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MICROBIOLOGY, IMMUNOLOGY & MOLECULAR GENETICS

Graduate Program

Handbook
2010-2011

University of Kentucky
College of Medicine

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I. INTRODUCTION

This booklet defines the **guidelines and policies** governing the Ph.D. Graduate Program in Microbiology, Immunology & Molecular Genetics, University of Kentucky, and is a supplement to the University of Kentucky Graduate School Bulletin. The information has been prepared for the graduate faculty and graduate students in the Graduate Program in Microbiology, Immunology and Molecular Genetics. All faculty and students are encouraged to be thoroughly familiar with the information provided and should adhere to these guidelines and policies in formulating the student's program of education.

The Microbiology, Immunology and Molecular Genetics program is designed to train students to become independent scientists and teachers with careers in basic, applied or clinical research.

Each student's graduate program is tailored individually and is monitored primarily by the student's Advisory Committee. The majority of formal course work is taken during the first two years. The Program places a strong emphasis on research, and students are expected to participate in laboratory and research activity early in their graduate careers.

II. ADMINISTRATION

Microbiology Educational Policies and Practices (MEPP) Committee

This committee of the faculty of the graduate program in Microbiology, Immunology and Molecular Genetics is responsible for implementation and management of the graduate program, as described in this pamphlet, and for formulating new or amended policies and practices that are subject to approval by vote of the faculty. The Director of Graduate Studies in Microbiology, Immunology and Molecular Genetics will be recommended by the Chair of the Department of Microbiology, Immunology and Molecular Genetics and serve as the Chairman of MEPP. The MEPP Committee will consist of five members in addition to the Chairman. Appointments will be made each year in the fall semester for two calendar years with appointments staggered for yearly partial turnover. Appointment to the MEPP Committee will be made by the Chairman of the Microbiology, Immunology and Molecular Genetics Department with the advice of the Director of Graduate Studies with the aim of achieving representation of junior and senior faculty and the various research interest groups in the program. One student of the graduate program in Microbiology, Immunology and Molecular Genetics will also be appointed to MEPP by the Chairman, with advice from the Director of Graduate Studies, who will participate in all MEPP Committee discussions except those relating to specific students.

The committee has the following functions:

- Represents the Department in the Integrated Biomedical Sciences Program.
- Recommends applicants to the Graduate School for admission into the graduate program.
- Advises the departmental graduate faculty on graduate program policy for this program.
- Monitors student progress and evaluates students on a yearly basis.
- Approves advisory committees, and permanent lab assignments of graduate students.
- Serves as a grievance committee for students and faculty regarding the Microbiology, Immunology and Molecular Genetics graduate program.
- Makes recommendations for dismissal of students.
- Selects a member of MEPP to chair qualifying examination committees

Graduate Faculty Meeting

Issues related to the Graduate Program are discussed each month at the Microbiology, Immunology and Molecular Genetics faculty meeting, and all active members of the Microbiology, Immunology and Molecular Genetics Graduate Faculty are invited to attend. In addition, all members of the Graduate Faculty in Microbiology, Immunology and Molecular Genetics are expected to attend Graduate Seminars and Departmental Seminars as an essential part of their participation in graduate education. All new policies formulated by the MEPP Committee must be approved by the Graduate Faculty. Additional meetings may be called as necessary.

Application for Graduate Study in Microbiology, Immunology and Molecular Genetics
Application for graduate study in Microbiology, Immunology and Molecular Genetics is through the Integrated Biomedical Sciences (IBS) Program which is an undifferentiated program which includes all Basic Biomedical Sciences Graduate Students in Anatomy and Neurobiology, Graduate Center for Nutritional Sciences, Graduate Center for Toxicology, Microbiology, Immunology and Molecular Genetics, Molecular and Biomedical Pharmacology, Molecular and Cellular Biochemistry and Physiology. Students participate in the IBS curriculum, do research rotations with any faculty in the participating departments and matriculate in the Department of Microbiology, Immunology & Molecular Genetics at the conclusion of the first year. (See IBS Graduate Handbook for details of first year)

Financial Support

Students awarded a research assistantship or fellowship through IBS receive payment of tuition, both in-state and out-of-state. Students are guaranteed payment of tuition related to their doctoral programs subject to the following conditions:

(1) The coursework for which the student has registered has been approved by the IBS director during the IBS year, and by the chair of their advisory committee and the DGS of their program, once they have entered a doctoral program.

(2) The student is in good academic standing. Effective fall 2007, students who have been notified by the Graduate School that they are officially on academic probation will be responsible for payment of in-state tuition charges while they remain on probation. During this time, out-of-state tuition will be paid by the PI/program for out-of-state students. Once they have raised their GPA to the required 3.0 to regain good academic standing, payment of any future tuition charges will be covered by their PI and/or program, subject to condition #1.

III. GENERAL GUIDELINES AND POLICIES FOR PH.D. DEGREE

Program Curriculum
The curriculum described below is designed to be completed within the first two years, prior to the qualifying exam. All first year Ph.D. students generally will take the IBS curriculum. Special arrangements can be made for students with M.S. degrees and/or other graduate training. Second year students are advised, and all courses approved, by their individual advisory committee in accordance with the recommended curriculum. To fulfill the Graduate School residency requirement, students must complete two consecutive semesters (excluding summer) of nine credit hours each, as well as an additional eighteen credit hours prior to taking the qualifying exam. Generally, this is accomplished by enrolling for four consecutive semesters of nine credit hours each. An alternative plan is available for non-traditional students upon approval by the MEPP committee. These courses include required and elective courses described below, as well as research credit hours. Note that MI 798, Dissertation Research, is included in the list of electives. All courses listed below are required unless designated as electives. See appendix A for course descriptions.

CORE CURRICULUM
SECOND YEAR

Choose Two from the following three core courses:

MI-615 Molecular Biology (3)
MI-685 Immunology (3)
MI-720 Structure and Function of Microbial Organisms (3)

Immunology and Structure/Function of Microbial Organisms are generally held every fall semester,
Molecular Biology every spring semester.

Choose two additional electives, which can include additional courses from the core courses listed above, from the following list, or with approval of the student's advisory committee.

Possible Electives:

MI-707 Contemporary Topics In Immuno/Mol. Biol. (2)
MI 710 (001) Special Topics in Microbiology – Virology (3)
MI-710 Microbial Pathogenesis (3)
BCH-611 Biochemistry & Cell Biology of Nucleic Acids (3)
BCH-504 Physical Biochemistry (3)
BCH-610 Biochemistry of Lipids and Membranes (3)
BCH-612 Structure & Function of Prot. and Enzymes (3)
BIO-520 Bioinformatics (3)
PGY 630 Mechanisms of Human Disease (3)

Register for MI-772 Seminar in Microbiology (1).

English Department course in writing skills (contact the English Dept. for recommended classes).

In addition, the English Department maintains a Writing Center that can provide assistance with all aspects of writing. The Center is located on the 5th floor of the W.T. Young Library, phone number 257-1368, http://www.uky.edu/AS/English/wc/

Notes:

a. Courses listed as electives are those most frequently taken by our students. Actual courses chosen will be at the discretion of the student and Advisory Committee.
b. Research credit, MI-798 can be used in any semester to bring the total credit hours up to nine.
c. Students who have a M.S. degree from another accredited university in the U.S. may request credit for one year of residency and take the qualifying exam at the end of the first year. This request must be made in writing to the Director of Graduate Studies and the Graduate School. In addition, students may receive credit for some of the required courses listed above if the student took a similar graduate course at another institution and the MEPP committee determines that the course covers largely similar material in sufficient depth. This request must be made in writing to the Director of Graduate Studies and must include copies of the course syllabus, exams, and any other assignments required by the course.
d. Generally, it is not necessary for a student to register in the summer if they have registered in the prior Spring semester and plan to register in the Fall. Students who do not register in the summer will be active in the Graduate Program, but **will not be considered full time students**. If it is necessary to maintain full time student status (6 hours in the summer) it will be necessary to register. This can be done by registering for 6 hours of MI 798 for pre-qualifying students or 2 credit hours of MI 767 for post qualifying students. Situations requiring summer registration include maintaining visa status, eligibility for student loan deferment, exemption from FICA payroll deduction, and certain fellowships requiring full time student status in the summer. Students are advised to check with the Director before the start of the summer sessions if they are not sure of their need to register.

Academic Performance

PhD students must receive a grade of "B" or higher for their two required core courses and two elective courses. Students are allowed a grade lower than a "B" in only one credited course during their graduate career. Whether a student is required to repeat a course in which they receive a grade lower than a "B" or is permitted to take another course to complete their core and elective requirements will be at the discretion of the student's advisory committee. All Ph.D. students must maintain a minimum overall grade point average of 3.0. Any student earning less than a 3.0 grade point average will be placed on academic probation. A student remaining on academic probation for two consecutive semesters, or receiving a grade of E in a single semester will be considered for termination from the program. The procedures to be followed for termination are outlined in Appendix D.

Choice of Advisor

A permanent advisor should be chosen by the end of the first academic year. By the end of each rotation the student should be familiar with the research programs of the laboratories in which they rotate, program facilities, and many new research tools and methodologies. This should provide a solid base of information and experience that the student and faculty can use in the final selection and approval of permanent advisee-advisor arrangements. The choice of the permanent advisor is by mutual consent between the advisee and advisor and must be approved by the DGS and Department Chair. The ability of a particular advisor to take on a new student is dependent upon a number of factors including availability of funding and number of students already in that lab. The "open/closed" status of individual labs is continually changing and updated lists will be available to students each semester.

To change the permanent advisor-advisee relationship, written approval from the MEPP Committee is required.

Student Advisory Committee

It is the responsibility of the permanent advisor after consultation with the student to recommend to the Director of Graduate Studies the composition of the Student's Advisory Committee as early as possible in the student's program, but not later August 15 prior to the second academic year. The advisory committee should consist of faculty from different research disciplines in order to provide sufficiently broad guidance for the student. The content of the advisory committee must be submitted to and approved by the DGS.

The Advisory Committee must have a minimum of four members. All four must be members of the Graduate Faculty; three, including the Major Professor, must possess full Graduate Faculty status. The Chairman of the committee must be a full member of the Microbiology Graduate Faculty. At least three members of the committee must be from the Microbiology, Immunology and Molecular Genetics Graduate Program, while one must be chosen from a different program. The outside member must possess full Graduate Faculty status. Students should ask each proposed committee member regarding his/her Graduate Faculty status at the time he/she is asked to be on the Advisory Committee. There is no upper limit to the number of people who can be on a committee. Once formed, the student may not remove any member of the advisory committee without the approval of the DGS.

The Advisory Committee must meet at least once a year and will guide the student's course work, program and research project. The student normally should be present at advisory committee meetings. The elective courses taken by the student in the second and subsequent years shall be formulated jointly by the student and by the student's Advisory Committee. It is recommended that the course requirements be completed as early as possible.

Each year at the end of the Spring semester, the advisor as chairman of the advisory committee, shall submit to the MEPP Committee an evaluation stating the overall achievement and development of the student. Included in this evaluation should be a description of the student's research goals, accomplishments, future directions, and a projected time frame for completion utilizing the MIMG student evaluation form. This document will be used as part of the evaluation of the student's progress during the past year.

The student's Advisory Committee together with a representative from the MEPP Committee is responsible for administration of the written and oral qualifying examinations for the Ph.D. candidacy. See appendices B and C for a more detailed description of the role of the advisory committee and the qualifying exam.

Research

All graduate students in the Microbiology, Immunology and Molecular Genetics graduate program are required to conduct an original, independent research project under the supervision of their advisor. The research project is a major component of the graduate curriculum in Microbiology, Immunology and Molecular Genetics. A dissertation reporting the results of the investigation and its significance in relation to the existing scientific knowledge must be written and should conform to requirements of the Graduate School.

To demonstrate in-depth knowledge in their area of specialization, each student is required to submit at least one first-authored manuscript from his/her personal research to a main-stream, peer reviewed journal (i.e. Cell, Science, P.N.A.S., J. Immunol., J. Bacteriol., Mol. Cell. Biol., etc.) prior to defending his/her dissertation. Students are also expected to present scientific papers at two acceptable (to advisor) regional or national scientific meetings (i.e. FASEB, ASM, etc.).

Beginning in their second year, all students present a yearly seminar to the Department. Beginning in their third year, and continuing until completion of the Ph.D. degree, the student's yearly seminar will be based on his/her research activities. These presentations provide opportunities for students to demonstrate their progress to all Department members, and provide experience in the production of scientific presentations, which will be essential for any scientific career.

All students are also expected to attend all Departmental sponsored seminars as part of their graduate education and to participate in at least one journal club in their area of research interest.

Qualifying Examination

A Qualifying Examination is required of all doctoral students to verify that they have sufficient understanding and competence in their fields to become candidates for the degree. The examination must be scheduled through the Director of Graduate Studies and approved a minimum of 3 weeks in advance by the Graduate School. The results of the examination must be reported by the Director of Graduate Studies to the Graduate School within 10 days of its conclusion. If the exam is failed, the Advisory Committee determines the conditions to be met before another examination may be given. The minimum time between examinations is four months. A second examination must be taken within one year after taking the first examination. A third examination is not permitted.

The examination is administered by the Advisory Committee and chaired by a representative of the MEPP Committee who is not already a member of the student's advisory committee. The makeup of the Advisory Committee must be approved by the Graduate School prior to the examination. The examinations will be scheduled at the discretion of the student, advisor and Advisory Committee after all course work has been completed with a 3.0 GPA or better and the residency requirements have been satisfied. The examination consists of a written and an oral section and is approximately a 6 week process. The format for the qualifying exam is outlined in appendix C (see also appendix B). It is the responsibility of the student to ensure that all approvals and time considerations are met.

Residence Requirements

All students must spend at least two consecutive semesters (Fall, Spring) of full-time (nine or more credits/semester) residence at the University plus an additional eighteen credit hours prior to taking the Qualifying Examination. Students with a prior M.S. degree may receive one year of residency credit.

Candidates (students who have satisfactorily completed their Qualifying Examination) for the doctorate must register for 2 credit hours of MI 767 a minimum of two semesters and each semester (fall and spring) thereafter until completion of the dissertation.

Student's Progress File

As a part of their personal file, students will assist the Department office in updating their personnel file. The Graduate program office will maintain a curriculum vitae for each student and it is the responsibility of the student to provide frequent updates (at least once every semester) to the Graduate program office. At the end of each semester the student will request his/her Graduate Progress Form from the secretary in the Microbiology Program office. The form should be updated and returned to the secretary for input into a computer database. This database will be used to aid in assigning teaching Assistantships, to accurately complete periodic forms submitted to the Graduate School, etc. In addition, updated copies of the student's CV should be provided to the advisory committee at each meeting. Files will also be used by the MEPP committee to evaluate student progress.

Teaching Responsibility for Graduate Students

All doctoral students should be prepared to serve a maximum of one semester as a Teaching Assistant. Teaching assignments are made by the Chairman of the Department of Microbiology, Immunology & Molecular Genetics after consultation with the Director of Graduate Studies. Each course instructor must meet with his/her student assistants before classes begin, to establish the guidelines of performance required of those assistants to fulfill their obligation.

T.A.s will also receive training in teaching methods prior to the beginning of the course as well as feedback during the course to insure that this is an effective learning experience for the student.

At the end of each teaching assignment, the course instructor will provide the MEPP Committee with a written evaluation of the performance of each Teaching Assistant; the evaluation will be included in each student's file and a copy sent to the student's advisor.

Final Comprehensive Examination
The Graduate School and the Director of Graduate Studies must be informed of a student's intent to submit a dissertation and defend it 8 weeks prior to the defense date. The Dean of the Graduate School will appoint an outside member to attend all oral examinations. All satisfactory(s) grades must be changed to letter grades by the Director of Graduate Studies.

Five copies of the dissertation, or more as required, in acceptable form and style are submitted to the Advisory Committee three weeks in advance of the oral exam. The Advisory Committee will decide upon the acceptability of the candidate's dissertation and all members are required to vote. If the Advisory Committee accepts the dissertation, the student will make one final appearance before the Advisory Committee for a final oral examination. An announcement of the candidate's name, department, and title of dissertation, together with the day, place and hour of the final oral examination must be posted at least seven days in advance. As a prelude to this examination, it is required that the student present his/her research in a formal seminar. The final oral is open to all faculty at the University. The examination will be limited to the subject of the candidate's dissertation and related matters. A favorable majority vote of the candidate's Advisory Committee shall be required for passing the final oral examination. In the event of failure, the student's Advisory Committee must submit a recommendation to the MEPP Committee. The student may be permitted to repeat the exam provided that the student's Advisory Committee and the MEPP Committee grant approval.

Honor Code/Unprofessional Conduct
Pursuit of a graduate program within the Microbiology, Immunology and Molecular Genetics Graduate program constitutes a tacit agreement of an honor code expressed by honesty and adherence to high ethical standards as practiced in the profession. Scientific misconduct such as cheating, falsification of data, deliberate misuse of data, or deliberate misuse of equipment are causes for dismissal from the Program.

Personal Safety
It should be recognized that working with equipment and use of certain infectious agents can involve elements of risk not only to the student, but also to others in the immediate area. Before using any equipment, apparatus, chemical, toxin, or infectious agent, a student should seek the advice of an appropriate faculty member regarding proper safety precautions. Laboratory accidents should be reported immediately to an experienced faculty member so that a course of action can be taken. In addition, all students must complete a biosafety course offered by the Medical Center Biosafety office, as well as a radiation safety course offered by the Medical Center Radiation Safety Office. It is the responsibility of the student to complete these courses, preferably during the first year.

SUMMARY DESCRIPTION OF COURSES

IBS COURSE DESCRIPTIONS

See IBS Handbook

BIOCHEMISTRY COURSE DESCRIPTIONS

BCH-504: Physical Biochemistry (3 credit hours)
Thermodynamic, hydrodynamic, structure, and kinetic properties of biological systems and macromolecules.
Prerequisites: CHE 444G or equivalent.

BCH-610: Biochemistry of Lipids and Membranes (3 credit hours)
A lecture and seminar course devoted to intermediary metabolism of lipids and various biochemical aspects of the structure, assembly and functions of biological membrane systems.
Prerequisites: CHE-232, CHE-444G, BCH-410G, 502, or 811. BCH-502 may be taken concurrently.

BCH-611: Biochemistry and Cell Biology of Nucleic Acids (3 credit hours)
A lecture and seminar course devoted to a study of the principles of nucleic acid chemistry and to the role of nucleic acids in cellular function.
Prerequisites: BCH-401G, 502, or 811.

BCH-612: Structure and Function of Proteins and Enzymes (3 credit hours)
Primarily a lecture course devoted to the relationship of the structure of protein molecules to their biological roles. Proteins will be discussed in terms of their size, shape, conformation, primary structure, catalytic mechanism and regulatory properties.
Prerequisites: BCH-401G, 502 or 811: CHE 444G or consent of instructor. May be taken concurrently with BCH-502

BIOLOGICAL SCIENCES COURSE DESCRIPTION

BIO-520: Bioinformatics (3 credit hours)
An introduction to computer analysis of macromolecular structure information. This course describes how to access, process, and interpret structural information regarding biological macromolecules as a guide to experiments in biology.
Prerequisites: BIO-315 or BIO-304 or BCH-401 or BCH-501 or BCH-502 or BIO-510 or consent of instructor.
(Same as INF-520.)

MICROBIOLOGY, IMMUNOLOGY & MOLECULAR GENETICS COURSE DESCRIPTIONS

PGY 630: Mechanisms of Human Disease (3 credit hours)
This course combines clinical presentations, diagnosis, and cutting edge research approaches to twelve different human diseases. The objectives are to enable students to have a deeper understanding of disease processes in order to integrate basic and translational concepts into their own research.

MI-615: Molecular Biology (3 credit hours)
An integrative and functional approach to the regulatory aspects of DNA, RNA and proteins in prokaryotic and eukaryotic cells. Lectures and discussions with readings in original literature.
Prerequisites: A course in genetics (e.g. BIO-404G) and a course in nucleic acids and elementary molecular biology (e.g.)BCH-502) or consent of instructor. (Same as BCH-BIO 615.)

MI-685: Advanced Immunobiology
An introductory level graduate course surveying current trends in immunology including the organization and structure of cells relevant to immunity, immunochemistry, types of immune responses, cellular immunology, immunogenetics and immunopathology.
Prerequisites: BCH 401G, or BCH 501 or 502 or equivalent, or consent of instructor. (Same as BIO 685)

MI-707: Contemporary Topics in Immunology (2 credit hours)
This course will deal with controversial and evolving areas of immunology. Lectures in a given topic will be accompanied by student discussion of contemporary literature.
Prerequisites: MI-698 or equivalent or consent of instructor. (Same as BIO 707)

MI-710: Special Topics in Microbiology (2-3 credit hours)
A variety of topics relating to infectious diseases, microorganisms, and molecular and cell biology.
Prerequisites: Consent of instructor.

MI-720: Microbial Structure and Function (3 credit hours)
Molecular basis of structure and function in unicellular microbes. Molecular genetic and structural approaches to the analysis of bacterial architecture growth, division, and differentiation.
Prerequisites: Consent of instructor, BCH-501, BCH-502, and BIO-476G or equivalent. (Same as BIO-720 and OBI-720).

MI-772: Seminar in Microbiology (0-1 credit hours)
Review of current literature in microbiology; presentation of papers on work in progress in the department or on assigned topics; reports on meetings of national and international scientific and professional societies and symposia. Required of all graduate students. Two hours per week. May be repeated nine times for a maximum of 10 credits. (Same as BIO 772).

MI-798: Research in Microbiology
May be repeated to a maximum of 24 credits.
Prerequisites: Consent of instructor. (Same as BIO-798).

GUIDELINES FOR MENTORS AND FACULTY MEMBERS OF STUDENT ADVISORY COMMITTEES

These guidelines are intended to assist MI Faculty members in guiding graduate students toward the successful completion of the Ph.D. degree. The MEPP Committee has developed these guidelines to enable MI Faculty members to take a more active role in assessing student's progress and to insure that the student's research progresses in a timely manner. At the end of the first year of graduate school a student forms an advisory committee which assumes primary responsibility for the student's progress and evaluation. One of the goals of the MI Graduate Program is to maintain a high standard of education and this responsibility is delegated to the student advisory committees. To enable the faculty to achieve this goal, the following guidelines are set forth, which are designed to clarify the role of the mentor and advisory committee in this process.

The Time Factor
Committees need to recognize the fact that MI students must complete their dissertation research in a reasonable amount of time, without lowering expectations for quality science. Long average durations in Graduate School damage the program (student's don't want to come to a program that has an average stay of 7 years) and also delay student's careers. While it is recognized that there will be inevitable setbacks in research, every effort should be made to anticipate problems or risky projects to keep delays to a minimum. The MI program should strive for an average stay of no more then five years for our Ph.D. students with an average of 4 to 4.5 years. With these goals in mind, the Advisory Committee should play a key role in determining whether the student is on track.

The Quality Factor
Quality of research is a subjective judgment and is sometimes difficult for committee members to assess. Nevertheless, committees should make sure that the research is important and scientifically sound. Furthermore, students should be expected to publish at least one and preferably two first authored papers in quality, peer reviewed journals. Below is a suggested guideline for advisory committees in order to monitor a student's progress.

First Meeting, End of First Year
Generally this is an introductory meeting at which students present their course work and planned second year courses for approval by the committee.

Committee responsibilities: Are the course requirements met? Are there any deficiencies that need to be remedied? Which electives would best suit the planned area of research? Remind **students** that they are expected to work in the lab as much as possible during their second year with the goal of identifying a research project during this year. Schedule a committee meeting for the late spring in order to set up the qualifying exam.

Second Meeting, Spring of 2nd year.
Schedule the Qualifying Exam for summer or early fall. Discuss progress on course work and research.

Committee responsibilities: Pay particular attention to any deficiencies that have surfaced in the prior year. Ask the mentor about the student's research abilities. This is a critical time in terms of the evaluation of the student. By now the mentor probably has a good sense of the student's abilities in the lab and his\her ability to solve problems. If the student has **serious** deficiencies in these areas then serious consideration should be given to counseling the student to leave the program, or recommending termination. It does students a great disservice to keep them in the program if they do not have the aptitude for science, and it compromises the program. Committees need to be stringent at this point in the student's evaluation and be willing to make the tough decision when it is appropriate. They should not rely solely on the qualifying exam to determine admission to candidacy.

Remind students that in the year following the qualifiers (third year) they should solidify the questions they will address for their dissertation research and have a solid research plan to present to the committee by the Spring meeting at the end of the third year. Make it clear to the student what type of written proposal the committee requires. For most committees a 3-4 page proposal will suffice in lieu of an NIH-style proposal. It should be handed out to the advisory committee a week prior to the spring meeting at the end of the third year.

Third Meeting: Qualifying Exam
Ask questions that test the student's abilities to design experiments and solve problems. Committees must be willing to fail individuals who do poorly. Students who fail do get a second chance.

Fourth Meeting: Spring of Third Year.
Carefully evaluate the student's research proposal. There should be clearly attainable goals that will answer the questions proposed. The systems and techniques should be up and running in the sponsor's laboratory. The project should not depend on the outcome of some uncertain event. Appropriate alternative approaches should be proposed if one approach does not work. The committee should repeatedly ask "what if this doesn't work?" until they are satisfied that the student will be able to make sufficient progress.

If things have gone well during the past year, students will be well on their way, with well developed systems and the tools in hand with which to pursue their questions. These students may very well be able to finish up in the next year. A research progress meeting should be scheduled in about six months. On the other hand, some students will have worked hard to develop a system only to conclude that the approach is not viable. In this case, they will still need to identify a question and a system to study. Either outcome is perfectly acceptable. The third year should be regarded as the time for students to develop new systems and attempt risky things that may or may not pay off. It should be recognized that some students may not have identified a clear project at this point. However, if a clear project has not been identified by this point, the committee needs to pay close attention to the student's plan for identifying a research project. It is no longer appropriate in the fourth year to embark on high risk projects that may leave the student empty handed at the end of the fourth year. The student should provide the committee with the possibilities being considered for a project and a clear plan for assessing the feasibility of a project within three to six months. The committee should schedule meetings in three month intervals until they are satisfied that a viable project has been identified.

Meeting, Spring of Fourth Year:
Students should be well along in their projects, and some students may be ready to write. The majority of students should be able to complete their work in the upcoming year. Pay close attention to the experiments proposed for the upcoming year. Students should be able to complete the experiments within the year and there should be relatively little risk involved in the proposed experiments. If students have not made sufficient progress by this point, and appear to be a long way from having useful data, the committee needs to determine why. If the problem appears to be due to a lack of effort or ability on the student's part, then the committee needs to put the student on notice, preferably in writing, that their degree is in jeopardy, and that they must see evidence of improved progress in the upcoming year. Students should also be encouraged to pursue postdoctoral opportunities at this point.

Meeting, Spring of Fifth Year:
This should be the final meeting to approve the dissertation research and the writing of the dissertation if it has not already been done. If students have not yet completed their research, the experiments remaining should be of the "mopping up" sort, and should be easily completed within the year. The student and the committee should come to a specific agreement, documented in writing, on what experiments are required to complete the dissertation research. This is not the time to embark on a new project or major new direction. Students should be reminded that this will be their last year in the program unless there are extenuating circumstances (illness, change of mentor, etc.) and that any further support must be specifically approved by MEPP. If sufficient progress has not been made, and the student was notified last year, the committee should recommend that the student be given a Masters degree. Expecting such a student to suddenly produce dissertation quality research in the final year is unrealistic.

Meeting, Spring of Sixth Year:
This meeting should not be necessary. All students at this point should be finished, or if not finished, writing their dissertation. If committees have done their job, we should not have students at this point who are not done. For those inevitable exceptions, there needs to be clear justification for allowing a student to continue. There must be a specific request to the MEPP committee, with approval of the advisory committee for a student to continue receiving support and to continue in the program. This will apply for every year beyond the sixth year.

RULES FOR THE PH.D. QUALIFYING EXAMINATION

Each graduate student in the Department of Microbiology, Immunology and Molecular Genetics will be expected to pass, before the beginning of the third year of full-time graduate study an examination which leads to admission to candidacy for the Ph.D. degree. This exam will consist of 2 individual parts:

1) An <u>independent research proposal</u> utilizing experimental approaches to test an original hypothesis in an area of research in microbiology, immunology or molecular genetics.
2) An <u>oral defense</u> of the independent research proposal which also will include an examination on general scientific background.

The main purposes of the qualifying examination are to help train students to function as successful scientists, to help in the evaluation of their academic and scientific thought processes, and, when needed, to provide a mechanism for strengthening skills and/or basic scientific background. During the examination the student will have an opportunity to put together scientific ideas and hypotheses, to express these ideas in writing and to defend them orally. This is the very essence of what an independent research scientist must be able to do, and the qualifying examination is an opportunity to further develop these skills. The student should expect and appreciate criticism of his/her research proposal and should accept the challenge of the exam as a valuable aspect of the learning experience and preparation as a research scientist.

The performance on the qualifying examination will be judged as passing if the Doctoral Advisory Committee is assured that the student can:

1) synthesize a critical approach to solve a scientific problem by:
   a.) developing a significant and focused scientific hypothesis and formulating a practical experimental approach to its solution;
   b) expressing this research problem concisely in writing;
   c) presenting and defending these ideas orally in an effective manner before a selected group of examiners.
2) demonstrate a sufficiency of basic scientific background information.
3) develop a cohesive experimental approach to solve an important scientific question for the student's dissertation research.

Passing this exam requires that a simple majority of the Doctoral Advisory Committee agree that the student has performed at a satisfactory level. Upon successful completion of the Qualifying Examination, the student will be recommended to the University for admission to candidacy for the Ph.D.

Procedural Guidelines and Time Schedule

At the beginning of the spring semester of the second year of graduate study and after satisfactory completion of the IBS core requirements, a meeting will be held with second year students by the Director of Graduate Studies to discuss the Ph.D. qualifying exam. The objectives, procedures and expectations of the qualifying examination will be presented at the meeting, which should cover all points outlined in these guidelines. Soon after this meeting, the DGS will appoint a member of MEPPS to chair the qualifying exam to ensure the exam is conducted objectively. This committee will be composed of at least 4, and preferably 5, members of the graduate faculty, which must include 1 faculty member from an outside department.

Selection of an Independent Research Topic

During the spring semester, 2nd year students will schedule a meeting with their doctoral advisory committee and MEPPS representative (exam committee) to discuss scheduling of the qualifying examination. At this time, a date will be set for submission to the exam committee of an abstract for an independent research proposal based on one of the student's dissertation research projects or on a project independent of the student's research. The date for abstract submission will be in consultation with the student's advisory committee near the end of the spring semester of the second year.

Preparing the Abstracts

Development of any research proposal starts with identifying an important scientific question for study. An important question in biology is not necessarily identical to what is currently "hot" in biology. An important question is one which, when answered, will advance in a fundamental way our knowledge not only of the immediate question under consideration, but of related biological questions as well. The abstract must be developed independently but may be an extension of the student's dissertation current work. The advisor will help direct the student so that the abstract is not the restating of the advisors proposals. It is appropriate to discuss the feasibility of potential topics with any member of the faculty, including your advisor.

The abstract submitted to the testing committee should be no more than 1 single-spaced page in length. The abstract should:

1) state a significant[1] and original[2] scientific problem;
2) state a testable[3] hypothesis[4] which can be evaluated experimentally to address the problem;
3) describe experimental approaches which can be used to test the hypothesis.

The abstracts should be written in acceptable scientific prose and free from jargon and excessive abbreviations. The proposed research should be based on a three-year project that could be completed by one investigator with a technician.

[1]"Significant" implies that the problem chosen for investigation would appreciably advance knowledge in a specific area of research. In other words, the planned study should not be a small step forward, a descriptive study of a phenomenon, or a repetition of experiments previously done with another organism, molecule, etc.

[2]"Original" implies that the problem proposed for study has not been previously studied in an adequate fashion or that the proposed hypothesis has not been previously formulated (in a grant or paper available to the student) and that the proposed experimental approach uses methodologies and/or systems that have not previously been used to study the problem.

[3]"Testable" implies that methods and procedures needed for the research can be worked out and the appropriate experiments conducted in a reasonable period of time; this does not mean that all methods and/or procedures be already worked out at the time the proposition is written.

[4]An "hypothesis" is a positive statement of assumption. Common mistakes in formulating an hypothesis are to choose a broad topic to investigate or to identify "interesting" questions. Another common mistake is to merely propose experiments that define the questions better, but not develop a clear hypothesis that can be accepted or rejected on the basis of experimentation. Therefore, a statement of an hypothesis which says that studies will "look at" or "determine the effect of" is not a true hypothesis, since it does not assume a testable answer to a scientific question.

Approval of the Abstract

The abstract must be submitted to each member of the exam committee in person or by email. Members of the committee will evaluate the abstract on its originality as well as overall feasibility and will communicate suitability of the abstract to the student within one week of receiving the abstract. The committee will determine whether the abstract is sufficiently developed and independent of the mentor's proposals. A conditional approval will be given, if the committee considers that an abstract topic is appropriate, but not sufficiently developed for the proposal. Following a conditional approval, the student will have one additional week to further develop the abstract as suggested by the committee. Upon final approval of an abstract, the student will then have 4 weeks to complete the written proposal and to submit it to each member of the committee. The oral defense of the independent research proposal will be scheduled to occur no sooner than 2 weeks after the exam committee has received the proposal for evaluation.

Preparation of the Independent Research Proposal

Writing a clear, concise proposal is just as important as developing a good hypothesis. Remember that in evaluating your proposal, committee members will be looking for more than just the protocols of your experiments; they will also be looking to ensure that you can explain the rationales behind your experiments, the justifications for their importance, and the possible interpretations of various outcomes (both expected and unexpected). In short, the scientific ideas that are part of a research project are as important, if not more important, than the technical methods.

Once an abstract is approved by the committee, the student is free to seek as much **technical** information for their proposal and from as many people as the student deems necessary (except from the advisory committee). However, the **experimental approaches** must be developed solely by the student as part of the exam and **the student must consider himself/herself on a strict honor system in this regard.**

The proposal is limited to 13 pages, single spaced with one inch margins, Arial font, and a font size of 11. Page limits includes figures and diagrams but not references. The first page must be the abstract as approved by the advisory committee. The general format should follow that described in the instructions for the **NIH Research Plan Component (PHS 398)** using Application Guide SF424 (R&R) Version B forms. http://grants.nih.gov/grants/funding/424/index.htm The student may also ask to look at grants from their advisor and at qualifying exams from other students to get a sense of what is expected in the written proposal.

A description of each required section and the suggested page limitation is described below.

I. ABSTRACT (1 page)

The approved abstract for your independent research proposal.

II. SPECIFIC AIMS (1 page)

First, state your overall objective, concisely and realistically. This objective should state the hypothesis that is to be tested and describe what the research is expected to accomplish. List the major experimental goals (i.e. specific aims) that will be completed to achieve that overall objective during the course of your study.

III. RESEARCH STRATEGY

a) SIGNIFICANCE (suggested length - 2-3 pages)

Briefly describe the scientific background to your proposal, critically evaluate existing knowledge, and specifically identify the gaps that the project is intended to fill. State concisely the importance of the research described in this proposal by relating the specific aims to longer term objectives beyond the scope of the present 3-year study.

- 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 (suggested length – 1 page)

- 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 (suggested length – 8-9 pages)

Discuss the experimental design and the basic procedures to be used to accomplish the specific aims of the project. Incorporate any preliminary data available to support the hypothesis and approach. For standard experimental approaches (such as DNA sequencing, ELISA, etc.), cite an appropriate reference for the method, but **do not** go into detail regarding the experimental technique. Describe the protocols to be used and provide a tentative timetable for the investigation. Include the means by which the data will be analyzed and interpreted. Discuss the potential difficulties and limitations of the proposed procedures and alternative approaches to achieve the aims.

- Describe the overall strategy, methodology, and analyses to be used to accomplish the specific aims of the project. Include how the data will be collected, analyzed, and interpreted.
- 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.

IV. LITERATURE CITED

Use complete literature citations, including all authors and titles. The bibliography need not be exhaustive, but should be relevant and current. This section is **not** included in the page limitations.

Oral Exam

The oral exam constitutes the second component of the Qualifying Examination. The oral component is an extension of the written proposal. Through appropriate questioning by the faculty, the student is expected to be able to adequately demonstrate his/her:

a) defense of the experimental plan and techniques in the proposal.
b) ability to analyze and solve experimental problems as they may be presented during the examination.
c) breadth and depth of knowledge in microbiology, immunology and molecular genetics.

The oral exam will begin two weeks after submission of the independent research proposal to the advisory committee, IF THE PROPOSAL IS JUDGED ACCEPTABLE. Within one week of receiving the proposal, the advisory committee will determine that the proposal is "acceptable" if it meets the criteria listed in the above section (**Preparation of the Independent Research Proposal**) and can serve as a basis for the oral exam. For defense of an acceptable proposal, the testing committee will consist of the student's thesis advisory committee and a member of the MEPP Committee. Note that the oral exam is an open exam which allows other faculty to attend, ask questions and participate in the discussion of the exam outcome. However, only official members of the advisory committee will have voting rights. The MEPP committee representative will be the chairman of the exam committee and will direct the flow of the examination, which will include a defense of the research proposal and general background knowledge in microbiology, immunology and molecular genetics.

Students should bring a copy of the proposal to the oral exam but no other reference material. At the beginning of the exam, the student will be excused from the room, so the exam committee can discuss their evaluations of the proposal and the academic and research progress of the student. At this time the chairman will also remind the committee of the ground rules of the oral examination process. When the student is called back into the room, he/she will be asked to present a 5-10 minute overview of the proposal, emphasizing any corrections, additions or deletions to the proposal that the student deems relevant. Generally, two rounds of questions will occur - the first round will focus on the proposal and the second round on the proposal and/or general scientific knowledge. The student should expect questions about the proposed research area, including the experimental design, technical aspects of proposed assays and procedures, interpretation of data and about possible alternative approaches in the experimental design. In addition, the student should be able to answer questions that probe his/her knowledge and understanding of major concepts related to the area of research in their proposal. There is no time limit for the oral exam, but plan on at least 2 hours of questioning and discussion.

After the questioning is concluded, the student will be asked to leave the room and each committee member in turn will discuss the strengths and weaknesses of responses to his/her questions. The committee will also list major strengths and weaknesses of the research proposal and the student's knowledge base in general areas of microbiology, immunology and molecular genetics. When discussion has been completed to everyone's satisfaction, a pass-fail vote will be taken. Only a majority vote will be considered a pass on the qualifying exam. "Conditional" passes, such as a requirement that the student re-write the proposal, are not permitted: the student will either pass or fail the exam outright on the date it is taken. The student will be immediately informed of the outcome of the qualifying exam. A passing vote will enable the student to advance to the status of candidate for the degree of Doctor of Philosophy.

In the situation where the exam committee determines that the submitted proposal is "unacceptable" to serve as the basis for the oral exam, the student will have <u>one</u> opportunity to revise the proposal before the initiation of the oral exam. The due date for receipt of the revised proposal will be two weeks after the student has been informed of an "unacceptable" status. Prior to revision of a proposal, the student is strongly encouraged to meet individually with members of the advisory committee to discuss weakness in the initial proposal. If the revised proposal is also judged unacceptable, the student will not be permitted to take the oral exam and will be recommended for termination from the graduate program. The student may be terminated from the program with or without a master's degree.

If the outcome of the oral exam is failure, the student will have the right to <u>one</u> retake of the qualifying exam. If a student chooses to retake the exam, the retake of the qualifying exam must occur no sooner than 4 months or later than 12 months after the first exam. Based on the performance of the student during the first qualifying exam, the committee may decide that both the written and oral components must be retaken or that only the oral exam component needs to be retaken. If the retake exam is also a failure, the director of graduate studies will recommend to the department chairman that the student should be terminated from the program. The student may be terminated from the program with or without a master's degree.

Within 1 week after completion of the oral exam, each committee member will provide the student an evaluation of his/her performance at the oral exam, regardless of the pass/fail decision of the advisory committee.

PROCEDURES FOR TERMINATING GRADUATE STUDENTS FROM THE MICROBIOLOGY, IMMUNOLOGY AND MOLECULAR GENETCIS GRADUATE PROGRAM

The following describe the conditions under which the Director of Graduate Studies for the Microbiology, Immunology and Molecular Genetics Graduate Program may terminate a graduate student from the Program.

1. If the student:

    a) Is on academic probation for two consecutive semesters; or,

    b) Fails either the Masters Final Examination or the Ph.D. Qualifying Examination after the second attempt. At the recommendation of the student's Advisory Committee, the Director of Graduate Studies will convene a meeting of the Microbiology Educational Policies and Practices (MEPP) Committee to discuss the student's situation and the student has the option to present his/her case at this time. A majority vote of the MEPP Committee will be required for approval of a recommendation for termination. The Director of Graduate Studies will provide the student, the student's advisor, and the Dean of the Graduate School with written notice of the decision.

2. It is by mutual agreement with the major professor (advisor) that a graduate student conducts his or her research in the advisor's laboratory. If during the course of a graduate student's program the student wishes to leave the advisory's laboratory, or the advisor wants the student to leave the laboratory, but not to be terminated from the graduate program, the Director of Graduate Studies must be notified and approval must be obtained by the MEPP Committee and the student's original Advisory Committee. The MEPP Committee and the DGS will help the student relocate into another laboratory.

3. A student's Advisory Committee may recommend termination at any time prior to the Qualifying Examination, after the student has failed to pass one Qualifying Examination of the Master's Final Examination, or after the Qualifying Examination has been passed. The recommendation of the advisory Committee must be in writing to the Director of Graduate Studies with a copy to the student. The letter should clearly document the reasons for the committee's recommendation. In the event of such a recommendation for termination from the Advisory Committee the following procedure will be followed:

    a) The Director of Graduate Studies will convene the MEPP Committee and present the letter for discussion. In addition, both the advisor and student will be provided the opportunity to appear before the MEPP Committee. A majority vote of the MEPP Committee will be required for recommendation for termination of the student from the Program. The Director of Graduate Studies will provide the student, the student's advisor, and the Dean of the Graduate School with written notice of the decision.

    b) If the MEPP Committee approves the recommendation for termination and the student dissents, the student will have an opportunity to meet with the MEPP Committee. Following this meeting and discussion, a second vote on the recommendation for termination will be held and a majority vote will be required to uphold the approval for termination. The Director of Graduate Studies will provide the student, the student's advisor, and the Dean of the Graduate School with written notice of the decision.

MICROBIOLOGY, IMMUNOLOGY AND MOLECULAR GENETICS GRADUATE FACULTY AND THEIR RESEARCH

BACTERIOLOGY & MICROBIAL PATHOGENESIS

Jason Johnston, Assistant Professor, Department of Microbiology, Immunology & Molecular Genetics; Ph.D., University of Alabama at Birmingham, 2003.

Sarah E.F. D'Orazio, Assistant Professor, Department of Microbiology, Immunology & Molecular Genetics; Ph.D., University of Miami School of Medicine, 1995. Protective immunity against intracellular bacterial pathogens. Bacterial antigens recognized by CD8+ T cells. *Listeria monocytogenes* infection. (sdora2@uky.edu)

Jeffrey L. Ebersol, Professor, Department of Oral Biology; Ph.D. , University of Pittsburgh, 1975. Research in immunobiology of the oral cavity. Specifically *in vitro*, animal model, and clinical investigations of mucosal, local tissue, and systemic immune and inflammatory responses interacting with microbial infections in the oral cavity. (jleber2@uky.edu)

Jacqueline Fetherston, Assistant Professor, Department of Microbiology, Immunology & Molecular Genetics; Ph.D., Washington University, 1981. Pathogenic mechanisms in *Yersinia pestis:* the role of iron transport systems in survival in mammals and fleas. (jdfeth01@uky.edu)

Robert D. Perry, Professor, Department of Microbiology, Immunology & Molecular Genetics; Ph.D., Michigan State University, 1978. Regulation and role of iron and heme transport systems in the pathogenesis of *Yersinia pestis,* the cause of plague. (rperry@uky.edu)

Carol Pickett, Associate Professor, Department of Microbiology, Immunology & Molecular Genetics; Ph.D., University of Texas, Austin, 1983. Mechanisms of bacterial pathogenesis, interactions of bacterial toxins with eukaryotic cells. (cpicket@uky.edu)

Anthony Sinai, Associate Professor, Department of Microbiology, Immunology & Molecular Genetics; Ph.D., University of Rochester, 1994. Molecular and cell biology of *Toxoplasma gondii.* (sinai@uky.edu)

Brian Stevenson, Professor, Department of Microbiology, Immunology & Molecular Genetics; Ph.D., State University of New York at Stony Brook, 1989. Bacterial pathogenesis. Biology of *Borrelia burgdorferi,* the cause of Lyme disease. (brian.stevenson@uky.edu)

Susan C. Straley, Professor, Department of Microbiology, Immunology & Molecular Genetics; Ph.D., Cornell University, 1972. *Yersinia pestis adherence,* invasion, and virulence protein expression, targeting, and mechanisms of action. (scstra01@uky.edu)

CELL AND MOLECULAR BIOLOGY

Jeffrey N. Davidson, Professor, Department of Microbiology, Immunology & Molecular Genetics; Ph.D., Harvard University, 1976. Bioinformatics, genomics and molecular approaches to study the promoter and enhancers that regulate the alpha fetoprotein gene, a gene with both developmental – and tissue – specific expression in mammals. (jndavid@uky.edu)

Bin-Tao Pan, Associate Professor, Department of Surgery; Ph.D., McGill University, Canada, 1983. Mechanisms by which oncogenic Ras induces tumor formation. (btpan@uky.edu)

Martha Peterson, Professor, Department of Microbiology, Immunology & Molecular Genetics, ; Ph.D., University of Wisconsin-Madison, 1984. Post-transcriptional gene regulation; splicing, cleavage-polyadenylation and transcription termination regulation of the IgM gene during B cell development. (mlpete01@uky.edu)

Andrew J. Pierce, Assistant Professor, Department of Microbiology, Immunology & Molecular Genetics; Ph.D., University of North Carolina at Chapel Hill, 1995. Genomic rearrangement and modification. DNA double-strand-break repair. (apierce@uky.edu)

Vivek Rangnekar, Professor, Department of Radiation Medicine; Ph.D., University of Bombay, India, 1983. Transcription factors in apoptosis and tumor growth suppression. (vmrang01@uky.edu)

Brett Spear, Professor, Department of Microbiology, Immunology & Molecular Genetics; Ph.D., University of Pennsylvania, 1985. Regulation of liver gene expression during development and disease. (bspear@uky.edu)

CELLULAR AND MOLECULAR IMMUNOLOGY

James S. Bryson, Associate Professor, Department of Medicine; Ph.D., Miami University, 1985. Bone marrow transplantation, Graft-versus-host disease. (jsbrys@uky.edu)

Subbarao Bondada, Professor, Department of Microbiology, Immunology & Molecular Genetics; Ph.D., Tata Institute of Fundamental Research, India, 1976. Growth regulation of B lymphocytes in health, autoimmunity and cancer. Immunology of vaccine responses in the young and the aged. (bondada@uky.edu)

Donald A. Cohen, Professor, Department of Microbiology, Immunology & Molecular Genetics; Ph.D., University of Cincinnati, 1979. Mechanisms of induction of interstitial pneumonitis after bone marrow transplantation and AIDS. (dcohen@uky.edu)

Beth A. Garvy, Professor, Department of Microbiology, Immunology & Molecular Genetics; Ph.D., Michigan State University, 1991. Host defense against *Pneumocystis carinii,* neonatal immunity, bone marrow transplantation, cellular immunology. (bgarv0@uky.edu)

Charlotte Kaetzel, Professor, Department of Microbiology, Immunology & Molecular Genetics; Ph.D., University of Maryland, 1979. Gene regulation in the mucosal immune system; intestinal immunity. (cskaet@uky.edu)

Alan M. Kaplan, Professor and Chairman, Department of Microbiology, Immunology & Molecular Genetics; Ph.D., Purdue University, 1969. Graft-versus-host disease, molecular mechanisms of induction of pulmonary fibrosis. (akaplan@uky.edu)

Heinz Kohler, Professor, Department of Microbiology, Immunology & Molecular Genetics; M.D., University of Munich, 1967. Development of Super-Antibodies for immunotherapy of cancer and in vivo diagnosis of cell cycle proteins. (hkohl00@uky.edu)

Charles T. Lutz, Professor, M.D./Ph.D., University of Chicago, 1982. Natural killer (NK) cell recognition of tumor cells; gene expression control of NK receptors and ligands in health, aging and disease. (ctlut@uky.edu)

Francesc Marti, Assitant Professor, Department of Microbiology, Immunology & Molecular Genetics; Ph.D., Autonomous University of Barcelona, Spain. Regulation of T cell activity: immunosurveillance, tolerance and autoimmunity; molecular immunology and signal transduction: integration of molecular networks. (fmarti3@uky.edu).

Joseph McGillis, Associate Professor, Department of Microbiology, Immunology & Molecular Genetics; Ph.D., George Washington University, 1985. Mechanisms of nervous system influence on immunity and inflammation. (jpmcgi01@uky.edu)

Thomas L. Roszman, Professor, Department of Microbiology, Immunology & Molecular Genetics; Ph.D., Michigan State University, 1966. The role of calpain in regulating integrated-mediated interaction of T-cells with the extracellular matrix. (tlrosz00@uky.edu)

Charles Snow, Professor , Department of Microbiology, Immunology & Molecular Genetics; Ph.D., University of Iowa, 1978. B cell fate determination, B cell/T cell interactions, regulation of apoptotic pathways. (ecsnow01@uky.edu)

Jerold G. Woodward, Professor, Department of Microbiology, Immunology & Molecular Genetics; Ph.D. , University of Utah, 1979. Mechanisms of autoimmune disease and the control of peripheral tolerance in the immune system. (jwood1@uky.edu)

John Yannelli, Associate Professor, Department of Microbiology, Immunology & Molecular Genetics; H.D., Virginia Commonwealth University, 1983. Developing effective vaccines for lung cancer by using cells of the immune system to deliver and stimulate immune responses against lung cancer in patients. (jyann1@uky.edu)

VIROLOGY

Robert J. Jacob, Associate Professor, Department of Microbiology, Immunology & Molecular Genetics; Ph.D., Syracuse University, 1974. Molecular pathogenesis of herpes virus infection and latency. Morphology and ultrastructure of biological/synthetic structures. (rjjaco00@uky.edu)

Guangxiang Luo, Associate Professor, Department of Microbiology, Immunology & Molecular Genetics; M.D., Hunan Medical University, China, 1983. Molecular genetic analysis of Hepatitis C virus RNA replication, viral pathogenesis, carcinogenesis, and antiviral drug discovery. (gluo0@uky.edu)

Craig Miller, Professor, Department of Oral Biology; D.D.S., University of Kentucky College of Dentistry, 1982. To better understand how herpes simplex virus 1 and 2 (HSV) reactivate from a latent state. (cmiller@uky.edu)

Chongsuk Ryou, Assistant Professor, Department of Microbiology, Immunology & Molecular Genetics; Ph.D., Wayne state University, 19198. Molecular and cellular biological studies of prions and transmissible spongiform encephalopathies. (cryou2@uky.edu)

Glenn Telling, Professor, Department of Microbiology, Immunology & Molecular Genetics; Ph.D., Carnegie Mellon University, 1990. Molecular and cellular mechanisms of prion pathogenesis. (gtell2@uky.edu)

Jianyou Zhang, Associate Professor, Department of Microbiology, Immunology & Molecular Genetics; Ph.D., University of Texas, Austin, 1989. Interference with HIV replication and retroviral recombination. (jzhan1@uky.edu)

SUMMARY OF GRADUATE SCHOOL REQUIREMENTS FOR PREDOCTORAL STUDENTS

The following information relates to Graduate School requirements for predoctoral students and is meant to serve as a reminder of some of the necessary Graduate School formalities.

Prequalifying Examination Graduate School Requirements

1. Completion of the equivalent of four, full-time semesters of graduate work. The two semesters preceding the qualifying examination must be full time (exceptions may be requested under special circumstances). A request that an M.S. degree fulfill two of the required full-time semesters may be made if this is acceptable with the student's committee and the Director of Graduate Studies (request not needed if M.S. is from U.K.).

2. An appropriately constituted committee. Requirements include:

    a. Chairperson is a full member of the Graduate Faculty, i.e. associate or full professor.
    b. Committee has at least four members of the Graduate Faculty, minimum of three of these individuals must be full members.
    c. One member of the committee must be from a program other than the Microbiology Graduate Program. At least three must be from Microbiology.
    d. Submission to the Graduate School of the Advisory Committee Request Form, approved by the Director of Graduate Studies. If for any reason there is a change in the student's committee, a new form should be submitted and labeled REVISED.

4. No incomplete grades.

5. Submission of the Recommendation for Qualifying Examination Form to the Graduate School at least two weeks before the scheduled date of the examination. If there are any special requests, the form should be submitted earlier.

6. Repeat Option - A student may repeat ONE graduate course and have only the second grade count in the grade point average. There is a repeat option form which the student must obtain from the Graduate School and which must be signed by the student and the Director of Graduate Studies. This form is best completed prior to the beginning of the semester and no later than the last day in the semester that a course can be dropped without a grade. The ONE TIME ONLY exercise of this option and DEADLINE for filing the appropriate form are strict requirements.

Qualifying and Final Examination: Graduate School Requirements

I. Registration for 2 credits of MI767 following the successful completion of the qualifying examination. If the exam is completed during the first six weeks of a semester, then that semester can be used as a postqualifying exam semester.

2. Student must submit a completed Application for Degree Form to the Graduate School. There is a strict deadline for filing this form for each semester. If this deadline is missed it means that the degree cannot be officially awarded until the following semester. At this time there is no problem if the form is filled out in one semester and the student does not actually finish until the following semester. When this form is filed, the student will be given instructions on the precise requirements for the format of the dissertation. If you receive this information in one semester and will be finishing in a later semester, you will want to verify that you have the current requirements.

3. A Notification of Intent to Schedule a Final Examination Form approved by the Director of Graduate Studies must be submitted to the Graduate School at least 8 weeks before the exam is to be scheduled. The Graduate School will appoint an Outside Examiner, who will serve as a member of the final examination committee.

4. The signed Request for Final Examination Form, the signed Dissertation Approval Sheet and a copy of the dissertation must be submitted to the Graduate School at least 2 weeks before the scheduled date of the final exam. After the Graduate School has approved the dissertation with respect to style and format, the student delivers a copy to the Outsider Examiner.

5. The final copy of the dissertation must be submitted to the Graduate School within 60 days of the final exam or sooner if the student wishes to have the degree awarded at the end of a specific semester and the submission deadline for this semester is less than 60 days after the final exam (or to state it more simply, check with the Graduate School about the deadline).

REQUIRED FORMS

Note that many of these forms should be accessed and submitted on line through the Graduate School web site.

Advisory Committee Request Form .... Submitted end of first year

Recommendation for Qualifying Examination .... Submitted three weeks prior to examination

DOCTORAL FORMS:

Notification of Intent to Schedule

This form should be presented to the Graduate School at least 8 weeks before the examination is to be given.

The Associate Dean of the Graduate School will assign an Outside Reader.

Request for Final Doctoral Examination

This form should be presented to the Graduate School Office at least two weeks before examination is to be given.

Dissertation Approval Sheet

The approval sheet accompanies the recommendation for Final Exam and must be signed by the majority of the members of the Advisory Committee. Note: the dissertation must be presented to the Advisory Committee one week prior to getting this form signed.

Copy of Dissertation

The copy accompanies the Recommendation for Final Exam.

This pre-exam copy should include:

- Title Page
- Abstract
- Table of Contents
- Complete Text
- Footnotes
- Tables
- Figures
- Appendices
- Bibliography/References

<u>It Must Be Typed And Paginated</u>

This copy should be presented to the Outside Reader after approved in the Graduate School Office

Department of Microbiology, Immunology, and Molecular Genetics
Program Assessment

Mission Statement

The Microbiology, Immunology, and Molecular Genetics (MIMG) graduate program is dedicated to train students to become independent scientists and teachers with careers in basic, applied, clinical, or translational research.

Statement of Learning Outcomes and Curricular Map

In order to become successful independent scientists and teachers the program aims to provide students with instruction that will result in the following learning outcomes:

1. Be able to critically analyze scientific literature and write scientific documents such as primary research articles, review articles, book chapters, and grants.

2. Be able to make valid scientific observations and use these to formulate novel scientific hypotheses and apply methodologies to test these hypotheses through appropriate experimental or theoretical avenues.

3. Be able to orally present and defend independent research before peers and the larger scientific community.

4. Be able to educate and train others in Microbiology, Immunology, and/or Molecular Genetics.

The MIMG curriculum is designed to provide flexibility in course work depending on individual research interests while providing a knowledge base on which students will achieve the desired learning outcomes.

Learning outcome	MI615 Molecular Biology	MI685 Advanced Immunology	MI720 Microbial Structure and Function	MI 772 Seminar	MI710(001) Special topics in Immunology	MI710(002) Microbial Pathogenesis	MI798 and 767 Research
1. analyze literature, writing	I,E,R	I,R	I,R	I	R,E,A	R	E, A
2. scientific method	I,R	I,R	I	R, E	R, E	R, E	E, A
3. oral presentation				I, R, E, A	R, E, A		R, E, A
4. teaching				I,A	R, A		R, A

I- outcome introduced R- outcome reinforced
E- outcome emphasized A- outcome applied

Assessment Responsibilities
Students will be assessed for learning outcomes by select faculty or graduate committees and reports sent to the administrative assistant for graduate studies for compilation of statistics. The

Director of Graduate Studies along with the Microbiology Education Policies and Practices (MEPP) Committee, a subcommittee of the MIMG faculty, will use the statistics for program review as outlined below. Recommendations will be formulated based on the program review and taken to the full faculty for discussion and implementation.

Program Assessment Methods and Procedures

Program assessment will include both direct and indirect measures of learning.

A. Indirect evidence of learning

1. Statistics on grades earned in the 3 MIMG core courses of MI615, MI685, and MI720 will be evaluated every 2 years. This is an indirect measure of learning outcome 1.
2. Numbers of manuscripts accepted in peer-reviewed journals for each incoming class will be evaluated every 2 years. This is an indirect measure of learning outcomes 1 and 2.
3. Number of presentations at local, regional, national, and international conferences will be evaluated for each class every 2 years. This is an indirect measure of learning outcomes 2 and 3.
4. Student graduation rates and time to graduation will be evaluated every 2 years. This is an indirect measure of learning outcome 1,2 and 3.
5. A post-graduate survey will be sent to graduates of the program 1 year after their graduation date to determine whether the 4 learning outcomes are deemed valuable in the student's post-doctoral employment. This is an indirect measure of learning outcomes 1-4.

B. Direct evidence of learning

1. Baseline information will be acquired form 1st year students using laboratory rotation evaluation rubrics. These data will be tabulated for each 1st year student and statistically analyzed for the entire first year class. At matriculation to departments, data for the entire first year class will be broken down by department and will be forwarded to each department. Specifically, this baseline information encompasses learning outcomes 1 and 2.
2. Students will be assessed for quality of oral presentations given yearly as part of MI772, Seminar in Microbiology. A baseline rubric assessment will be used for 2nd year students and then again during the 4th year to assess learning outcomes 3 and 4 over a two year period. A jury of three faculty members will assess the student's oral presentations.
3. Graduate committees including thesis advisors will provide a written evaluation for each student on a yearly basis. Included in these evaluations is a scoring grid to assess work ethic, reading of the literature, participation in journal clubs/seminars, and knowledge of research area. These provide measures of learning outcomes 1, 2, 3 and 4. Scores will be averaged for students during each of the 4 years in the department and assessed for progress from the 2nd to the 5th year.
4. Graduate committees will evaluate students for learning outcomes 1, 2, and 3 during the qualifying exam and again at the final dissertation exam. The same rubric will be applied to these exams to compare improvement during the post-qualifying training period.

Artifact Map		OUTCOMES			
		1. Be able to critically analyze scientific literature and write scientific documents such as primary research articles, review articles, book chapters, and grants.	2. Be able to make valid scientific observations and use these to formulate novel scientific hypotheses and apply methodologies to test these hypotheses through appropriate experimental or theoretical avenues.	3. Be able to orally present and defend independent research before peers and the larger scientific community.	4. Be able to educate and train others in Microbiology, Immunology, and/or Molecular Genetics.
Artifacts	Baseline rotation evaluation	IBS year	IBS year		
	Oral presentation	2nd and 4th years		2nd and 4th years	2nd and 4th years
	Qualifying exam	End of 2nd year	End of 2nd year	End of 2nd year	
	Final exam	Thesis defense	Thesis defense	Thesis defense	
	Post graduate survey	1 year post-graduate	1 year post-graduate	1 year post-graduate	1 year post-graduate

Assessment Cycles

Over the past 10 years, there have been, on average, 6 students per year enter the MIMG doctoral program. The range over the past 5 years was 2-8 students entering the program per year. In order to perform a meaningful evaluation, we will accumulate data for 2 incoming classes prior to program evaluation by the DGS and MEPP Committee. Moreover, we will examine trends over multiple cycles once we have sufficient data for comparison. Accumulation of indirect evidence of learning, that is grades, manuscripts published, presentations at conferences, and graduation rates, has been ongoing for years and provides a program baseline. That data will be tabulated and evaluated beginning spring of 2011. Direct measures of learning will be implemented in the fall semester of 2010 and so evaluation will begin in the summer of 2012 and take place every 2 years thereafter.

ROTATION EVALUATION

Student: ____ ____________________ Faculty Mentor: _______ _________________

Learning outcomes	Excellent 4	Good 3	Average 2	Needs Improvement 1	Insufficient data to assess 0	**SCORE**
Able to communicate effectively with the PI and scientific peers, asks questions, communicates ideas	Routinely seeks out PI to ask questions and routinely asks appropriate questions of lab peers, articulates understanding of the project and contributes to planning of experiments.	Asks questions of the PI when available, routinely asks appropriate questions of lab peers, has appropriate understanding of the project but not a deep enough understanding to contribute to planning experiments.	Speaks to the PI at meetings and occasionally seeks out the PI, asks questions of lab peers, has a basic understanding of the project but lacks depth, makes some errors in the lab due to miscommunication	Speaks to the PI only when addressed by the PI, does not ask questions of lab peers, makes mistakes due to lack of understanding of the procedures and project and failure to communicate		
Able to carry out complex protocols, keep accurate records in a timely fashion, organize scientific data accurately	Demonstrates through understanding of scientific method, clear ability to perform complex protocols, data is analyzed promptly and accurately, data is presented with a clear and proper interpretation	Demonstrates good understanding of scientific method, performs complex protocols with few errors, analyzes data accurately, presents data in a thought out context	Demonstrates satisfactory understanding of scientific method, needs some assistance with complex protocols and analyzing data, can present and interpret data with some guidance from the PI	Demonstrates minimal understanding of scientific method, limited ability to carry out complex protocols, need significant faculty input for data analysis and interpretation		
Reliably and conscientiously performs assigned tasks, arrives on time for appointments and work, keeps up with lab notebook, able to work independently	Reports to the lab and meetings promptly and works till tasks are complete. Keeps records up to date, appropriately bound, and legible. Is able to learn new techniques and work independently. Spends extra time working out problem areas, learning new techniques, and reading literature.	Reliably attends meetings and completes assigned tasks. Acceptable record keeping with some oversight. Able to learn techniques and works with minimal supervision. Works required time and reads literature when time permits during the work day.	Satisfactorily attends meetings and works on assigned tasks. Keeps records, though notebook is not always up to date. Requires assistance and moderate supervision with new techniques. Spends time in the lab but has a minimal understanding of the projects. Very little time spent reading.	Inconsistent attendance and punctuality to meetings and work. Demonstrates minimal ability to pick up new techniques. Requires constant supervision and has little understanding of techniques and projects. Notebook is disorganized and record keeping incomplete. Spends no time reading or trying to understand projects.		
Able to critically analyze literature related to the project, contribute intellectually to the direction of the project, demonstrate intellectual curiosity about the project	Demonstrates a thorough understanding of content and scientific context. Uses appropriate and relevant sources to explore ideas within the	Demonstrates an adequate understanding of content and scientific context. Uses appropriate and relevant sources to critically develop	Demonstrates awareness of content and scientific context. Uses appropriate and relevant sources that are applied through	Demonstrates minimal awareness of content and scientific context. Uses appropriate and relevant sources to develop limited areas of this work. Examples of		

	discipline and to critically develop a well-articulated scientific theme. Clear demonstration of independent intellectual contribution.	a scientific theme. Follows and presents literature well but independent contribution not evident.	most of the work. Organization of ideas not always logical or consistent with composing a logical scientific argument.	inappropriate literature citations common. Frequent lapses of logic when composing a scientific argument.		

Approximate number of hours per week in lab: __________

Does this student exemplify the quality of work you expect of a graduate student working-full time in your lab?

Achievements of Note/Areas for Improvement/Additional Comments:

Student Signature: ____________________________________ Date: ___________

Faculty Signature: ____________________________________ Date: ___________

MI-772 Speaker Review Form

Student Speaker: Date:
Talk Title:
Reviewer:

Learning outcomes	Excellent 4	Very Good 3	Good 2	Deficient 1	Score
Demonstrate the ability to use technical tools	• Familiar with the A/V equipment • Slides easy to read and not overcrowded • Audible from every seat in the room • All crucial slides presented long enough for viewing • Projected images easily viewable • No typos or slides out of order	Mostly excellent elements with some deficient elements	More excellent elements than deficient elements	• Technical bugs not worked out in advance • Projection of color choices and slide layouts difficult to read • Speaker didn't project well enough to be heard all over the room • Went through some slides too fast • Oercrowded slides, multiple typos	
Able to speak effectively	• Speaker spoke clearly and with an appropriate tempo • There were no distractive movements or gestures by the speaker • The speaker maintained audience attention with eye contact, voice inflection, facial expression • Avoided jargon and used simple language • Talk was targeted appropriately to the audience	Mostly excellent elements with some deficient elements	More excellent elements than deficient elements	• Tempo was either too fast or too slow • Speaker had a distractive movement • Speaker didn't engage with the audience • Speech was full of jargon and not targeted appropriately to the audience	
Able to construct an effective oral presentation with a clear introduction, middle, and conclusion	• There was a distinct introduction making it clear what the talk would be about and providing rationale for the work • Included a clear hypothesis • The middle section was distinct with clear explanation of the techniques and main results • Complex ideas simply explained • Crucial technical terms clearly defined • The conclusion section was distinct with a summary of the important results and ideas • Include a clear take home message • Applications to future work were clearly defined	Mostly excellent elements with some deficient elements	More excellent elements than deficient elements	• Important background information and rationale for the work was not clearly articulated in the introduction • The middle section was technically difficult to follow and not appropriately targeted to the audience • The conclusions section was just a summary without the speaker putting the work into a larger context including how the results contribute to the scientific knowledge in the field and what future directions to take	
Able to field questions effectively	• The talk stimulated interesting questions, not just clarification of the technical aspects of the work • The speaker repeated questions or paraphrased to clarify and strived to understand questions that were unclear • Questions were answered appropriately • The speaker demonstrated a depth of knowledge about the field and was able to critically apply this knowledge to his/her own work	Mostly excellent elements with some deficient elements	More excellent elements than deficient elements	• There were few questions generated about the content, just clarification of technical aspects that were not clearly presented • The speaker answered questions inappropriately due to failure to understand the question or a failure to understand the larger context of the field • The speaker became flustered or frustrated during the questioning	

Strengths:

Suggestions for improvement:

Overall Evaluation: **excellent** **good** **average** **deficient**

MIMG Qualifying Exam Assessment

Student:
Date of Exam:
Exam Committee Members:

Learning outcomes	Excellent 4	Competent 3	Marginal 2	Deficient 1	Insufficient data to assess 0	**SCORE**
Able to critically analyze literature related to the project, think intellectually about the direction of the project, demonstrate intellectual curiosity about the project	• Demonstrates a thorough understanding of content and scientific context. • Uses appropriate and relevant sources to explore ideas within the discipline and to critically develop a well-articulated scientific theme. • Clear demonstration of independent intellectual contribution, creativity, and original thinking.	• Demonstrates an adequate understanding of content and scientific context. • Uses appropriate and relevant sources to critically develop a scientific theme. • Follows and presents literature reasonably well. • Demonstrates some insight and creativity	• Demonstrates awareness of content and scientific context. • Uses appropriate and relevant sources that are applied through most of the work. • Organization of ideas not always logical or consistent with composing a scientific argument. • Minimal evidence of original thinking.	• Demonstrates minimal awareness of content and scientific context. • Uses appropriate and relevant sources to develop limited areas of this work. • Examples of inappropriate literature citations common. • Frequent lapses of logic when composing a scientific argumen. • Lack of creativity or original thinking.		
Able to formulate relevant and testable hypothesis, devise clear experiments for addressing the hypothesis, and analyze and interpret data appropriately	• Demonstrates a thorough understanding of the scientific method. • Clear ability to understand and design complex experimental protocols. • Aanalyzes and presents data with a clear and proper interpretation.	• Demonstrates good understanding of scientific method. • Designs experiments appropriate for addressing hypotheses. • Presents data in an appropriate context.	• Demonstrates satisfactory understanding of scientific method. • Needs some assistance with complex experimental design and analyzing data. • Can present and interpret data with some guidance from the PI.	• Demonstrates minimal understanding of scientific method. • Limited ability to conceive of experimental design to address hypotheses. • Needs significant faculty input for data analysis and interpretation.		
Able to effectively communicate data and interpretation with scientific peers, answers questions, communicates ideas	• Articulates intimate understanding of the project. • Is able to orally communicate and defend new ideas. • Thinks effectively on his/her feet. • Iis able to integrate knowledge from multiple disciplines and experience in solving problems.	• Has appropriate understanding of the project. • Aable to articulate ideas but lacks some creativity. • Can think through basic problems when questioned. • Has an adequate knowledge base and is able to integrate appropriately to solving problems.	• Has a basic understanding of the project but lacks depth. • Can answer basic questions about the project but has some difficulty thinking on his/her feet. • Has some gaps in knowledge base and does not effectively use this for problem solving.	• Lacks understanding of the project and unable to communicate rationale for interpretation of data or direction of the project. • Substantial gaps in knowledge base and is unable to draw from different areas or experiences to solve problems.		

Able to communicate effectively through scientific writing.	• Demonstrates a thorough understanding of context, audience, and purpose of the scientific work. • Uses appropriate, relevant, and compelling content to convey the contribution to the scientific discipline. • Pays detailed attention to and successful execution of conventions particular to grant writing including organization, content presentation, formatting, and style. • Uses relevant and credible references appropriately. • Uses graceful language that skillfully communicates meaning to readers with clarity and fluency, and is nearly error free.	• Demonstrates adequate consideration of context, audience and purpose of the scientific work. • Uses appropriate, relevant and compelling content to convey the contribution to the scientific discipline. • Consistently uses important conventions particular to writing grants including organization, content, presentation, and style. • Consistently uses appropriate references to support ideas. • Uses straightforward language that generally conveys meaning to readers with few errors.	• Demonstrates awareness of context, audience, and purpose of the scientific work. • Uses appropriate and relevant content to explore ideas through most of the work. • Follows expectations appropriate to grant writing for basic organization, content, and presentation. • Attempts to use credible and/or relevant references to support ideas. • Uses language that generally conveys meaning with clarity, though with errors	• Demonstrates minimal attention to context, audience, purpose of the scientific work. • Uses appropriate and relevant content to develop simple ideas in parts of the work. • Attempts to use a consistent system for basic organization and presentation. • Attempts to use sources to support ideas. • Uses language that sometimes impedes meaning because of errors in usage.		

MIMG Final Exam Assessment

Student:
Date of Exam:
Exam Committee Members:

Learning outcomes	Excellent 4	Competent 3	Marginal 2	Deficient 1	Insufficient data to assess 0	**SCORE**
Able to critically analyze literature related to the project, think intellectually about the direction of the project, demonstrate intellectual curiosity about the project	• Demonstrates a thorough understanding of content and scientific context. • Uses appropriate and relevant sources to explore ideas within the discipline and to critically develop a well-articulated scientific theme. • Clear demonstration of independent intellectual contribution, creativity, and original thinking.	• Demonstrates an adequate understanding of content and scientific context. • Uses appropriate and relevant sources to critically develop a scientific theme. • Follows and presents literature reasonably well. • Demonstrates some insight and creativity	• Demonstrates awareness of content and scientific context. • Uses appropriate and relevant sources that are applied through most of the work. • Organization of ideas not always logical or consistent with composing a scientific argument. • Minimal evidence of original thinking.	• Demonstrates minimal awareness of content and scientific context. • Uses appropriate and relevant sources to develop limited areas of this work. • Examples of inappropriate literature citations common. • Frequent lapses of logic when composing a scientific argument. • Lack of creativity or original thinking.		
Able to formulate relevant and testable hypothesis, devise clear experiments for addressing the hypothesis, and analyze and interpret data appropriately	• Demonstrates a thorough understanding of the scientific method. • Clear ability to understand and design complex experimental protocols. • Analyzes and presents data with a clear and proper interpretation.	• Demonstrates good understanding of scientific method. • Designs experiments appropriate for addressing hypotheses. • Presents data in an appropriate context.	• Demonstrates satisfactory understanding of scientific method. • Needs some assistance with complex experimental design and analyzing data. • Can present and interpret data with some guidance from the PI.	• Demonstrates minimal understanding of scientific method. • Limited ability to conceive of experimental design to address hypotheses. • Needs significant faculty input for data analysis and interpretation.		
Able to effectively communicate data and interpretation with scientific peers, answers questions, communicates ideas	• Articulates intimate understanding of the project. • Is able to orally communicate and defend new ideas. • Thinks effectively on his/her feet. Is able to integrate knowledge from multiple disciplines and experience in solving problems.	• Has appropriate understanding of the project. • Able to articulate ideas but lacks some creativity. • Can think through basic problems when questioned. • Has an adequate knowledge base and is able to integrate appropriately to solving problems.	• Has a basic understanding of the project but lacks depth. • Can answer basic questions about the project but has some difficulty thinking on his/her feet. • Has some gaps in knowledge base and does not effectively use this for problem solving.	• Lacks understanding of the project and unable to communicate rationale for interpretation of data or direction of the project. • Substantial gaps in knowledge base and is unable to draw from different areas or experiences to solve problems.		

Able to communicate effectively through scientific writing.	• Demonstrates a thorough understanding of context, audience, and purpose of the scientific work. • Uses appropriate, relevant, and compelling content to convey the contribution to the scientific discipline. • Pays detailed attention to and successful execution of conventions particular to scientific writing including organization, content presentation, formatting, and style. • Uses relevant and credible references appropriately. • Uses graceful language that skillfully communicates meaning to readers with clarity and fluency, and is nearly error free.	• Demonstrates adequate consideration of context, audience and purpose of the scientific work. • Uses appropriate, relevant and compelling content to convey the contribution to the scientific discipline. • Consistently uses important conventions particular to writing manuscripts including organization, content, presentation, and style. • Consistently uses appropriate references to support ideas. • Uses straightforward language that generally conveys meaning to readers with few errors.	• Demonstrates awareness of context, audience, and purpose of the scientific work. • Uses appropriate and relevant content to explore ideas through most of the work. Follows expectations appropriate to scientific writing for basic organization, content, and presentation. Attempts to use credible and/or relevant references to support ideas. • Uses language that generally conveys meaning with clarity, though with errors.	• Demonstrates minimal attention to context, audience, purpose of the scientific work. • Uses appropriate and relevant content to develop simple ideas in parts of the work. • Attempts to use a consistent system for basic organization and presentation. Attempts to use sources to support ideas. • Uses language that sometimes impedes meaning because of errors in usage.		

Department of Microbiology, Immunology, and Molecular Biology
Program Assessment by Graduates

Name:
Date of Graduation:
Current position:

Please score the following program elements in terms of whether they have been important in preparing you for your current position.

Learning outcomes	Well prepared/ Used every day 4	Mostly prepared/ Used regularly 3	Some preparation/ Used occasionally 2	Not prepared/ Never used 1	**Score**
Fund of knowledge obtained from courses outside the department					
Fund of knowledge obtained from courses taught by MIMG					
Scientific skills learned by working in a lab such as ability to read scientific literature and creatively apply it to current research projects, ability to develop hypotheses and design experiments to address these, ability to analyze and interpret data					
Public speaking skills obtained from giving seminars, journals club presentations, class room presentation, presentations at conferences					
Writing skills learned from writing papers for courses, manuscripts for publication, fellowship applications, qualifying exam, dissertation					
Teaching skills obtained from putting together presentations in classes and journals clubs, working as a teaching assistant, and/or giving oral presentations					

What are your perceived strengths of the MIMG program?

What are your perceived weaknesses of the MIMG program?