
Laboratory Rotations	ISB 2000	3 credits
CMSB Conference	ISB 2060	1 credit

Rotation Schedule

Rotation Begins	Rotation Ends & Report Due	Evaluation Form Due
September 8, 2026	October 7, 2026	October 9, 2026
October 12, 2026	November 11, 2026	November 13, 2026
November 16, 2024	December 14, 2026	December 16, 2026

First Year – Spring (Electives) Minimum of 9 credits		
Systems Genomics	ISB 2020	3 credits
Cellular Biology of Normal and Disease States	MSCBMP 2880	4 credits
Model Organisms	MSMGDB 2535	2 credits
Developmental Mechanisms of Human Disease	MSMGDB 2525	2 credits
Imaging Cell Biology in Living Systems	MSCBMP 2885	3 credits
Histology	MSCBMP 2870	5 credits
CMSB conference (required)	CMSB 2060	1 credit
Directed Study (required)	CMSB 2080	3 credits

First Year – Summer (required)		
Scientific Ethics and Responsible Conduct of Research	INTBP 2290	1 credit
Directed study	CMSB 2080	2 credits

Second Year – Fall		
Grant Writing (required)	INTBP 3240	3 credits
CMSB conference or Experiments and Logic in Cell Biology or Research in Progress (pick one (required))	CMSB 2060/ MSCBMP 2875/ MSMGDB 2550	1 credit
Directed Study (required)	CMSB 2080	3 credits
Reproductive Development from Model Organisms to Humans	MSMGDB 3540	3 credits
Molecular Mechanisms of Longevity and Aging	MSMGDB 3560	2 credits
Introduction to Biostatistical Methods (required)	BIOST 2041	3 credits
Biostatistical Methods	BIOST 2141	3 credits

Second Year – Spring (Electives) Minimum of 9 credits		
Systems Genomics	ISB 2020	3 credits
Cellular Biology of Normal and Disease States	MSCBMP 2880	4 credits
Model Organisms	MSMGDB 2535	2 credits
Cell & Systems Modeling	MSCBIO 2041	4 credits
Scalable Machine Learning for Big Data Biology	MSCBIO 2066	4 credits
Developmental Mechanisms of Human Disease	MSMGDB 2525	2 credits

Imaging Cell Biology in Living Systems	MSCBMP 2885	3 credits
Genome Instability and Human Disease	MSMGDB 3530	3 credits
Histology	MSCBMP 2870	5 credits
CMSB conference/Research in Progress or Experiments and Logic in Cell Biology (pick one (required))	CMSB 2060/ MSCBMP 2875/ MSMGDB 2550	1 credit
Directed Study (required)	CMSB 2080	3 credits

Third and subsequent Years – Minimum of 9 credits & Maximum of 14		
CMSB Full Time Dissertation Study	CMSB 3090	9-14 credits
CMSB conference/Research in Progress or Experiments and Logic in Cell Biology (pick one (required)) until year 4	CMSB 2060	1 credit

Progress evaluation:

An evaluation at the end of the first year assesses student progress and consists of the Milestones and Curriculum Committee review of student transcripts, rotation reports, and any additional information. In the second year, the Milestones and Curriculum Committee will review grades from courses and directed study from the laboratory. Subsequently, a comprehensive exam is taken during the second year. Upon successful completion of the comprehensive exam, students will propose a doctoral committee and present a dissertation proposal as promptly as possible. An annual review of all CMSB students will be conducted by the Milestones and Curriculum Committee. If a significant deficiency is identified, the student will receive an unsatisfactory rating and may be placed on probation. Specific recommendations within a designated time frame will be given. Failure to remedy the unsatisfactory areas with the defined time period may result in dismissal from the program. A decision to dismiss shall be made by a majority vote of the Executive Committee and the Director of the Graduate Program.

Grades:

University policy dictates that the student must have a cumulative grade point average (QPA) of at least 3.0 for graduation. This grade is computed on the basis of course credits only, and students are graded on an A to F basis in required and elective courses. The Program requires that the student obtain a minimum of a B grade in all required courses, B- or better in all elective courses and maintain a QPA of 3.0. Only A through F grades are employed for the QPA computation. If a student has failed to maintain the minimum grade requirement, the Milestones and Curriculum Committee and the Program Director must decide whether to dismiss the student from the CMSB program or to allow the student to retake any required course for which a grade less than a B was received and restore a minimum QPA of 3.0. If the student is allowed to retake the course(s), the students will be on probation until completion of the required coursework at which time their status will be reevaluated.

Faculty Advisor

During Fall of the first year, each student is expected to interview Program faculty members regarding possible research areas for their dissertation. In the Spring term, the student will choose a mentor(s) (and possible co-mentor) who will give assistance on the decision about the subject of the dissertation research program and who will remain in close consultation with the student about various aspects of the research as it unfolds. The student must submit to the Director of the Program written notification of the choice of a faculty mentor(s)/co-mentor. Students enrolled in the CMSB Program may select a thesis advisor only from among the CMSB Program faculty. Current CMSB Program faculty and their research interests are listed on the CMSB web site.

Research Credit

Students enrolled in the Ph.D. program will register for CMSB 3090 for their research accreditation. Laboratory research is the major component of any biomedical Ph.D. program. Failure to maintain satisfactory laboratory performance may result in the student being placed on probation. Failure to remedy the problems in laboratory research may result in dismissal from the program by a vote of the CMSB Evaluations and Curriculum Committee and the Director.

F. Comprehensive Examination and Admission to Candidacy.

1. Introduction: The Comprehensive Examination will be administered in the Spring Semester of the student's second year of full-time study. The student should have a thesis advisor and chosen their general area of study by the Spring of their 1st year. Students will have completed or be in the process of completing their second-tier course work.

The comprehensive exam has two parts, an original, written proposal in the NIH F31 format and an oral defense. Failure of either part can result in dismissal of the student from the program.

2. Format of the Comprehensive Examination:

The Comprehensive Examination is based on the student's thesis research area (see below). The examination will require that the student submit and defend a proposal in the format of an F31 research grant with the following guidelines rigorously adhered to:

a. The proposal is expected to be conceptually well-founded and adequately documented. The student is responsible for preparing an original research proposal. Dissertation advisors and others may be consulted on specific scientific issues, but the document must be prepared exclusively by the student. Advisors may not edit the written proposal for style or content or coach the student for the oral defense. Attribution to published and unpublished sources must be comprehensive. The written proposal must be original to the student, although the project may have been previously outlined in the advisor's grant. The proposal should not be verbatim or slightly modified version of any published or unpublished papers the student may have written with the advisor or anyone else. The proposal is to be well organized, written in a coherent, grammatically correct style, and should describe original and innovative experiments that will accomplish the stated aims and objectives of the research. The Specific Aims and Experimental Plan sections of the proposal must include only those experiments that have not

already been done in the advisors or any other laboratory. The written proposal cannot consist of just a collection of experiments but must include well-defined hypotheses and rationale as well as the significance of the proposed experiments. How the expected results will benefit the field of research also should be discussed.

b. The written research proposal will adhere to the following page guidelines:

1. **Title Page**
2. **Specific Aims** – limit 1 page
3. **Research Strategy** which includes Significance, Background, and Approach – limit - 6 pages
4. **Literature Cited** -Must include complete citation with all authors, year, title, journal, volume, inclusive pages. References should be limited to relevant and current sources, published or unpublished, that are pertinent to the proposed research. – limit 4 pages

c. Under no circumstances shall the proposal (including title page), contain more than 8 pages of single space type, with half-inch margins on all sides, excluding the Literature Cited. The type font should be Arial, size 11 and line spacing should have no more than 6 lines of text within a vertical line.

d. At the end of this document, the advisor's specific aims from funded grants must also be included for the examination committee to determine if the proposal is original. **The file should be named as: [student's last name][year].pdf**

e. **Developing the Proposal:** The written proposal will be based on the student's proposed thesis work. It is critical that the student defines novel studies that have not been completed by other investigator's or are merely derived from their mentor's grant applications. The student must adhere to the page limits described above, based on the current F31 guidelines from the NIH. To create a comprehensive written exam the student should follow the 5 steps outlined below.

Scientific Foundation and Rationale

1. Provide the context for the proposed research training project. Include information on published and unpublished findings serving as the scientific foundation for the proposed research training project. Describe the strengths and weaknesses in the rigor of the prior research that serves as the key support for the proposed project.
2. Describe the rationale for the research training project, including unaddressed areas for research and why this area of research is interesting and important.
3. Describe how achieving the proposed research training project goals will advance biomedical research in the candidate's chosen field.

Approach

1. Describe the overall strategy, methodology, and analyses to be used to accomplish the specific aims of the project.

2. Describe plans to address weaknesses in the rigor of the prior research that serves as the key support for the proposed project.
3. Describe the experimental design and methods proposed and how they will achieve robust and unbiased results. Include how the data will be collected, analyzed, and interpreted, as well as any resource sharing plans, as appropriate. Include details about and tools for Enhancing Reproducibility through Rigor and Transparency website.

Discuss potential problems and benchmarks

1. Address where success is anticipated to achieve the aims and where problems may arise. Provide alternative approaches.
2. If the project is in the early stages of development, describe any strategy to establish feasibility, and address the management of any high-risk aspects of the proposed work.
3. Explain how relevant biological variables, such as sex, are factored into research designs and analyses for studies in vertebrate animals and humans. For example, strong justification from the scientific literature, preliminary data, or other relevant considerations, must be provided for applications proposing to study only one sex.

Resources:

When writing any grant proposal investigators rely heavily on colleagues to choose the right experimental method and design to address scientific questions. When writing the comprehensive proposal the same rules apply. The difference is that you need to be able to defend the approaches taken in the oral exam. The table below lists permitted and non-permitted interactions with committees, faculty, mentors and students. In summary however, it is expected that the written proposal is the student's own work. The ideas laid out should be their own and they will be required to defend this in the oral portion of the exam.

	Permitted	Not Permitted
Contact with Committee	The student is encouraged to go to his/her committee for general intellectual guidance.	The student may not ask the committee for text or specific solutions.
Contact with Other Investigators and Students	This is open territory, remember, ideas are great but the student should be prepared to defend what he/she writes.	The student may not ask other investigators or students for text or specific solutions.
The Internet (including AI), library, Books, etc.	These resources are allowable as long as the student writes his/her own thoughts. Information found through literature should be attributed to the appropriate primary source (this is particularly important in the preliminary data section).	Attributing information that is not independent thought as your own is strictly prohibited. The student must check all references to be real and not AI generated hallucinations. If these are not in place, this is grounds for failure.
Access to Grant Applications in the Field of Study	The student may reference existing grants for general guidance regarding formatting.	The student is not permitted to copy ideas from his/her mentor's grants or other grants specific to the topic.
Consultation with your Advisor	The student is permitted to discuss general ideas with your advisor	The student may not ask his/her advisor for direct, interactive help. This includes review of the proposal, direct suggestion of experimental approaches, etc.

3. Administration:

- a. The Comprehensive Exam Committee Chair will meet with the eligible students in January of their second year to discuss these guidelines, answer questions, and to clarify the extent to which the student's thesis advisor, faculty, post-docs and students may be used as a resource.

b. Student will communicate to the Comprehensive Exam Committee Chair their intention to submit their written proposal and stand for the oral exam. This must be at least 2 months prior to an intended exam date. The Comprehensive Exam Committee Chair, with the advice of appropriate faculty members, shall then establish for each student's proposal a panel of faculty members (exam panel and its chairperson) competent to evaluate the subject of the research proposal. The Chair will then set a tentative date for the oral examination and firm deadline for the receipt of the written proposal (no less than 2 weeks prior to the exam). The student will distribute copies of the student's proposal to members of the selected panel.

c. Students shall take no more than four weeks from their laboratory work in the writing of their Comprehensive Examination proposal. Upon completion, all documents shall be submitted electronically to the Comprehensive Exam Committee Chair, the Exam Committee and the Program Coordinator by 5:00 P.M. on the due date. A copy of the Specific Aims of the advisor's grant(s) on the specific area should also be included where available. A copy of the student's written proposal will be given to the advisor who will be asked to certify that the proposal complies with the standards set forth in Section 2a. Examination proposals submitted after the deadline must be accompanied by a letter from the student that states the reasons for late submission and a justification for acceptance of the proposal. The Comprehensive Exam Committee Chair and the Program Director will review all cases of late submission and inform the student within 2 working days whether the examination proposal has been approved for submission. **Rejection of the proposal will be counted as a failing grade on the examination.**

d. Each Exam panel shall consist of three members; at least one member should be from the CMSB Program. The thesis advisor may not be a member of the committee, nor will they be present at the oral examination. It will be the responsibility of the exam panel chairperson to poll the panel members as to the acceptability of the written proposal, and, if acceptable as submitted, to convene the panel for an oral examination.

e. If a majority of the panel find the written proposal unacceptable, the panel chairperson shall notify immediately the Comprehensive Exam Committee Chair, who shall convene a meeting of the panel, with or without the student in attendance, to review the reasons why the proposal was deemed unacceptable. **An unacceptable written proposal shall constitute failure of the written part of the comprehensive exam.** The exam panel chairperson shall submit to the Comprehensive Exam Committee Chair a written evaluation of the proposal and reasons for failure. The Comprehensive Exam Committee Chair shall forward copies of the critique to the director of the CMSB Program, the CMSB Program Coordinator, the student and the student's advisor. Based on these critiques and guidelines, the student must submit a revised version of the proposal by email directly to the exam panel, the Comprehensive Exam Committee Chair, the Program Coordinator and the CMSB program director within one month.

In the case of an unacceptable written proposal, the exam panel, CMSB program director and Comprehensive Exam Committee Chair will evaluate the resubmission and will determine if the proposal is acceptable for passage into the oral exam. Failure at this stage will result in the dismissal of the student from the program or recommendation that the student transfer to the M.S. degree program for the completion of their training.

4. Oral Examination Process:

- a. Presuming an acceptable written proposal, the student may sit for the oral examination.
- b. At the beginning of an oral examination, and in the absence of the student, the Comprehensive Exam Committee Chair will briefly address the committee, communicating the ground rules for the examination.
- c. The oral examination will be held in a closed session, with only the student and the three members of the exam panel in attendance. The student will begin the examination with an oral presentation of the research proposal (not to exceed 30 minutes); however, the panel may interrupt the presentation to ask questions. The **oral examination shall not exceed a total duration of two hours**. The research proposal shall be the sole document available to the student during the oral examination. They should not have additional slides in their presentation.
- d. It will be the exam panel's task to evaluate the student's understanding of both the contents of the research proposal and the basic concepts underlying them.
- e. At the end of the oral examination, the exam panel will vote in private to pass/fail the student. A simple majority shall prevail; ABSTENTIONS WILL NOT BE PERMITTED. There shall be no conditional pass/fail decision. After the panel vote, the panel chair will immediately notify the student of the decision and evaluation of performance.

A critique written by the exam panel chairperson, evaluating the exam performance and the pass/fail decision, shall be submitted to the Comprehensive Exam Committee Chair who shall distribute copies to the Director of the graduate program, the Program Coordinator, the student and the student's advisor. Students and their thesis advisors shall be formally notified of the exam outcome by a letter from the Graduate Program Coordinator.

- f. Students failing the oral exam will be given **one** more opportunity to retake the exam (this applies to all students who have passed the written portion of the exam (whether on one or two tries). The exam panel will provide reasons for failure to the student, the CMSB Program Director, Program Coordinator and the Comprehensive Exam Committee Chair within two days after the initial exam. The student, the exam panel, the Comprehensive Exam Committee Chair and CMSB Program Director will decide on another convenient time to hold the oral (within 1 month). The student has the option to ask to replace one committee member so that the exam will have two continuing committee members, and a third member chosen by the Comprehensive Exam Committee Chair. The Chair or their designee will also attend the exam as a non-voting member to ensure the fairness of the process. **A second failure shall result in the dismissal of the student from the program or recommendation that the student transfer to the M.S. degree program for the completion of their training.**

- g. A "pass" shall be warranted when both of the following conditions are met: (i) the written proposal is considered acceptable as presented, and (ii) the student has performed knowledgeably in the oral defense of the proposal.

G. Doctoral Committee

Nomination of a Doctoral Dissertation Advisory and Final Examination Committee - After the student passes their comprehensive examination, the student and their major advisor(s) will select the dissertation committee members. The dissertation committee must be approved by the Program Director prior to seeking approval from the Associate Dean for Graduate Studies. A majority of the dissertation committee members must have graduate faculty status to meet the SOM requirement. Only upon these approvals may the student convene an Overview /Prospectus meeting and then petition for Admission to Candidacy. A minimum of five persons is required to serve as the Doctoral Committee. The primary responsibility of the Doctoral Committee shall be to advise the student in the effective analysis of a research problem and to approve a body of original research of sufficient quality to form the basis for the Ph.D. dissertation.

Dissertation Overview/Prospectus Meeting -Directly after the student has passed the Comprehensive Examination the student with consultation with their advisor(s) will form the Doctoral Committee and schedule the first meeting within 3 months of passing the comprehensive exam. At the first meeting of the dissertation advisory committee, the committee shall approve the dissertation proposal. The student and advisor will designate the chair of the Doctoral Committee, which **shall not** be the advisor, and must be a member of the CMSB program. The student is also responsible for submitting names of the approved Doctoral Committee to the Director of the CMSB Program and to the Program Manager.

Application for Admission to Candidacy for the Doctoral Degree – This is the formal petition from a student permitting them to study toward the PhD degree. At the first committee meeting, the Committee should review the student thesis proposal and approve it for doctoral research. This report is then submitted to the CMSB director and to the Associate Dean for Graduate Studies for approval.

After the first meeting, it is suggested that the Thesis Committee meets semi-annually to review the student's research progress, but the Thesis Committee shall meet no less than once per year. One week prior to each semi-annual committee meeting, the student must forward a brief progress report of no more than 2-3 pages to the committee. A simple majority of the Doctoral Committee determines the actions of the committee.

H. Dissertation and Final Oral Examination for Ph.D. Degree

The student's dissertation must provide evidence of original scholarly research of sufficient quality to be published in a leading scientific journal. Laboratory work for which a student receives wages is not eligible for any part of the dissertation research. The Doctoral Committee will meet at the time the student's research is ostensibly complete and will authorize the student to begin writing the thesis. This is usually within six months before the defense. The style and format of the thesis must conform to the standards set forth by the Graduate Council of the University. The thesis advisor and one or more members of the Doctoral Committee will read preliminary drafts of the thesis and will approve the final copy for submission to the Doctoral Committee.

The final copy will be submitted to the Doctoral Committee as noted below. The thesis defense will consist of a public seminar on the subject of the dissertation followed by a closed examination by the Doctoral Committee. Approval of the Thesis will be granted if there is no more than one dissenting vote

by full members of the Doctoral Committee exclusive of the major advisor. The degree will be granted by the School of Medicine.

All graduate students must be on active status (i.e., must have been registered for a minimum of three credits during a twelve-month period) and must register for at least one credit during the term in which they graduate. Students who complete all the degree requirements in one term but are graduated in the next may petition the Associate Dean for Graduate Studies for a waiver of this requirement. A student who is in an inactive status must be re-admitted and registered for three credits in order to be graduated.

The following procedures and requirements have been stipulated by the School of Medicine. These requirements must be met before the last day of the term in which the student has applied for graduation.

1. At least one month prior to the defense:

Student will decide with their graduate program on a date for final oral defense. The information will be relayed to the Office of Graduate Studies in letter form stating student's name, graduate program, degree sought, title of dissertation, date, time, and place of the thesis defense. This information will then be forwarded by this office to the University for publication (must be received within the stipulated time frame for this publication). The announcement will also be sent to the Graduate Faculty Members of the School of Medicine.

The student will submit a draft of their thesis to each member of the student's Doctoral Committee (identified on Nomination of the Doctoral Thesis Defense and Final Examination Committee, form PITT-1976) no less than two weeks before the final defense. The draft thesis is also submitted at the Graduate Studies Office.

2. The Oral Defense.

The student is required to give a public oral defense with a presentation of their thesis work. This is open to all members of the University of Pittsburgh research community and outside guests. The presentation should be ~ 50 – 55 minutes in length with additional time for questions from the public.

After the public questioning, the thesis committee and student will meet in a private session at which time the committee will examine the student about the thesis work. All member of the Thesis Committee are expected to participate in the questioning.

At the conclusion of the questioning, the student is dismissed and the Thesis Committee will meet in a closed-door session to determine the outcome of the defense. The Committee has four options: 1) they can pass the student unanimously; 2) they can pass the student conditionally on the oral exam and require additional modifications to the written thesis; 3) they can pass the student conditionally on the written thesis and require a revised oral presentation; 4) if the decision of the committee is not unanimous, the case is referred to the Associate Dean of Graduate studies for resolution.

A report of this examination and a report on approval of the dissertation, signed by all members of the doctoral committee, must be sent to the Associate Dean for Academic Programs for approval. The report on the approval of the dissertation may be signed concurrently with or subsequently to the report of the final oral examination.

3. After the successful completion of the thesis defense, the following should be submitted to the Graduate Studies Office:

ETD Approval Form (with original signatures).

Dissertation Defense Report and Dissertation Approval Report Milestone Forms Survey of Earned Doctorates completion certificate.

Please also note that students are required to submit an electronic version of the thesis using the ETD submission process as required by University Policy.

I. TEACHING OPPORTUNITIES. The CMSB program allows a non-mandatory, optional teaching experience in a medical school course. This requires passing the Histology (MSCBMP 2870) class. Students in years 2, 3 and 4 of the CMSB program have the option to participate in this experience. If you wish to participate in this opportunity, please contact the Program Director.

J. Master of Science (M.S.) Degree

The Program does not formally accept students for the Master's degree. This degree is available to students who do not complete the Ph.D. program.

1. Financial Aid

All full-time students enrolled in the M.S. Program are eligible for waiver of tuition. Once a student has joined the laboratory of their thesis advisor, the student is supported by the research grant of the thesis advisor at a level equivalent to the stipend received by students in the Ph.D. degree program.

2. Faculty Advisor

Selection of the faculty advisor is as described for the Ph.D. degree program.

3. Thesis Committee

The Master's Thesis Committee for an individual student shall consist of his or her thesis supervisor and at least two other members, one of whom may be chosen from outside the Program faculty. The proposed composition of the student's thesis committee, together with the title and one page abstract of the proposed thesis research, must be submitted by the major advisor to the Student Evaluations Committee within six months after the choice of a major advisor, as described for the Doctoral Committee.

The student's Master's Thesis Committee must meet with the student at least twice a year, at which time the student must submit a progress report, and the committee discusses his/her research project and general progress. The student's Thesis Committee, through the major advisor, must forward a copy of the progress report with accompanying evaluation to the Milestones and Curriculum Committee and to

the Director of the Graduate Program following each six-month meeting. A simple majority of the Milestones and Curriculum Committee determines actions of the committee.

4. Degree Requirements

1. The student must successfully complete the first-year core curriculum and receive a B or better in all required courses and laboratory rotations.
2. There is no additional advanced topic course(s) required beyond the core curriculum.
3. The student must complete a one-year research project leading to an M.S. thesis. The thesis must be defended before a thesis committee.

A total of 24 credits meets University requirements for the M.S. degree. The University mandates that the M.S. degree work must be completed within a period of 5 years of full-time enrollment. Award of the M.S. degree for work that has extended beyond the 5-year limit requires special permission of the Graduate Council of the University.

5. Grades for M.S. degree

A final QPA of 3.0 is needed to obtain the M.S. degree.

6. Comprehensive Examination and Preliminary Evaluation

The Preliminary Evaluation for Ph.D. students serves as the Comprehensive Examination for M.S. students.

Following satisfactory completion of the required course work and satisfactory performance on the comprehensive examination, the student shall proceed to complete the research requirement for the M.S. degree. If, however, the student has failed to maintain a QPA of 3.0 in required course work, or if the performance on the comprehensive examination has been unsatisfactory, the ISB Executive Committee shall decide, by majority vote, whether the student shall be given an opportunity to remedy the deficiency or be dismissed from the Program.

7. Thesis and Final Oral Examination for M.S. degree

The scope of the research project should be carefully planned to ensure completion within a reasonable period of time (as close to the two-term minimum as possible).

M.S. candidates must be registered as full-time students during the execution of thesis research. Thus, those individuals who complete the course requirements on a part-time basis shall be required to matriculate as full-time students for completion of the degree. During this research period the Program encourages and expects from the M.S. candidate the same vigorous full-time commitment to the successful completion of the graduate training as it does of Ph.D. candidates.

The student's thesis must provide new knowledge and evidence of original scholarly research of sufficient quality to be published in a leading scientific journal. The Thesis Committee will meet at the time the student's research is ostensibly complete and will authorize the student to begin writing the thesis. The committee shall consist of three members of which at least one may be from outside the CMSB Program faculty. The composition of the thesis committee and the nature of the research must be approved by the Milestones and Curriculum Committee as outlined in the Ph.D. candidates. The responsibilities of the Master's Thesis Committee are essentially the same as described for the Doctoral Committee.

The style and format of the thesis must conform to the standards set forth by the Graduate Council of the University. The faculty advisor and one or more members of the Thesis Committee will read preliminary drafts of the thesis and will approve the final draft for submission to the Thesis Committee for final approval.

The final copy will be submitted to the Thesis Committee at least two weeks prior to the date of the thesis defense. The thesis defense must take place at least two weeks before the degree is to be conferred. The thesis defense shall consist of an oral presentation of the thesis by the student, followed by the student's response to questions from the floor. This thesis defense, or final examination, is open to the public and will be conducted by the Thesis Committee. Following approval of the thesis, the M.S. degree will be granted by the School of Medicine.

All graduate students must be on active status (i.e., must have been registered for a minimum of three credits during a twelve-month period) and must register for at least one credit during the term in which they are graduated. Students who complete all the degree requirements in one term but are graduated in the next may petition the Dean for a waiver of this requirement. A student who is on inactive status must be readmitted and registered for three credits in order to graduate.

The following procedures and requirements have been stipulated by the School of Medicine. These requirements must be met before the last day of the term in which the student has applied for graduation.

After completion of the master's thesis, the following should be brought to the Graduate Studies Office (as one package).

ETD Approval Form (with original signatures) Dissertation Approval Report Milestone Forms

Processing Receipt from University Cashier (G-7 Thackery Hall) for payment of dissertation binding/microfilming fees.

Please also note that students are required to submit an electronic version of the thesis using the ETD submission process as required by University Policy.

II. Credit Requirements

A. For PhD students:

- The minimum credit requirement for the PhD degree is met by six terms of registration as a graduate student for 12 or more credits per term or the equivalent number of credits in a reduced load. A minimum of 32 course credits and 40 dissertation credits are required to earn a PhD degree.

- No more than 30 credits may be accepted for a master's degree awarded by another institution to meet the minimum credit requirement. In recognition of graduate study beyond the master's degree successfully completed elsewhere, no more than 12 additional credits may be accepted at the time of admission to meet the minimum credit requirement.

B. For MS students:

The Master of Science degree requires satisfactory completion of a minimum of 32 credits of graduate study approved by the graduate program or school. See Section on CMSB Masters' degree above. Students are not directly admitted to the CMSB graduate program to attain a M.S. degree. In certain cases, however, it may be necessary that a student in the Ph.D. program be transferred to a terminal M.S. degree program. Students pursuing a M.S. degree in CMSB will be required to complete the same course work as described for the Ph.D. program during the first two years and to prepare and successfully defend a Master's Thesis as agreed upon by the dissertation advisor and the program directors.

C. For certificate students:

- Graduate certificates are intended to provide depth of understanding in a given topic or area. A graduate certificate requires the satisfactory completion of a minimum of 10 credits, of which, at least nine (9) credits are at the graduate level .
- Graduate certificates may include additional requirements for non-course educational activities such as workshops, projects, or other milestones.
- Transfer credits from other universities may be applied toward a University of Pittsburgh graduate certificate, but at least ten (10) Pitt credits must be earned towards the certificate.
- The awarding of a graduate certificate will be annotated on the official transcript of students who successfully meet the requirements as set forth by the academic unit(s) offering the graduate certificate.
- It is the responsibility of the academic unit offering the graduate certificate to track student progress and certify completion with the Office of the University Registrar.
- The Office of the University Registrar will not send a diploma for a graduate certificate. The issuing School(s) may develop and distribute a paper certificate following guidelines found at <https://www.provost.pitt.edu/standards-issuing-physical-certificates>
- Graduate students already enrolled may, when approved in advance by their graduate program and the dean, spend a term or more at another graduate institution to obtain training or experience not available at the University of Pittsburgh and transfer those credits toward the requirements for an advanced degree at the University of Pittsburgh. In all cases, at least three terms, or 36 credits, of full-time doctoral study must be successfully completed at the University of Pittsburgh.

- Students must register each term for the number of credits for course work, independent study, or research equivalent to the anticipated use of faculty time and University facilities. A student who has not registered for at least one credit during a 12-month period will be transferred automatically to inactive status and must file an application for readmission to graduate study (and pay the application fee) before being permitted to register again.

D. Medical Scientist Training Program (MSTP)

- An MSTP student (Medical Scientist Training Program – see <https://www.mdphd.pitt.edu/>) who wishes to conduct graduate studies in CMSB should identify potential research laboratories and meet with respective PIs. The student should also forward all transcripts (undergraduate and graduate), CV, statement of research interest, and three letters of recommendation to the Program Director, who will send the request to the Admissions committee(s) for evaluation.
- Program requirements specific for MSTP students (MD/PhD) factor into the MSTP students' advanced training outside of our program. These students are typically considered advanced students and rotation and course requirements for the program are modified as follows: CMSB MSTP students in the PhD training will have completed their rotations and core courses in medical school training. These credits will transfer to the requirements of 32 course credits. Electives as outlined in the CMSB courses will be available to MSTP students to complete their requirements. It is intended that these modifications to the standard program will permit fulfillment of the CMSB PhD requirements within four years, although longer studies may be needed for completion of the thesis research.

III. General Information

• Academic Appointments for PhD Students

- PhD students in the School of Medicine receive academic appointments that provide stipend support, tuition remission, and health insurance. First year PhD students receive Dean's fellowships through academic appointments as Predoctoral Fellows (Certificate Fellows) – [Predoctoral Fellows and Trainees Policy](#). These fellowships are awarded to support entering first-year students before they choose a dissertation advisor. To retain the award, students must maintain a minimum cumulative grade point average of 3.00 while taking a full-time course load (9-15 credits in the fall and spring terms; at least 3 credits in the summer term).
- In the second year and beyond, PhD students in the School of Medicine are supported through academic appointments as:
 - Graduate Student Researchers (GSRs) are generally funded through research grants to faculty members. [Graduate Student Researchers \(GSR\) Academic Regulations](#)
 - Trainees are generally funded through NIH training grants (e.g. T32) [Predoctoral Fellows and Trainees Policy](#)

- Predoctoral Fellows are generally funded through NIH predoctoral fellowships (e.g. F30, F31) [Predoctoral Fellows and Trainees Policy](#)
- It is a SOM policy that all PhD students receive the same stipend, regardless of their educational background or program of study. The only exceptions are competitive individual fellowships that pay higher stipends. Awards with a stipend that is less than the school stipend must be supplemented to the full school level.
- Termination of an Academic Appointment – Termination may result from unsatisfactory academic performance. Examples include failure to attend classes regularly, having a GPA below 3.0, failure to carry out assignments, research progress that does not meet the standards of the program, or violations of the University policies for academic or research integrity. Termination proceedings may be initiated only if the student has been evaluated on a regular basis and has received an appropriate written warning with respect to their performance or has violated one or more of the major canons of institutional responsibility or University policy.
- **Leave of Absence**
 - Under special conditions, graduate students may be granted one leave of absence. A maximum leave of two years may be granted to doctoral students or one year to master's students. The length and rationale for the leave of absence must be stated in advance, recommended to the dean by the graduate program, and approved by the dean. If approved, the time of the leave shall not count against the total time allowed for the degree being sought by the student. Readmission following an approved leave of absence is a formality.
- **Graduate Student Parental Accommodations Guidelines**
 - Consistent with the University's efforts to strive to be inclusive and to support academic-personal life balance, the University believes it is important to provide accommodation for graduate students who become new parents, whether by childbirth or adoption, so that they may contribute to their family responsibilities while continuing to make progress towards their degree. This practice will help develop students who can successfully integrate their academic and personal pursuits. In recognition of the challenges of balancing the demands of graduate study and parenting a new child, these guidelines aim to improve the academic environment for student parents. The Graduate Student Parental Accommodation Guidelines assist graduate students immediately following the birth or adoption of a young child. The purpose of these guidelines is to make it possible for a student to maintain registered full-time student status, along with all the benefits of such status, while facilitating the return to full participation in courses, and research.
 - The Parental Accommodation Guidelines apply only to full-time students enrolled in graduate programs who are in good academic standing and who are making satisfactory progress toward completion of a graduate degree. These guidelines do not cover students in professional programs. Students must have completed at least one full-time semester of their degree program to become eligible for coverage under these guidelines. The guidelines cover the situation of students who

experience a childbirth, who adopt a child who is unable to be enrolled in full-day public school due to age or other developmental reasons, or who is a partner of someone who has experienced a childbirth or an adoption for whom the student has parental responsibilities. These eligibility requirements cover all provisions of the guidelines.

- All eligible students will be granted a Parental Accommodation Period six weeks immediately following the birth of a child or the adoption of a child for whom the student has parental responsibilities.
- During this period of accommodation, the student will continue to be enrolled as a full-time student. Because the student remains enrolled as a full-time student and continues to pay tuition, this is not a formal Leave of Absence. It is instead a modification of deadlines and academic expectations to accommodate the student's new parental responsibilities.
- The student will be able to postpone completion of course assignments, examinations, academic milestones and other academic requirements for the six-week Accommodation Period.
- The Accommodation Period *does not* extend the University's academic Statute of Limitations.
- Because the Accommodation Period needs to be tailored to the student's individual circumstances and the timing of the student's academic responsibilities, the student should consult in advance with their research advisor, program advisor, or SOM Graduate Studies Office about how the student will meet academic goals and requirements. The student is responsible for ensuring that this consultation takes place as far in advance of the Accommodation Period as possible.
- Students enrolled in programs characterized by sequential courses must anticipate potential consequences associated with accommodation, and in consultation with their advisor, plan how best to complete their program following the Accommodation Period.
- The student must complete the accommodation period within six weeks of their child's birth or adoption. The student may not divide the period of parental accommodation for use past this time limit.
- If both parents are eligible graduate students, both may take the six-week accommodation period.
- The total accommodation period for each birth or adoption is limited to six weeks; in the event of a multiple birth or adoption, the length of the accommodation period is limited to six weeks.
- After the end of the Parental Accommodation Period, students are expected to return to graduate study and resume progress toward completing their degrees.
- Faculty are encouraged to remain flexible in their expectations of students who become new parents, so that students can meet the demands of graduate study while they face new demands in their parental roles.

Nothing in these guidelines can or should replace communication and cooperation between students and advisors, and the good-faith efforts of both to accommodate the birth or adoption of a child. It is the intent of these guidelines to reinforce the importance of that cooperation and to provide support to make that accommodation possible.

Special Notice to International Students: Students who are attending the University of Pittsburgh with a F-1 student visa or J-1 Exchange Visitor visa are strongly encouraged to consult in advance with the Office of International Studies about their plans during the period of Parental Accommodation.

- **Financial Aid**

- Graduate students are eligible and permitted to receive student loans. To apply for a student loan, students must complete a Free Application for Federal Student Aid (FAFSA), obtainable from the Office of Financial Aid located in Alumni Hall. The FAFSA does not serve as the actual application for a loan or scholarship; however, it is required in order to be eligible for a loan. All information regarding student loans is handled by the Office of Financial Aid, 1st floor Alumni Hall, 624-7488. <https://oafa.pitt.edu/financialaid/applying-for-aid/aid-eligibility-requirements/>.

- Graduate Students who are enrolled half-time minimally are generally eligible for the Federal Direct Unsubsidized Loan (graduate students are not eligible for Direct Subsidized funds), the Federal Direct Graduate Plus Loan, and/or the Private Educational Loan. Emergency student loans of up to \$300 are available for educational purposes to students who are registered for six or more credits from the Student Organization Resource Center (SORC), room 119 William Pitt Union. <https://www.studentaffairs.pitt.edu/student-organization-resource-center/services>

- **Educational Enrichment Account**

- A \$2,000 educational enrichment account is provided to each first-year PhD student in the CMSB program. Funds may only be used to support the purchase of items or services that will enrich your graduate education. These include educational books, subscriptions to scientific journals, and expenses incurred to attend a scientific meeting. Funds may be used to purchase one computer or computer-like device. Examples include laptop, desktop, iPad, tablets, etc. See the Graduate Studies Office website (somgrad.pitt.edu) for a complete set of guidelines and forms to access the account. Students in a program that offer educational enrichment accounts only have access to these funds during their first two years in the program.

- **External Support for Graduate Students**

- PhD students are encouraged to apply for support through individual fellowships and institutional training grants. Specific advice on such opportunities can be obtained through individual dissertation mentors, graduate program directors, and the Associate Dean. In general, when support through these mechanisms originates from the US government, the recipient must be a citizen or permanent resident of the United States. Fellowships through non-governmental organizations (e.g. American Heart Association) often do not have a citizenship requirement.

- **Tuition**

- Tuition rates, fees, and other charges paid by graduate students are established by the Board of Trustees in cooperation with the University Administration. Graduate students who register for nine to fifteen credits in the fall or spring term are full-time students and are assessed the current tuition rate for their school. Students who register for fewer than nine credits are part-time students and billed on a per-credit basis. Payment options and due dates are available on the Student Payment Center website - <https://www.payments.pitt.edu/>

- For PhD students - Each term of registration will generate a tuition invoice. As a student with an eligible academic appointment, you will receive full tuition remission which includes the tuition, Student Health Service, Security & Transportation, and Network Service fees. However, you are responsible for the Student Activity Fee and any fees resulting from late registration or late payment of the activity fee.

Each semester, the Graduate Office automatically pre-pays your tuition and fees. It is the student's responsibility to check and make sure the tuition has been paid in a timely fashion.

- **University of Pittsburgh Code of Conduct**

- The faculty and the students of SOM recognize the importance of personal integrity and honor. To achieve this end, each student accepting an offer of admission to SOM will accept the obligations of the Honor Code/Code of Conduct and will expect to apply the code to all aspects of their professional life regardless of the level of training. Students and faculty of the SOM shall be honor bound to enforce the Honor Code/Code of Conduct and to report violations of it. The Honor Code/Code of Conduct emphasizes the individual's involvement in and responsibility for the corporate well-being of the community of the SOM. In keeping with the latter, it is incumbent upon every member of the community to promote the climate which this code seeks to establish. This involves not only counseling with fellow members of the school concerning their actions, but also bringing the sanctions of SOM's disciplinary procedures to bear upon those whose conduct is in violation of the Code.

- The mission of Student Conduct is to process violations of the Student Code of Conduct. By processing these violations, we seek to provide a safe learning environment and opportunities for students to learn from their own behavior and the behavior of others. Student Conduct supports this mission, the values identified in the Pitt Promise, and the educational mission of the University of Pittsburgh by:

- Developing, disseminating, and enforcing campus regulations
- Providing a fair and consistent conduct process
- Assessment as normative practice
- Mentoring students through meaningful interactions
- Educating students about the effects of their behavior on themselves and those around them
- Promoting healthy decisions

- Fostering safe and inclusive communities both on and off campus
- Connecting students with support services in order to encourage their personal, social, and academic growth
- Collaborating with faculty, staff, students, and the campus community to manage and address conduct matters
- The website of the Office of Student Affairs addresses all issues regarding student conduct. The link to University of Pittsburgh Student Code of Conduct and Judicial Procedures: <https://www.studentaffairs.pitt.edu/conduct> (Revised August 1, 2024).

- **Academic Integrity Guidelines**

- The most recent Academic Integrity Policy Guidelines, revised September 2005 are detailed in [UNIVERSITY OF PITTSBURGH POLICY 02-03-02](#)
- This document contains a set of principles which shall be applicable to each of the academic units* throughout the University. A student desiring information about an academic unit's specific procedures and the makeup of its Academic Integrity Hearing Board may obtain a copy of the procedures and other necessary information from the Office of the Dean, either in the academic unit in which they are registered or in the academic unit in which a particular course is taught. Additional information or guidance may be obtained from the Office of the Provost. Copies of this document and guidelines for academic units should be distributed by the deans to all instructional staff in each academic unit. *“Academic unit” is used to refer to a college, academic unit, or regional campus.*
- Provided here are Academic Integrity Policy Guidelines based on the 1983-86 document which was initially approved by the Board of Trustees on the recommendation of the University Senate Council. The original document evolved from and represented careful deliberation among staff, Senate committees, and student leaders of the University. The purpose of this document is to clarify and codify the rights and responsibilities that are inherent in traditional faculty-student relationships and to reflect procedural modifications that were approved, effective January 1, 1989, by the Chancellor.

- **Research Integrity Policy**

- The most recent University of Pittsburgh Policy on Research Integrity, revised July 11, 2025 are detailed in [UNIVERSITY OF PITTSBURGH POLICY RI 07 \(formerly 11-01-01\)](#)
- The University of Pittsburgh seeks excellence in the discovery and dissemination of knowledge. Excellence in scholarship requires all members of the University community to adhere strictly to the highest standards of integrity with regard to research, instruction and evaluation. The principle of academic integrity is integral to membership in the University community. Each such

member is deemed to recognize the value and special importance of this responsibility, which is linked to accepting an appointment at the University.

- As scholars and citizens of the University community, all parties must be ever cognizant of the axiom that every increment of authority and discretion brings with it corollary responsibilities to colleagues, staff, students, the University as a whole, the community, and society at large. In addition, federal regulations impose policies and procedures on the University for dealing with possible misconduct in science.
- All those engaged in research should be cognizant of the value to the University of calling attention to research misconduct, and of the importance of bona fide challenges in assuring and maintaining the integrity of scholarly investigation and of this institution.
- Should the conduct of research or the collection or reporting of research data and information be challenged on the ground of misconduct, whether by a faculty member, student, staff member, research associate or fellow, or a person outside the University, the framework for resolution of the grievance shall involve the dean and the Research Integrity Officer working within a process of peer and administrative review. Throughout, responsible and honest discourse, the protection of academic freedom, and protection of the individual against unnecessary public dissemination of unproven allegations are essential ingredients in the process.
- Research misconduct, as defined below, carries potential for serious harm to the University community, to the integrity of research, and to society as a whole. Accordingly, it is incumbent upon faculty members to exercise active leadership in their supervisory roles in mentoring, collaborating with, or directing junior colleagues, staff, or students. First, faculty must be fully cognizant of the quality of work being done for which they assume responsibility and, second, they must seek to avoid undue pressure placed upon more junior faculty, staff, or students which could lead to the publication or other report of any inaccurate, incomplete, or falsified data or information. In judging whether misconduct has occurred, it is important to distinguish fraud from honest error and ambiguities that are inherent in the process of scholarly investigation and are normally corrected by further research.
- This policy shall be followed in responding to all allegations of research misconduct on the part of faculty, research associates, and staff. In the case of students involved in alleged misconduct, this policy shall apply in those instances where the research in question is supported by federal agencies or where the relevant dean requests that the Research Integrity Officer invoke the policy. Student matters may also, as appropriate, be handled under the relevant Academic Integrity Guidelines.
- The procedures described below are steps in an academic peer review and fact-finding process and are not intended or designed to represent rules of a judiciary. Principles of basic fairness and confidentiality shall be observed in these peer-review procedures. Any allegations of misconduct must be treated on an individual-case basis.
- Safeguards give the individual accused of misconduct the confidence that his or her rights are protected and that the mere filing of an allegation of research misconduct will not bring the

research to a halt or be the basis for other disciplinary or adverse action absent other compelling reasons. Safeguards for a complainant or a witness in any proceeding described in this document include protection against retaliation for making good- faith allegations or providing testimony, fair and objective procedures for the examination and resolution of the allegations, and diligence in protecting the position and reputation of one who makes allegations or gives testimony in good faith.

- Both the person bringing an allegation and the one against whom the allegation is made in any of the procedures described below may seek the advice of the Senate Committee on Tenure and Academic Freedom, as may any administrator. A dean, in initiating any of the procedures described below, shall advise the principals that they may seek such advice.
- The University's Research Integrity Officer, who is appointed by the Chancellor, shall work closely with the relevant academic administrators, inquiry panels, and investigative boards. In consultation with the General Counsel, he/she shall ensure procedural compliance with applicable law, government regulations, University policy, and principles of fairness in each stage of the proceedings set out in this policy. Academic administrators and inquiry panels or investigative boards shall keep the Research Integrity Officer fully informed of their activities and shall consult him/her as to process before making any final recommendations or decisions. The Research Integrity Officer shall monitor compliance with all procedures and time schedules described in this policy and shall inform the Provost of any failures to comply with such time schedules. The Research Integrity Officer shall not have decision-making responsibility regarding the substance of any allegations. He or she may, at the request of a panel or administrator in a research misconduct proceeding, assist in drafting the recommendations arrived at by that panel or administrator. The Research Integrity Officer shall make or supervise all relevant contacts with government agencies or other outside parties and shall maintain the record of all proceedings. In the case of short absences from the campus, the Research Integrity Officer may designate an Acting Research Integrity Officer.
- The Provost shall have oversight responsibility to ensure compliance with the policy. Only the Research Integrity Officer or the Provost has the authority to modify the various time limits specified in the procedures. (All subsequent references to the number of days for particular stages in the process refer to calendar days.)
- Even if a respondent leaves the University before a case is resolved or does not participate in the proceedings, the University has a responsibility to follow the procedures described in this policy and reach a conclusion.
- This policy shall be administered in compliance with regulations of any agency (the sponsoring agency) sponsoring the research in question and shall be subject to appropriate modifications, if necessary.

- **Bias/Mistreatment**

- The University of Pittsburgh School of Medicine is committed to supporting our students and fostering an environment that is free of bias, discrimination, mistreatment, and harassment in the classroom and in the broader university community. If you feel you have been mistreated/harassed, or subjected to discrimination or bias, you should report it, confidentially or anonymously, through the Office of the Learning Environment (<https://www.ole.pitt.edu/>).

- **Office of the Learning Environment (OLE)** - <https://www.ole.pitt.edu/>

- The Office of the Learning Environment supports all UPSOM students, including over 1,000 medical and graduate students, by helping educators create a safe, respectful, and supportive experience in classroom, clinical, and research.

- **School of Medicine Ombuds Office** - <https://www.medschool.pitt.edu/ombuds-office>

- The Ombuds Office provides a safe, welcoming, confidential, and unbiased setting for students to relay their concerns and explore options available to them for informal resolution within the School of Medicine. Students may contact the Ombuds Office to discuss difficulties that have been unresolved elsewhere (such as the Offices of the Learning Environment, the Office of Graduate Studies, or your graduate program leadership) or directly if for any reason they are fearful, embarrassed, or unwilling to contact those offices.
- Ombuds team members will help to identify new opportunities for systemic change and may serve as a conduit for students to bring meaningful suggestions for ways to improve the school.

- **Title IX**

- Title IX is landmark federal civil rights legislation that prohibits sex discrimination in education. Title IX includes sexual harassment, gender-based discrimination, and sexual violence. It encompasses attempted or completed rape or sexual assault, as well as sexual harassment, stalking, voyeurism, exhibitionism, verbal or physical sexuality-based threats or abuse, and intimate partner violence. The Title IX Office at Pitt is here to answer questions and assist any member of the campus community. Title IX protects all members of the University community: students, staff and faculty from sexual or gender-based misconduct, including discrimination, harassment, and assault. For more information about Title IX, please visit their website at <https://www.policy.pitt.edu/cs-27-title-ix-policy>

- **Biomedical Graduate Student Association**

- The Biomedical Graduate Student Association (BGSA) is an organization which represents all graduate students in the School of Medicine. Its purpose is to foster academic and social interactions among graduate students within training programs and with other members of the University community. It functions as a support network for all biomedical graduate students, and facilitates communication between students, faculty, and administration. Please go to our website for up-to-date information and a calendar of events – [BGSA Website Link](#)

- **Graduate Student Unionization** - <https://www.gradstudentunionization.pitt.edu/>

- This is the primary resource for graduate students to view updates on the new graduate student unionization at the University of Pittsburgh

- **Drug and Alcohol Policies and Resources**

- The University of Pittsburgh prohibits the unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance on University property or as part of any University activity. Faculty, staff, and students of the University must also comply with the laws of the Commonwealth of Pennsylvania on the possession and consumption of alcohol.
- Violation of this policy will result in disciplinary action, including, but not limited to a warning, written reprimand, suspension (with or without pay), dismissal, expulsion, and/or mandatory participation and successful completion of a drug abuse assistance or rehabilitation program approved by an appropriate health or law enforcement agency.
- Any University employee paid from federally funded grants or contracts, or any student participating in any federally funded or guaranteed Student Loan Program, must notify the University of any criminal drug statute conviction for a violation occurring at the University while engaged in University activities.
- An important step in overcoming any problem is to know where to turn for assistance. Information, counseling, and treatment for alcohol and/or drug problems is available through resources in the community and costs may be covered by health care benefits. Confidential support services are available for those with abuse problems who individually pursue treatment and counseling. Some of those resources include:

University of Pittsburgh Student Health Service

Wellness Center

Nordenberg Hall

119 University Place

Pittsburgh, PA 15260

412-383-1800

<https://www.studentaffairs.pitt.edu/student-health-services>

University of Pittsburgh Counseling Center

Wellness Center

Nordenberg Hall

119 University Place

Pittsburgh, PA 15260

412-648-7930

<https://www.studentaffairs.pitt.edu/counseling>

Gateway Rehabilitation Center

19 locations in southwest Pennsylvania

800-472-1177

Mercy Behavioral Health Center

264 South 9th Street

Pittsburgh, PA 15203-1263

877-637-2924

Western Psychiatric Institute & Clinic

3811 O'Hara Street

Pittsburgh, PA 15213

412-624-2100

Allegheny County Crisis Emergency Center: 1-888-424-2287

AA (Alcoholics Anonymous): 24 hour hotline (412-471-7472); both crisis and long-term help for individuals with alcohol problems

NA (Narcotics Anonymous): 24 hour hotline (412-391-5247); both crisis and long-term help and support for individuals with problems resulting from drug abuse other than alcohol

- **Building Emergency or Inclement Weather Policy for Students**

- Only the Chancellor may officially close the Pittsburgh campus of the University.
- The University will remain open in all but the most extreme circumstances. However, University employees and students are urged to use their own discretion in deciding whether they can safely commute to work.
- When a State of Emergency is declared by the Governor or other local governing official, school personnel are expected to abide by those directives and there will be no classes.

- **University Resources**

- Graduate Student Resources - <https://www.gradstudies.pitt.edu/>
- Health Sciences Library System - <https://www.hsls.pitt.edu/>
- Office of Academic Career Development (OACD), Health Sciences - <https://www.oacd.health.pitt.edu/>
- The Office of Academic Career Development is dedicated to providing professionals in the schools of the health sciences with the tools, resources, and support they need to achieve their full potential as leaders in biomedical research, education, and clinical practice. The OACD supports graduate and medical students, postdoctoral fellows, residents, clinical fellows, and faculty, potentiating career excellence at all levels.
- Panther Central - <https://www.pc.pitt.edu/>
- Pitt's Information Technology - <https://www.technology.pitt.edu/>
- Accounts are automatically created for students. You can activate your University Computing Accounts through an online account activation tool at My Pitt (my.pitt.edu). Account usernames are used as University email addresses. A University username with the @pitt.edu designation is the official email address for University students and employees.
- All students, faculty, and staff have unlimited cloud storage space through pitt.box.com (in My Pitt).
- Students are able to print documents by various means. See the info page from the IT website <https://services.pitt.edu/TDClient/33/Portal/KB/ArticleDet?ID=145>.
- Parking - <https://www.pts.pitt.edu/>

- City parking permits may be obtained by city residents from the Parking Authority located at 232 Boulevard of the Allies. Permits cost \$20 per annum (check or money order) and you must supply your driver's license, vehicle registration, and proof of residency (utility bill with name and city address).
- Information regarding daily parking and monthly permits is available on the University Parking, Transportation & Services website
- Parking permits for the UPMC Towerview Garage may be available for a monthly fee. Apply in person at the UPMC Parking Operations Office.
- Pittsburgh Regional Transit (PRT) - <https://www.rideprt.org/schedule-finder/>
- All University of Pittsburgh students, staff and faculty may ride all Pittsburgh Regional Transit buses, trolleys and inclines within Allegheny County FARE-FREE 24 hours a day, seven days a week, 365 days a year using the Port Authority ready2ride app (instructions on downloading and using the app can be found here - <https://www.pc.pitt.edu/prt-launches-ready2ride-app>).
- University Shuttle Services - <https://www.pts.pitt.edu/mobility/shuttle-services>
- Ride Systems GPS (<http://pittshuttles.com/routes>) provides transit riders with next bus times by smartphone applications. Find stops and scheduled arrival times for your desired route.
- SafeRider - <https://www.pts.pitt.edu/mobility/shuttle-services/saferider>
- This service provides complimentary transportation from 9:00 pm to 3:00 am when special non-emergency needs arise for Pitt students, faculty, and staff.
- You can request SafeRider from your phone with the TransLoc app or call 412-648-2255.
- Shuttle Service for Passengers with Disabilities – Call 412-648-7890 to make transportation arrangements for passengers with disabilities
- A van with a wheelchair/cart lift and standard passenger seating operates between the hours of 8:30 am and 7:00 pm, Monday through Sunday when classes are in session. The On-Call shuttle is also equipped with the wheelchair/cart lift service and is available after 7:00 pm

Bike Registration and Racks

- Register your bike for free through Pitt's BikeIndex. Registering your bike deters theft, provides proof of ownership, and could help you recover your bike if retrieved from a theft - <https://www.pts.pitt.edu/mobility/biking/register-your-bike>.
- From outdoor racks and lockers to indoor bike rooms, there are plenty of safe and secure bike parking options available to you. Explore bike parking maps and learn how to register for a bike locker or bike room - <https://www.pts.pitt.edu/mobility/biking/bike-parking-storage>.

- POGOH - <https://pogoh.com/>
- POGO is the latest mode of transit in Pittsburgh, PA. With 50 stations and 500 bikes to rent, located throughout the city, POGO provides affordable active transportation options for all! POGO takes advantage of the latest advances in technology and policy in order to create a system that is convenient, affordable, and fun.

Student Health Services - <https://www.studentaffairs.pitt.edu/student-health-services>

- The mission of Student Health Services is to provide high quality primary health care, prevention, health education, and pharmacy services to enhance student living and learning
- University Counseling Center - <https://www.studentaffairs.pitt.edu/counseling>
- The mission of the University Counseling Center (UCC) is to create an inclusive space and provide high quality services that support the emotional well-being of Pitt's diverse student body.
- Allegheny County Health Department - <https://www.alleghenycounty.us/Services/Health-Department>
- Free health-related screenings and immunizations are offered at the Allegheny County Health Department
- The Mental Health Program at the School of Medicine - <https://www.medstudentaffairs.pitt.edu/contact-us/upsom-mental-health-team-medical-and-graduate-students-school-medicine>
- The Mental Health Program at the School of Medicine offers medical students and graduate students (SOM only) evaluation, treatment, and referral for a wide range of psychological needs. The program is dedicated to maintaining healthy and confident students and is both free of charge and highly confidential. No insurance is billed for services. Students can see providers for individual psychotherapy, medication management, or both.
- A student using the program can be assured that no information shared in treatment is ever available to others without expressed permission from the student.
- All of their providers have the ability to meet virtually; most also have offices close to the school if a student prefers in-person appointments. Meetings are by appointment only