University of Pittsburgh School of Medicine
Department of Pathology
Transforming the Present -- Discovering the Future

Student Handbook

Guidelines and Regulations for Graduate Study in the Cellular and Molecular Pathology Program

The Student Handbook is not intended to be a complete statement of all University, or Department of Pathology, policies, procedures and academic regulations. Information contained in the Handbook is subject to change at any time, with or without notice. The Handbook does not represent a contract between the University of Pittsburgh and its students. The information contained herein supersedes that published in previous Handbooks.

2021 – 2022

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Department of Pathology home page: http://path.upmc.edu/
Office of the Provost: https://www.provost.pitt.edu
Office of Academic and Career Development: http://www.oacd.health.pitt.edu
Pitt post-doctoral positions: http://postdocjobs.hs.pitt.edu/SearchResults.aspx
AAMC compact between students and mentors: www.aamc.org/gradcompact
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University of Pittsburgh Health Sciences home page: http://www.health.pitt.edu

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1. OVERALL OBJECTIVES AND GUILDELINES

The graduate training program in Cellular and Molecular Pathology at the University of Pittsburgh has been designed to accomplish several objectives:

- Development of trainees into independent biomedical research scientists.
- To develop competence in conducting laboratory research; to plan, execute, report, and defend an original piece of research.
- To develop general competence in Pathology and specific expertise in one or more areas of Pathology, such as neuropathology, liver pathology, lung development and disease, cancer biology, regenerative medicine, translational medicine and/or immunopathology.
- To develop a general professional competence in oral and written expression, including the critical analysis of primary scientific articles, seminar presentation skills, grantsmanship, and teaching.

In formulating the graduate training program, the faculty has been guided by several principles. First, the Cellular and Molecular Pathology (CMP) Graduate Training Faculty and each student's Major Advisor/mentor should aid each student in the development of an individualized training program based on the student's background and interests. Second, research experience should form the core of each student's training and as such, should not be postponed by a lengthy period of time devoted to coursework that is not inherently valuable to training the student as a competent biomedical scientist. Third, students should be evaluated in terms of those competencies that are important to an independent research scientist: designing, conducting and evaluating research, both their own and that of others. It is anticipated that students should be able to complete the program after entering CMP in approximately three to four years. Thus, the progress that a student makes in the program is considered primarily in terms of the student's performance as an investigator.

In accordance with University guidelines (http://www.provost.pitt.edu/students/graduate-studies/additional-graduate-resources), there is no formal policy dictating student laboratory hours; the understanding is that the final decision rests in the agreement reached between the student and his or her mentor or teacher. Nevertheless, please bear in mind that being a graduate student is most often not a 9-5 job, nor does it entail a typical 40-hour work week. You may find that you have to work longer and harder than the average person in order to achieve a scholarly project in a reasonable period of time. 1) Students are expected to attend all classes in which they are enrolled, get to them on time, and notify the instructor(s) when there is a scheduling conflict; appropriate steps should be taken to minimize potential outside commitments as more than two unexcused absences in a semester may result in a grading penalty. 2) Although negotiations are left between the student and their advisor with regards to time off, the program director must be notified of any anticipated leave of absence that is greater than 2 weeks in a given year, for the purpose of obtaining pre-approval status. For students from foreign countries, it is strongly recommended that they do not leave the country for visits home until all required coursework has been finished and the comprehensive exam has been passed as potential visa issues may be encountered that interfere with returns. With regard to Parental Accommodation leave for both father and mothers, the program Director has a copy of the University recommended guidelines. 3) Students are not required to sign time sheets; however, to complete thesis projects in a timely manner it is understood that graduate students generally need to work greater than 40 hours/week in the lab, including weekends and evenings. 4) Attendance at scientific meetings is important for student growth; mentors should encourage attendance at 1 or 2 meetings/year.

While the program does not currently have a hard policy about publishing before graduation, students should be aiming for approximately 3 publications, with at least one as first author, and should make a point of interacting with other scientists in their field in an effort to earn co-authorship status on their colleague's publications. Further, bear in mind that some journals are considered better than others and it is sometimes better to have one good publication than three poor ones when looking for a position after graduation.

2. PURPOSE OF THIS DOCUMENT

This document is mean to supplement the ***Regulations Governing Graduate Study at the University of Pittsburgh*** and thereby provide a complete handbook for students concerning the Program's rules, expectations, and recommendations for each aspect of the CMP graduate program.

Questions regarding specific issues of the graduate program should be directed to Dr. Wendy Mars, Associate Professor of Pathology and Director of the Cellular and Molecular Pathology Graduate Training Program. ***Note that the CMP program, while closely affiliated and interactive with select educational components of the Pathology Department, is in fact a stand-alone educational training program within the University of Pittsburgh School of Medicine (SOM).***

2.1 Changes to the Guidelines

Each graduate student should print a copy of the Student Handbook when they enter the program. To ensure that students are given an up-to-date version of the Handbook, a new edition of the Handbook will be dated and posted on the internet at the beginning of each fall and spring term. The Director will oversee the editing of the Handbook following solicitation of student input. It is expected that this annual revising of the Handbook will not result in any substantive change in the graduate program. Rather, this process is expected to update or clarify aspects of the previous edition. Major substantive alterations in the Handbook (e.g., a change in the format of the Comprehensive Examination) would require additional discussion by the faculty and students.

During their progress through the Program, each student should refer to the Handbook for general guidance and questions.

3. ADVISORS

To aid the student in attaining the objectives outlined in this document, the faculty has created separate mechanisms for providing academic and research advice. Upon entering the Program, each student will select a Major Advisor/Mentor. The Major Advisor is the faculty head of the laboratory the student will perform his/her thesis dissertation. It is expected that the Major Advisor will also serve as a general advisor to the student (see below). Further advice regarding research projects is the function of the PhD Dissertation Committee. At all stages of their graduate training, each student must have a Major Advisor and, upon completion of their Comprehensive exam, an active Dissertation committee. Advice on academic issues and other issues relating to graduate education will be handled formally by the Program Director, with meetings regularly scheduled prior to each academic term.

3.1 Directors of the CMP Graduate Training Program

The Director of the CMP Graduate Training Program (hereafter referred to as Director) has the primary responsibility for ensuring the graduate program is running effectively. Students who have questions related to required coursework, curriculum development, or completion of Program milestones should consult with the Director. The Director is responsible for approving student registration forms, approving the composition of student evaluation committees, (i.e., Comprehensive Examination and Thesis Dissertation committees), and may, at his/her discretion, approve minor modifications in the Program's academic requirements for students on an individual basis.

The Associate Director is also available to address student questions and is also responsible for the program design and implementation.

Administrative staff member(s) from the Department of Pathology will assist the Directors. The Graduate Coordinator is responsible for maintaining student files, notifying students of upcoming deadlines, assisting students with scheduling exams and committee meetings and monitoring the status of students.

3.2 Major Advisor/Mentor

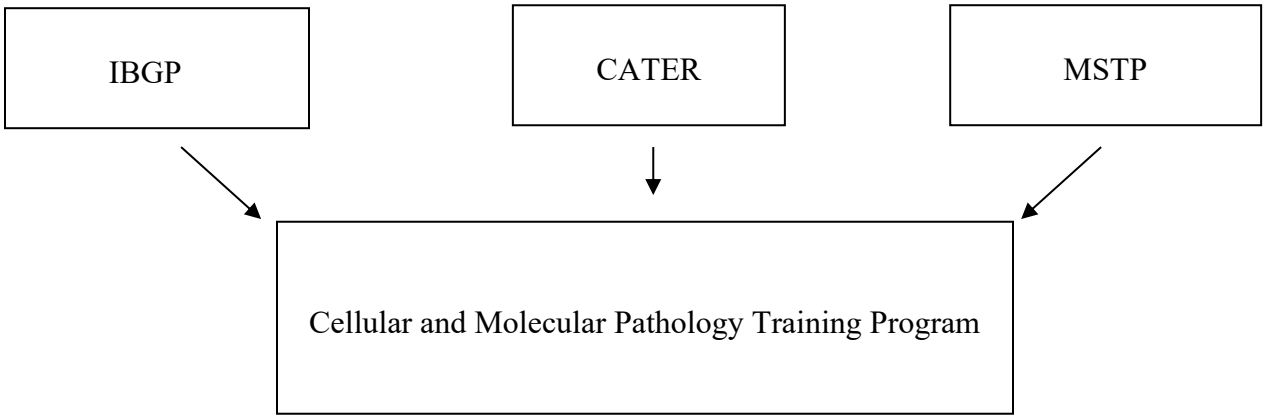
At all times during their graduate training, students will be engaged in laboratory research. While a student is working in a faculty member's laboratory, that faculty member will serve as the student's Major Advisor. Major Advisors are limited to CMP Graduate Training Program faculty members.

Students and the Major Advisors should discuss the nature of their interactions so that each has a full understanding of what they should, and should not, expect from one another. The students should understand that different faculty members have different styles of interacting with students. New students are encouraged to consult with more senior students to obtain student perspective concerning the mentoring styles of different faculty members.

4. CMP GRADUATE PROGRAM

The following sections outline the academic courses, the research experiences, and the oral and written examinations (herein referred to as "milestones") that the student must successfully complete prior to being awarded a doctoral degree. Students can affiliate with CMP via the Interdisciplinary Biomedical Graduate Program (IBGP) or the MD/PhD program (MSTP) in the School of Medicine, the Cellular Approaches to Tissue Engineering and Regeneration (CATER) program that is a joint effort between Bioengineering and CMP. A calendar listing the deadlines associated with these milestones is included in section 11. These requirements are described in terms of the academic and research accomplishments expected during each year of the student's progress through the Program. The Director must approve deviations from the outlined sequence and time schedule.

GATEWAYS INTO CMP TRAINING PROGRAM



4.1 Interdisciplinary Students and Curriculum

Students are admitted to a variety of PhD degree-granting programs through the Interdisciplinary Biomedical Graduate Program (IBGP). The first year of study is a focused interdisciplinary core program that covers the basic knowledge and skills necessary for research in all areas of biomedical sciences. After successful completion of the first year, students choose one of six specialized degree-granting programs for their advanced courses and dissertation work. Therefore, students enter the CMP Graduate Program only after completing the first year requirements of the Interdisciplinary Biomedical Graduate Program.

4.1.a IBGP Students -- First Year

The IBGP curriculum emphasizes research experience and practical skills from the first day. The approach is flexible, and accommodates students whose research interests are still evolving by introducing them to a variety of fields through interdisciplinary courses and laboratory experiences. For those students who have a clearly defined research interest, the program offers the opportunity to move quickly into a dissertation project and accelerate their study.

The first year generally includes three, 12-week research rotations with graduate faculty selected by the students in an effort to meet their research interests. These research rotations provide an opportunity for students to experience individual laboratory environments, including techniques being used in the laboratory as well as the research questions being addressed. Further, the experiences help students make an informed choice in selecting their dissertation mentor. A first year faculty mentor assigned to the student aids them in the selection of research rotations. A list of current rotation projects available to students can be found at the following web site:

http://www.gradbiomed.pitt.edu/affairs_lr_list.aspx. However, not all faculty elect to list their projects so it is important to work with your first year mentor to find a suitable rotation.

Foundations of Biomedical Science is the core course taken in the fall by all students entering the IBGP. This course is designed to convey knowledge of the molecular mechanisms controlling cell and tissue function and to develop an understanding of the experimental evidence supporting these concepts. The conceptual breadth of modern biomedical science is covered through a longitudinally integrated presentation of material drawn from biochemistry, cell biology, genetics, immunology, microbiology, neurobiology, pathology, pharmacology and physiology. The development of critical thinking skills is emphasized through an evaluation of experimental evidence and reading of the primary literature. Contemporary approaches to problem solving in biology as well as principles underlying modern methods of biomedical research are integrated through the analysis of mechanisms underlying biological phenomena. In the spring, students take specialized courses in areas of interest such as signaling, pathobiology, or immunology.

IBGP First Year Coursework:

Coursework Fall Semester	*required:* Foundations of Biomedical Science and Conference (12.0 Cr)
⇩	
Coursework Spring Semester	*suggested: (CMP required course)* Molecular Mechanisms of Tissue Growth and Differentiation (3.0 Cr) *Possible elective course:* Molecular Pathobiology (3.0 Cr)
⇩	
Coursework Summer Semester	*required:* Data to Knowledge (3.0 Cr) Scientific Ethics (1.0 Cr)
⇩	
Three research rotations	*required:* A minimum of three research rotations (1.0 Cr each) must be completed.

During the summer term, all students must complete a course covering Biostatistics as related to Research (INTBP 2013, 3.0 Cr), take a course on Scientific Ethics (INTBP 2290, 1.0 Cr), and **in the subsequent fall, all CMP students are also required to take a course on Grant Writing (INTBP 3240, 2.0 Cr)**. At the end of the first year, the IBGP Steering Committee completes a Preliminary Evaluation of each student's performance. Upon successful completion of the above requirements and the Preliminary Evaluation, the student is admitted into the second year of graduate school. The student can then officially join a laboratory and a graduate training program such as CMP. Students must file transfer forms (from the IBGP to CMP), which are

available from the IBGP Graduate Office. The student, Major Advisor/Mentor, Department Chair of the Mentor, Director of the CMP Graduate Training Program and the graduate office, must all sign this form.

Once the student has joined the IBGP-CMP program they will be required to submit yearly progress reports (by June 30) and present their research at the BGSA Symposium (Fall) and the Departmental Retreat (late May/early June).

4.1.b. IBGP Students -- Second Year

Students will continue with coursework, which includes required and elective courses (typically one or two classes in both the Fall and Spring terms), as well as Research Seminar (MSCMP 2750, Fall term and Spring term, 1.0 Cr/semester, 5-semester minimum requirement). Students typically complete most required coursework by the end of the second year. All students are required to complete Molecular Mechanisms of Tissue Growth & Differentiation (MSCMP 2730, 3.0 Cr) by the end of year 2. It is advised that students complete this course during their first year of graduate school, while still an IBGP student. Students must also complete one of the following three "hard elective" courses: Molecular Pathobiology (MSCMP 2740, 3.0 Cr) *or* Cancer Biology and Therapeutics (MSCMP 3710, 3.0 Cr) *or* Personalized Medicine (MSCMP 3790, 3.0 Cr, Fall only). A minimum of two "soft" elective courses is also required. Suggested elective courses include Intro to Tissue Engineering (MSCMP 2760, 3.0 Cr, Spring only), ECM in Tissue Biology (MSCMP 3735, 3.0 Cr, Spring only), Stem Cells (MSCMP 3740, 3.0 Cr, Spring only), Angiogenesis (MSCMP 3740, 3.0 Cr, Spring only), or Cell Therapy (MSCMP 3770, 3.0 Cr, Spring only). The University of Pittsburgh requires at least 32 credit hours of coursework to obtain a PhD degree. All CMP graduate students are required to enroll in the Pathology Research Seminar each term or a substitute approved by the program director for a minimum of 5 terms, though they may be excused from this seminar series during the term in which they will defend their thesis. Students are also expected to attend the monthly Research in Progress series (last Monday of the month) where 2 students present their research to the other students.

Before the end of the fall term of the third year following matriculation, each student must pass the Comprehensive Examination (see section 10.2). The members of the Dissertation Committee should be finalized after successful completion of the Comprehensive Examination. Students can then submit the Application for Admission to Candidacy form (Please refer to section to Milestone Forms in Section 12 to preview these forms). Students are expected to enter Dissertation within six months after passing their Comprehensive exam. **Both the Comprehensive and Dissertation committees must be approved by the program director.** Descriptions of the comprehensive and oral exams can be found in sections 10.2 and 10.3, respectively. **The Director has one-page guidelines prepared regarding both the exam process and entering dissertation available for students and faculty upon request.**

****Note: Students must obtain the appropriate forms from the administrative coordinator prior to their scheduled meetings. Also, be aware that the administrative coordinator is available to assist in making room reservations for the meetings.**

4.1.c. IBGP Students -- Third Year and Subsequent Years

Students will focus on dissertation research and course electives during the third and subsequent years. Each student must meet with their thesis committee every six months to discuss progress to date. After entering dissertation, students must accumulate at least 40 credit hours of PhD

Dissertation Research to fulfill a University requirement. These credit hours cannot be accrued until the student completes the Comprehensive Examination and enters into dissertation including submission of the Application for Admission to Candidacy milestone form (Please refer to section to Milestone Forms in Section 12 to preview these forms).

4.1.d IBGP Students -- Completion

Students will be awarded a degree after successfully defending their thesis and fulfilling all University requirements for the PhD. Important steps for graduation are outlined in section 10.4.

4.2 MSTP (MD/PhD) Students entering the CMP Program

The overall University and Cellular and Molecular Pathology (CMP) program requirements for obtaining a PhD, as described in this manual, are similar for MD/PhD students except the only required course is Tissue Growth and Differentiation. MD/PhD students first transfer into the IBGP and then immediately transfer into CMP.

4.2.a. MSTP Students -- Coursework

All CMP graduate students are required to enroll in the Pathology Research Seminar (MSCMP 2750) for a minimum of five terms although, students may excused from this seminar series during the term in which they will defend their thesis. Additional coursework is typically completed during the first 1.5 years after MD/PhD students enter the CMP graduate program, thereby maximizing the time students can focus on their PhD dissertation research. Students entering the CMP program are required to take MSCMP 2730 (Molecular Mechanisms of Tissue Growth & Differentiation), as well as three electives of their choice. Suggested elective courses include Molecular Pathobiology (MSCMP 2740, 3.0 Cr, Spring only), Cancer Biology and Therapeutics (MSCMP 3710, 3.0 Cr, Fall only), Intro to Tissue Engineering (MSCMP 2760, 3.0 Cr, Spring only), ECM in Tissue Biology (MSCMP 3735, 3.0 Cr, Fall only), Stem Cells (MSCMP 3740, 3.0 Cr, Spring only), Angiogenesis (MSCMP 3750, 3.0 Cr, Spring only), Cell Therapy (MSCMP 3770, 3.0 Cr, Spring only) or Basics of Personalized Medicine (MSCMP 3790, 3.0 Cr, Fall only). A typical curriculum might be as follows:

YEAR 1 IN CMP GRADUATE PROGRAM

FALL TERM

Course number and Title	Credits
MSCMP 2750 Research Seminar	1 Cr
Elective	3 Cr

SPRING TERM

Course number and Title	Credits
MSCMP 2730 Molecular Mechanisms of Tissue Growth & Differentiation	3 Cr
MSCMP 2750 Research Seminar	1 Cr
Elective	3 Cr

FALL, SPRING or SUMMER TERMs

Course number and Title	Credits
Elective	3 Cr

YEARS 2 and 3 IN CMP GRADUATE PROGRAM
FALL AND SPRING TERMS

Course number and Title	Credits
MSCMP 2750 Research Seminar	1 Cr
MSCMP 2750 Research Seminar	1 Cr
MSCMP 2750 Research Seminar	1 Cr

4.2. b. MSTP Students -- Comprehensive Examination

All MD/PhD students in the CMP graduate training program are required to complete their comprehensive examination by the end of the second Fall term in the CMP program. Shortly after completing the Comprehensive Examination (before Spring term drop/add ends), students should have a second committee meeting and submit the Application for Admission to Candidacy form. This ensures that students can obtain PhD Dissertation Credit Hours beginning the Spring term of the second year. The University requires that PhD students accumulate at least 40 Credit hours of PhD Dissertation Research, which requires a minimum of 1.5 years to complete. Therefore, MD/PhD students rapidly progress through this important program milestone. A full description of the Comprehensive examination is described in section 10.2 of this handbook. A one-page guideline for the comprehensive exam can be obtained from the Director.

4.2. c. MSTP Students -- PhD Dissertation Committee

Typically, the faculty participants in the PhD Dissertation Committee are the same as in the Comprehensive exam committee. This permits the Dissertation Committee to quickly contribute to the experimental design of the thesis project. All CMP students are required to meet with their PhD Dissertation Committee at least twice per year. An evaluation form is available from the Graduate Coordinator and must be returned to the Graduate Coordinator after each committee meeting. Additional information regarding the PhD Dissertation Committee can be obtained in section 10.3 of this handbook.

4.2. d. MSTP Students -- Subsequent Years and Completion

Students focus on dissertation research and are required to meet with their thesis committee every six months to discuss progress and future plans. A student is awarded a degree upon successfully writing and defending his/her thesis. Important steps for graduation are outlined in section 10.4.

4.3 Cellular Approaches to Tissue Engineering and Regeneration (CATER)

One of the most significant challenges in regenerative medicine is developing the next generation of experts in each of the enabling disciplines to be trained cognizant of the cross-disciplinary challenges and approaches needed to solve tissue engineering problems. We have developed a cross-disciplinary pre-doctoral training program that gives engineers or life scientists a common grounding in the field. The Cellular Approaches to Tissue Engineering and Regeneration (CATER) Program provides a solid foundation upon which to build a productive independent career in cellular and tissue-based therapy for human disease and injury. This is accomplished via a highly coordinated and mentored interdisciplinary training program with a combination of required and elective courses, research activities, and specialized training opportunities. CATER incorporates faculty from multiple departments at the School of Medicine, the Bioengineering department, and the McGowan Institute for Regenerative Medicine, to provide a unique educational and research experience at the leading edge of science

with respect to cellular/tissue regeneration and engineering. This combination of training faculty research interests and coursework provides a better educational experience and more numerous training opportunities for the students than could be obtained within the individual university departments.

4.3. a. Mechanisms and criteria for selection of trainees into CATER

Students entering the CATER program will generally be graduate students entering their second year. All students must have maintained at least a 3.25 GPA during the 1st year of training in order to be eligible for CATER. There are three mechanisms by which students gain entry into the CATER Training Program. The first is via successful admission into the University of Pittsburgh Bioengineering department and completion of the 1st year course requirements, the second is by admission into the University of Pittsburgh School of Medicine Interdisciplinary Biomedical Graduate Program (IBGP) and completion of the 1st year course requirements, with subsequent entry into the laboratory of a CATER training faculty, and the third is via entry from the MSTP track after entering the laboratory of a CATER faculty mentor.

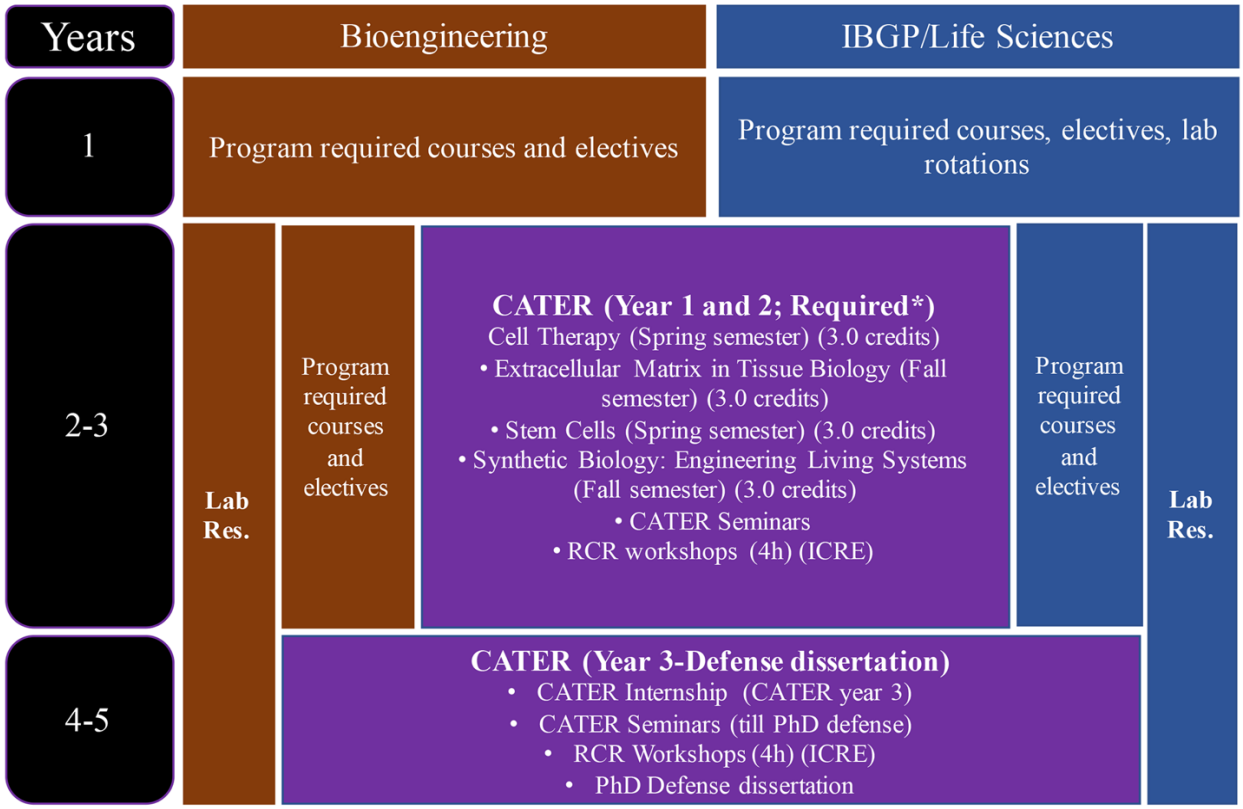
The procedure for recruitment and selection of CATER trainees is as follows. Each year, the CATER Trainee Admissions and Evaluation Committee sends out a request for nominations to all Bioengineering and IBGP/MSTP graduate students, as well as the CATER training faculty. Standard nomination forms include relevant academic information, a brief personal statement and research proposal by the student, and letters of reference. The admission committee evaluates the candidates based upon:

- Research background and interests relevant to program goals
- Letters of reference
- GPA
- Personal statement
- Program affiliation

A student evaluation at the end of the first year consists of a review of the coursework, participation in seminars and other training activities (preparation of manuscripts, presentation of data at conferences), a written critique by the faculty mentor, and a review of the research topic.

4.3. b. CATER Students -- Coursework

On the next page is a description of previously required coursework to be completed by Bioengineering and CMP students. **Requirements change and should be verified with the CATER director, Dr. Paul Monga, smonga@pitt.edu.** The courses provide a basis and framework in molecular and cellular biology that are used for subsequent more specialized courses. It is important to note that all students entering the CATER training program have completed formal training in bioethics and statistics. CMP students are required to complete three laboratory rotations prior to selecting a laboratory / mentor for their thesis work. Bioengineering students are not required to perform laboratory rotations but have the opportunity and are encouraged to perform rotations to obtain lab experience and to select the best laboratory and mentor for their thesis project. Students entering CATER are also required to present their research at the yearly Pathology retreat.



Courses required for all students during the first two years of the CATER program include a course on Stem Cell biology to introduce the concepts, use and ethical considerations of stem cells in future therapeutic or regenerative interventions, a course on Cell Therapy which is designed to teach fundamentals of cell based therapy, a course that focuses on Extracellular Matrix in Tissues as the matrix is clearly an important component of tissue engineering and regeneration, and a course entitled Synthetic Biology: Engineering Living Systems which focuses on a systems approach to Biology. The combined bioengineering and biological based courses provide an excellent and unique training experience and generate highly skilled research scientists in tissue engineering and regeneration.

4.3.c. CATER Students -- Evaluation and Monitoring

CATER trainees are evaluated and receive guidance in multiple ways. The first and most important involves mentorship by the CATER faculty thesis advisor of the student. Second, CATER trainees are required to pass the comprehensive examination within the Department of Bioengineering or the CMP Training Program prior to admission into PhD candidacy. Before this oral examination, the student prepares a written proposal using much the same format as a NIH grant application that is distributed to the members of the comprehensive exam committee two weeks prior to the examination. The examination begins with a presentation by the trainee and is followed by a lengthy critique by the exam committee. The trainee must demonstrate the ability to communicate effectively and defend his/her scientific ideas. The fourth method of evaluation involves the thesis advisory committee. Each trainee, with the help of his/her advisor, is required to select a thesis committee at the beginning of the 3rd year of graduate training. All thesis committees must have at least two CATER faculty members. Trainees are required to meet with their thesis committee twice per year to review research progress and receive guidance. The thesis committee assumes a part of the responsibility for monitoring the student's progress during the years of thesis research. No less than six-months prior to the anticipated thesis dissertation defense, the student and thesis committee must meet to make a semi-final assessment of the thesis research project. Lastly, all students must meet twice per year with the

Director of the CATER Training Program (Dr. Paul Monga) to review their progress and discuss upcoming research and career goals via an individualized career development plan form. All CATER trainees also do an internship for ½ day x 10-12 weeks in clinical, regulatory or startup setting for enrichment. Finally, CATER trainees are required to enroll in CATER seminars, a 1.0 credit course offered in spring and fall semester which allows trainees and CATER faculty to present and discuss their research and is host to various professional development activities such as exposure to careers of choice, grant writing, science writing and other activities.

4.3.d. CATER Students – Subsequent Years and Completion

Students focus on dissertation research and are required to meet with their thesis committee every six months to discuss progress and future plans. A student awarded a degree upon successfully writing and defending his/her thesis. Important steps for graduation are outlined in section 10.4.

5. COMPONENTS OF THE PLAN OF STUDY FOR ALL CMP STUDENTS

In developing a plan of study, students are expected to strike a balance between breadth in pathology and depth in their area of specialization. Students are encouraged to be innovative in designing their graduate training experience. Thus, courses are defined as any accredited interaction between a student and one or more faculty members, such as the Special Topics course. This includes formal lecture courses (usually but not always at the graduate level), seminars, or tutorials at the University of Pittsburgh, CMU, or at other universities, research institutes, or special study programs. Additional components include the Pathology Research seminar, formulation of a thesis committee and bi-annual reports to this committee, and completion of all student milestones.

5.1 Core Curriculum in Pathology

The core curriculum consists of two courses, designed to be completed within the first year of entering the program. The first core course, Molecular Mechanisms of Tissue Growth & Differentiation (MSCMP 2730), deals with issues of cellular and molecular biology related to normal tissue growth and differentiation. All students must take this course. It is advised that students entering CMP through IBGP complete this course during the spring term of their first year of graduate school. IBGP students are also required to complete one of three other courses dealing with basics related to Pathology: Cancer Biology and Therapeutics (MSCMP 3710), Basics of Personalized Medicine (MSCMP 3790) or Molecular Pathobiology (MSCMP 2740). MSTP students may take either of these two courses or substitute with another elective.

5.2 Electives and Tutorials

Students entering via IBGP must also take two elective courses in order to further their expertise in pathology and assure they have fulfilled the University requirement of 32 credit hours of coursework. Students may also establish tutorials in specialized areas for which formal courses are not available. In such cases, a student (or group of students) identifies a faculty member willing to serve as a tutor and develops a syllabus, including a mechanism by which competency in the area will be assessed. The Director should approve the syllabus, in advance of the beginning of the tutorial. The tutorials are then offered as a Special Topics (MSCMP 2780) class for the appropriate credit hours. The subject matter of these tutorials usually will be “academic” in nature; i.e., with a focus on the reading of primary and secondary literature. It also may involve learning new laboratory techniques.

5.3 Research Seminar

Each student is required to attend the Pathology Research Seminar during each Fall and Spring term (MSCMP 2750). Students are required to participate in this course for at least five terms. After five terms, students may participate in another seminar series in which they have an opportunity to present research data, providing they have adequately demonstrated proficiency in oral presentation skills. If the student fails to reach these objectives, then he/she must continue in the weekly Research Seminar. It is also expected that the most senior students will informally attend this course to assist in the development of more junior students. Students are not required to take this course in the term in which they will defend their thesis. If a student has a conflict with their assigned presentation time, they should contact the Course Director to get reassigned another date/time.

Students are required to present a paper approximately once each term, and it is expected that the more senior students will make their presentations earlier in the term whereas the more junior students will make their presentations later in the term. The presentations will be critiqued by fellow students and the faculty supervisors. Presentations that are not considered acceptable by the faculty supervisors must be repeated. In addition to presenting a paper once during the term, each student is required to read the selected paper each week and be prepared to discuss it. The faculty view active participation in this course as an essential component of the CMP Graduate Training Program.

5.4 Departmental Seminar Series

Each student is encouraged to attend the Department of Pathology research seminars on a regular basis. The seminars typically occur at noon on Wednesdays and are usually invited speakers discussing the latest advancements in multiple fields related to the study of human disease.

5.5 Statistical Analysis

All students are required to successfully complete a course on biostatistics. Students entering the program via the general program, IBGP, will enroll in this course during the summer term following the first year of graduate school (Data to Knowledge, INTBP 2013). Students entering the CMP program via CATER (Bioengineering track) or the MD/PhD program will have already completed a comparable statistics course.

5.6 Professional Ethics and Practices

All students are expected to show ethically appropriate behavior with regard to the conduct of their research and mastery of safe laboratory practices. These competencies extend to the treatment of laboratory animals, publication of data, and the use of references to previous literature. Further, all documents submitted to satisfy curriculum or research requirements of the program should be free of plagiarism and conform to the rules defined in the University of Pittsburgh Academic Integrity Guidelines (https://www.provost.pitt.edu/faculty/academic-integrity-freedom/academic-integrity-guidelines). As part of their orientation to the University upon first entering the program, all students must attend training sessions in Radiation Safety, Laboratory and Formaldehyde Safety, and Library usage. All students should also familiarize themselves with the NIH “Guide for the Care and Use of Laboratory Animals” (2011), the

"Handbook for the Use of Animals in Research, Testing, and Teaching at the University of Pittsburgh" (2017) and "Guidelines for Ethical Practices in Research" (University of Pittsburgh, May 2007); each are available on various web sites that are can be accessed through www.provost.pitt.edu/students/graduate-studies/additional-graduate-resources.

All IBGP students are required to complete a formal training program on research ethics during their first year in the program. This requirement will be fulfilled by taking a 1-credit course in Scientific Ethics (INTBGP 2290) during the summer term. MD/PhD students take a comparable course through the MSTP program.

5.7 Grant Writing Skills

All CMP students will be exposed to a formal course in grant writing before completing their thesis. Exposure to this component of the program is dependent upon the way in which they enter the program. For IBGP students the required way to fulfill your requirement is via the formal grant-writing course is offered by the IBGP program (INTBP 3240, fall, 2.0 Cr). MD/PhD students take a comparable course through the MSTP program.

5.8 Research in Progress (RIP)

All CMP students will meet the last Monday of the month from 5-6 PM to talk about the research being conducted by CMP students. Generally, two students will do a 30 min. overview of their research although other topics of relevance to the CMP student body can also be discussed. The intent is to introduce newer students to the work of the more senior students as well as to get constructive feedback on the research projects being performed. RIP is open to faculty as well.

5.9 Professional Development

Currently this is not a requirement; however, the graduate office is working hard to make information accessible to students from the very beginning of their experience at Pitt. During the first two years of study, students are encouraged to take the Introduction to Professional Development Seminar for 1st & 2nd Year Doctoral Students. Subsequently, senior students in are encouraged to take Introduction to Professional Development: A Seminar for Advanced Doctoral Students. See: http://www.oacd.health.pitt.edu/taxonomy/term/89/archive

As an alternative, there is an ongoing two-part course in the fall and spring that students may elect to participate in: MSMPHL 3340 and 3341; Foundations of Successful Career Planning and Development Parts 1 and 2, for a total of 2 credits.

6. COURSE DESCRIPTIONS

MSCMP 2700 (ALL) (01.0 to 14.0 Cr)
MS Thesis Research
This is a directed research project that results in a thesis for a master's degree.

MSCMP 2730 (SPRING ONLY-core course) (03.0 Cr)
Molecular Mechanisms of Tissue Growth and Differentiation
This course covers the anatomy, embryology, histology, function, and growth regulation (growth factors, receptors, and signaling pathways) of various differentiated tissues. Multidisciplinary lectures are given by the members of the various departments including pathology, cell biology and physiology, medicine, and surgery who have on going research in these areas. The course is

designed to offer detailed information on specific tissues, tissue-tissue interactions, and overlapping cellular and molecular pathways that exist in multiple tissues. (Required for all)

MSCMP 2740 (SPRING ONLY-IBGP hard elective) (03.0 Cr)
Molecular Pathobiology
This course is structured to introduce students to the integration between basic and clinical research on the molecular pathogenesis of relevant human diseases. The course will provide students with an overview of the natural history of selected diseases, their diagnosis and clinical management. This will be followed by in-depth discussions concerning the pathologic substrate of the disease, with particular attention focused on the molecular mechanisms of disease progression. In addition to current basic science research, students will be exposed to the clinical impact of basic science discoveries upon the development of new therapeutic interventions. Discussions of current research trends and factors that enhance fundability of research projects will ensue. Each disease module will contain lectures from the faculty followed by presentations of current research papers by the students. These research presentations/discussions will be peer reviewed by fellow students and the faculty, and form the basis of the final grade.

MSCMP 2750 (SPRING AND FALL-core course) (01.0 Cr)
Research Seminar
Students present their research (allowed one time) or a recent research article from a broad range of topics selected by the student in consultation with a faculty advisor. The course meets weekly. Emphasis is placed on a careful analysis and critical evaluation of the manuscript as well as the development of teaching and speaking skills needed for scientific presentation. The student is expected to elucidate issues relevant to the topic and to answer questions from other graduate students and faculty. (Required a minimum of 5 semesters)

MSCMP 2760 (SPRING ONLY) (03.0 Cr)
Intro to Tissue Engineering-(sponsored by BioE)
The purpose of this course is to introduce students to tissue engineering. Tissue engineering is defined as the development and manipulation of laboratory-grown molecules, cells, tissues, or organs to replace and/or support the function of injured body parts. Tissue engineering is highly interdisciplinary and therefore crosses numerous engineering and medical specialties. Upon completing this course, the graduate and undergraduate students should:

- understand the basic principles behind human cell and tissue biology
- be familiar with the general types of biomaterials used in tissue engineering
- understand techniques utilized to design, fabricate, and functionally assess tissue engineering systems
- be able to apply the combined knowledge of tissue organization and tissue engineering strategies to design a unique, reasonable tissue engineering solution.

This five-part course covers cell and tissue biology, biomaterials, drug delivery, engineering methods and design, and clinical implementation.

MSCMP 2770 (SPRING ONLY) (03.0 Cr)
Biomaterials and Biocompatibility-(sponsored by BioE)
This course serves as an introduction to biomaterials and biocompatibility and assumes some background in organic chemistry and biology. The first half of the course connects biomaterial applications. The second part of the course introduces biocompatibility issues as they follow from protein adsorption, thrombosis, inflammation and infection. Throughout the course, ties are made between the topics of students and clinically relevant material and device performance.

MSCMP 2780 (ALL) (03.0 Cr)
Special Topics
One or more student(s) will focus on a selected topic (usually defined by the students) in cellular and molecular pathology and discuss the primary literature pertaining to the topic. Students will be evaluated on their discussions and presentations, and write a paper under the direction of a faculty advisor.

MSCMP 2790 (ALL) (01.0 to 14.0 Cr)
Directed Study
This course provides the student an opportunity to carry out a specific laboratory project in any area of interest in cellular and molecular pathology.

MSCMP 2820 (FALL ONLY) (03.0 Cr)
Synthetic Biology (CATER requirement)
An introduction to the engineering of biological systems with synthetic biology tools. Emphasis on synthetic biological networks and biological control. Design and analysis of computational and experimental tools in synthetic biology including microfluidic systems. Applications of synthetic biology in biomedical, chemical, and environmental engineering problems.

MSCMP 3700 (ALL) (01.0 to 14.0 Cr)
PhD Dissertation Research
After advancement to candidacy for the PhD degree, students enroll in this course to pursue original experimental laboratory research, the results of which will provide the substance of their doctoral dissertation. A minimum of 40 credits of this course are required for the PhD degree in the School of Medicine.

MSCMP 3710 (FALL ONLY-IBGP hard elective) (03.0 Cr)
Cancer Biology and Therapeutics
This presents biochemical and clinical aspects of cancer biology and therapy and is designed for graduate students in basic sciences or medicine. The lectures will cover: Biology of Normal and Neoplastic Cells, Mechanisms of Neoplastic Transformation, Chemical and Environmental Carcinogenesis, Viral Oncogenesis, Breast and Prostate Cancer, Chemotherapy, Radiotherapy, Gene Therapy, Tumor Immunology, and Nutrition and Cancer.

MSCMP 3730 (SPRING AND FALL) (01.0 Cr)
Topics in Experimental Neuropathology
This course meets once every other week to critically evaluate the latest scientific literature concerning diseases of the central nervous system. Participants include the faculty, residents, and fellows within the Division of Neuropathology. Emphasis will be placed on methodologies as they are applied to the study of human neurologic diseases, with discussion of the most recent hypotheses concerning cellular and molecular mechanisms that cause human disease. Student participants will present scientific papers and lead the classroom discussion.

MSCMP 3735 (FALL ONLY) (03.0 Cr)
ECM in Tissue Biology and Bioengineering (CATER requirement)
This course presents a comprehensive overview of the biochemical composition of tissue matrix, the receptors that bind and signal through the matrix, and how these matrix interactions are important for basic biology and tissue engineering. Topics include gene expression, mechanistic interactions, and cellular interaction/communication.

MSCMP 3740 (SPRING ONLY) (03.0 Cr)
Stem Cells (CATER requirement)

The course entitled "Stem Cells" will provide a comprehensive overview on this intriguing and highly debated topic. The course will focus on the biology of stem cells and their role in health and disease with emphasis on development, carcinogenesis and tissue engineering. Lectures on various aspects of stem cells from renowned experts will cover both embryonic and adult stem cells. Specific lectures will include stems cells in the blood, liver, brain, muscle, kidney, pancreas, prostate, lung, gut, skin and eye. Students will also be educated on therapeutic cloning as well as bio-ethical issues and existing laws governing stem cell research.
Letter grades will be based on midterm and final exams as well as on the attendance in the lectures.

MSCMP 3750 (SPRING ONLY) (03.0 Cr)
Angiogenesis: Molecular Pathways and Pathophysiological Functions
This course will provide extend basic knowledge of developmental, cellular, molecular biology of angiogenesis and most recent advancements in its clinical applications. Topics include: 1) Angiogenesis in physiological and pathological processes; 2) Molecular and cellular regulation of angiogenesis; 3) Current advances in angiogenic therapies. Recent outstanding research publications will also be discussed.

MSCMP 3760 (SPRING AND FALL) (01.0 Cr)
Regenerative Medicine Research Seminar
The seminar in regenerative medicine is geared towards providing updated information on topics in the field of regenerative medicine, tissue engineering and stem cell applications. Through biweekly seminars, the students will be acquainted to the recent advances in the ever-growing field of regenerative medicine. Experienced faculty will deliver lectures in this seminar series.

MSCMP 3770 (SPRING ONLY) (03.0 Cr)
Cell Therapy (CATER requirement)
This course is meant to be unlike any other in the graduate curricula, showcasing cell therapy from theory to practice, from the bench to the bed-side. For each area of cell transplantation the lectures will be given by faculty who have implemented cell transplantation techniques and moved them into clinical therapy. Most of the lectures in the course and all clinical application lectures will be given by those who actually do the patient transplants. Immunology and pharmacology will be addressed as it directly relates to cellular therapy. Gene therapy and stem cell biology will not be addressed individually, but will be raised in the context of specific applications. Course meetings will consist of approximately 2 lectures per discussion session. The first lecture will present the basic research leading into a particular area of cell therapy area such as animal models used for preclinical studies, and the second will focus on the clinical application of that particular cell therapy for specific disease(s). The grade for the course results from attendance at lectures and the submission of a paper in an area relevant to Cell Transplantation / Cell Therapy. At the conclusion of this course students should: be able to critically read and review the literature in the field of cellular therapy; know the mechanisms of rejection of cellular transplants from both allotypic and xenotypic sources and be familiar with strategies to avoid transplant rejection; be familiar with the application of cellular therapy techniques to a variety of disease states; have a perspective and be conversant on relevant ethical issues associated with the field of cellular therapy.

MSCMP 3780 (FALL ONLY) (02.0 Cr)
Systems Approach to Inflammation
This course is focused on particular topics of great biologic complexity in critical illness, where modeling has the potential to translate in improved patient care. Lectures are provided by basic (biological and mathematical sciences) and clinical faculty, in conjunction with members of industry and speakers from outside institutions. This information will be communicated within

the framework of defined themes that describe the complexity of inflammation in acute and chronic illnesses. Grading is based on participation in discussions and on a semester-long, interdisciplinary group project. Each group includes students with a predominantly biology background along with students who are more facile with mathematics and/or simulation. This project therefore requires the students to work with others from outside of their main discipline, to learn about and from interdisciplinary exchange, and gain practical experience in team-based modeling of biological processes.

MSCMP 3790 (FALL ONLY-IBGP hard elective) (03.0 Cr)
Basics of Personalized Medicine
Rapid and ongoing discoveries in basic biomedical research are leading to a world where there is a demand for personalized medicine. Never the less, on a practical level, it is complicated to translate the findings from the basic scientific arena into clinical practice. This course will show students how findings from basic research can be translated into clinically relevant tests for the diagnosis and treatment of patients. The course will provide an overview of the past, present, and future of basic biomedical research as it relates to this subject.

7. TEACHING BY GRADUATE STUDENTS

Teaching is seen as an important part of the graduate training program. It provides experience in classroom instruction as well as an opportunity to obtain a broader perspective of pathology. Pathology Research Seminar is designed to give you a teaching-like opportunity; however, teaching is not a required component of the CMP Graduate Program. Therefore, students must take the initiative to obtain other teaching experiences. Certain faculty members allow graduate students to give classroom lectures in their graduate courses. Additionally, the IBGP offers teaching opportunities through group sessions and private tutoring for the Foundations Course. Students wishing to obtain this teaching experience should contact the Program Director.

8. EVALUATION OF GRADUATE STUDENTS

8.1 Yearly Progress Reports

By June 30th of each year, all students must submit a brief progress report summarizing their activities during the past year and their plans for future study. This report will serve as the focal document for the annual student evaluation by the Director of the CMP Graduate Training Program, although reports from the student's research advisor, committee chairpersons, course instructors, teaching supervisors, etc. will also be incorporated into the evaluation. Therefore, the progress report should incorporate everything the student wishes the faculty to know at the time of the evaluation. It should be organized as follows:

a) statement of last year's goals and the extent to which they have been achieved,
b) a list of the courses taken and the grades attained,
c) a summary of research efforts,
d) a list of Program "milestones" completed,
e) a list of any awards or honors attained,
f) a list of manuscripts and abstracts published,
g) attendance and presentations at scientific conferences, and
h) a statement of specific objectives for the coming academic year.

The length of the progress report should be approximately 1-2 pages. Students should also turn in an updated Curriculum Vitae in School of Medicine format. The link can be found under secondary appointments at:
http://medfaculty.pitt.edu/appointments-promotions

These reports should be submitted to the Director via the Administrative Coordinator. Yearly progress will then be evaluated by the Director and Associate Director.

8.2 Termination of a Student from the Graduate Program

Students may be terminated from the Graduate Program for failure to pass two required core courses or one of these courses on successive occasions, failure to pass the Comprehensive Examination, or Doctoral Thesis Examination, failure to make adequate progress in laboratory research, or breaches in legal ethical conduct such as plagiarism. Except for instances involving breaches in legal or ethical behavior, students will not be terminated from the Program without first being notified in writing that they have been placed on probation. This written communication will include a detailed description of the reason(s) for placing the student on probation, and the goals the student must accomplish in order to be taken off probation. Students will typically have one term to resolve their problems and get off probation or they will be terminated from the Program. This "Program Probation" is different from "University Probation" in that it does not preclude financial support from the University.

When a student who is not on probation fails one of the major examinations listed above, the student will be placed on probation and given a second opportunity to pass that examination. Failure on the second examination shall result in termination from the Program. When a student who is already on probation fails one of the major examinations, they may or may not be given a second opportunity to pass that examination, at the discretion of the Director.

When a student is informed that his/her laboratory research progress has been determined not to meet program standards, the student will be given one term to improve laboratory skills and productivity before being reevaluated. A second determination that laboratory performance is substandard, at this time or during any subsequent evaluation, will result in a student's termination from the program.

In all cases, the termination of a student requires a decision by the Director and cannot be made by an individual faculty member or examination committee. Terminations are final.

8.3 University Probation

The University requires that all graduate students maintain a QPA of 3.0 or above to undergo the preliminary evaluation, to take the comprehensive examination, to be admitted to candidacy for the PhD degree, and to be graduated. Students whose QPA falls below 3.0 must be put on "University Probation" and cannot be awarded financial assistance from the University (e.g., teaching assistantship) until they have re-established a QPA of 3.0 or above.

8.4 Terminal Master's Degree

If students leave the program, whether voluntary or not, after having completed the following requirements, they may write to the Director petitioning to receive a Masters Degree. Students wishing to receive such a degree must fill out appropriate forms, as mandated by the University.

The requirements for a Master's degree include: all of the PhD Coursework, including successfully passing the Comprehensive Examination. Students must also submit and defend a Master's thesis to a committee consisting of at least three graduate faculty members. The instructions for writing a the Master's thesis can be found in the University's Electronic and Theses Dissertation guidelines (www.etd.pitt.edu/etd-format-guidelines)

9. SPECIAL STATUS

9.1 Leave of Absence

Students may request a leave of absence from the Program for various reasons including issues such as illness and/or parental accommodation leave. Such requests should be made in writing to the Director. Requests should include the reason for the request and the anticipated duration of the requested leave. Leaves of absence are subject to the approval of the Associate Dean for Graduate Studies of the appropriate school (i.e., depending on the student's current mentor). Students considering taking a leave of absence should consult ***Regulations Governing Graduate Study at the University of Pittsburgh*** regarding policies on leaves of absence. The School of Medicine has recommended guidelines for parental accommodation leave that can be obtained from the Director.

9.2 Vacation Policy

Students may wish to take a short vacation during their time in the Program. While there are no formal vacation policies for graduate students at the University of Pittsburgh, CMP strongly recommends that vacation leave times should be pre-approved by the student's mentor, with a maximum leave time request of no longer than 2 weeks/year. Further, due to frequent difficulties recently encountered with Visas when students returned to the USA, we strongly advise that foreign students not return to visit their home countries until having passed their comprehensive exams. Students must et pre-approval from the Program Director if they anticipate being gone longer than 2 weeks.

9.3 Attendance at Scientific Meetings

It is expected that most students will attend scientific meetings during their time in the Program in an effort to further their careers. While there are no formal policies governing attendance at meetings, it is expected that attendance at these meetings will be pre-approved and likely funded with help by the student's mentor. Further, it is expected that meeting attendance will not be excessive (twice per year is a general guideline) and that every effort will be made so that attendance does not substantially interfere with class attendance. When a student wishes to attend a meeting that is in conflict with a scheduled class, the student is expected to show good intent by notifying the teacher prior to submitting their registration for the meeting.

9.4 Disability Accommodation

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact the program director (Dr. Mars), your instructor, and the Disability Resources and Services (DRS) division at the University. DRS can be reached at 412-648-7890 or 412-383-7355 (TTY). DRS will verify your disability and determine a reasonable accommodation for the course.

10. MILESTONES

Note: Specific forms are required in association with the different milestone examinations. The relevant forms should be requested a minimum of one week in advance of the examination. Requests for appropriate forms should be made to the Graduate Coordinator.

10.1 Preliminary Evaluation

All IBGP students must pass a preliminary evaluation at the end of their first year. This evaluation is performed by Graduate Council and is a review of the first year coursework and rotation reports for each student. Upon recommendation of Graduate Council, students are advanced to the second year of graduate training and are permitted to officially join a particular laboratory and apply for admission to the Cellular and Molecular Pathology Program. The transfer form is obtained from the Graduate Office on the IBGP.

10.2 Comprehensive Examination

The Comprehensive Examination is the major requirement that a student must pass prior to being admitted to candidacy for the doctoral degree. For students entering via the IBGP track, this examination is typically taken after the second year of graduate school (after one year for MD/PhD students) and provides the student with an opportunity to master a literature that is relevant to their research interests and ultimately to demonstrate that the necessary competency has been achieved.

The specific educational goals of the Comprehensive Examination are to test the student's ability to:

- Independently evaluate and critique a body of pathology literature
- Integrate the acquired information into broad conceptual schemes
- Develop testable hypotheses
- Devise experimental approaches and thereby evaluate hypotheses
- Demonstrate the communication skills required to present and defend scientific ideas in oral and written formals

The topic of the Comprehensive Examination is expected to overlap with the student's research interests and dissertation goals. In addition, it is expected that the proposed plan be original in its conception and scholarly in its execution. The Major Advisor is only permitted to assist in the generation of the specific aims of the written proposal.

Students are required to complete the Comprehensive Examination by December 31st within the third year of the graduate program (second year for MD/PhD). Any requests for delay in this schedule should be made in writing to the Director; such requests should include a reason for the delay, as well as the time when the student plans to take the exam. Note that students are encouraged to schedule the Comprehensive Examination as soon as possible. The student must establish their Comprehensive Examination committee and set up a tentative time frame for the exam by July 1 of their second year (first year for MD/PhD).

10.2. a. Committee

The Comprehensive Examination committee is selected by the student and Major Advisor, but must be approved by the Director. This committee must be established by the end of the second year (July 1). The committee consists of at least five members, and must contain a majority of members from the CMP Graduate Training Faculty. The Major Advisor is generally a member of the committee but cannot serve as its Chairperson. Although not required, it is recommended that the Chairperson be a member of the CMP program. Prior to the first committee meeting, the student and Major Advisor should select a Chairperson.

10.2. b. Written Examination

Students must write a mock "grant application" based on the Comprehensive Examination topic. Thus, students will need to evaluate the literature in the area, formulate a significant and relevant hypothesis, and devise experimental strategies to test the hypothesis. The written report should follow the basic form of a printed NIH R01 application, and should be a realistic proposal for three years of research. It should include all sections characteristic of a research grant proposal as follows. *Specific Aims:* This section should include a statement of the hypothesis to be tested and the goal or the objectives of the proposal (1 page). *Background:* Concise presentation of pertinent literature in the chosen area of interest, setting the appropriate context of the proposed research plan (2 – 4 pages). *Significance:* Brief summary of the broad significance of the research to the advancement of the relevant scientific field (1-2 paragraphs). *Preliminary Data:* This section should include a brief description of the types of preliminary data the students feels are necessary to support the proposal and may include data obtained to date by the student (1 page). *Research Plan:* Description of the methods and experiments that are proposed to achieve the research goals of the proposal. This section should place less emphasis on methodological details and more emphasis on anticipated outcomes and potential experimental pitfalls (3 – 4 pages). *Literature Cited:* Full citations of all referenced literature should be included. The entire document, not including references cannot exceed 15 single-spaced pages. (For margins and font requirements, see instructions for preparing an NIH grant application.) Students are encouraged to look at actual grant applications submitted by their Major Advisor or other students to get a sense of what is included in an application.

While working on the written portion of the Examination, **it is only appropriate for students to discuss their ideas with their committee members, as well as with their Major Advisor, in a very general manner. Students are encouraged to show their Specific Aims to their Major Advisor, so they can receive feedback as to whether or not they are going in an appropriate direction. However, students should complete all subsequent sections of the proposal without aid** and they are not allowed to receive assistance with the written drafts of their Examination from any committee members. **A minimum of one week prior to the exam, a copy of the written portion of the exam should be sent to the graduate program coordinator as well as all comprehensive committee members.**

10.2. c. Oral Examination

Approximately one week after the student submits the written "application", there will be an oral examination. The oral examination consists of a presentation of the proposal (lasting ~40 minutes) followed by an oral examination administered by the committee. At the oral examination, students will be expected to defend their hypothesis and to address questions concerning all background information relevant to the topic, significance, and design of the experiments they proposed. It is expected that the entire oral examination (presentation and defense) will last 2-3 hours.

10.2. d. Evaluation

At the end of the oral examination, the student will be excused from the room and the committee will evaluate the student's performance. The student will then be immediately informed of the decision of the committee. The possible outcomes are pass, partial pass, or fail.

Students may receive a partial pass if they were deficient in some but not most of the areas on which they were examined. Significant problems associated with either the written or oral portion of the examination, or both, that are not so severe as to result in a failing score may result in a "partial pass". If the committee decides on a partial pass, they must define those areas of the performance that were deficient and provide specific criteria that must be met for the student to pass. For example, the committee might decide that experimental descriptions were poor throughout the written portion of the examination, and thus the student must submit revised descriptions of the proposed experiments. As another example, the committee might decide that some of the student's oral answers were unacceptable, and thus the student must retake the oral portion of the examination. Whatever the reason for the partial pass, the committee must present the student with a detailed description of what needs to be done to satisfactorily complete the examination. Partial passes must be remedied within eight weeks of the initial oral examination, or the student will be considered to have failed the examination.

Students who fail the Comprehensive Examination will be allowed to take the examination a second time provided that they are not already on probation. The second examination must occur within three months of the initial examination. The examination must be passed before a student can apply for admission to candidacy for the PhD Once this examination has been passed, the Program notifies the appropriate Dean of Graduate Studies of that fact. The Comprehensive Examination report is submitted to the School of Medicine Graduate Office (example of form located at end of handbook).

10.3 Dissertation Proposal

The dissertation is the culmination of the graduate program. The dissertation is intended to embody an extended original investigation of a problem of significance in the field of pathology. It must add to the general store of knowledge and to understanding in this field. And it must serve to demonstrate each of the competencies described at the outset of these guidelines.

10.3. a. Dissertation Committee

After successful completion of the Comprehensive Examination, the student and his/her Major Advisor propose a doctoral committee for approval by the Director and University. This committee consists of at least five members that are typically the same faculty as the Comprehensive Examination committee. At least four of the members (including the Major Advisor) must be members of the CMP Graduate Training Faculty and at least three of these must be from the school in which the student is registered (i.e., School of Medicine). At least one member of the committee must be from outside the Department of the Major Advisor. All committee members from the University must be members of the Graduate Faculty. According to University Regulations, the Major Advisor must be a member of this committee; however, in the CMP Program, the Major Advisor retains his/her status as an advisor, both to the student and

to the committee, and does not chair the committee meetings. The student should select one of the committee members from within the CMP Program to serve as the Chairperson. Please refer to Milestone Forms in Section 12 to preview the Dissertation Overview/Prospectus form.

10.3. b. Dissertation Proposal and Overview Meeting

A dissertation proposal and an overview meeting are University requirements. The proposal submitted as the grant application for the Comprehensive Examination, which has been approved by the examining committee, serves as the dissertation proposal. The first meeting must occur within six months from passing the Comprehensive Examination. Upon completion of the committee meeting, the Dissertation Overview/Prospectus form is submitted to the School of Medicine Graduate Office (Please refer to section to Milestone Forms in Section 12 to preview this form).

10.3. c. Admission to Candidacy for the PhD degree

After successful completion of the overview, typically the first dissertation committee meeting after completing the Comprehensive Examination, the student files an application for admission to candidacy indicating the dissertation topic. Students must complete this milestone to receive PhD dissertation credit hours. This application must be approved by the Director and the Associate Dean for Graduate Studies of the school in which the student's mentor is appointed (i.e., School of Medicine). It is a University requirement that this be done at least eight months prior to the dissertation defense. Please refer to section to Milestone Forms in Section 12 to preview the Admission to Candidacy form.

10.3. d. Bi-Annual Meetings

Students must schedule periodic meetings each year with their committee to discuss the progress of experiments and to review new data. Specifically, students must meet with their committee at least twice per year. The committee must write a summary report of each meeting and submit it to the program administrators so it can be given to the student and added to their file. Please refer to section to Milestone Forms in Section 12 to preview this form. Report forms should be obtained from the Graduate Coordinator and returned to the Graduate Coordinator upon completion.

10.3. e. Written Dissertation

Information regarding the written dissertation can be obtained from the Office of the Associate Dean for Graduate Studies (also see www.etd.pitt.edu/etd-format-guidelines). As a general rule, (a) the introduction to the dissertation should include a more thorough review of the literature than usually is the case for a research article, (b) the methods section should include all necessary information concerning the conduct of the research, including procedural information already published, (c) the student may wish to include within the results section (or in an appendix) some data which, because they are confirmatory or incomplete, will not be published, and (d) there must be a general discussion section that is more broad than a discussion section associated with a single manuscript.

Manuscripts (including articles in any state of the publication process, e.g., published, submitted for publication, or completed but not yet submitted) authored or co-authored by the student and based on the research conducted for the dissertation study may be included in the dissertation. To

logically integrate this work into a dissertation, the student is required to write extensive introduction and discussion sections that give an overview of the objective or objectives of the research and draw general conclusions from the assembled data. If a manuscript is co-authored, the contribution of the student must be clearly delineated in the preface so the committee can ascertain the student's own work satisfies the requirements of a dissertation. The Style and Form Manual gives instructions on incorporating manuscripts into the dissertation.

A completed dissertation must be submitted to all committee members at least two weeks prior to the defense. The student can expect his/her advisor to read the dissertation prior to its submission, and the submission of the dissertation implies that the student's advisor has approved the dissertation as ready for distribution to the committee.

10.3. f. Application for Graduation

Candidates for graduation must file an official application for graduation in the Office of the Associate Dean for Graduate Studies in the first month of the term in which graduation is expected. It is the student's responsibility to complete this task. If the student does not successfully defend his/her thesis during this term, the student must file an application for graduation each following term until the student graduates. **Students, be aware that there are costs including fees and printing charges associated with graduation and budget according.**

10.3. g. Announcement of Thesis Defense

At least one month before the final examination, the student provides the Graduate Coordinator with the title of the dissertation and the time and place for its defense. This information is to be published in the University Times and is sent to all appropriate departments of the University. It is assumed that all graduate students, postgraduate fellows, and faculty within the CMP Program will attend the dissertation defense.

10.3. h. Final Oral Examination

The Chairperson of the doctoral committee will oversee the examination and introduce the student. The student begins by making a public presentation of the research project. Approximately 45 minutes are allotted for this presentation. After a brief period of questions and discussion, the candidate, the doctoral committee, and any faculty who wish to attend move to a conference room to complete the oral examination. The Major Advisor does not participate in this examination and must remain silent throughout the process. When the questioning is complete, the candidate leaves the room while the committee evaluates the dissertation and its defense. The Major Advisor (and other faculty members in attendance who are not members of the examining committee) may be asked to leave for a portion of the committee's deliberation. The committee selects one of the following options: pass, revision of the written document and/or additional oral questioning at a later time, or fail. If the committee requires revision of the written document and/or additional oral questioning, this needs to be completed in a three month period. If the student fails the thesis defense, the student may take the examination again within three months. Failure to pass the thesis defense on a second occasion may result in the student being terminated from the program. At the conclusion of the defense, the student is provided with a verbal summary of the committee's deliberations. In addition, a report signed by all members of the doctoral committee, including the Major Advisor, is sent to the Associate Dean

for Graduate Studies. When the decision of the committee is not unanimous, the matter is resolved by the Dean.

10.4. Final graduation steps:

Once you have committee approval to defend, stop by the IBGP graduate office at the beginning of the term in which you wish to graduate and pick up a graduation packet. **The applications are due during the early part of the term you intend to graduate and the dates will change each term.** Note: There is a fee for graduation. Also, please note you must be registered for credit in the term of graduation. Finally, you must fill out a defense information sheet and submit it to the IBGP office about 3 weeks prior to your defense so that she can prepare and send out defense announcements to the graduate faculty and students. After your public defense, you must submit your final thesis electronically. Instructions on how to prepare and submit your electronic thesis can be found at the following web link:

www.etd.pitt.edu

After your theses is submitted electronically, successfully uploaded, and approved by the graduate office, notify the graduate school director (Dr. Mars), graduate coordinator (Shanning Wan) and payroll administrator (Carolyn Nolte) for the following reasons:

Dr. Mars (wmars@pitt.edu) needs to write a final CMP exit letter on your behalf to the School of Medicine.

Carolyn Nolte needs something in writing indicating exactly when you are leaving the CMP program so she can amend the payroll paperwork. Even if you do not leave the University and accept a post-doc position within the system, you will no longer be a GSR and your paperwork will need to be to updated. Send Carolyn Nolte noltecr@upmc.edu an e-mail stating when your official last date of employment will be.

Send Shanning Wan (shw1266@pitt.edu) an e-mail with your new contact information (where you will be--how we can reach you, e-mail, etc.) so that she can send you an exit interview. This is a great opportunity for you to help us understand how we can improve our program.

11. CALENDAR OF MILESTONES AND DEADLINES

First Year of Graduate School

- Select Major Advisor and Program — end of summer term

Second Year of Graduate School (first year for MD/PhD Candidates)

- Submit Annual Progress Report and updated CV/Bio — by June 30
- Establish Comprehensive Examination Committee — by July 1

Third Year of Graduate School (second year for MD/PhD Candidates)

- Complete Comprehensive Examination — before December 31
- Submit Comprehensive Examination Report — upon approval by committee
- Meet with Dissertation Committee — by June 15
- Submit Dissertation Overview Report — upon approval of committee
- File for Admission to Candidacy — upon approval of proposal

Subsequent Years of Graduate School

• Submit Annual Progress Report and updated CV/Bio	by June 30 of each year
• Bi-Annual Meetings with Dissertation Committee	two/year
• Application for Graduation	term of graduation
• Announcement of Dissertation Defense	> 1 month prior to defense

12. MILESTONE FORMS

On subsequent pages, please find copies of the milestone forms used in the CMP Graduate Training Program. **These are provided simply to give you an idea of what each form looks like and what information is contained on each**. **You must request that the CMP coordinator, Shanning Wan will fill them out properly for you before each meeting that you hold.** Please request triplicate copies of these forms (except for the Bi-Annual Meeting with Doctoral Dissertation Advisory forms) at least one week in advance from the Graduate Coordinator. The Graduate Coordinator will prepare the forms for you and will notify the student when they are available to be picked up. **Please do not make copies from this book**, as most of the forms (note exception above) must be created in triplicate form.

Please be sure to notify the Graduate Coordinator if anything regarding your progress has changed – such as change in committee members, Title of Dissertation. Also, please be sure to notify the Graduate Coordinator of the date of each milestone, in order for this information to be included on the forms.

COMPREHENSIVE EXAMINATION REPORT

Doctor of Philosophy

University of Pittsburgh School of Medicine
Graduate Division of Biomedical Sciences

Student's Name	**SS#**	**Date of Examination**

Academic Program	**Passed**	**Failed**
Cellular and Molecular Pathology		

EXAMINATION COMMITTEE:

_____

_____

_____

_____

_____

Chair of the Committee

COMMENTS:

SUBMIT THIS FORM TO THE GRADUATE STUDIES OFFICE

NOTE: This examination should be administered approximately at the time of completion of formal course requirements and should be passed at least eight months before the scheduling of the final oral examination and dissertation defense. In no case may the comprehensive examination be taken in the same term in which the student is graduated. Results must be reported no later than the last day of the term in which the examination is administered.

DISTRIBUTION OF COPIES: WHITE-Submit to Graduate Studies Office; YELLOW-Issued to Department; PINK-Issued to Student. PITT 1016 (0397) FORM II

NOMINATION OF A DOCTORAL DISSERATION ADVISORY AND FINAL EXAMINATION COMMITTEE

University of Pittsburgh School of Medicine
Graduate Division of Biomedical Sciences

Student's Name	**SS#**	**Date of Examination**
Proposed Title of Dissertation		

I hereby agree to serve as Major Advisor for this Candidate and to supervise the preparation of his/her dissertation. I recommend that the following persons be appointed to serve as the Doctoral Dissertation Advisory and Final Examination Committee.

COMMITTEE MEMBERS **ACADEMIC PROGRAM** **SIGNATURE**

_____

_____

_____

_____

COMMITTEE CHAIR

_____

MAJOR ADVISOR **DATE**

APPROVED:

_____

ACADEMIC PROGRAM CHAIR **DATE**

_____

DEAN OF GRADUATE STUDIES **DATE**

SUBMIT THIS FORM TO THE GRADUATE STUDIES OFFICE

There shall be a minimum of five members on the dissertation committee including the thesis advisor. The dissertation advisor may or may not serve as the chair of the examination committee; it shall be determined by training program policy. A majority of the committee, including the advisor, must have graduate faculty status, and must be from the student's training program. A minimum of one graduate faculty member from the university community who is not a member of the student's training program must participate on the committee. The dissertation committee must be approved by the director of the student's training program prior to seeking approval from the Graduate Dean. Only upon this approval may the student meet with his/her committee at their Overview/Prospectus meeting and proceed with Admission to Candidacy.

DISTRIBUTION OF COPIES: WHITE-Submit to Graduate Studies Office; YELLOW-Issued to Department; PINK-Issued to Student.

PITT 1386 (0397) FORM III

DISSERATION OVERVIEW/PROSPECTUS MEETING

Doctor of Philosophy

University of Pittsburgh School of Medicine
Graduate Division of Biomedical Sciences

Student's Name	**SS#**	**Date of Meeting**

Academic Program	**Approved**	**Not Approved**
Cellular and Molecular Pathology		

This student has prepared a dissertation proposal and presented it to this committee. He/She has carefully formulated a plan and permits the doctoral committee to provide guidance in shaping the conceptualization and methodology of that plan.

Doctoral Dissertation Advisory and Final Examination Committee:

_____

_____

_____

_____

_____

MAJOR ADVISOR

_____

COMMITTEE CHAIR

COMMENTS:

SUBMIT THIS FORM TO THE GRADUATE STUDIES OFFICE

NOTE: This meeting should be conducted once the Nomination of a Dissertation Advisory and Final Examination Committee Form has been approved by the Dean of Graduate Studies. Results of this meeting must be reported no later than the last day of the term in which the meeting occurs.

DISTRIBUTION OF COPIES: WHITE-Submit to Graduate Studies Office; YELLOW-Issued to Department; PINK-Issued to Student.

PITT 1642 (0397) FORM IV

APPLICATION FOR ADMISSION TO CANDIDACY
FOR THE DOCTORAL DEGREE

University of Pittsburgh School of Medicine
Graduate Division of Biomedical Sciences

Name of Applicant & Date	**SS#**	**Department** **Cellular and Molecular Pathology**

I am a student with full graduate status and: have satisfied the requirements of a preliminary evaluation, have completed formal coursework with a minimum quality point average of 3.00, have passed the comprehensive examination, and have received approval of the proposed subject and plan of the dissertation from the doctoral committee following an overview/prospectus meeting of my committee. I hereby petition the Graduate Faculty of the School of Medicine for Admission to Candidacy for the degree of Doctor of Philosophy, and propose the following topic for my dissertation:

DOCTORAL DISSERTATION ADVISORY COMMITTEE

We hereby support the above petitioner for admission to candidacy, and will supervise the preparation of his/her dissertation.

_____

_____

_____

_____
MAJOR ADVISOR

_____
COMMITTEE CHAIR

APPROVED:

_____
CHAIR OF THE ACADEMIC PROGRAM **DATE**

_____
DEAN OF GRADUATE STUDIES **DATE**

SUBMIT THIS FORM TO THE GRADUATE STUDIES OFFICE

DISTRIBUTION OF COPIES: WHITE-Submit to Graduate Studies Office; YELLOW-Issued to Department; PINK-Issued to Student.

PITT 1643(0397) FORM V

BI-ANNUAL MEETING WITH DOCTORAL DISSERTATION ADVISORY COMMITTEE

University of Pittsburgh School of Medicine
Cellular and Molecular Pathology Program

Student's Name: Date of Committee Meeting:

DOCTORAL DISSERTATION ADVSORY COMMITTEE
We hereby acknowledge we have met with the above student to discuss the progress of the student's dissertation. We find the progress made to date to be:

____ satisfactory ____unsatisfactory

Committee Members: Signature:

Major Advisor

Committee Chair

Chair Comments:

Advisor Comments:

APPROVED:

Chair of the Academic Program Date

****Please return this form to the Pathology Graduate Program Coordinator****

DISSERTATION DEFENSE REPORT

Doctor of Philosophy

University of Pittsburgh School of Medicine
Graduate Division of Biomedical Sciences

Student's Name	**SS#**	**Date of Defense**

Academic Program	**Passed**	**Failed**
Cellular and Molecular Pathology	**Passed with honors**	**Passed with Revisions**

Title of Dissertation

DOCTORAL DISSERTATION AND FINAL EXAMINATION COMMITTEE:

_____

_____

_____

_____

_____
Major Advisor

_____
Chair of the Committee

SUBMIT THIS FORM TO THE GRADUATE STUDIES OFFICE

DISTRIBUTION OF COPIES: WHITE-Submit to Graduate Studies Office; CANARY-Issued to Department; PINK-Issued to Student.

PITT 1713 (0397) FORM VI

DISSERTATION APPROVAL REPORT

Doctor of Philosophy

University of Pittsburgh School of Medicine
Graduate Division of Biomedical Sciences

Student's Name	**SS#**	**Date**

Academic Program	**Approved**	**Not approved**
Cellular and Molecular Pathology		

Title of Dissertation

The above noted dissertation has been defended and corrected, and is hereby approved by this committee:

_____

_____

_____

_____

_____
Major Advisor

_____
Chair of the Committee

NOTE: This report should be completed once the defended dissertation is corrected and in its final form. This report must be submitted with the defended and corrected dissertation to the Graduate Studies Office no later than the last day of the term in which the defense takes place.

DISTRIBUTION OF COPIES: WHITE-Submit to Graduate Studies Office; CANARY-Issued to Department; PINK-Issued to Student.

PITT 1318 (0397) FORM

13. CMP GRADUATE TRAINING FACULTY

See https://path.upmc.edu/cmp/faculty.htm for a description of their research interests

Dr. Sameer Agnihotri	(412) 692-9233	sameer.agnihotri@pitt.edu	Neurosurgery
Dr. Jonathan Alder	(412) 692-2118	jalder@pitt.edu	Medicine/CCM
Dr. Stephen Badylak	(412) 235-5145	badylaks@upmc.edu	Surgery/MIRM
Dr. Yaacov Barak	(412) 641-8557	baraky@mwri.magee.edu	Ob/Gyn (Mag)
Dr. Michael Becich	(412) 623-3941	becich@pitt.edu	Bioinformatics
Dr. Aaron Bell	(412) 383-8922	bellaaro@pitt.edu	Pathology
Dr. Sarah Berman	(412) 383-5868	bermans@upmc.edu	Neurology
Dr. Timothy Billiar	(412) 647-1749	billiartr@upmc.edu	Surgery
Dr. Harry Blair	(412) 383-9616	hcblair@pitt.edu	Pathology
Dr. Bryan Brown	(412) 624-5273	brownb@upmc.edu	Bioengineering
Dr. Ronald Buckanovich	(412) 641-4271	buckanovichrj@mwri.magee.edu	Medicine
Dr. Grant Bullock	(412) 624-7523	bullockgc@upmc.edu	Pathology
Dr. Timothy Burns	(412) 864-7859	burnstf@upmc.edu	Medicine (UPCI)
Dr. Anne-Ruxandra Carvunis	(412) 648-3335	anc201@pitt.edu	Comp Biol
Dr. Stephen Y. Chan	(412) 692-2935	chansy@pitt.edu	Medicine (VMI)
Dr. Yuan Chang	(412) 623-7716	yc70@pitt.edu	Pathology/UPCI
Dr. Yvonne Chao	(412) 623-7703	chaoyl@upmc.edu	Hem/Onc/UPCI
Dr. Charleen Chu	(412) 647-3744	ctc4@pitt.edu	Pathology
Dr. Lan Coffman	(412) 641-2016	coffmanl@upmc.edu	Medicine/MWRI
Dr. Marie DeFrances	(412) 647-9505	defrancesmc@upmc.edu	Pathology
Dr. Anthony Demetris	(412) 624-6645	demetrisaj@upmc.edu	Pathology
Dr. Steven Dobrowolski	(412) 692-9874	dobrowolskis@upmc.edu	Pathology (Child)
Dr. H. Henry Dong	(412) 692 6324	dongh@pitt.edu	Pediatrics (Child)
Dr. Chris Donnelly	(412) 383-8983	chrisdonnelly@pitt.edu	Neurobiology
Dr. Albert Donnenberg	(412) 623-3256	donnenbergad@upmc.edu	Medicine/UPCI
Dr. Anette Duensing	(412) 623-5870	aduensin@pitt.edu	Pathology/UPCI
Dr. Andrew Duncan	(412) 624-5302	duncana@pitt.edu	Pathology/MIRM
Dr. Mo Ebrahimkhani	(412) 648-1038	mo.ebr@pitt.edu	Pathology
Dr. Yvonne Eisele	(412) 383-4438	eiseley@pitt.edu	Medicine
Dr. Toren Finkel	(412) 383-4409	finkelt@pitt.edu	Medicine (AI)
Dr. Ira J. Fox	(412) 692-6693	foxi@upmc.edu	Surgery (Child)
Dr. George Gittes	(412) 692-7291	George.Gittes@chp.edu	Surgery (Child)
Dr. Mark Gladwin	(412) 692-2117	gladwinmt@upmc.edu	Medicine (VMI)
Dr. Delphine Gomez	(412) 383-3260	gomezd@pitt.edu	Medicine (VMI)
Dr. Hun-Way Hwang	(412) 624-7300	Hunway.Hwang@pitt.edu	Pathology
Dr. Brett Kaufman	(412) 383-6031	bkauf@pitt.edu	Medicine
Dr. Samira Kiani	(412) 383-9594	samira.kiani@pitt.edu	Pathology
Dr. John Kirkwood	(412) 623-7707	kirkwoodjm@upmc.edu	Medicine (UPCI)
Dr. Corrine Kliment	(412) 692-2210	ckliment@pitt.edu	Medicine/CCM
Dr. Melanie Koenigshoff	(412) 624-8209	koenigshoffm@upmc.edu	Medicine/CCM
Dr. Gary Kohanbash	(412) 692-9456	gary.kohanbush2@chp.edu	Neur. Sur (Child)
Dr. Julia Kofler	(412) 624-6353	koflerjk@upmc.edu	Pathology
Dr. Scott Kulich	(412) 688-6549	kulichsm@upmc.edu	Pathology
Dr. Robert Lafyatis	(412) 383-9054	lafyatis@pitt.edu	Medicine
Dr. Eric Lagasse	(412) 235-5147	Eric_Lagasse@yahoo.com	Pathology/MIRM
Dr. Janet Lee	(412) 692-2210	leejs3@upmc.edu	Medicine (VMI)
Dr. Hang Lin	(412) 624-5503	hal46@pitt.edu	Ortho Surg (BSP)
Dr. Youhua Liu	(412) 648-8253	liuy@upmc.edu	Pathology
Dr. Joseph Locker	(412) 648-9701	lockerj@upmc.edu	Pathology
Dr. Anna Lokshin	(412) 623-7706	loksax@upmc.edu	Medicine/UPCI
Dr. Peter Lucas	(412) 692-6218	lucaspc@upmc.edu	Pathology (Child)
Dr. Jianhua Luo	(412) 648-8791	luoj@upmc.edu	Pathology
Dr. Kacey Marra	(412) 383-3924	marrkx@upmc.edu	Surgery

Dr. Wendy M. Mars	(412) 648-9690	wmars@pitt.edu	Pathology
Dr. George K. Michalopoulos	(412) 648-1040	michalopoulosgk@upmc.edu	Pathology
Dr. Pamela Moalli	(412) 641-6052	pmoalli@mail.magee.edu	Ob/Gyn (Magee)
Dr. Satdarshan (Paul) Monga	(412) 648-9966	smonga@pitt.edu	Pathology
Dr. Michael Morowitz	(412) 692-5976	michael.morowitz@chp.edu	Pediatrics
Dr. Kari Nejak-Bowen	(412) 648-8793	knnst5@pitt.edu	Pathology
Dr. Yuri Nikiforov	(412) 802-6797	nikiforovye@upmc.edu	Pathology
Dr. Michael Oertel	(412) 648-9727	mio19@pitt.edu	Pathology
Dr. Steffi Oesterreich	(412) 641-8555	oesterreichs@upmc.edu	Med-Pharm
Dr. Tim Oury	(412) 648-9659	tdoury@pitt.edu	Pathology
Dr. Ivona (Vasile) Pandrea	(412) 624-3242	pandrea@pitt.edu	Pathology
Dr. Andrey Parkhitko	(339) 368-4594	aparkhitko@pitt.edu	Medicine (AI)
Dr. Julie Phillippi	(412) 624-6704	phillippija@upmc.edu	Surgery/MIRM
Dr. Jon Piganelli	(412) 692-7498	jdp51@pitt.edu	Surgery (Child)
Dr. Reben Raeman	(412) 648-2021	reben.raeman@pitt.edu	Pathology
Dr. Jeremy Rich	(412) 623-3364	richjn@upmc.edu	Neurology/UPCI
Dr. Iain Scott	(412) 692-2935	scotti2@upmc.edu	Medicine (VMI)
Dr. Melanie Scott	(412) 647-5806	scotmx@upmc.edu	Surgery
Dr. Ian Sigal	(412) 864-2220	sigalia@upmc.edu	Ophthalmology
Dr. Alejandro Soto-Gutierrez	(412) 648-0064	alexsotoguti@gmail.com	Pathology
Dr. Cynthia St. Hilaire	(412) 692-2935	sthilaire@pitt.edu	Medicine (VMI)
Dr. Donna B. Stolz	(412) 383-7283	dstolz@pitt.edu	Cell Biology
Dr. Kenichi Tamama	(412) 648-9485	tamamakj@upmc.edu	Pathology
Dr. Roderick Tan	(412) 648-9040	tanrj@upmc.edu	Medicine (Renal)
Dr. Sina Tavakoli	(412) 647-7288	sit23@pitt.edu	Radiology
Dr. Angus Thomson	(412) 624-1116	thomsonaw@upmc.edu	Surgery
Dr. Thanos Tzounopoulos	(412) 383-8626	thanos@pitt.edu	Otolaryngology
Dr. Flordeliza Villanueva	(412) 647-5840	villanuevafs@upmc.edu	Medicine (VMI)
Dr. Nam Vo	(412) 648-1092	von@upmc.edu	Ortho Surg
Dr. Yoram Vodovotz	(412) 647-6067	vodovotzy@upmc.edu	Surgery
Dr. David Vorp	(412) 235-5136	vorpda@upmc.edu	BioE/MIRM
Dr. Jing Hong Wang	(412) 864-7728	jhw51@pitt.edu	Hem/Onc/UPCI
Dr. Xiaosong Wang	(412) 623-1587	wangx13@pitt.edu	Path/UPCI
Dr. Zhou Wang	(412) 623-3903	wangz2@upmc.edu	Urology/UPCI
Dr. Alan Wells	(412) 647-7813	wellsa@upmc.edu	Pathology
Dr. Sally (Morganroth) Wenzel	(412) 692 2210	swenzel@pitt.edu	GSPH/EOH
Dr. Clayton Wiley	(412) 647-0765	wileyca@upmc.edu	Pathology
Dr. Cary (Chuanyue) Wu	(412) 648-2350	carywu@pitt.edu	Pathology
Dr. Jian Yu	(412) 623-7786	yuj2@upmc.edu	Pathology/UPCI
Dr. Reza Zarnegar	(412) 648-8657	rezazar@pitt.edu	Pathology
Dr. Yingze Zhang	(412) 692-2306	zhangy@upmc.edu	Medicine

Adjunct:

Dr. Dean Yimlamai	(412) 692-5412	dyimlamai@gmail.com	Pathology

14. CURRENT CMP STUDENTS (and their mentors) as of 9/1/21

Anu Balogun	olb25@pitt.edu	Kari Nejak-Bowen
Maria Beecher	mlb207@pitt.edu	Peter Lucas
Rithika Behera	rithika.behera@pitt.edu	Robert Lafyatis
Hannah Butterfield	heb62@pitt.edu	Peter Lucas
Mona Chatrizeh	moc28@pitt.edu	Michael Morowitz
Grace Conway	gec36@pitt.edu	Liza Villanueva
Raphael Crum	rjc105@pitt.edu	Steve Badylak
Andrea Cruz	anc232@pitt.edu	Sameer Agnihotri
Taylor Gatesman	tag85@pitt.edu	Sameer Agnihotri
Shohini Ghosh-Choudhary	skg46@pitt.edu	Toren Finkel
Matthew Halbert	meh237@pitt.edu	Sameer Agnihotri

Sam Herron	rsh35@pitt.edu	Hun-way Hwang
Rebecca Kritschil	rak148@pitt.edu	Nam Vo
Yekaterina Krutsenko	yek14@pitt.edu	Paul Monga
Ryan LeGraw	ryl17@pitt.edu	Mo Ebrahimkhani
Jie Bin Liu	liu.jiebin@medschool.pitt.edu	Steffi Oesterreich
Mingjun Liu	mil128@pitt.edu	Delphine Gomez
Philip Mannes	pzm2@pitt.edu	Sina Tavakoli
Nicole Martucci	njm97@pitt.edu	George Michalopoulos
Meghan Mooring	msm127@pitt.edu	Dean Yimlamai
Joud Mulla	jom219@pitt.edu	Melanie Scott
Mark Murdock	mhm35@pitt.edu	Steve Badylak
Anthony Otero	pao19@pitt.edu	Charleen Chu
Justin Sui	jus104@pitt.edu	Corinne Kliment
Kyle Sylakowski	kys13@pitt.edu	Alan Wells
Bill Tennant	wmt7@pitt.edu	Chris Donnelly
Rick van der Geest	riv13@pitt.edu	Janet Lee
Jeremy Velazquez	jev50@pitt.edu	Mo Ebrahimkhani
Susannah Waxman	suw31@pitt.edu	Ian Sigal
Sierra Wilson	siw40@pitt.edu	Andy Duncan
Jiazhen Xu	jix104@pitt.edu	Chris Donnelly

names in bold are ASIP members

15. RECENT CMP GRADUATES (and their mentors)

2020-2021

Drew Bradshaw	anb199@pitt.edu	Alan Wells
Karis Kosar	kpk21@pitt.edu	Kari Nejak-Bowen
Laura Molina	lmm208@pitt.edu	Paul Monga
Tianmeng Chen	tic37@pitt.edu	Tim Billiar

2019-2020

La Li	lal92@pitt.edu	Rocky Tuan
Tiffany Bernardo	tmb94@pitt.edu	Yaki Barak
Tolani Olonisakin	tfo5@pitt.edu	Janet Lee
Heejae Kang	hek43@pitt.edu	Peter Lucas
Miranda Culley	mkc53@pitt.edu	Steve Chan
Mason Donnell	mld140@pitt.edu	Tim Oury

2018-2019

Jia-Ying (Lloyd) Lee	jil87@pitt.edu	Peter Lucas
Abby Stahl	ecs40@pitt.edu	Bryan Brown
Alicia Watson	alw128@pitt.edu	Angus Thomson
Prashanti Patil	prp32@pitt.edu	Nam Vo
Kevin Levine	kml116@pitt.edu	Steffi Oesterreich
Jackie Russell	jor76@pitt.edu	Paul Monga
Patrick Wilkinson	pdw14@pitt.edu	Andy Duncan

2017-2018

Ahmad Khazali	ahk28@pitt.edu	Alan Wells
Tianyu He	tih19@pitt.edu	Ivona Pandrea
Morgan Preziosi	mep116@pitt.edu	Paul Monga
Matthew Wexler (MS)	maw266@pitt.edu	Xiaosong Wang
Colin Beckwitt	chb106@pitt.edu	Alan Wells

2016-2017

Jennie Vorhauer (MS)	jmv55@pitt.edu	Nahed Ismail

J. Randall McAuley	jrm169@pitt.edu	Peter Lucas
Alex Kikuchi	kikuchi.alexander@gmail.com	Paul Monga
Greg Logan	logangre@pitt.edu	Steven Maracich
Rachel Brick	rmb135@pitt.edu	Rocky Tuan

2015-2016

Austin Nuschke	aun2@pitt.edu	Alan Wells
Erin Steer	ers90@pitt.edu	Charleen Chu
Heather Metz	hem5@pitt.edu	H. McGarry Houghton
Kelly Koral	koralk@pitt.edu	George Michalopoulos
Josiah Radder	jeradder@gmail.com	Steve Shapiro
Johannes Kutten	jck57@pitt.edu	Jeff Isenberg
Ben Rothrauff	bbr4@pitt.edu	Rocky Tuan

2014-2015

Jing (Sophie) Yang	jiy36@pitt.edu	Paul Monga
Lindsey Kelly	lmk66@pitt.edu	Yuri Nikiforov
Jihee Sohn	jis49@pitt.edu	Johnny Huard
Edgar Tafaleng	ent8@pitt.edu	Ira Fox
Beth Oczypok	eao14@pitt.edu	Tim Oury
Neil Kelly	njk41@pitt.edu	Steve Shapiro
Ricardo Londono	ril5@pitt.edu	Steve Badylak

2013-2014

Nisha Sambamurthy	nis21@pitt.edu	Steven Shapiro
Danushka Seneviratne	dss24@pitt.edu	Reza Zarnegar
Evan Delgado*	evd7@pitt.edu	Paul Monga
Joshua Jamison*	jaj64@pitt.edu	Alan Wells
Julie Chandler Cramer	juc24@pitt.edu	Eric Lagasse
Jonathan Proto	jdp44@pitt.edu	Johnny Huard
Katy Sobek	kmg55@pitt.edu	Denise O'Keefe
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