Preface

This handbook has been issued to provide comprehensive information for the students and faculty about the Moffitt Cancer Center’s Doctor of Philosophy Program in Cancer Biology, in Cancer Chemical Biology, in Cancer Immunology and Immunotherapy and in Integrated Mathematical Oncology. In addition to program specific requirements, it also outlines University degree expectations for degree conferment. Students in joint programs may have additional requirements. Certain exceptions may be made in extenuating circumstances. This handbook is accurate as of its print date.

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All correspondence will be forwarded to the appropriate personnel through this office.

Cancer Biology Education Committee

To ensure long-term stability and consistency, the Education Committee is comprised of core members representing the research faculty at the Moffitt Cancer Center. Core committee membership is for a minimum of 4 years; there is no maximum term limit. The Education Committee also includes all acting course directors for the current academic year.
The Education Committee for 2019-20 is:

Ken Wright  
Doug Cress  
Mark Alexandrow  
Srikumar Chellappan  
Alvaro Monteiro  
Sheng Wei  

John Koomen (Course Director – BSC 6457)  
Conor Lynch (Course Director – PCB 6230, Fall)  
Brian Ruffell (Course Director – PCB 6930 Fall, BSC 6421 Fall)  
Eric Lau (Course Director – PCB 6930, Spring)  
Mark Alexandrow (Course Director – PCB 6205)  
Amer Beg (Course Director – PCB 6231 Fall)  
Paulo Rodriguez (Course Director – PCB 6282 Fall)  
Shari Pilon-Thomas (Course Director – PCB 6281 Spring)  
Andriy Marusyk (Course Director – PCB 6931, Fall)  
David Basanta (Course Director – PCB 6931, Spring)  
Alvaro Monteiro (Course Director – PCB 6526)  
Gary Reuther (Course Director – PCB 6910 & BSC 7911)  
Mark Ji (Course Director – BSC 6885, Spring)  
Heiko Enderling and David Basanta (Course Directors – PCB 6882, Fall)  
Sandy Anderson and Philipp Altrock (Course Directors – BSC 6883, Spring)  
TBD (Course Director – PCB 6084)  
TBD (Course Director – BSC 6888)  
TBD (Course Director – PCB 6937)
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Introduction

The University of South Florida & The Moffitt Cancer Center’s Doctor of Philosophy Program in Cancer Biology was founded in the year 2000 to contribute to the prevention and cure of cancer. The challenge to conquer this disease is not only to unravel the molecular and biological basis for tumor development, but also to utilize basic discoveries and to translate their findings into lifesaving cancer therapies. To meet this goal we have designed an interdisciplinary cancer biology curriculum, affiliated with the University of South Florida’s Colleges of Medicine, Engineering, and Arts and Sciences that encompasses biochemistry, molecular and cell biology, immunology, signal transduction, drug discovery, chemistry, functional genomics, proteomics, cancer genetics, bioinformatics, mathematical modeling and cancer therapeutics. This interdisciplinary approach will prepare our students to face the challenge of translating cancer research discoveries into lifesaving clinical protocols. In order to facilitate the best care, it is imperative for researchers to be dedicated to seeing ideas through from the laboratory bench to the patient’s bedside. The Program contains four integrated majors:

1. Cancer Biology
2. Cancer Chemical Biology
3. Immunology and Immunotherapy
4. Integrated Mathematical Oncology

Application Process

Applications must be completed on-line and can be accessed at the following

https://secure.vzcollegeapp.com/usf/

The priority deadline for funding consideration by the program is December 1st for both domestic and international applicants. The University deadline to apply for fall admission is February 15th; the Cancer Biology PhD Program only admits in the fall.

Completed applications will include:

☐ The on-line USF Application to Graduate Studies or International Graduate Admissions.

**Items below should be uploaded through the on-line application to the Cancer Biology Ph.D. Program:**

☐ One copy of transcripts from all relevant undergraduate/graduate institutions (can be unofficial at time of application)
☐ Personal statement summarizing research experiences and goals
☐ A CV or resume
☐ Names and email addresses of three individuals who can attest to the applicant’s research and/or academic abilities by supplying letters of recommendation. The recommender will upload their letter directly into the application system.
☐ Official GRE test results directly from ETS

In addition to these documents, *international applications* must also include:
TOEFL scores, provided from ETS

All supporting documents are to be uploaded to the on-line application.

**Admission Requirements**

Eligibility requirements:
- A Bachelor’s Degree from a regionally accredited college or university
- An extensive background in biology, chemistry, mathematics or other relevant field. Preference will be given to those with advanced coursework.
- Minimum 3.0 Grade Point Average (out of 4.0)
- A Graduate Record Examination (GRE) score must be submitted for application to receive full consideration. The GRE Subject test is not required.

Applicants from countries where English is not the official language and who have not earned at least a bachelor’s degree in the U.S. from a regionally accredited institution must also demonstrate proficiency in the English language. Click [here](#) for the list of English speaking countries. Minimum test scores required to determine proficiency are:
- IELTS - 6.5
- PTE-A - 53
- TOEFL (iBT – 79; PBT – 550)
- GRE Verbal – 153
- Transcript evaluation by an accredited service; A list of available providers is available on the USF Office of Graduate Studies website – [www.grad.usf.edu](#).

*Students who seek admission to the Cancer Biology Ph.D. Program are required to meet all of the entrance requirements set forth by the University of South Florida and the State University System of Florida.*

**Admission is highly competitive.**

The majority of successful applicants will exceed the aforementioned criteria.

**Courses**

Students are required to successfully complete all Cancer Biology Program Core Courses. The Program and Dissertation Committees may also require additional coursework in a specified discipline if it will serve to better prepare the student to meet the needs of the research environment. Students must receive a “B-” or higher in all relevant coursework credited toward their degree; overall GPA for graduate coursework must be a 3.0 or higher in accordance with the USF Graduate Catalog requirement and to retain appointment as a Graduate Assistant/Associate.

In special circumstances the Education Committee will consider waiving specific course requirements if previous course work in the same area was completed. Requests to waive course
requirements should be made in writing, providing a detailed account of the specifics of the request, along with copies of any pertinent documentation pertaining to the request. If recommended by the Education Committee, the request will be submitted to the University for validation and final approval.

**Required Cancer Biology Courses**

- PCB 6457 Cancer Research Techniques
- PCB 6230 Cancer Biology I - Basics of Molecular Oncology
- PCB 6231 Cancer Biology II – Cancer Immunology
- PCB 6205 Cancer Biology III – Cancer Genomics and Drug Discovery
- PCB 6526 Cancer Biology IV – Cancer Genetics
- PCB 6910 Laboratory Rotations
- PCB 6931 Advances in Cancer Biology
- PCB 6930 Current Topics in Oncology
- PCB 6932 Bioethics for Cancer Researchers
- BSC 6939.004 Selected Topics in Cancer Biology – Grant Preparation (Qualifying Exam)
- BSC 6930 Current Topics in Oncology
- BSC 6932 Bioethics for Cancer Researchers
- BSC 6939.004 Selected Topics in Cancer Biology – Grant Preparation (Qualifying Exam)
- BSC 7911 Dissertation Hours

**Required Cancer Chemical Biology Courses**

- PCB 6457 Cancer Research Techniques
- PCB 6230 Cancer Biology I - Basics of Molecular Oncology
- BSC 6885 Cancer Drug Discovery
- CHM 6250 Advanced Organic Chemistry: Synthesis
- BCH 6746 Structural Biology
- PCB 6910 Laboratory Rotations
- PCB 6934 Advances in Cancer Chemical Biology
- PCB 6930 Current Topics in Oncology
- PCB 6932 Bioethics for Cancer Researchers
- BSC 6939.004 Selected Topics in Cancer Biology – Grant Preparation (Qualifying Exam)

Choose one of the highlighted courses

{CHM 6250, BCH 6746}
BSC 6939.008  Research Seminar – CBSSS & student defenses required attendance
BSC 7911  Dissertation Hours

**Required Cancer Immunology and Immunotherapy Courses**

- BSC 6428  Immunological Techniques for Cancer Research
- PCB 6230  Cancer Biology I - Basics of Molecular Oncology
- PCB 6231  Cancer Biology II – Cancer Immunology
- PCB 6281  Cancer Immunotherapy

- **Choose one of the highlighted courses**
  - BSC 6885  Cancer Drug Discovery
  - PCB 6205  Cancer Biology III – Cancer Genomics and Drug Discovery
  - PCB 6526  Cancer Biology IV – Cancer Genetics
- PCB 6910  Laboratory Rotations
- BSC 7911  Directed Research
- PCB 6937  Advances in Tumor Immunology and Cancer Research
- PCB 6930  Current Topics in Oncology
- PCB 6932  Bioethics for Cancer Researchers
- BSC 6939.004  Selected Topics in Cancer Biology – Grant Preparation (Qualifying Exam)
- BSC 6939.008  Research Seminar – CBSSS & student defenses required attendance
- BSC 7911  Dissertation Hours

**Required Integrated Mathematical Oncology Courses**

- PCB 6457  Cancer Research Techniques
- PCB 6230  Cancer Biology I - Basics of Molecular Oncology
- BSC 6882  Integrated Mathematical Oncology I
- BSC 6883  Integrated Mathematical Oncology II
- PCB 6282  Cancer Biology and the Immune System
- **Choose one of the highlighted courses**
  - PCB 6281  Cancer Immunotherapy
  - BSC 6885  Cancer Drug Discovery
  - PCB 6205  Cancer Biology III – Cancer Genomics and Drug Discovery
  - PCB 6526  Cancer Biology IV – Cancer Genetics
- PCB 6910  Laboratory Rotations
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<tr>
<td>BSC 7911</td>
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**Cancer Research Techniques**

This course will expose graduate students to modern molecular and cellular biology principles and techniques utilized in basic and translational cancer research as performed in eleven Moffitt sponsored core facilities. Each core rotation of 1-2 weeks will include instruction by core staff via lectures and laboratory demonstration and participation. Practical applications and considerations of core services will also be described.

Topics typically include:

- Molecular Biology
- Biostatistics
- Tissue Procurement
- Translational Research
- Molecular Imaging
- Flow Cytometry
- Cell Therapies
- Microarray

- Microarray Data Analysis
- Mouse Models
- Histopathology
- Analytic Microscopy
- Laser Microdissection
- Animal Subjects: IACUC
- Human Subjects: IRB

**Immunological Techniques of Cancer Research**

This course will provide foundational knowledge of modern techniques utilized in cancer immunology research. In-class discussion will be supplemented with tours, interactive assignments, and papers from the recent literature. This course will expose graduate students to modern molecular, cellular, and immunological principles and techniques utilized in cancer immunology research. The course will include presentations by faculty and staff with relevant technological expertise. In-class discussion will be supplemented with tours, interactive assignments, and papers from the recent literature. Theory and practice of core technology services will also be described.

Topics typically include:

- In vitro and in vivo immunological techniques
- Flow Cytometry
- Animal Modeling

- Microscopy
- Proteomics and cell biology techniques

**Cancer Biology I – The Basics of Molecular Oncology**

*Prerequisites: Undergraduate Biology and Chemistry*

This course will provide in-depth exposure to many current topics in molecular and cell biology as they relate to cancer. A balance will be sought between cell biology, molecular biology, and biochemistry. The primary objective of this course is to obtain a current understanding of
normal and abnormal cellular processes. In order to achieve this, this course is taught by a variety of lecturers who are scheduled to speak on their personal area of expertise. Topics to be covered include signaling transduction, transcriptional regulation, cell cycle control, apoptosis, drug discovery, oncogenes and tumor suppressors.

Individual instructors will provide reading assignments.

**Topics Typically include:**
- Molecular Basis of Cancer
- Cell Cycle Control
- Cytoplasmic Signaling
- Apoptosis
- Transcriptional Regulation
- Tumor Suppressors

**Text:** *The Biology of Cancer, 2nd Edition, Weinberg*


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**Cancer Biology II – Immunology and Applied Biology**

**Prerequisite:** Undergraduate Biology

This course is a continuation of Basic Cancer Biology. It is divided into two broad sections: Immunology and Applied Cancer Biology. The Immunology section will cover the basics of normal immune development and function, cancer in the immune system as well as basic and applied aspects of transplant immunology. The Applied Cancer Biology section will cover several topics on the treatment of cancer.

**Topics Typically include:**
- Innate and Adaptive Immunity
- Transplantation Immunology
- Genetic Basis for Antibody Diversity
- Hematopoietic Stem Cell Biology
- Diversification of Immune Receptors
- Biology of Hematolymphoid Malignancies
- T Cell Activation
- Principles of Chemotherapy
- T & B Cell Signal Mechanisms
- Principles of Radiation Therapy
- B Cell Activation
- Cytokine Gene-Based Therapies
- Myeloid Cell Lineages and Immunity
- Targeting Signaling Pathways with Gene Therapy
- Cellular Mechanisms and Molecular Mechanisms of Antigen Presentation
- Translational Models of Cancer
- Natural Killer Cells
- Early Detection and Prevention of Cancer
- Complement System
- Biology of Hematolymphoid Malignancies II
- Tolerance
- Bone Marrow Transplantation
- Mouse Models of Cancer

**Text:** *Janeway’s Immunobiology 9th Edition, Murphy*

*Fundamental Immunology 7th Edition, Paul*

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**Cancer Biology III – Genomics and Drug Discovery**

**Prerequisite:** Cancer Biology I

This course is taught jointly by multiple faculty members. Topics to be covered include transcriptional and chromatin control, microRNA regulation, DNA replication and damage, mitotic regulation, cancer gene discovery, mode of action of chemotherapeutic drugs, and rational drug design. Individual lecturers will provide recent primary research articles, and students will be expected to participate in the analysis of these papers as part of their grade. Students are expected to supplement the lecture information and primary research paper reading, and gain more in-depth understanding of each topic, by studying appropriate chapters in the primary assigned book.

**Topics Typically include:**
- Drug Discovery
- Chemotherapeutic Drug Actions
- Transcription Control
- Gene Discovery
- DNA Replication/Damage


Cancer Biology IV – Cancer Genetics
Prerequisite: Cancer Bio I and II; approval by Program Director and Course Director.
This course explores the field of cancer genetics through a combination of traditional lectures and analyses of case studies. The lectures cover various concepts and methodologies. Concepts to be covered include penetrance, oncogenes, two-hit hypothesis, tumor suppressors, loss of heterozygosity, epidemiological studies, LOD scores, and risk assessment. Methodologies to be covered include: RFLP -> microsatellite markers -> SNPs, positional cloning, Representational Differential Analysis (RDA), Comparative Genomic Hybridization (CGH), spectral karyotyping, haplotype analysis, and somatic cell genetics to identify complementation groups. Case studies will revisit the concepts and methods above in light of actual data.


Cancer Immunotherapy
This course is focused on understanding applied immunology and the use of immunotherapeutic approaches to eliminate cancer. This course provides an advanced introduction to cancer immunotherapy principles and current practice. Topics include: Tumor Immunogenicity, Transplant Immunity, Vaccine Strategies, Checkpoint Blockade, Gene-Based Therapies, Adoptive T cell Therapies, Hematologic Malignancies, Immune Modulation, Design of Clinical Trials, and Immune Monitoring.

Fundamental Immunology, 5th Edition, (Paul), Lippincot Williams & Wilkins Publishers

Cancer Biology and the Immune System
This course is a broad introduction to the components of the immune system specifically focused on understanding the role of the immune system in eliminating cancer and how tumors modulate immune function. Topics include: B Cells and T Cells, Antigen Presentation, Myeloid Cells, Pattern Recognition Receptors, Tolerance, Tumor Microenvironment, Immune Suppression

Text: Cellular and Molecular Immunology, 9th Edition (Abbas) Elsevier Publisher
Cancer Drug Discovery

Prerequisite: CHM2210 or equivalent.

This core course will offer cutting-edge knowledge in cancer drug discovery and chemical biology and reveal the development and use chemical probes to unravel the mechanisms underlying oncogenesis and innovative anticancer drug design. This course provides an in-depth study of the process of cancer drug discovery. This includes knowledge on multiple classes of chemical probes and tools and will provide an understanding of how to develop and use these tools to unravel the mechanisms underlying oncogenesis as well as to develop innovative anticancer drugs. Individual lectures will be supplemented with review of recent primary research articles.

Students should have successfully completed undergraduate organic chemistry (CHM2210 or equivalent) prior to enrolling in this course. Successful completion of PCB 6230 (Cancer Biology I: Basics of Molecular Oncology) is highly recommended prior to enrollment. Topics include: High-Throughput Screening, Structural Biology Techniques and Structural Pharmacology, Structure-Based Drug Design, Current Anti-Cancer Drugs, Anti-Cancer Drug Repurposing, the Process of Cancer Drug Discovery, Peptidomimetics, Bioisosterism, and Synthetic Challenges in Anti-Cancer Drug Discovery.


Structural Biology in Drug Discovery: Method, Techniques, and Practices (Renaud) Wiley

Integrated Mathematical Oncology I

This course is a broad introduction to phenomenological mathematical modeling of cancer biology specifically focused on how tumors grow and respond to therapy, bridging multiple scales in space and time. The IMO1 Integrated Mathematical Oncology course is an advanced mathematical modeling course that teaches how to build phenomenological models for cancer biology. Topics will include cellular automaton models, agent based models, differential equations, partial differential equations, data visualization and data fitting. Biological topics include tissue homeostasis, cell cycle progression, cell transformation and oncogenesis, tumor viruses, extracellular environment and cell invasion. Students are expected to have completed basic courses in calculus and computer programming. Multiple faculty members teach this course jointly.


Integrated Mathematical Oncology II

Prerequisite: Integrated Mathematical Oncology I

This is a deep focus course on data-driven development of mathematical models of tissue homeostasis, cancer development, and treatment response to answer specific open questions in cancer biological and clinical oncology. The IMO2 Integrated Mathematical Oncology course is an intense course focus on data-driven development of mathematical models. Topics to be covered include modeling for tissue homeostasis, oncogenesis, metastatization, radiation therapy, chemotherapy, and immunotherapy. Students are expected to have successfully completed the IMO1 course (BSC 6882) prior to enrolling.
Individual lectures will provide recent primary research articles, and students are expected to participate in the analysis of these papers as part of their studies.


**Laboratory Rotations**
First Year Cancer Biology Ph.D. students will be required to complete the Laboratory Rotations Course. This course is designed to help the students choose a compatible Major Professor and allow students to develop necessary technical skills. It is graded on a satisfactory (pass) or unsatisfactory (fail) basis. The rotation Professor will also complete the Rotation Evaluation form. *Rotation Evaluation forms will be used by the Education Committee as part of the determination if the student will proceed to the Qualifying Examination and be reappointed to the second year of the Program.*

The Laboratory Rotations Course Director will contact all program faculty members and arrange for them to give brief presentations of their research to incoming students on a day known as Meet the Mentors. On this day, potential “Major Professors” will be allotted 15 minutes each to present their research to the incoming Cancer Biology students.

After these presentations, students will consult with individual faculty members whose interests are compatible to their own and arrange for rotations. A Rotation Form that has been signed by the sponsoring faculty mentor must be submitted to the course director within two weeks.

Students are encouraged to complete 3 rotations; a minimum of 2 rotations is required. Each one will be for 10 weeks so the student has adequate time in each laboratory to make an informed decision about who their Major Professor will be. If after completing the spring semester, the student still has not identified the Major Professor, the student may enroll in the Laboratory Rotations Course for the summer semester upon approval of the Education Committee.

Students enrolled in this course will be evaluated by the professor whose laboratory in which they are completing their rotations and by the Laboratory Rotations Course Director.

**Directed Research**
This course consists of practical laboratory work, guided by the student’s major professor. It is taken prior to passing the qualifying exam. Students enrolled in Directed Research receive either a satisfactory or an unsatisfactory grade.
Advances in Cancer Biology, Advances in Cancer Chemical Biology, Advances in Tumor Immunology and Cancer Research, and Advances in Integrated Mathematical Oncology

An important component of graduate training is gaining experience in the critical evaluation of research reports and developing and executing professional research presentations. The course will provide Cancer Biology graduate students with the opportunity to read and orally present current cancer research literature within their specific major. The student will learn to critically evaluate research for coherence with respect to the authors’ rationale and quality of the methodology employed. Students are enrolled in this course from their second year in the program until the beginning of their sixth year. First year students are not formally registered but are required to attend unless there is a course schedule conflict. Senior students are required to attend until the semester of their defense unless a waiver is requested and approved by the Program Director.

Current Topics in Oncology

Progress in cancer research is proceeding at a rapid rate, and thus, textbooks and didactic lectures are inherently behind the times. This course will bring renowned speakers from outside the USF community in order to broaden the students’ perspectives on cancer research beyond the walls of the Moffitt Research Center. In preparation for each seminar, students will be assigned two papers to read and critically examine. These articles will serve to introduce the students to the speaker’s area of expertise and generate questions for discussion. Following the seminar, participants will meet with the speaker and the course director to discuss cancer research innovations relevant to the speaker’s specialization. Enrollment in this course is limited to second- and third-year Cancer Biology students only.

Bioethics for Cancer Researchers

The objective of this course is to introduce students to the ethical issues facing cancer biologists and to prepare the students better handle the issues when confronted by them in their careers. The course will consist of seven 75 minute interactive open discussion sessions focused on the key ethical issues. Each session will be facilitated by two faculty members who will introduce the topic and outline the key considerations for discussion. Case studies and video vignettes will be presented and analyzed by the students in class. This course requires active student participation and open discussion between during each session. 2nd year students are required to attend.

Selected Topics In Cancer Biology

These courses provide an in-depth study of a single aspect of cancer biology. Examples of current Selected Topics:

Grant Writing: The objective of this course is to introduce students to the process of preparing an effective research grant proposal. The students will learn the components of a grant application and build writing skills. This course requires active student participation and open discussion between during each session.
**Research Seminar:** An important component of graduate training is developing and executing professional research presentations. Experience both attending and presenting multiple presentations and seminars is invaluable in this process. This course will provide faculty feedback on student presentation skills, PowerPoint slides and usage of AV equipment as part of the Cancer Biology Student Seminar Series (CBSSS). No faculty feedback will be provided following dissertation defenses other than that provided by the dissertation examination committee. Students are enrolled in this course from their second year in the program until the semester of their defense. While not formally registered, first year students must also attend if there are no other class conflicts.

**Key Program Requirements**

**Selection of Major Professor**

Selection of a student’s Major Professor is the most important aspect of graduate training. Upon selection, the major professor becomes the key faculty member responsible for the student’s training. This individual not only serves as a scientific mentor to the student, but also functions as the student’s source of financial support beginning in the second year of the program. Therefore one must consider the availability of funding when choosing a Major Professor.

Typically, students should select a Major Professor before or around June 1st of their first year in the program. If a student needs more information prior to making a selection, he or she is encouraged to rotate in a 4th Laboratory Rotation, thereby delaying the selection deadline until August 1st.

**Selection of Dissertation Committee**

Following the selection of the Major Professor, the Dissertation Committee must be selected. Under the guidance of the Major Professor, the students will choose a minimum of three additional Faculty members to serve on the Dissertation Committee along with the Major Professor. At least one member of this committee must also be a current or former member of the Cancer Biology Education Committee. A complete list of Education Committee Members is available in the Program Office. All committee members are expected to have appointments as USF faculty. Dissertation Committee members without a USF appointment will need to submit a CV for prior approval. Once the committee members have been selected, a USF Graduate Student Supervisory Committee form must be completed, signed and returned to the Cancer Biology Program Office, for forwarding to the Dean of Arts and Sciences.

The responsibilities of the Dissertation Committee are to:

- Review the student’s transcript and oblige the student to complete additional coursework if relevant to successful completion of the program.
- Advise and monitor the student’s academic progress toward the Ph.D. degree.
- Advise the student on dissertation research.
- Evaluate the student’s final dissertation and oral defense.

Once formed, the dissertation committee is the primary authority that guides the student. If serious problems arise with the Dissertation Committee, the student must document concerns in writing and submit them to the Program Director. The request will then be presented at the next Cancer Biology Education Committee meeting. The committee will discuss the situation and decide whether or not the situation warrants intervention. The Committee reserves the right to interview both the student and the Faculty members in question prior to making a final decision on the matter. In the event that a Dissertation Committee needs to be changed for any reason, the student must submit a new Supervisory Committee Form to the Cancer Biology Office.

Qualifying Examinations

Approval to proceed to the Qualifying Examination stage:
In May to early June of a student’s first year, the Education Committee (including ad hoc members if requested by the committee) will review each student’s lab rotation evaluations and grades. Students must achieve a B- grade or better in required courses, an overall score of 6 out of 10 in their lab rotation evaluations, and receive a majority pass vote by the committee. Following a positive review, student is approved to begin work on their qualifying exam. If the student receives a negative evaluation of the first year accomplishments he/she will be informed of the Program’s intention to not reappoint them as a GA for the following year. A Qualifying Examination Committee is then formed for each student from volunteer faculty and consists of 4-5 members, excluding the student’s major professor.

Written Proposal:
The student will develop an abstract with specific aims which the Qualifying Examination Committee will approve to be developed into a 6 page F31 style grant proposal. The proposal will be on the student’s planned thesis project.

Oral Defense format:
The student is to give a presentation of their research proposal lasting no longer than 45 minutes. Immediately following the presentation, the Qualifying Examination Committee will ask questions for the student to defend or clarify any aspect of the proposal. This may include aspects which were not specifically written in the proposal including methodology, significance and background underlying the proposal. In addition the committee may ask general scientific questions. The oral examination is meant to be a rigorous testing of the student’s critical thinking skills as well as general scientific knowledge.

Qualifying Examinations Timeline
Qualifying examinations will initiate at the end of the student’s first Spring semester and conclude in the fall semester of the student’s second year. The timeline for completion is (dates are subject to change):
• Early May of student’s first year – The Qualifying Examination (QE) Committee will inform the students if they have received approval to begin their qualifying exam.
• May 28 - 1st draft of Specific Aims page due.
• June 4 – 2nd Draft of Specific Aims page due
• July 2 – 1st draft of 6 page Research Proposal and 3rd draft of SA
  o See format guidelines sheet
  o The proposal must be original work of the student.
• J Cancer Biology Qualifying Exam Proposal – Guidelines
• §
• Comments on revised proposal provided to students 1 week prior to oral defense
• Oral defense will be scheduled between October 8 and October 19.
• Should a student fail on the first attempt he/she will be given 30 days to revise and defend again
• Second failure will result in student’s removal from the Program at the end of the current fall semester

Grading of the Qualifying Examination:

Qualifying Examination Committee = will consist of 4-5 members of the Cancer Biology PhD Program faculty. The committee will be selected and impaneled by the Program Director in June of each year and dissolved at the conclusion of the examination period. All members of the committee will be required to be present during the Oral Defense. Major Professors of students taking the exam are excluded from the committee.

The written presentation, oral presentation, and oral defense sections will be graded independently by members of the committee according to the criteria listed on the Qualifying Exam Evaluation Form. All three sections must be passed. To pass, the student needs an average score of 3 (out of 5) or better. The committee may elect to require the student to amend the proposal and/or repeat the oral defense to correct any deficiencies. It will be the responsibility of the committee to calculate the overall grade and determine whether the student passes or fails. Students failing this portion of the qualifying exam will be dismissed from the program at the end of the current semester.

Once the qualifying examination has been passed, students will
• submit an Admission to Candidacy form to the Dean of Arts and Sciences. Following admission to candidacy students must be registered for a minimum of two hours of Dissertation Research (BSC 7980 Dissertation Research) each semester. This form will not be accepted before the Dissertation Committee form is completed and approved by the University.
2. Specific Aims (1 page)

State concisely the goals of the proposed research and summarize the expected outcome(s), including the impact that the results of the proposed research will exert on the research field(s) involved. List succinctly the specific objectives of the research proposed, e.g., to test a stated hypothesis, create a novel design, solve a specific problem, challenge an existing paradigm or clinical practice, address a critical barrier to progress in the field, or develop new technology.

3. Research Strategy (6 pages)

The Research Strategy must address – Significance, Innovation, and Approach. Cite published experimental details in the Research Strategy section and provide the full reference in the Literature Cited section.

(a) Significance
• Explain the importance of the problem or critical barrier to progress in the field that the proposed project addresses.
• Explain how the proposed project will improve scientific knowledge, technical capability, and/or clinical practice in one or more broad fields.
• Describe how the concepts, methods, technologies, treatments, services, or preventative interventions that drive this field will be changed if the proposed aims are achieved.

(b) Innovation
• Explain how the application challenges and seeks to shift current research or clinical practice paradigms.
• Describe any novel theoretical concepts, approaches or methodologies, instrumentation or interventions to be developed or used, and any advantage over existing methodologies, instrumentation, or interventions.
• Explain any refinements, improvements, or new applications of theoretical concepts, approaches or methodologies, instrumentation, or interventions.

(c) Approach
• Describe the overall strategy, methodology, analyses, and interpretation to be used to accomplish the specific aims of the project.
• Discuss potential problems, alternative strategies, and benchmarks for success anticipated to achieve the aims.
• If the project is in the early stages of development, describe any strategy to establish feasibility, and address the management of any high risk aspects of the proposed work.
• Point out any procedures, situations, or materials that may be hazardous to personnel and precautions to be exercised.

Preliminary Data: You may use data that you have generated, data from your laboratory, data from the literature, or other sources as long as it is fully cited. Preliminary data should be used to support your hypothesis, rationale and/or feasibility. This should be included within the six page limit. (Additional preliminary data may be presented during your oral defense.)
Annual Progress Reports

All Cancer Biology Students must submit an Annual Progress Report to the Office of Cancer Biology (MRC 4072) by October 31st beginning the second year that they are enrolled in the program. The report will be presented to the Education Committee.

The following information is required as part of the students’ annual progress portfolio. Items should be submitted in the following order:

1. Research Progress (1/2 page)
2. Publications
3. Abstracts of Talks Given
4. Honors and Awards
5. Printout of all classes taken with grades assigned
6. List of courses taken during the year

Second year students should also include lab rotations completed and Committee members selected. A template is available on the Cancer Biology website in the Current Student subsection in “Forms”.

The Major Professor is required to complete an evaluation provide by the Cancer Biology office on the student’s performance and progress. Are they on track for graduation? What are their strengths? What do they need to improve on in order to succeed? After completing the report the Major Professor and student should discuss it so that the student understands their current status. This needs to be an honest evaluation. If the student has deficiencies it is important that it be addressed promptly so that all parties understand the circumstances and have an opportunity to improve. This report must be co-signed by the student and submitted to the Cancer Biology Program Administrator (MRC 4 East).

Students and Major Professors should retain a copy of the reports.

Annual Committee Meetings

Candidates are required to organize annual meetings of their Dissertation Committees. The purpose of these meetings is for the committee to evaluate the student’s progress toward the degree and to provide input and direction. Evaluation forms, available on the Program’s website under the “Students-Information and forms for current students” section as “Dissertation Committee Meeting Report Form”, should be completed at each meeting, signed by the members.
of the committee, discussed with the student and then submitted to the Cancer Biology Education office.

**Stipends**

*Full tuition and fee waivers are provided. The Cancer Biology Program covers student health insurance premiums. In addition, each first year student receives a stipend of $28,000 per year (2019-2020). A $1,000 enrollment bonus is given to 1st year students after completion of the first 2-4 weeks of the fall semester. 2nd year students and above will receive a $29,000 annual stipend. Stipend levels are reviewed every three years and market adjustments are made if necessary. As noted in the Student-Major Professor Selection and Commitment form, stipend support beyond five years from the time of admission (not counting leave of absences) is not guaranteed.*

Incoming students are appointed as Graduate Research Assistants and supported from Program funds for their first year only. Beginning the second year, the major professor will henceforth be responsible for providing stipend for the student. Tuition, tuition fees, and health insurance will continue to be paid by Cancer Biology Programmatic Funding. **All students are encouraged to apply for funding from outside sources.**

**Outside employment for students who are receiving stipends is strictly prohibited.**

**Teaching Opportunities**

Students admitted to the Cancer Biology Program are appointed as Graduate Research Assistants/Associates. Opportunities for teaching experience on a voluntary basis exist primarily in the Cancer Biology course or in the Biology Department.

Requests for teaching opportunities should be sent to the Program Office via email.

**Fellowships**

**Purpose:**
The Cancer Biology Program encourages all students to apply for funding. This includes pre-doctoral fellowships and other research support. Pre-doctoral fellowship awards are very prestigious both for the individual student and for the Program. Students should consider applying as soon as possible after selecting a mentor since many pre-doctoral awards are not available after the student completes their second year. Other types of research awards are also valuable in building the student’s career and supporting their research efforts.

In an effort to (a) encourage and reward successful applications, (b) maintain consistency across the program and (c) avoid confusion between the expectations of the mentor and student, the following policy has been established.

**Policy Statement (revised as of November 22, 2016):**
1. A student who acquires funding for his/her stipend will receive the greater of:

A 10% bonus over their current stipend for the duration of the award. The bonus is not to exceed the amount of the award. The Major Professor is responsible for providing the bonus to the student.

OR

The entire amount of the Fellowship, if that amount is greater than the current stipend and bonus combined.

Should the fellowship stipend be less than the corresponding stipend level within the Cancer Biology Program for the student, the Major Professor will be required to fund the difference so that the student will remain on par with his/her peers. This funding would be reviewed and adjusted as necessary on an annual basis.

2. A student who receives individual research funding that does not include stipend will receive a bonus based on the following:

A salary bonus equal to 10% of the award amount but not to exceed 10% of the student’s current stipend.

The Major Professor is responsible for providing the bonus to the student.

Parental Leave

Purpose:
To provide guidelines for addressing maternity leave requested by Graduate Students in the Cancer Biology Ph.D. Program.

Definitions:

Student – For the purpose of this policy, “student” will refer to a USF student currently enrolled in the Cancer Biology Ph.D. Program.

Policy Statements:

Eligibility:

A. Students must have completed at least 2 consecutive semesters as a Cancer Biology Graduate Research Assistant/Associate or as a USF Presidential Fellow.

B. Students must be in good academic standing.

The student must notify the Cancer Biology Program Director and their major professor in writing as soon as possible but no later than 4 months prior to expected delivery of child.
If the student is the birth mother, then she will be eligible for 6 weeks paid leave. If the student is the birth father, he will be eligible for 3 weeks paid leave. Adoptive parents will be eligible for 3 weeks paid leave.

During leave, the student will remain registered as a full time student. The student (in consultation with the Cancer Biology Program Office) must assure that she/he will not be registered for courses in which their absence will result in a failing or incomplete grade. Students may register for Directed Research or Dissertation Research.

If necessary, Ph.D. qualifying examinations will be postponed until the semester following the student’s return from parental leave.

Once the birth mother returns to lab related work, she may request that responsibilities be scaled back to a minimum of 20 hours per week while receiving full pay for up to 4 additional weeks. The mentor and student will determine a mutually satisfactory part-time schedule prior to the student’s return to the lab.

The Cancer Biology Ph.D. Program will provide the stipend during the initial parental leave and one half of the stipend during the period the student elects to scale back to 20 hours per week. The Major Professor will be responsible for the other half of the stipend during the scale back period of 20 hours per week.

This funding mechanism is available only twice for each student.

**Travel Awards**

*This program will be renewed annually, contingent on the availability of funds.*
*To be eligible you must be a student in the Cancer Biology Ph.D. program.*

For a meeting to qualify for this award, it must be either:

1) A scientific conference in which you are presenting an abstract as first author OR

2) A respected scientific course (i.e. Cold Spring Harbor). *Training courses run by companies to instruct you in the use of their equipment do not qualify.*

The Cancer Biology Ph.D. program will grant one travel award per student per calendar year. There will be no restriction on the destination but the award will be capped at $1,000. The student’s faculty mentor will be required to meet any expense beyond the $1,000 limit.

Students will make every effort to minimize costs and all travel arrangements must be made through the Program Administrator. The standard USF travel *per diem* will apply.

Any student who accepts the award is required to submit a written meeting report within three weeks of his or her return. This report should summarize what the student has learned at the meeting and how this will benefit his or her research and/or career. The student must also submit
a copy of the meeting schedule and all documentation requested for reimbursement purposes at this time.

How to Apply:

Complete the Travel Award Request form available on the Cancer Biology website: [http://cancerbiology.usf.edu](http://cancerbiology.usf.edu), go to the “Resources” section, then select the Travel Award form from the list in the “Current Students” section. Submit with necessary travel dates/times to Program Administrator, MRC 4-E.

If requesting payment of registration fees, please have all necessary documents to the Program Administrator at least 4 weeks prior to any published deadlines.

### Requirements for Degree Conferment

#### Publication Requirement

Students must have *at least* one paper (*first author*) accepted for publication in a peer-reviewed journal. Generally, it is expected that students surpass this requirement by publishing numerous papers. If questions are raised regarding whether or not a paper qualifies to meet this publication requirement, the final decision will be determined by a majority vote of the dissertation committee. *This paper must reflect the student’s own, original work.*

#### Research-In-Progress Seminars

Each Ph.D. candidate is required to present a minimum of two formal seminars to the Moffitt Cancer Center Faculty or at national meetings. This may be incorporated into the formal Cancer Biology Student Seminar Series (CBSSS) or arranged by the Program Administrator, specifically to fulfill this requirement. It is the student’s responsibility to contact the Program Administrator in their third and fourth years to insure that they are scheduled. The final defense seminar does **not** count toward this requirement.

#### Curriculum Requirements:

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Dissertation and Oral Examination

Once a candidate has met all program requirements and the Major Professor has reviewed and approved the student’s dissertation draft, the candidate should submit his or her dissertation draft to each member of the previously appointed Dissertation Committee. Once the committee members have had at least two weeks to review the dissertation draft, the committee should meet to decide whether the dissertation draft is approved or disapproved. The Dissertation Committee may approve the draft as written, or approve with the stipulation that the student complete minor modifications to the existing draft. If extensive modifications are required, the student must modify the draft and begin the review process again by resubmitting the draft to the Major Professor and then to the members of the Dissertation Committee.

When the Dissertation Committee has approved the dissertation draft, they will complete a form requesting the announcement and scheduling of the Dissertation Oral Defense examination. This form must be submitted to the College of Arts and Sciences for approval. The Dean must receive the form at least three weeks prior to the dissertation defense. In addition, the oral defense of the dissertation must be held at least three weeks prior to the end of the semester for the student’s degree to be confirmed at the end of that semester.

The Chairperson of the Dissertation Defense Committee will be from outside of the USF community and should be an expert in the student’s field of interest. The student and Major Professor will confer and select a dissertation defense chair. This Chairperson must be approved by the Cancer Biology Program Director, the Associate Dean of CAS, Dean of the Office of Graduate Studies and the Associate Dean of the Office of Graduate Studies.

The Dean of the Office of Graduate Studies must approve all Dissertations prior to conferment of the Ph.D. degree. Detailed information may be found at the following URL:

   http://www.grad.usf.edu/ETD-res-main.php

The Office of Graduate Studies will not accept a dissertation after the first day of a semester unless the candidate is enrolled in the appropriate dissertation course for at least 2 credit hours. All dissertations are to be submitted to the University electronically.
Dissertation Policies

Format of the Dissertation Thesis

Purpose:
To provide uniformity to the dissertation theses produced by the graduates of the Cancer Biology Ph.D. Program. Bound copies of dissertations written by graduates are available in the Program Office for review.

Policy Statements:

A. The format of the dissertation will follow the traditional style; use of the ETD Alternate Format is not allowed. Example of the traditional format as required by the USF Office of Graduate Studies can be found at this link:

   http://www.grad.usf.edu/ETD_Section_00_Formatting.php

B. The outside chair for the dissertation defense will be included in the “Acknowledgement” section of the thesis. The outside chair’s full name followed by his degree designation (Ph.D., M.D.) and the institute where he is currently on faculty should all be noted as well as any other relevant information.

C. Full citations containing all authors and full titles will be used in the “Reference” section of the thesis, not the abbreviated form containing the first author’s name followed by “et al”.

D. The binding and lettering of the final approved thesis is provided by the Program and required to match as closely as possible those dissertations of earlier graduates. The student will provide the Program Administrator with a copy of the final dissertation for printing and binding.

E. The Program will provide binding three (four if there is a Co-Major Professor) copies of the dissertation thesis. One copy will be kept in the Cancer Biology Program Office, one copy will be presented to the Major Professor and one copy is for the student.

Time Limits Policy

Policy: Time Limitation on Funding Support

Purpose: To clarify existing policy and establish criteria for continued funding beyond 5 years of study.

Policy Statements:

To qualify for their dissertation defense and ultimately graduation, Cancer Biology PhD students are required to show proficiency, distinctive achievement, demonstrate the ability to do original
independent cancer research and document this achievement with at least one first author peer reviewed scientific publication. These qualifications and a successful dissertation defense should be reached within 4-6 years of admittance to the Program.

1. Stipend support and tuition/fee payments beyond 5 years from time of admission (not counting leave of absences) will be subject to annual review.

2. If a student expects to require continued funding beyond 5 years the student must submit an application of continued support for approval by the Cancer Biology Education Committee. The application procedure is:

   a. Submit a written application to the Education Committee no later than July 15th preceding the beginning of the Fall semester of the 6th year.
   b. The application must include clear statements of progress toward graduation, requirements completed and a clear plan with a time line for achieving the graduation requirements.
   c. The application must be signed by the student and include signatures of the mentor and all committee members indicating receipt of a copy of the application. (Note: Mentor and committee member signatures do not indicate support for the application, only acknowledgement that they are aware the application is being made.)
   d. The mentor must submit a separate letter to the Education Committee indicating his/her support or lack of support for the application. If supporting the application, the letter should also state a willingness to continue to fund the student’s stipend for an additional year. If co-mentors are involved, both should submit letters.
   e. The Education Committee may also request letters from the other dissertation committee members.
   f. If the application is approved it will be valid for one academic year. Additional years of extended funding will required a new application for each year.
   g. If the application is denied the student may appeal the finding or request one year of continued enrollment in the program without financial support (in this case the student will become responsible for cost of tuition and will not receive a stipend).

3. USF Graduate School Policy - Students have 7 academic years after admission into USF to successfully defend their dissertation. If the student needs additional time, the student must submit a request for an extension to the Graduate School. Procedures are available on the USF Graduate Studies web site.
Appendices