Cell Biology, Genetics, and Molecular Medicine (CGM) Discipline
Discipline-specific Guidelines and Curriculum

Cell Biology, Genetics, and Molecular Medicine Discipline of the IBMS Graduate Program
Cell Biology, Genetics, and Molecular Medicine (CGM) is one of the 7 disciplines of the Integrated Biomedical Science (IBMS) program. Members of the Cell Biology, Genetics, and Molecular Medicine Discipline share common research interests (see section G for the CGM faculty listing). Students of the Cell Biology, Genetics, and Molecular Medicine Discipline will gain the broad knowledge and skills necessary for future careers in various areas of Cell Biology, Genetics, and Molecular Medicine basic and translational research.

A. Cell Biology, Genetics, and Molecular Medicine Discipline Executive Committee (DEC) Membership

All members of the CGM DEC are appointed members of the IBMS Graduate Program:

P. Renee Yew, PhD, Associate Professor of Molecular Medicine, CGM Discipline Director and Graduate Advisor
Robin Leach, PhD, Professor of Cellular Systems and Anatomy, CGM Discipline Co-Director and Chair of IBMS Curriculum Committee
Teresa Johnson-Pais, PhD, Associate Professor of Urology, CGM Recruitment Committee Chair
Rita Ghosh, PhD, Associate Professor of Urology, Chair, CGM Qualifying Examinations
Ellen Kraig, PhD, Professor of Cellular Systems and Anatomy, Member, IBMS Curriculum Committee for CGM
Philip LoVerde, PhD, Professor of Biochemistry, Member
Larry Jay Morris, PhD, Assistant Professor/Research of Molecular Medicine, Member, IBMS Admissions Committee for CGM (Year 1) - Tentative
Pamela Larsen, PhD, Associate Professor of Cellular Systems and Anatomy, Member, IBMS Admissions Committee for CGM (Year 4)
Mengwei Zang, PhD, Associate Professor of Molecular Medicine, Member, IBMS Admissions Committee for CGM (Year 3)
Sadiya Ahmad, IBMS-CGM Graduate Student and IBMS Student Council Representative for CGM, Member

Responsibilities: The Discipline Executive Committee will ensure that Cell Biology, Genetics, and Molecular Medicine Discipline trainees and faculty follow the guidelines, requirements and expectations of the IBMS Graduate Program as described in the IBMS Handbook and the CGM Guidelines. In this role, the DEC will review pertinent policy considerations and curriculum of the CGM, and will monitor and evaluate student academic progress, approve the appointment of Supervising Professors, and approve the memberships of Qualifying Exam and Dissertation Supervising committees. The DEC will also mediate disputes between students and Supervising Professors. The Director of the CGM discipline will present matters to the DEC for consideration and actions typically will be made with its consent.

Communication: The CGM DEC will communicate with discipline faculty members and trainees regarding decisions affecting CGM discipline policies and procedures. In order to guarantee the efficient operation of the Cell Biology, Genetics, and Molecular Medicine Discipline, the following CGM Coordinating Team will be responsible for ensuring the necessary communication among the CGM DEC, CGM faculty, and key administrators:

Discipline Directors, Cell Biology, Genetics, and Molecular Medicine:
P. Renee Yew, Ph.D., yew@uthscsa.edu
Robin Leach, Ph.D., leach@uthscsa.edu

Academic Program Coordinator:
Magdalene Madla, Academic Program Coordinator, madlam@uthscsa.edu

B. Conducting the Business of the Cell Biology, Genetics, and Molecular Medicine Discipline

In concordance with the responsibilities and functions described in the IBMS Handbook, the Discipline Executive Committee (DEC) for the Cell Biology, Genetics, and Molecular Medicine Discipline of the Integrated Biomedical Sciences (IBMS) Graduate Program, is empowered by the Bylaws of the Graduate Faculty Assembly and the Graduate Faculty Council of the Graduate School of Biomedical Sciences to administer the policies and procedures of the IBMS Ph.D. Graduate Program. The CGM DEC, consisting of selected members of the Discipline faculty, acts on such matters as curriculum, student recruitment and admissions, student progress, assignment of Supervising Professors, mediation of disputes between students and Supervising Professors, reviewing qualifications for membership on the discipline Graduate Faculty, and other pertinent policy considerations.

CGM Discipline Executive Committee Meetings:
The CGM DEC will meet at least quarterly (every 3rd Tuesday at 9:30-10:30 am in the Biochemistry Conference Room, 425D MED) unless it is necessary and appropriate to call for an interim meeting to discuss and/or vote on major time-sensitive issues regarding CGM discipline students. Such time-sensitive issues include, but are not limited to: proposing a recommendation to dismiss a student from the program; consideration of a recommendation to remove an individual from the CGM Discipline Graduate Faculty; major curriculum changes; mediation of serious disputes involving students and/or faculty members of the CGM discipline; consideration of other substantive changes to the program.

Procedures of CGM DEC meetings include:
Rules of Procedure*:* Robert's Rules of Order for small groups governs the conduct of DEC meetings.
Agenda: Copies of the meeting agenda will be sent to DEC members prior to a meeting. No action will be taken at a DEC meeting unless the item of business was on the published agenda.
Voting*:* At meetings, a quorum of voting DEC members must be present to conduct a meeting. A simple majority constitutes a quorum. For routine matters, voting may be conducted between scheduled meetings of the DEC by electronic mail. A simple majority of the entire membership is required to pass a motion. Votes that are not returned are considered abstentions unless otherwise stipulated in the email requesting the vote. Decisions typically made by e-mail vote include: Approval of students' supervising committees and professors; approval of qualifying exam questions and committees; approval of dissertation proposals and waiving certain departmental requirements. Any member of the DEC who considers that an action requires discussion may request a meeting of the committee.
Minutes: The CGM DEC Discipline Director will note the outcomes and decisions made at DEC meetings, but not formal minutes will be recorded.

Amending the operating procedures of the CGM Discipline Executive Committee:
Changes to these Operating Procedures may be suggested, in writing, to the Discipline Director by any CGM Discipline Graduate Faculty Member. The suggested amendment shall be considered by the DEC following normal procedures for voting. If the amendment is approved by the DEC, the Discipline Director will send an appropriate memo to all members of the CGM Discipline Graduate Faculty to inform them of the revision and will amend these operating procedures accordingly.

C. Plan of Study of the Cell Biology, Genetics, and Molecular Medicine Discipline

The following summarizes the CGM Discipline Plan of Study. Further details that apply to all students of the IBMS Graduate Program may be found in the IBMS Handbook.

It is the responsibility of each CGM student to adhere to the responsibilities and timeline and to submit all paperwork required to verify appropriate academic progress in this Plan of Study of the CGM Discipline of the IBMS Ph.D. Program. A delay in the progression described below could result in a student receiving a grade of Unsatisfactory ("U") for academic/research progress. Extreme or extenuating circumstances resulting in such a delay may allow temporary exemption from this requirement only if approved by the CGM DEC.

Note that there are required IBMS courses taken by all students of the IBMS Graduate Program, as well as specific required courses taken by students in the Cell Biology, Genetics, and Molecular Medicine Discipline of the IBMS program. Advanced elective courses can be selected from the listed curriculum or the curricula of any of the IBMS disciplines. Full-time student status requires a minimum of 12 credit hours per semester; 72 total credit hours must be accrued prior to graduation.

Cell Biology, Genetics, and Molecular Medicine (CGM) Discipline Plan of Study

Year 1

Fall semester

IBMS 5000 Fundamentals of Biomedical Sciences (required for all GSBS students)	8.0 SCH
TSCI 5070 Responsible Conduct of Research	2.0 SCH
IBMS 5008 Laboratory Rotations	3.0 SCH
	TOTAL 13.0 SCH

Spring semester

CGM Advanced Core Courses (see following page for list)	4 SCH
CSAT 5089 Colloquium	2 SCH
CSAT 5095 Experimental Design and Data Analysis	3 SCH
IBMS 6090-4CGM Seminar	1.5 SCH
IBMS 6097-4CGM Research*	1.5 SCH
*Replace with IBMS 5008 Laboratory Rotations (1-3 SCH) for additional rotations if needed.	**TOTAL 12.0 SCH**

Year 2

Fall semester

CGM Advanced Elective Courses (see following page for list)	0-2 SCH
IBMS 7010-4CGM Student Journal Club & Research Presentation***	1.0 SCH
IBMS 6090-4CGM Seminar	1.5 SCH
CSAT 5077 Scientific Writing	2 SCH
CSAT 6005 Rigor and Reproducibility	1 SCH
IBMS 6097-4CGM Research	4.5-6.5 SCH
	TOTAL 12.0 SCH

Spring semester

CGM Advanced Elective Courses (see page 3 for list)	0-2 SCH
IBMS 7010-4CGM Student Journal Club & Research Presentation***	1.0 SCH
IBMS 6090-4CGM Seminar	1.5 SCH
IBMS 7001-4CGM Qualifying Examination	1.0 SCH
IBMS 6097-4CGM Research	6.5-8.5 SCH
	TOTAL 12.0 SCH

Year 3

Fall semester

CSAT 6071 Supervised Teaching (optional elective)[&]	0-2 SCH
IBMS 7010-4CGM Student Journal Club & Research Presentation***	1.0 SCH
IBMS 6090-4CGM Seminar	1.5 SCH
IBMS 6097-4CGM Research	8.5-9.5 SCH
	TOTAL 12.0 SCH

Spring semester

CSAT 6071 Supervised Teaching (optional elective)[&]	0-2 SCH
IBMS 7010-4CGM Student Journal Club & Research Presentation***	1.0 SCH
IBMS 6090-4CGM Seminar	1.5 SCH
IBMS 6097-4CGM Research	7.5-8.5 SCH
	TOTAL 12.0 SCH

Year 4

Fall semester

IBMS 7010-4CGM Student Journal Club & Research Presentation***	1.0 SCH
IBMS 6090-4CGM Seminar	1.5 SCH
IBMS 6097-4CGM Research	6.5 SCH
IBMS 7099-4CGM Dissertation**	3.0 SCH
	TOTAL 12.0 SCH

Spring semester

IBMS 7010-4CGM Student Journal Club & Research Presentation***	1.0 SCH
IBMS 6090-4CGM Seminar	1.5 SCH
IBMS 6097-4CGM Research	6.5 SCH
IBMS 7099-4CGM Dissertation**	3.0 SCH
	TOTAL 12.0 SCH

Year 5 (and beyond if applicable)

Fall semester

IBMS 7010-4CGM Student Journal Club & Research Presentation***	1.0 SCH
IBMS 6090-4CGM Seminar	1.5 SCH
IBMS 6097-4CGM Research	6.5 SCH
IBMS 7099-4CGM Dissertation**	3.0 SCH
	TOTAL 12.0 SCH

Spring semester

IBMS 7010-4CGM Student Journal Club & Research Presentation***	1.0 SCH
IBMS 6090-4CGM Seminar	1.5 SCH
IBMS 6097-4CGM Research #	6.5 SCH
IBMS 7099-4CGM Dissertation (Final Hours if applicable)** #	3.0 SCH
	TOTAL 12.0 SCH

** A minimum of 2 semesters of IBMS 7099-4CGM (Dissertation) is required for graduation. A student may begin enrolling in IBMS 70994CGM once the Dissertation Research Proposal and the Dissertation Supervising Committee membership are approved by the GSBS Dean.

*** IBMS 7010-4CGM is a continuous requirement beginning in the Fall semester of the second year until the preceding semester of the dissertation defense.

[#] Final Hours for 3.0 SCH may be applicable for the final semester.

[&] Supervised Teaching is not a requirement, but can be taken as an elective typically during Year 3, but can also be taken in Year 2 or other years. Research credit hours can be adjusted as needed to maintain a total of 12 semester credit hours.

CGM Advanced Core Courses (4 SCH required)

Students will choose from among these required core courses to total 4 credit hours.

Please note: Students may opt to take CSAT 6064 or INTD 5007 or they may opt to mix and match any of the individual modules from either course to total a final of 4 SCH.

1. CSAT 6064-Genes and Development (4 SCH) (Spring semester only)
   Comprised of 4 modules: CSAT 5025-Genetics (1 SCH) (Kraig, Walter)
   CSAT 5024-RNA Biology and Genomics (1 SCH) (Penalva and Morita)
   CSAT 5023-Development (1 SCH) (Wang)
   CSAT 6059-Stem Cells and Regenerative Medicine (1 SCH) (Kokovay)

2. INTD 5007-Advanced Cell and Molecular Biology (4 SCH) (Spring semester only)
   Comprised of 2 modules: INTD 6009-Advanced Molecular Biology (2 SCH) (Yew)
   INTD 6007-Advanced Cell Biology (2 SCH) (Sun)

CGM Advanced Elective Courses (4 SCH required)

Students may choose from among the following elective courses to total 4 credit hours. Although students may choose from among any courses offered at the UTHSCSA with the approval of the CGM discipline directors, the following list of courses may be of special interest to CGM students.

Additional CGM core courses in any combination:
CSAT 6071-Supervised Teaching (1-2 SCH) (Ran)
CSAT 5025-Genetics (1 SCH) (Spring semester only)
CSAT 5024-RNA Biology and Genomics (1 SCH) (Spring semester only)
CSAT 5023-Development (1 SCH) (Spring semester only)
CSAT 6059-Stem Cells and Regenerative Medicine (1 SCH) (Spring semester only)
INTD 6009-Advanced Molecular Biology (2 SCH) (Spring semester only)
INTD 6007-Advanced Cell Biology (2 SCH) (Spring semester only)

Other discipline and departmental courses in any combination:
BIOC 6036-Macromolecular Structure & Mechanism (2 SCH)
BIOC 6037-Integration of Metabolic Pathways (2 SCH)
CSAT 5007-Methods in Cell Biology, (1 SCH)
CSAT 5083-Practical Optical Microscopy (1 SCH)
CSAT 6021-Animal Models (3 SCH)
CSAT 6049-Biology of Aging: Molecular and Cellular Homeostasis (2 SCH) (Spring semester only)
CSAT 6050-Biology of Aging: Systems Homeostasis and Aging (2 SCH) (Spring semester only)
CSAT 6068-Cancer Biology Core I (2 SCH) (Spring semester only)
CSAT 6069-Cancer Biology Core II (2 SCH) (Spring semester only)
CSAT 6074-Molecular Aspects of Epigenetics, (2 SCH)
CSAT 6095-Functional Genomic Data Analysis, (2 SCH) (Spring semester only)
INTD 6008-Mitochondria and Apoptosis (1 SCH) (Fall semester only)
INTD 5040-Fundamentals of Neuroscience (2 SCH)
MICR 5025-Eukaryotic Pathogens (1 SCH) (Spring semester only)
MICR 5026-Pathogenic Microbiology (1 SCH) (Spring semester only)
MICR 5028-Virology (1 SCH) (Spring semester only)
MICR 6052-Immunology (3 SCH) (Spring semester only)
MMED 6016-Advanced Molecular, Cellular, and Synthetic Biology (4 SCH) (Fall semester only)
MMED 5015-Modern Methods in Molecular Analysis (2 SCH) (Fall semester only)
PHAR 5013-Principles of Pharmacology (3 SCH)
PHYL 5041-Mammalian Physiology: Excitable Membranes (1 SCH)

CGM Course Descriptions

CSAT 5089: Graduate Colloquium

This course is designed to provide graduate students the opportunity to develop their skills in oral presentation. The course will focus on critical thinking, clear and concise presentation of research endeavors, and communicating science to other scientists. Each student will present 3 papers of his/her own choice in 30 minute “journal club style” seminars (at the discretion of the instructors, the final presentation may be excused if the student has performed exceptionally well in his/her first two presentations). Following each presentation, the class members, TAs, and instructors will provide constructive input designed to identify strengths and weaknesses with the long-term goal of improving presentations skills.

INTD 5007/INTD 6009: Advanced Molecular Biology
This is an 8-week course that represents one-half of the current course of INTD 5007, Advanced Cell and Molecular Biology. This module is focused on Advanced Molecular Biology and may be taken separately as an individual module. Topics will include: The nucleus; DNA structure, replication, damage, repair, recombination, and rearrangements; the nucleolus and RNA processing; microRNAs; transcription, chromatin and epigenetics; protein synthesis and modifications; and proteolysis. This advanced course provides a unique learning experience that prepares the student to evaluate and design new research in the cutting-edge areas of modern cell and molecular biology. The entire course comprises a small-group format in which students interact closely with a group of faculty members who have active research programs. For each topic, faculty will provide students with an overview of the research area. Students and faculty will then jointly discuss key publications that serve to bridge the gap between the student's prior understanding of the field and the state of the art in that research area.

INTD 5007/INTD 6007: Advanced Cell Biology
The course provides an in-depth learning experience that instructs students on the fundamentals of cell biology as well as prepares the students to evaluate and design new research in the cutting-edge areas of modern cell biology. The course combines a didactic program of lectures along with a small-group discussion format in which students interact closely with a group of faculty who have active research programs. The course focuses on active areas of research in cell biology: Protein Processing, Cell Membrane and Ion Movement, Cell Signaling, Adhesion, and Communication, Cell Growth, and Cell Death. Each week, the faculty provides students with didactic lectures on a current research area. Students and faculty then jointly discuss key publications that serve to bridge the gap between the fundamental underpinnings of the field and the state of the art in that area. By the end of the course, the students should have a comprehensive understanding of how a cell functions as a living unit and be able to apply gained knowledge to the dissection of cellular mechanisms contributing to various physiological and pathological states.

CSAT 5025: Genetics
This course is designed to provide an overview of current topics in genetics with a focus on mammalian systems. Topics to be discussed include: cytogenetics and chromosome dynamics, mitochondrial genetics, mutagenesis and genomic instability, programmed gene rearrangements and transposable elements, imprinting, genetic variation, linkage and methods for analyzing, population genetics, gene and cell-based therapies, and principles of rodent genetics.

CSAT 5024: RNA Biology and Genomics
The Genomics course will provide an overview of OMICs methods commonly used in biomedical research, databases and analysis platforms. The course is very dynamic; besides lectures given by experts, students will participate in journal clubs and will give presentations on relevant topics. Instead of a formal exam, students are invited at the end of the course to develop a research proposal in which they will apply genomics methods learned in class to solve a biological question of their interest. We expect students to leave the course with a broad view on genomics and its research and clinical applications and develop skills to use genomic methods in their current and future research.

CSAT 5023: Development
Developmental biology is the study on how a single cell develops to an organism. It is one of the most exciting fields in biology, creating a framework that integrates molecular biology, physiology, cell biology, anatomy, cancer research, neurobiology, immunology, ecology, and evolutionary biology. The study of development has become essential for understanding any other area of biology. The course mainly focuses on development of several animal models including mouse, Drosophila, and C. elegans.

CSAT 6059: Stem Cells and Regenerative Medicine
The fields of stem cells and regenerative medicine are rapidly evolving and have great potential to change the way medicine is practiced. This course will encompass topics from basics of tissue specific stem cell biology to pre-clinical animal models, strategies and progress in regenerative medicine.

IBMS 6090-4CGM: Seminar
Students are required to attend a minimum of 16 faculty (not student or post-doctoral) research seminars during the semester. Students are free to choose any faculty seminars of interest and can even attend seminars at UTSA and TBRI. Additionally, students can receive 1 seminar credit per research symposium or workshop they attend. Near the end of each semester, in order to receive a satisfactory grade, students must submit either a Word or Excel file to the course director documenting the seminars they attended along with a very brief description of what they learned.

IBMS 7010-4CGM: Student Presentation and Journal Club
Student Presentation - Students are given credit for attending student presentations in CGM as well as in other graduate programs or disciplines (IMGP, IBMS, etc). Students are required to give a research update or dissertation proposal presentation once per year.
Journal Club - There are several journal club opportunities for CGM students and students can attend any journal club that has been approved by the course director. Pre-approved journal clubs include the following: Cell Biology, Genetics, and Molecular Medicine, Stem Cells, Cancer Biology, Aging, Microbiology and Immunology, Cancer Immunology, Brain Health, and Neuroscience
Grading in IBMS 7010-4CGM - To receive a satisfactory grade, students must attend a total of 16 presentations (journal club and/or student presentations) and give at least one presentation (journal club or research presentation) each semester. Students must keep track of their attendance and send documentation to the course director near the end of the semester.

IBMS 7001-4CGM: Qualifying Examination
IBMS 7001-4CGM (Qualifying Exam; QE) The mock and QE are closed book exams. Five faculty members chosen from the discipline and based on expertise in the area of the student's proposal will serve on the mock and QE committee. The course director and a member of the CGM leadership committee (3-year term) will serve as permanent members of the committee. The student will present a 10 minute PowerPoint of the proposal developed in CSBL 5077. An oral defense of the proposal will examine the student's problem-solving processes and the soundness of the student's experimental design. Questions will also test the general knowledge of the student on topics related to Cell Biology, Genetics, and Molecular Medicine as well as topics covered in the student's IBMS courses.

D. Evaluation of Academic Progress for CGM Students in addition to the evaluation of academic progress described in the IBMS Handbook

Students of the Cell Biology, Genetics, and Molecular Medicine Discipline of the IBMS Graduate Program are required to present their work to their Dissertation Supervising Committees at least once per semester allowing regular assessments and monitoring of their progress. In addition, each trainee is required to present a formal seminar, first for approval of the student's Dissertation Research Proposal, and then annual research updates as part of IBMS 7010. Furthermore, trainees are encouraged to apply for individual pre-doctoral fellowship grants.

E. Cell Biology, Genetics, and Molecular Medicine Qualifying Examination Process (CGM specific changes or additions are highlighted in yellow)

Mock Qualifying Examination: In the CGM Discipline, students will have a Mock Qualifying Examination (QE) during the beginning of the spring semester of IBMS 7001-4CGM (Jan-Feb). During the Mock QE, students will defend their qualifying examination proposals (see more detail about the proposal below) in front of five members of the QE Committee comprised of the QE Course Director, a CGM Discipline Executive Committee member, and 3 IBMS faculty members with expertise in the research area of the proposal. The mentor will not be in attendance at the Mock QE. Then mentor will not participate in the QE, but will be present as a silent observer. The Mock QE will be conducted similarly to the QE except that the student will not receive a formal grade for the mock QE. The student

will receive written critiques of the written proposal and oral Mock QE. The student will submit a revised proposal along with an introduction page addressing the specific criticisms within 6 weeks of receiving the written critiques. The student should use the written critiques to prepare for the QE, but during the QE, any questions can be asked related to the proposal or general knowledge related to Cell Biology, Genetics, or Molecular Medicine (questions from the Mock QE may be asked again or new questions unrelated to those asked during the Mock QE may be asked).

IBMS 7001-4CGM (Qualifying Examination) 1.0 SCH

Objective: The purpose of the Qualifying Examination (QE) is to determine if a student has met programmatic expectations with regard to: i) Acquiring a level of scientific reasoning and a knowledge base in his/her field of study appropriate for a graduate student at the current stage of training; ii) Demonstrating skills of problem-solving and development of experimental strategies designed to test hypotheses associated with a specific scientific problem; and iii) Demonstrating the ability to defend experimental strategies proposed for solving scientific problems. Successful completion of the QE is required for Advancement to Candidacy and continuation in the IBMS Ph.D. program.

Modular Structure: IBMS 7001 is divided into 7 modules that are overseen by the 7 IBMS Disciplines as follows: IBMS 7001-2BA Biology of Aging; IBMS 7001-3CB Cancer Biology; IBMS 7001-4CGM Cell Biology, Genetics & Molecular Medicine; IBMS 7001-5III Infection, Inflammation & Immunity; IBMS 7001-6MBB Molecular Biophysics & Biochemistry; IBMS 7001-7NS Neuroscience; IBMS 7001-8PP Physiology & Pharmacology. Each IBMS Discipline is responsible providing its students with a detailed description of the examination process, and for ensuring that the programmatic expectations and goals of the QE are met.

Expectations: A student's Discipline Director/Academic Advisor will indicate in which of the IBMS 7001 modules the student should enroll. The QE will be administered by faculty members of a student's IBMS discipline during the Spring semester of Year 2 (4th semester overall) of each student's program of study. Deviations from this schedule are possible only if approved by a student's Discipline leadership in consultation with the student's Supervising Professor, followed by the approval of the Executive Committee on Graduate Studies. A student who delays taking the QE in the appropriate semester will receive a grade of Incomplete (I) until the exam is completed. Each IBMS discipline will determine the minor details required for the administration of the QE process for its students so as to achieve the goals of the discipline while satisfying the expectations of the IBMS graduate program. Minimal expectations in the design and administration of the QE include: 1. Prior to initiation of the QE, the expectations and process of the exam will be provided to the students. 2. Members of the IBMS Graduate Faculty will be identified and approved by the Discipline leadership who will serve as the QE Committee and who will administer and report outcomes of the examination. In CGM, the QE Committee is comprised of the QE Course Director, a CGM Discipline Executive Committee member, and 3 IBMS faculty members with expertise in the research area of the proposal. The mentor will be in attendance at the QE as a silent observer. 3. A relevant unsolved problem in the biomedical sciences will be identified that is approved by the Discipline QE Committee (or QE Course Director) and will serve as the basis for the examination. The QE question must be based on an idea conceived and developed by the student, and must not duplicate any aims in his/her mentor's active or pending grants. Discipline specific guidelines for CGM: The QE proposal should not be related to the mentor's primary research or to the student's thesis research and the student should not solicit help on the written QE from the Supervising Professor. Not required for CGM: A written declaration from the student to the examination committee clarifying the relationship between the proposed research and that of the student's Supervising Professor's research. 4. A hypothesis-driven research proposal will be written by the student that describes experimental strategies for solving the QE problem. 5. An oral defense-of-proposal will examine the student's problem-solving process and the soundness of the student's experimental design. Questions may also test the general knowledge of the student on topics related to Cell Biology, Genetics, and Molecular Medicine or covered in the student's IBMS courses.

Grading: Following the oral defense of the proposal, the QE faculty committee will discuss the outcome and determine if the student will receive a designation of Satisfactory with Honors, Satisfactory, or Unsatisfactory based on clear criteria set by the discipline to satisfy the expectations of the discipline and the IBMS graduate program. This grade, posted for the IBMS 7001 course, should represent the

consensus of the examination committee. In addition, a report should be submitted by the chair of the QE committee to the Discipline leadership indicating the outcome of the exam and any recommendations that may be required to foster the academic progress of the student.

- In the event that a student passes the QE, a grade of Satisfactory (S) or a grade of Honors (H) will be posted on the Registrar's grade site. In the CGM Discipline, there may be rare cases where the QE committee decides that the student has a deficiency in a specific examination area and may ask the student to complete a task before receiving a satisfactory grade (conditional pass). If this is the case, specific written instructions and a deadline will be given to the student.
- In the event that a student fails the QE, a grade of Unsatisfactory (U) may be posted. Alternatively, a grade of Incomplete (I) may be posted, and a maximum of one remediation examination will be allowed. If a student successfully passes the second attempt, the grade of "I" will be changed to Satisfactory (S).
- If a student fails the QE a second time, a grade of Unsatisfactory (U) will be posted. The report from the QE committee to the Discipline leadership should include an opinion regarding whether the student should be recommended for dismissal from the program by the Dean of the GSBS, or that a transfer into a Master's level degree track should be considered.

F. Cell Biology, Genetics, and Molecular Medicine Dissertation Proposal

Format: The CGM Dissertation Proposal format is the basic NIH F31 pre-doctoral fellowship application format, similar to the format that was used for the qualifying examination. The main differences between the qualifying examination proposal and the dissertation proposal are that the dissertation proposal will be prepared with input from the student's mentor and the proposal topic will be based on the student's thesis work. It will include the student's preliminary results/studies which will help to provide the rationale for the student's hypothesis and aims. It is also suggested that students include a brief timeline at the end of the Research Strategy section.

General format of dissertation proposal (NIH F30/F31 format):
0.5 inch margins, single-spaced, Arial 11 pt or Times New Roman 12 pt

A. Abstract/Project Summary (~1/2 page, 30 lines)
B. Specific Aims (1 page)
C. Research Strategy (6 pages)
    1. Significance
    2. Innovation
    3. Approach
        a. Preliminary Studies (can be interspersed throughout the approach where it is most relevant or contained in one section - your choice)
        b. Experimental Design (discussion of your aims in detail including rationale, experimental procedure, expected results, and caveats/alternative approaches)
    4. Timeline
D. Literature Cited/References (no page limit)

Dissertation Proposal Approval Process
Upon successfully passing the Qualifying Examination and Advancement to Candidacy, CGM students will present their Dissertation Proposals for approval by the CGM faculty and choose their Dissertation Committees according to the IBMS Handbook and CGM Guidelines (see below).

Dissertation Proposal: Detailed procedure and time line for CGM students:
Note: Students will need to plan well in advance to allow enough time for their mentors and committee members to review the initial submission of the dissertation proposal prior to the initial committee meeting and the subsequent revision. Remember that typically 1 week is needed for proposal review and that the mentor needs to review each iteration of the proposal before it is sent to the committee for review.

1. The student will schedule his/her Dissertation Proposal **presentation date** by e-mailing the Discipline Director following receipt of the calendar of available dates. The student will need to start working on the proposal well in advance such that at around 6 weeks prior to the presentation date, the student can submit a completed version of the proposal to the mentor for final comments and revision. **Note:** Around this time, finalize your committee members and set up a committee meeting at least 4 weeks prior to your scheduled presentation date. It can take a long time to find a committee meeting date so if this is delayed, make sure to send out your proposal to your committee members and ask them for feedback via e-mail. This way you can revise your proposal prior to your meeting date to address the major concerns. Also, send your committee member names to the CGM Discipline Director to obtain pre-approval from the CGM DEC.

2. At least 6 weeks prior to the scheduled presentation date: The dissertation proposal should be completed following the NIH F30/F31 format listed above and should be submitted to the mentor for final review. The proposal must then be revised according to the mentor's recommendations prior to distribution to the student's committee members. The mentor will require at least 1 week for thorough review of the written proposal (confer with your mentor to find out his/her required timeframe).

3. At least 5 weeks prior to the scheduled presentation date: At least 1 week prior to the student's first dissertation proposal committee meeting, students will distribute to the members of their Dissertation Committee, their completed Dissertation Proposal. Some committee members may require longer than 1 week to review the proposal so contact your committee members to find out how long they will require for the review process.

4. About 4 weeks prior to the scheduled presentation date: The student will meet with the Dissertation Committee to present the proposal and receive feedback for revisions. During this meeting, the student will distribute the "**Evaluation of Research Progress by Research Supervising Committee**" forms for the committee members to complete. Make sure to print out the evaluation forms for the meeting and to collect the forms before your committee members leave the meeting. **Note:** To leave yourself enough time to complete a revision and have the revision reviewed by your mentor and committee members, your initial Dissertation Committee meeting should be at least ~4 weeks prior to your scheduled presentation date.

5. Based on the feedback and recommendations of the committee, the student will revise the proposal with guidance from the mentor. The mentor will review the revised proposal and when the mentor approves of the final revision (remember that the mentor review process of the revised proposal may require at least 1 week or more), the student will send the final revised proposal back to his/her committee for review (remember that the committee review process of the revised proposal will require at least 1 week or more).

6. The student will meet with the Dissertation Committee a second time **if needed** to address any remaining concerns until the Dissertation Committee members are able to give their verbal unanimous approval to accept the Dissertation Proposal for presentation to the CGM faculty which should be reflected by favorable evaluations on the IBMS student evaluation form.

7. One week prior to the scheduled presentation date: The student will submit all the evaluation forms, the list of committee members, the presentation title, and the approved final written dissertation proposal to the CGM Discipline Director (cc'ing the CGM Academic Program Coordinator and the Course Director of IBMS 7010) no less than **5-7 days** prior to the student's scheduled presentation date. Additionally, the mentor and student will send an e-mail to the CGM Discipline Director verifying that all committee members give their verbal approval of the student's dissertation proposal. **If this deadline cannot be met or if a committee member is not able to give his/her verbal approval, the student's dissertation proposal presentation will need to be re-scheduled.**

8. The student will present the Dissertation Proposal in an oral presentation to the CGM students and faculty followed by general audience questions, a private CGM faculty questioning period, and a presentation by the student of his/her Dissertation Committee members with an explanation of the special expertise each member contributes to the student's dissertation research. This is followed by a vote by the CGM faculty to approve/disapprove the Dissertation Proposal and the Dissertation Committee.

9. Once the student's Dissertation Proposal and Dissertation Committee have been approved by the Dissertation Committee and CGM faculty, the student should initiate the final Dissertation Proposal Approval process in IMPACT. Once this process in IMPACT is completed, then the student's Dissertation

Proposal will be officially approved. **This process must be completed before the end of the Fall Semester of the student's third year (typically mid-December of the Fall Semester) or the student will be at risk of receiving an Unsatisfactory grade in Research**. Please refer to the IBMS Handbook for additional information about this process.

Dissertation Committee Composition for the CGM Discipline

The minimum composition of student dissertation committees for a student in the CGM Discipline should include the following:

1. The student's Dissertation Mentor, now to be referred to as the Supervising Professor.
2. One member from the IBMS Graduate Faculty with a **primary or secondary affiliation in the CGM discipline**.
3. One member from the IBMS Graduate Faculty with a **primary, secondary, or other affiliation in the CGM discipline**.
4. One member from the IBMS Graduate Faculty with a **primary affiliation in a discipline other than the CGM discipline**.
5. One member from an institution of higher education or research institute approved by the student's discipline and holding no faculty appointment at the UTHSCSA.

For additional information about the dissertation committee, please refer to the IBMS Handbook.

G. CGM Biannual Committee Meetings

As part of the IBMS 6097-4CGM-Research course, students are required to meet with their dissertation committees and submit completed evaluation forms from each committee member once per semester. The deadline for completion of this requirement is the last day of each semester. Students are recommended to print out their Powerpoint presentations (3 slides per page) for the members of the committee. Please refer to the IBMS Handbook for further details about the biannual Dissertation Committee meetings.

H. Cell Biology, Genetics, and Molecular Medicine Faculty (Includes primary, secondary, and affiliated faculty)

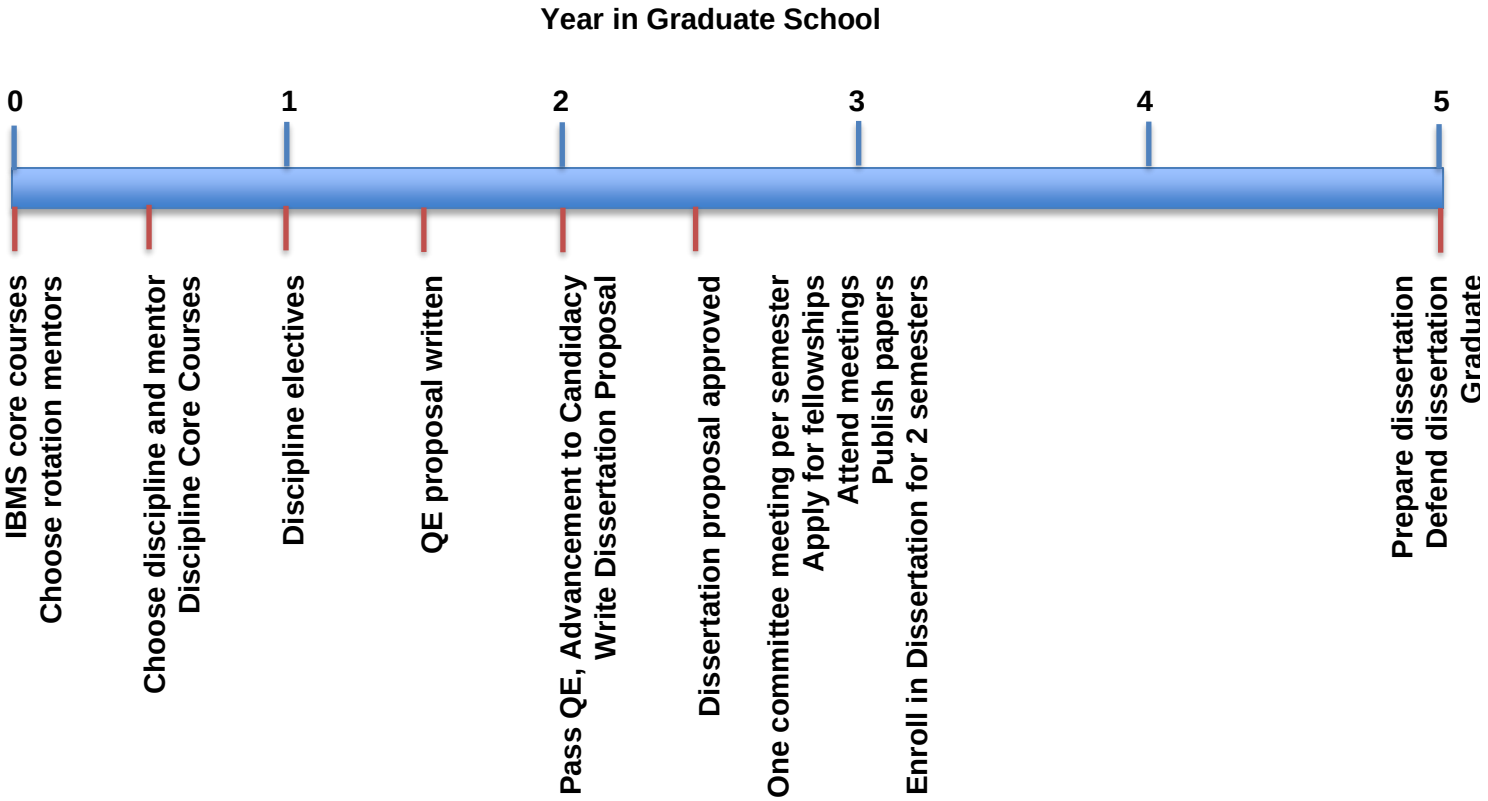
CGM Affiliated Faculty

Ahuja, Sunil, Medicine - Determinants of human disease: HIV, allergy, autoimmunity.
Anderson, Timothy, Texas Biomedical Research Institute - Parasitic diseases
Bacich, Dean, Urology - Unique models of Prostate cancer initiation, progression, and metastasis.
Bai, Yidong, Cell Systems and Anatomy - Mitochondrial, respiratory chain, complex assembly, turnover, copy number control.
Barberi, Tiziano, Texas Biomedical Research Institute - Human embryonic stem cells.
Bhat, Mansoor, Cellular and Integrative Physiology - Neuron-glial interactions in Drosophila and mice.
Bishop, Alexander, Greehey Children's Cancer Research Institute - Genomic instability, DNA repair, cell signaling, cancer and aging.
Bopassa, Jean, Cellular and Integrative Physiology - Mitochondria and cardioprotection
Boyer, Thomas, Molecular Medicine - Transcriptional regulation and dysregulation in development and disease.
Bunnik, Evelien, Microbiology, Immunology & Molecular Genetics - Host-pathogen interactions and the interplay between host immune responses and immune evasion
Carless, Melanie, Texas Biomedical Research Institute - Genetics and epigenetics in heart disease and mental disorders
Chang, Tien-Cheng, Medicine - Assisted Reproductive Technology (ART).
Chatterjee, Bandana, Molecular Medicine - Gene regulation, nuclear receptors, cancer biology, environmental carcinogenesis.
Chen, Lizhen, Barshop/Cell Systems and Anatomy - Molecular mechanisms of neuronal aging and age-dependent axon regeneration.
Chen, Xiao-Dong, Comprehensive Dentistry - Stem cell fate in tissue regeneration.

Chen, Yidong, Epidemiology and Biostatistics - Bioinformatics, statistical, and systems biology methods for modeling tumor phenotype.
Cole, Shelley, Texas Biomedical Research Institute - Genetic risk factors for complex diseases
Cornell, John, Epidemiology & Biostatistics - Statistical methods for high-throughput genomic and proteomic experiments.
Daadi, Marcel, Texas Biomedical Research Institute - Pluripotent stem cells and neural stem cells in human disease.
Dahia, Patricia, Medicine - Genetics of cancer and oncogenic pathways.
Dong, Lily, Cell Systems and Anatomy - Adiponectin signaling in obesity and diabetes.
Frost, Bess, Barshop/Cell Systems and Anatomy - Fundamental processes in cell biology that drive age-related neurodegenerative disorders.
Fujikawa, Teppei, Cellular and Integrative Physiology - Mechanism by which the CNS regulates whole body metabolic homeostasis
Gaczynska, Maria, Molecular Medicine - Proteolytic systems in cancer and aging.
Galvan, Veronica, Cellular and Integrative Physiology - Alzheimer's disease, nervous system, aging, mTOR pathway, stem cell.
Ghosh, Rita, Urology - Melanoma, DNA damage, genitourinary and skin cancer.
Giavedoni, Luis, Texas Biomedical Research Institute - Viral infection and the development of vaccines and therapies; immune responses to retroviral infections in animal models.
Gonzales, Cara, Comprehensive Dentistry – Novel therapeutic strategies to treat oral cancer.
Griffiths, Anthony, Texas Biomedical Research Institute - Filovirus biology, vaccines, and therapeutics.
Harris, Stephen, Periodontics - BMP2 mechanisms and osteocyte function.
Hasty, Paul, Molecular Medicine - Genetics of chromosomal metabolism with importance toward cancer and aging.
Huang, Hui-Ming Tim, Molecular Medicine - Cancer epigenetics.
Ignatius, Myron, Greehey Children's Cancer Research Institute/Molecular Medicine - Tumor heterogeneity and its effect on self-renewal and metastasis.
Jin, Victor, Molecular Medicine - Computational epigenetics and bioinformatics.
Johnson-Pais, Teresa, Pediatrics - Genetic alterations in cancer tumorigenesis.
Kadosh, David, Microbiology, Immunology, and Molecular Genetics - Cell morphology, filamentous growth, fungal pathogenesis, gene regulation, genomics.
Kaiser, William, Microbiology, Immunology & Molecular Genetics - Virology, immunology, and signal transduction
Kitagawa, Katsumi, Molecular Medicine - Molecular mechanisms of chromosome segregation in mitosis and meiosis.
Kokovay, Erzsebet, Cell Systems and Anatomy - Niche regulation of neural stem cells, aging of neural stem cells.
Kraig, Ellen, Cell Systems and Anatomy - Effects of aging and infection on immunity and autoimmunity.
Kurmasheva, Raushan, Molecular Medicine, Greehey Children's Cancer Research Institute - Childhood sarcoma
Larsen, Pamela, Cell Systems and Anatomy - Metabolism, stress resistance, aging and *Caenorhabditis elegans* development.
Leach, Robin, Cell Systems and Anatomy - Genetics of complex diseases and biomarkers for cancer.
Lechleiter, James, Cell Systems and Anatomy - Mechanisms of neuroprotection during ischemic stress, acute brain injury, aging.
Lee, Sang Eun, Molecular Medicine - DNA repair and cancer.
Lehman, Donna, Cell Systems and Anatomy - Public health genomics, diabetes.
Li, Senlin, Medicine - Stem cell/gene therapy, neurodegenerative diseases, atherosclerosis, aging, and rejuvenation.
Liu, Zhijie "Jason", Molecular Medicine - Gene regulation of enhancer networks in breast and prostate cancer.
LoVerde, Philip, Biochemistry - Molecular, genetic and immunological investigation of the human blood fluke, *Schistosoma mansoni.*
Morita, Masahiro, Molecular Medicine – Cancer, metabolic syndrome, and genome wide analyses.
Morris, James L. "Jay," Molecular Medicine - Natural products in cancer treatment and prevention.

Muniswamy, Madesh, Medicine - Renal Diseases - Mitochondrial metabolism in health and disease
Nicholson, Bruce, Biochemistry and Structural Biology - Cell communication; gap junction channel structure, permeability and gating.
Norton, Luke, Medicine - Diabetes - Molecular biology, genetics, and physiology of insulin resistance and type-2-diabetes.
Oyajobi, Babatunde, Cell Systems and Anatomy - Ubiquitin-proteasome pathway, non-invasive small animal imaging.
Padelecki, Susan, Urology - Bone metastases.
Patterson, Jean, Texas Biomedical Research Institute - Virology and immunology.
Penalva, Luiz, Greehey Children's Cancer Research Institute - Post-transcriptional regulation and RNA binding proteins.
Pertsemlidis, Alexander, Greehey Children's Cancer Research Institute & Pediatrics - MicroRNA in cancer.
Pickering, Andrew, Barshop/Molecular Medicine - Identification and characterization of novel factors that can slow progression of aging and age associated disease using the Drosophila melanogaster model system.
Ran, Qitao, Cell Systems and Anatomy - Oxidative damage, antioxidant defense, aging, Alzheimer's, transgenic mice, apoptosis.
Rao, Hai, Molecular Medicine - Ubiquitin regulated proteolysis, protein quality control, prion diseases.
Rao, Manjeet, Greehey Children's Cancer Research Institute - Pediatric cancers, microRNA, RNAi, transcription.
Rodriguez, Karl, Barshop/Cell Systems and Anatomy - Protein homeostasis and quality control in healthspan and longevity.
Saikumar, Pothana, Pathology - Cell injury, cell death, oncogenes.
Salmon, Adam, Barshop/Molecular Medicine - Oxidative stress, mTOR, rapamycin, metabolism, and aging.
Sayre, Naomi, Neurosurgery - Cholesterol homeostasis in repair and recovery after brain and spinal cord damage.
Schlesinger, Larry, Texas Biomedical Research Institute - Infectious diseases, tuberculosis and lung biology
Sharma, Kumar, Medicine - Renal Diseases - Mitochondria and diabetic kidney disease
Sharp, Z. David, Molecular Medicine - The target of rapamycin in cancer and aging.
Shiio, Yuzuru, Biochemistry and Structural Biology - Quantitative proteomics, ubiquitin ligases, protein secretion, senescence, cancer.
Sun, LuZhe, Cell Systems and Anatomy - Cancer biology, signal transduction, cell cycle, senescence, experimental therapeutics.
Sung, Patrick, Biochemistry and Structural Biology - DNA repair and genome stability
Tekmal, Rajeshwar, Obstetrics and Gynecology - Growth factor/hormone crosstalk, signal transduction, steroid hormone co-activation.
Torrelles, Jordi, Texas Biomedical Research Institute - Infectious diseases, tuberculosis and lung biology
Vadlamudi, Ratna K., Obstetrics and Gynecology - Nuclear receptors, hormones, chromatin regulation, epigenetics, breast cancer.
Walter, Christi, Cell Systems and Anatomy - DNA repair, mutagenesis, mitochondria, transgenic mice, aging, spermatogenic cells.
Wang, Pei, Cell Systems and Anatomy - Pancreatic diseases: Diabetes and pancreatic ductal adenocarcinoma.
Wargovich, Michael, Molecular Medicine - Cancer chemoprevention and drug discovery.
Xu, Kexin, Molecular Medicine - Epigenetic regulatory programs in human disease.
Xu, Zhenming, Microbiology, Immunology, and Molecular Genetics - Host immune response to infection, cancer and vaccination.
Yew, P. Renee, Molecular Medicine - Cell cycle regulation and ubiquitination in cancer and human disease.
Zang, Mengwei, Barshop/Molecular Medicine - Metabolic regulation, diabetes, and fatty liver disease.
Zare, Habil, Cell Systems & Anatomy - Computational biology and bioinformatics
Zheng, Siyuan, Epidemiology & Biostatistics - Genomics and proteomics of pediatric and adult cancers
Zhong, Guangming, Microbiology, Immunology, and Molecular Genetics - Microbial manipulation of mammalian cell apoptosis, Infection and Immunity, vaccines.

I. Timeline


Year in Graduate School
0
1
2
3
4
5
IBMS core courses
Choose rotation mentors
Choose discipline and mentor
Discipline Core Courses
Discipline electives
QE proposal written
Pass QE, Advancement to Candidacy
Write Dissertation Proposal
Dissertation proposal approved
One committee meeting per semester
Apply for fellowships
Attend meetings
Publish papers
Enroll in Dissertation for 2 semesters
Prepare dissertation
Defend dissertation
Graduate