

## THE MOLECULAR MICROBIOLOGY AND IMMUNOLOGY GRADUATE PROGRAM

Richard Di Paolo, Ph.D., Interim Chair of the Molecular Microbiology and Immunology Department

Graduate Program Directors: Ryan Teague, Ph.D. (Chair), Lynda Morrison, Ph.D., and John Tavis, Ph.D.

The Department of Molecular Microbiology and Immunology (MMI) offers a program in molecular microbiology and immunology leading to the Ph.D. degree. The goal of the MMI graduate program is to graduate exceptionally well-trained researchers who are prepared for a career in academic science or biotechnology. Students with a bachelor's degree enter the Program following successful completion of the year-long Basic Biomedical Sciences core program, which provides a strong foundation for specialization in microbiology and/or immunology. Students with master's or doctoral degrees may petition for direct entry to the Program. Saint Louis University M.D./Ph.D. students enter the Program following their second year in medical school. Areas of research emphasis in the Program include cell and molecular biology, virology, and immunology. Graduate training in the Program includes advanced coursework, training in scientific writing and oral presentation skills, and performance of original biomedical research leading to the Ph.D. Dissertation. Training in teaching skills is provided for students interested in an academic teaching career.

Although each Ph.D. candidate will have a least one primary mentor, the responsibility for the education of each student ultimately lies with faculty of the Department as a whole.

The MMI students will elect an *ex officio* representative to assist the Graduate Program Directors. The students may use any means of selecting their representative that they choose. The term of the student representative will be one year, starting on the first day of fall semester, and s/he may serve multiple terms. The student representative will participate in all discussions regarding oversight and management of the MMI graduate program, and s/he will bring issues of importance to the students to the Directors' attention. The student representative will not participate in discussion of privileged academic information for any student.

### I. PREREQUISITES AND ENTRY PROCESS

#### a. Prerequisites.

A Bachelor of Science, Bachelor of Arts, master's, or doctoral degree is required including course work in the biological sciences, organic chemistry, and mathematics.

#### b. Entry through the Basic Biomedical Sciences Core Program.

Most students enter following successful completion of the Basic Biomedical Sciences core program. Students select dissertation mentors in the MMI Graduate Program following laboratory rotations in the mentor's lab as part of BBS.5970. Formal admission to the program entails communication of the student's choice to MMI Graduate Program Directors, followed by approval of the MMI Graduate Program Directors and the Chairperson of the MMI department.

#### c. Entry through the M.D./Ph.D. Program.

Students in the M.D./Ph.D. program select dissertation mentors in the MMI Graduate Program following laboratory rotations in the mentor's lab as part of the M.D./Ph.D. program. Formal admission to the MMI program entails communication of the student's choice to MMI Graduate Program

Directors, followed by approval of the MMI Graduate Program Directors and the Chairperson of the MMI department.

**d. Direct Entry of Advanced Students.**

Students with a master's or doctoral degree are eligible for direct entry to the MMI program. Students apply either through the Basic Biomedical Sciences core program or directly to the MMI Graduate Program. Students are evaluated on a case-by-case basis by the MMI Graduate Program Directors and the Chairperson of the MMI Department following consultation with the MMI Graduate Faculty. Students may either directly select a mentor or may choose a mentor following research rotations as part of MB.5310. Coursework from the master's or doctoral studies substitutes for coursework in the Basic Biomedical Sciences core program, but 80% of the credits needed for the Ph.D. degree must be accrued through Saint Louis University graduate-level coursework. In most cases, this means that only 11 or 12 credits will be eligible to be transferred from the prior master's or doctoral training. Only non-dissertation research credits graded on a system other than pass-fail are eligible to be transferred.

**e. Timeline for Entry and Major Milestones in the MMI Graduate Program.**

	Admission to MMI	Preliminary Degree Exam	Candidacy Exam	Ph.D. Defense
MMI program year:		1	2	3....
Core program year:	1	2	3	4....
MD/PhD and Direct Entry Students:	Prior training	1	2	3....

## II. CRITERIA FOR THE PH.D. DEGREE

**A. Course Work (36 hrs; See sections III-V for course descriptions)**

**1. First Year (through the Basic Biomedical Sciences program)**

1<sup>st</sup> Semester

BBS.5010	5 hrs	Basic Biomedical Science I
BBS.5020	4 hrs	Special Topics in Basic Biomedical Science I
BBS.5920	1 hr	Basic Biomedical Science Colloquium
BBS.5970	2 hr	Introduction to Basic Biomedical Research

2<sup>nd</sup> Semester

BBS.5030	5 hr	Basic Biomedical Science II
BBS.5040	4 hr	Special Topics in Basic Biomedical Science II
BBS.5100	0 hr	Ethics for Research Scientists
BBS.5920	1 hr	Basic Biomedical Science Colloquium
BBS.5970	2 hr	Introduction to Basic Biomedical Research

Summer

BCHM.6280	2 hrs	Introduction to Genomics and Bioinformatics
ORES.5010	3 hrs	Biostatistics for Medical Sciences

**2. Second Year (*through MMI*)**1<sup>st</sup> Semester

MB.6350	3 hrs	Virology
MB.6650	3 hrs	Basic Immunobiology
MB.6900	0-1 hrs	MMI Journal Club
MB.6920	0-1 hrs	MMI Colloquium
BBS.5920	1 hr	Basic Biomedical Science Colloquium
MB.6990	0-3 hrs	Dissertation Research

2<sup>nd</sup> Semester

*****	0-4 hrs	Electives*
MB.6900	0-1 hrs	MMI Journal Club
MB.6920	0-1 hrs	MMI Colloquium
BBS.5920	1 hr	Basic Biomedical Science Colloquium
MB.6990	0-6 hrs	Dissertation Research

**3. Third and Subsequent Years**1<sup>st</sup> Semester

*****	0-4 hrs	Electives*
MB.6900	0-1 hrs	MMI Journal Club
MB.6920	0-1 hrs	MMI Colloquium
MB.6990	0-6 hrs	Dissertation Research

2<sup>nd</sup> Semester

*****	0-4 hrs	Electives*
MB.6900	0-1 hrs	MMI Journal Club
MB.6920	0-1 hrs	MMI Colloquium
MB.6990	0-6 hrs	Dissertation Research

\*Electives: These can be any Advanced Topics courses offered by any graduate program. Electives may be taken at any time in the student's graduate program; however, at least 36 hours of total course work must be taken over the course of the Ph.D.

**B. M.D./Ph.D. Course Requirements.**

Credits accrued during the first two years of medical school will be transferred to the graduate program and will substitute for coursework required for non-M.D./Ph.D. students, including MB.6350 (Virology) and MB.6650 (Basic Immunobiology). Students will take 1 credit of each MB.6240: Advanced Topics in

Immunology and MB.6820: Advanced Topics in Virology and Cell Biology, or two credits of MB.6970 (Research Topics) to enhance their training in virology and immunology beyond what is provided through the medical school curriculum. All other requirements for the MMI Ph.D. degree apply to M.D./Ph.D. students.

### **C. Laboratory Research.**

Students will choose a mentor and join his/her laboratory, typically in the summer following the first year that is spent in the Basic Biomedical Sciences program. Biomedical research is to be conducted under the guidance of the mentor and other faculty. *Primary laboratory and/or in silico research forms the core of the students' training.*

### **D. Preliminary Degree Examination.**

The Preliminary Degree Examination must be taken before the end of the summer session of the first year of graduate studies in the MMI program. This is an oral examination whose goal is to determine whether the student has an adequate foundation of knowledge in the biomedical sciences to support Ph.D. studies. The Examination allows weaknesses and deficiencies in the student's training to be identified, which then can be corrected. The Examination covers all material expected as a prerequisite to enter the MMI program, taught as part of the Basic Biomedical Sciences program, or covered in the MMI coursework. The MMI faculty have prepared an outline of topics over which the student will be tested during the Examination. A committee of 5 faculty members appointed by the MMI Graduate Program Directors administers the Examination. A pass in this examination requires a majority vote of the committee. Should the student fail, a second Examination may be taken prior to the end of fall semester of his/her second year in the MMI program. A third Examination is granted only under extraordinary circumstances, and only upon the approval of 3/4 of the primary MMI faculty. The last opportunity to take the Preliminary Degree Examination will be the end of the summer session of the second year of studies in the MMI program. Successful completion of the Preliminary Degree Examination is required to continue as a student in good standing in the MMI graduate program. Failure to either pass the Preliminary Degree Examination or take it in a timely manner is grounds for dismissal from the MMI graduate program.

### **E. Candidacy Examination.**

The Candidacy Examination is composed of both Written and Oral components. The Candidacy Examination is governed by the Office of Graduate Education, and the student must register for the Candidacy Examination with the Doctoral Candidacy Advisor in the Office of Graduate Education, Office of the Provost of Saint Louis University using the "Doctoral Oral Examination" form at least two weeks prior to administration of the Candidacy Examination-Oral Component. The Candidacy Examination will be administered by the Candidacy Examination Committee, which is comprised of the student's mentor as Chairperson plus four other Graduate Faculty members appointed by the Graduate Program Directors, two of whom may have primary appointments outside of MMI if their scientific expertise is felt to be beneficial to the student. The Candidacy Examination will be taken for the first time before the end of summer session of the second year of studies in the MMI program.

The goals of the Candidacy Examination are to determine whether the student can formulate, test, and evaluate hypotheses at a level suitable for a Ph.D. scientist, and to evaluate the suitability of the student's proposed dissertation project. A pass in the Candidacy Examination requires a favorable vote from the majority of the Candidacy Examination Committee on both the Oral and Written Components. If the student fails either component, the Candidacy Examination Committee plus the Associate Provost for Graduate Education must approve a second attempt on the failed component. A third attempt is rarely approved and is considered by

the Associate Provost for Graduate Education only upon unanimous recommendation of the Candidacy Examination Committee. A faculty member who is not a member of the MMI Graduate Program must be present during the 2<sup>nd</sup> and 3<sup>rd</sup> exams. The Candidacy Examination must be successfully completed by the end of the summer session of the third year in the MMI program. Failure to either pass the Candidacy Examination or take it in a timely manner is grounds for dismissal from the MMI graduate program.

The Candidacy Examination-Written Component focuses on the student's anticipated Ph.D. research project. It should contain preliminary data developed by the student if his/her research project has advanced to a point where this is possible, be written using the NIH format (1/2 inch margins, Ariel 11 point font) and be divided into Specific Aims, Significance, Innovation, and Research Strategy sections). Students are strongly encouraged to write and submit an external fellowship grant application in support of their research, but funding of the application is not required. If the student and his/her mentor plan to submit an external fellowship application within one year of the Candidacy Exam, the Candidacy Examination-Written Component may be formatted as appropriate for the selected a pre-doctoral fellowship [e.g., American Heart Association, NIH F30 (M.D./Ph.D.), NIH F31 (Ph.D.), or NIH F31-Diversity (Ph.D.) predoctoral grants]. Otherwise, it should be formatted as an NIH R21. The Candidacy Examination-Written Component must be submitted to the Candidacy Examination Committee at least 1 week prior to administration of the Oral Component. Members of the Examination Committee will provide written critiques of the Candidacy Examination-Written Component within 1 week after administration of the Oral Component if requested by the student or her/his mentor to provide guidance regarding grantsmanship and project design.

Candidacy Examination-Oral Component. The student will be examined by the Candidacy Examination Committee on the both Candidacy Examination-Written Component and their area of research. To pass, the student must 1) Display adequate knowledge of their project, appreciation of the scientific method, and intellectual flexibility; and 2) Be able to apply this understanding to their research project.

## **F. Dissertation Research (12 hrs).**

### **a. Research Training.**

Original scientific laboratory and/or *in silico* research forms the essential core of training in the MMI program. These studies will be compiled into the student's Ph.D. dissertation, and hence are referred to as dissertation research. Dissertation research is conducted under the tutelage of the student's mentor, with assistance from other Graduate Faculty as needed. Research is permitted in any area of the biomedical sciences of interest to the student and his/her mentor for which sufficient expertise is available.

### **b. Formation and Role of the Dissertation Committee.**

The Dissertation Committee includes the student's mentor as Chairperson plus at least two members of the Graduate Faculty. Additional Graduate Faculty may serve on a Dissertation Committee if their scientific expertise is felt to be beneficial to the student. Non-SLU faculty may serve on a Dissertation Committee if they have been granted Graduate Status. Graduate Status is obtained by approval from the Graduate Program Directors; the Office of Graduate Education must be notified of this status and be provided with the faculty member's CV. The Dissertation Committee's role is to guide the student and his/her mentor during the student's dissertation research, to assist as needed during writing of the student's dissertation, and to approve the final dissertation. The Dissertation Committee will meet at least two times annually to review and critique the research progress; more frequent meetings are strongly encouraged. Submitting a brief written report to the Dissertation Committee prior to each

meeting is required. Students are highly encouraged to interact frequently with their Dissertation Committee members on an informal basis throughout their dissertation studies.

If a student finds it necessary to make a major change(s) in their proposed dissertation research, they must seek advice and approval from their Dissertation Committee. This entails writing a proposal outlining the changes and discussing the proposal at a meeting of their Dissertation Committee prior to initiating the changes. If it becomes necessary to replace one or more members of their Dissertation Committee, the change must be approved by the student's mentor and the Graduate Program Directors, and then be registered with the Office of Graduate Education.

**c. Dissertation Research Credits.**

The student must take 12 credits of MB.6990, Dissertation Research, prior to defense of his/her dissertation. The student must register for  $\geq 1$  credit per semester until 12 credits have accrued, after which he/she may register for 0 credits of MB.6990.

**G. Other Requirements for the Ph.D. Degree.**

**a. Peer-Reviewed Primary Research Report.**

Students are required to have published or have accepted for publication at least one peer-reviewed research report based on data produced by the student; the publications must be in an academic journal that is indexed in PubMed. The student must be first, co-first, or senior author on the report and he/she must write the document with his/her mentor's guidance.

**b. Attendance at MMI Seminars and Journal Club.**

Students are required to regularly attend the MMI seminars and the journal club each semester. Students are expected to present a current journal article in each fall semester as part of the MMI journal club, and to present an update on their own work in the spring semester as part of the MMI progress report (section H.a.). Presentation in the fall semester of the student's first year in MMI is optional at the discretion of the student and his/her mentor. Students needing to accrue credits may register for MB.6920 (MMI Seminars) or MB.6900 (MMI Journal Club), but registration is not required.

**H. Annual Research Progress Report and Annual Review.**

**a. MMI Progress Report.**

Students will present their progress on their Ph.D. studies in both written and oral formats to the MMI department each spring semester as part of MB.6900, Microbiology Journal Club. The goals of the MMI Progress Report are to provide the student with training on presenting their work orally and in writing, and to provide the full MMI faculty an opportunity to provide constructive criticism on the student's project. The Progress Report-Written Component will be submitted to the MMI faculty at least one week prior to presentation of the oral component. This report will be 3 to 5 pages long and will present the aims of the research project, progress that has been made towards completion of the aims, and goals for the next year. The student will also include an updated copy of their Curriculum Vitae. These documents will be confidential and will be distributed only to the MMI faculty. The Progress Report-Oral Component will describe the aims of the student's research project, the progress that has been made towards completion of the aims, and the goals for the next year. The Graduate

Program Directors, the student's mentor, and MMI faculty as appropriate will discuss the student's project in a private meeting immediately following the oral presentation. The student and his/her mentor will also update the Graduate Program Directors on key milestones of the student's progress concurrently with the MMI Progress Report using the attached *MMI Ph.D. Training Milestones* form.

**b. Annual Review.**

All students must undergo a formal Annual Review each year using the attached *Annual Graduate Student Review Form*. The review must be completed by the end of spring semester. The review is to be completed by the student and his/her mentor and must be approved by the MMI Graduate Program Director. A copy of the completed review form is maintained by the MMI Graduate Program Director.

**I. The Ph.D. Dissertation.**

A Ph.D. dissertation is written according to the guidelines of the Office of Graduate Education. Candidates must write the dissertation, have the written dissertation approved by the Dissertation Committee, and then defend the dissertation in a public forum. Candidates are expected to provide a draft of the dissertation to the Dissertation Committee well in advance of planning the public defense, and the public defense can only be scheduled after the Dissertation Committee has agreed that the written dissertation is in its final form and ready to be defended. The date, time, and location of the presentation are determined by the candidate's Dissertation Committee. The candidate must submit the "Notification of Readiness for the Public Oral Defense" form, signed by the Dissertation Committee Chairperson, to the Doctoral Candidacy Advisor in the Office of Graduate Education at least two weeks in advance of the oral defense date. Following the public defense, the Dissertation Committee examines the student orally in private on the dissertation. A majority vote of the committee is required to pass. In the event that the student fails the dissertation, he/she may attempt a second time within three months. Additional attempts will require the unanimous approval of the Dissertation Committee.

**J. The Ph.D. Degree.**

The Graduate Faculty consider that a Ph.D. will be granted when the student has achieved an appropriate breadth and depth of knowledge, and when he/she has demonstrated the ability to independently define a scientific question and to design and execute experiments whose unambiguous results answer the posed question. It is understood that the student's research has been directed in large part by his/her mentor, and the MMI faculty anticipate that the ability to conduct fully independent research will require postdoctoral training. Each student will be considered on a case-by-case basis by their Dissertation Committee. The degree is conferred on the day that all Saint Louis University requirements are met (all grades posted, the dissertation is accepted on Pro Quest, ballots submitted), not the day a student defends his/her dissertation.

**K. The M.S. Degree.**

The M.S. degree may be granted by the MMI Graduate Program to those students whose Ph.D. studies are terminated either through choice of the student or failure to pass the Candidacy Examination. Students who fail the Preliminary Degree Examination are not eligible to receive the M.S. degree. Each student will be considered on a case-by-case basis by their mentor and the MMI Graduate Program Directors. The MMI faculty consider that the M.S. degree can be granted when the student has demonstrated mastery of subject matter within the biomedical sciences clearly superior to that required for the B.S. degree. This will typically involve primary scientific research conducted by the student under direction of his/her mentor. The student must write a M.S. thesis according to the rules established by the Office of Graduate Education and defend it

to a Master's Committee of three graduate faculty members with the student's mentor as Chairperson. The student may present a public seminar on his/her thesis at his/her discretion. A favorable vote from the majority of the Master's Committee is required to pass. In the event that the student fails the thesis defense, he/she may attempt it a second time within three months. Additional attempts will require the unanimous approval of the Master's Committee.

#### **L. Exceptions to these Policies, Conflict Resolution, and Appeals.**

Exceptions. The MMI faculty recognize that each student has unique educational needs and that exceptions to these policies will occasionally be needed. The MMI Graduate Program Directors will consider each request for an exception on a case-by-case basis. In all cases, exceptions will only be granted when they are: 1) in the student's best interest; 2) consistent with the spirit of the MMI Graduate Program policies; and 3) fair to other students in the MMI Graduate Program.

Conflict. Resolution of conflicts between the student and his/her mentor, the Preliminary or Candidacy Examination Committee members, or the Dissertation Committee members will be mediated by the Graduate Program Directors and the Chair of the MMI Department with consultation of the Office of Graduate Education as needed. The governing principles during conflict resolution will be to act in the student's best interest while remaining fully consistent with academic and scientific standards.

Appeals. All appeals to decisions made under these policies will first be considered by the MMI Graduate Program Directors and the Chair of the MMI Department, with consultation of the MMI faculty and the Office of Graduate Education as appropriate. If a mutually acceptable resolution consistent with academic and scientific standards cannot be achieved, further appeals will be at the student's discretion and must follow University-approved policies as articulated by the Office of Graduate Education.



### III. FIRST YEAR CORE GRADUATE COURSE DESCRIPTIONS

#### **BBS.5010: Basic Biomedical Sciences I (5)**

This intensive, multi-disciplinary lecture course is taught by faculty from all four biomedical research programs of the Medical School. The lecture topics include: macromolecular structure, shape and information; DNA, RNA and protein synthesis; genetics and control of gene expression; membranes and intracellular organelles; and pathways and control of carbohydrate metabolism. BBS.5020 is co-requisite. (Offered every Fall semester)

#### **BBS.5020: Special Topics in Basic Biomedical Sciences I (4)**

An intensive multi-disciplinary course designed for all biomedical graduate students. This course involves participation in small group exercises involving problem solving and critical analysis of the scientific literature. The special topics are selected to coordinate with the lecture topics in the co-requisite course BBS.5010. (Offered every Fall semester)

#### **BBS.5030: Basic Biomedical Sciences II (5)**

An intensive multi-disciplinary course designed for all biomedical graduate students. This course is a continuation of BBS-5010. Course topics include: membranes, cell signaling, cancer, neuroscience, and integrated biology. BBS.5040 is a co-requisite. (Offered every Spring semester)

#### **BBS.5040: Special Topics in Basic Biomedical Sciences II (4)**

An intensive multi-disciplinary course designed for all biomedical graduate students. This course involves participation in small group exercises involving problem solving and critical analysis of current scientific literature in selected special topics, as related to the lecture topics in the co-requisite course BBS.5030. (Offered every Spring semester)

#### **BBS.5100: Ethics for Research Scientists (0)**

The course covers a variety of topics relevant to the ethical aspects of conducting and reporting scientific investigations including general ethical principles, use of animals and human subjects in research, authorship, mentorship, conflicts of interest, and scientific misconduct. It is a self-paced web-based course. The course is a requirement for all pre- and postdoctoral fellows. (Web course offered every Spring semester)

#### **BBS.5920: Basic Biomedical Science Colloquium (1-2)**

Students are introduced to the techniques of critical data analysis and formal scientific presentation through weekly colloquia. Students in their second year of graduate studies present in the Fall semester and first year students present in the Spring semester. Emphasis is placed on styles of presentation and techniques for effective communication. In the Fall semester, a written report on one of the scientific topics is required of each student. In the Spring semester, each student critically reviews and presents a topic from the current scientific literature at one of the weekly colloquia. All students are required to attend both the scientific presentation and a 10-15 minute discussion session that follows. (Offered every Fall and Spring semester)

#### **BBS.5970: Introduction to Basic Biomedical Research (0-3)**

Each semester is divided into four- to six-week rotations in different research laboratories. Students are introduced to research problems currently under investigation, and to advanced techniques employed in those studies. In the fall semester, the first rotation involves introductory activities distributed between the four graduate biomedical science programs of the medical school. (Offered every Fall and Spring semester)

**BCHM.6280: Introduction to Genomics and Bioinformatics (2)**

Prerequisites: BBS.5010 and BBS.5020 or permission from instructor. This course introduces current practices in genomics and bioinformatics. Lecture topics include finding information in nucleic acid and protein sequence and structure databases, protein motif and family classification, comparative genomics, and large-scale gene expression data analysis. Computer-based exercises are coordinated with lecture topics. (Offered every Summer session)

**ORES.5010: Applied Biostatistics for Medical Sciences (3)**

This course teaches the basic methods of biostatistical analyses used in epidemiological and experimental biomedical research. It employs didactic lectures on statistical theory and problem sets to be performed by the students. (Offered every Summer session).

**IV. REQUIRED COURSES FOR THE MMI PH.D. PROGRAM****MB.6350: Virology (0-3)**

This is a survey course in human and animal virology covering the major DNA and RNA virus families. Topics include viral structure, gene expression, replication, genetics, dynamics, taxonomy, and oncogenesis. Additional key concepts of pathogenesis, host countermeasures to viral infection, viral immune evasion strategies, vaccine development, and antiviral therapy are explored. (Offered every Fall semester)

**MB. 6650: Basic Immunobiology (0-3)**

This is a survey course that presents fundamental concepts in molecular and cellular immunology. Topics include mechanisms in innate immunity such as Toll-like receptors, chemokine and cytokine signaling, complement and cellular responses; the genetics, biochemistry and biology of antigen recognition structures and antigen processing; T and B cell development; lymphocyte activation and cell-cell interactions in adaptive immunity; and host immune responses in infection, allergy, and autoimmunity. Emphasis is on experimental approaches and some review of current literature. (Offered every Fall semester)

**MB.6900: Microbiology Journal Club (0-1)**

Students present important research published in the biomedical literature in each Fall semester and present their own research in each Spring semester. Students are required to choose their paper for their Fall semester presentation one month in advance and discuss their choice with their dissertation mentor and/or the course director. One week prior to their research presentation in the Spring semester the student must circulate a research progress report to the MMI Faculty (see above, section G). The director of MB.6900, the student's mentor, and MMI faculty as appropriate will discuss the student's project in a private meeting immediately following the oral presentation. (Offered every Fall and Spring semester)

**MB.6920: Microbiology Colloquium (0-1)**

Students attend the MMI seminar series and critique the scientific presentations using the attached form. Students also attend lunch meetings with the visiting speakers. One or two meetings with the course director are held each year to discuss scientific presentation skills. Students are encouraged to collectively invite and host one or more seminar speakers per semester. (Offered every semester)

**V. RECOMMENDED ADVANCED TOPIC ELECTIVES FOR MMI STUDENTS****MB.6240: Advanced Topics in Immunology (1-3)**

This course entails a discussion of research publications focused on topics of current importance in molecular and cellular immunology. These may include recombination in the Ig and TCR loci; signal transduction coupled to antigen and cytokine receptors; molecular aspects of intracellular pathways in antigen processing; ligand-receptor interactions in cell-cell communications; chemokine and cytokine networks and infection; role

of T cell subsets in host defense mechanisms; and immune mechanisms in pathogenesis of infectious disease. (Offered every semester)

**MB.6750: Immunology Journal Club (2)**

This is an advanced topics literature survey. Students attend weekly presentations of current publications on topics in molecular and cellular immunology, vaccine development and gene therapy. Each student presents once per semester. (Offered every semester)

**MB.6970: Research Topics (0-3)**

This is an advanced topics course taught by any of the MMI Faculty. It is designed for a class of several students who meet with the instructor once or more per week to discuss and analyze a research topic. Material is taken for current research papers published in leading research journals. The topic for the course is tailored to meet the interests of the students. (Offered every semester)

**BCHM.6230: Macromolecules: Structure, Function, and Interactions (4)**

Prerequisites: BBS.5010, BBS.5020, BBS.5030, and BBS.5040. Students participate in self-directed problem-solving exercises designed to provide familiarity with concepts and methodology in the analysis of enzyme catalysis, protein-nucleic acid interactions, and protein function and regulation. Emphasis is on independent investigation of information resources, development of a research plan, design of experimental approaches, and evaluation of data. (Offered every Fall semester)

**BCHM.6250: Preparation and Evaluation of Scientific Research Proposal (3)**

Lectures dealing with organization and evaluation of research proposals. Presentations of published papers selected by students in areas outside their dissertation topic. Weekly progress reports lead up to submission of a research proposal. Proposals are critiqued by faculty and students and are revised in light of written critiques. (Offered every Spring semester).

**MB.6980: Graduate Reading Course (1-3)**

Individualized reading courses taught one on one with a student and any of the MMI faculty. Topics are tailored to the student's interest. (Offered every semester)

**MB.5310: Introduction to Research Techniques and Topics (1-3)**

Students in the first year of their MMI graduate studies spend a minimum of six weeks doing a research project with one or more MMI Graduate Program faculty members. Projects are designed to acquaint the student with a specific line of research and to help them learn techniques and develop new research skills. (Offered every Fall semester)

**MB.6820: Advanced Topics in Virology and Cell Biology (1-3)**

This course is taught by one or more of the faculty in the program. Students meet with the instructor one to three times per week to discuss and analyze a research topic in virology or the relationship between viruses and their host cells. Material is taken from research papers published in leading research journals, with supporting information from graduate-level textbooks. Topics for the course are selected by the faculty of the molecular microbiology and immunology program. (Offered every semester)

**MB.6950: Special Study for Examinations (0-1)**

**MB.6990: Dissertation Research (0-6)**

**MB.6CR: Doctor of Philosophy Degree Study (0) (summer only)**

## **Appendixes:**

**Forms employed to evaluate and track MMI student performance**

# MMI PhD training program milestones

Form updated 04/22/2021

General information												
Student Name												
Mentor(s)												
Dissertation committee members												
Core, direct entry, or MD/PhD												
Date admitted to MMI												
Classes												
Preliminary classes completed? (Core series, MD/PhD or MS credits transferred: yes/no)												
MMI immunology (semester passed)												
MMI virology (semester passed)												
MMI journal clubs (Semesters participated)												
MMI research updates (Semesters participated)												
MMI seminar attendance (Semesters participated)												
Dissertation credits (Total accrued by end of current semester)												
MMI annual progress review												
Semesters submitted												
Grant writing												
Grant type written												
Date submitted (externally or to candidacy exam committee)												
Outcome (if submitted externally)												
Dissertation committee meetings												
Dates												
Final meeting (date)												
Research publication												
Date first first-authored paper accepted												
Journal name												
Exams												
Preliminary Degree Exam dates												
Outcome (P, F, Provisional pass)												
Candidacy Exam dates												
Outcome (P, F, Provisional pass)												
PhD defense dates												
Outcome (P, F)												
Semester and year PhD awarded												



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# Annual Graduate Student Review Form

Department of Molecular Microbiology & Immunology  
Saint Louis University School of Medicine

*Please Print or Complete Electronically to Ensure Accurate Entry.  
All text boxes are expandable.*

## **Student Information**

Date of Evaluation : _____	
Name: _____	
Email: _____	Phone: _____
Banner ID: _____	Mentor: _____
Graduate Program: _____	Degree: _____

Are you on Academic Leave? ☐ - Yes ☐ - No  
If Yes, please attach a copy of your Leave Agreement to this review.

## **Academic Coursework**

**Current courses:** Which courses have you taken this year or are you currently taken? If none, enter "none".

Course #	Course Title	Credits

**Future courses:** Which additional do you intend to take and when? If none, enter "none".

Term	Course #	Course Title	Credits

## **Thesis or Dissertation Research Activities**

Describe your current progress with the research requirements of the program (i.e., thesis, dissertation). Provide expected timelines, with dates, for completion of the major components of your thesis or dissertation (e.g., proposal meeting, IRB approval, data collection, data analysis, written draft, final written version, committee approval, oral defense).

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**Support:** Have you received financial support from SLU or an external organizations? If so, what is the source (e.g., research assistantship from NIH grant, etc.)? If none, enter “none”.

Term	Source of Support

**Teaching:** In which courses and semesters have you been a Teaching Assistant? In which courses and semesters have you been the Primary Instructor? If none, enter “none”.

Term	Course #	Course Title	Role

**Publications:** List any publications that have been accepted for publication. If none, enter “none”.

List any publications that have submitted for publication. If none, enter “none”.

### **Professional Development**

List below all presentations at professional meetings and conferences for the current academic year (Please include any presentations to occur over the rest of the academic year, including summer—if known). If none, enter “none”.

List below all internal or external grants submission (or your participation in the submission) this academic year, indicating the funding source to which it was submitted and the results of the review if known. If none, enter “none”.

List all professional organizations of which you are a student member, including any offices held. If none, enter “none”.

Describe any professional service and/or leadership positions associated with the university, graduate education, department or program. Indicate your title and dates of service If none, enter “none”..

List any awards, honors and achievements you have received this academic year. If none, enter “none”.

List any additional factors that you would like to have included in your evaluation? If none, enter “none”.

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## **Evaluation**

### **To be completed by the Mentor or Graduate Director**

Based upon the faculty’s discussion, you were rated in each of the following dimensions. (Inadequate: Not meeting expectations, not progressing; Adequate: Meeting expectations, making sufficient progress; Exceptional: Exceeding expectations, exceptional progress).

	Inadequate	Adequate	Exceptional
<b>Academic Quality (in coursework)</b>			
<b>Academic Progress</b>			
<b>Research Quality (in research or assistantship)</b>			
<b>Research Progress</b>			
<b>Professional Skill Acquisition</b>			
<b>Personal &amp; Professional Development</b>			

### **Evaluation Commentary**

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\_\_\_\_\_  
Student’s signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Mentor’s signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Graduate Director’s signature

\_\_\_\_\_  
Date

For students with assistantship assignments apart from their mentor:

\_\_\_\_\_  
Supervisor’s signature

\_\_\_\_\_  
Date

The review is to be completed by the student and his/her mentor and must be signed by the MMI Graduate Program Director. This needs to be completed by the end of spring semester each year. After completion, the student should:

1. Give a copy to Dawn Schwartz to enter into MMI’s files.
2. File a copy with the MMI Graduate Program Director



## MMI Preliminary Degree Examination Ballot

Student Name: \_\_\_\_\_

Exam Date: \_\_\_\_\_

Ability to clearly express ideas:

☐ Excellent   ☐ Good   ☐ Fair   ☐ Weak   ☐ Unacceptable

Comments:

Knowledge of factual material:

☐ Excellent   ☐ Good   ☐ Fair   ☐ Weak   ☐ Unacceptable

Comments:

Ability to synthesize information:

☐ Excellent   ☐ Good   ☐ Fair   ☐ Weak   ☐ Unacceptable

Comments:

Overall evaluation:

☐ Pass   ☐ Conditional Pass   ☐ Fail

Comments (including conditions to be met in the event of a conditional pass):

Faculty Signature: \_\_\_\_\_

*(MMI Candidacy Exam Form)*

**Result Form, Doctoral Oral Exam/Project Defense**

Student Name:

Student Banner ID:

Degree Program:

Committee Chair:

Committee Members:

Date:

Time:

Committee Decision for: Doctoral Oral Exam/Project Defense (check only one)

Passing with distinction\_\_\_\_\_

Passing \_\_\_\_\_

Unfavorable\_\_\_\_\_

Comments:

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Date: \_\_\_\_\_

Committee Chair's Signature\_\_\_\_\_

Committee Members' Signatures\_\_\_\_\_

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*This form is used to schedule the Candidacy Examination*

## DOCTORAL ORAL EXAMINATION FORM

**This form must be completed and sent to the Doctoral Candidacy Advisor,  
420C DuBourg Hall, AT LEAST TWO WEEKS PRIOR TO THE EXAMINATION**

STUDENT'S NAME: \_\_\_\_\_

SLU ID: \_\_\_\_\_ TELEPHONE: \_\_\_\_\_

EMAIL: \_\_\_\_\_

DATE OF EXAM: \_\_\_\_\_

DAY OF EXAM: \_\_\_\_\_

TIME OF EXAM: \_\_\_\_\_

CHAIRPERSON OF EXAM COMMITTEE: \_\_\_\_\_

COMMITTEE MEMBERS: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

OUTSIDE COMMITTEE MEMBER: \_\_\_\_\_  
(Only if Required)

Date student passed preliminary written exam: \_\_\_\_\_

Major field Program Director/Chairperson: \_\_\_\_\_  
(Signature)

Dean/Associate Dean/Center Director: \_\_\_\_\_  
(Signature)

Date sent to Graduate Education: \_\_\_\_\_

# NOTIFICATION OF READINESS

## FOR THE PUBLIC ORAL PRESENTATION OF THE DISSERTATION DEFENSE\*

Candidate's Name:

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Candidate's Banner ID:

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Degree Program:

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Dissertation Committee Members:  
(Please Print)

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*(Chairperson)*

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*(Outside Committee Member if Required)*

Title of the Dissertation:

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Date of the Oral Presentation:

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(Start) Time of the Presentation:

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Location of the Presentation:

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Date: \_\_\_\_\_ Signed: \_\_\_\_\_

*(Dissertation-Committee Chairperson)*

Date: \_\_\_\_\_ Signed: \_\_\_\_\_

*(Dean/Associate Dean/Center Director)\*\**

\*This form must be completed and delivered to the Doctoral Candidacy Advisor (DuBourg Hall, Room 420D), at least **two weeks** before the date of the public, oral presentation of the dissertation

\*\*Signature conveys approval of the committee chair, dissertation committee, and outside committee member if required.

Rev 12/13

The **Dissertation-Committee Chairperson** is responsible for this form.

A list of those individuals the major field desires to receive invitations to this specific presentation may accompany this form with their email address. Any invitations that must be sent by the USPS are the responsibilities of the major field.

Please note that the University community will be informed of the day, date, time, and location of the presentation, initially one week in advance, via Newslink.

**The Dissertation-Committee Chairperson** should note:

There are now two results reported. One result is for defense only and the other is for the dissertation.

If the decision for the defense is unfavorable, then a new Notification of Readiness will be required for the second defense. An outside committee member (a SLU faculty member from another program) must be included in the second defense.

**Doctoral Candidate:** please note that the dissertation is not to be given to the Doctoral Candidacy Advisor in advance of the format review appointment. The format review appointment is held after the defense and after all changes have been made that were recommended by the committee.