



Translational Bioscience Graduate Program

School of Medicine
University of Missouri

PhD Graduate Program Student Handbook

University of Missouri-Columbia
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Translational Biosciences PhD Program

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Graduate Student Handbook: Policies, Procedures, and Recommendations

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<p>The University of Missouri-Columbia Columbia, MO 65211 URL: http://www.missouri.edu/</p>	<p>Mizzou Online 136 Clark Hall Phone: (573)882-2491 or 1-800-609-3727 http://online.missouri.edu/</p>
<p>Disability Services A038 Brady Commons Phone: (573)882-4696 or TTY: (573)882-8054 http://disabilityservices.missouri.edu/</p>	<p>Transcripts Transcript Department 130 Jesse Hall Fax: (573)884-8382 http://registrar.missouri.edu</p>
<p>Graduate Admissions Graduate School 210 Jesse Hall Phone: (573)882-6311 or 1-800-877-6312 Fax: (573)884-5454 http://gradschool.missouri.edu</p>	<p>Registrar Office of the University Registrar 130 Jesse Hall M-F 8:00-5:00 Phone: (573)882-7881 http://registrar.missouri.edu</p>
<p>International Center N52 Memorial Union Phone: (573)882-6007 http://international.missouri.edu</p>	<p>Financial Assistance Student Financial Aid 11 Jesse Hall Phone: (573)882-7506 or 1-800-225-6075 http://admissions.missouri.edu</p>
<p>Veteran's Benefits Veterans Services Phone: (573)882-3852 http://veterans.missouri.edu/</p>	<p>Housing Administration 125 Jesse Hall Phone: (573)882-7275 or 1-800-225-6075 Fax: (573)882-3725 http://reslife.missouri.edu</p>

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Introduction

The purpose of this handbook is to outline the expectations of graduate students and to provide helpful information for prospective and current students. However, we realize that each student is unique and therefore we take extenuating circumstances into consideration. Any questions concerning departmental policies or guidelines should be directed to Christa Smith, the program coordinator.

For additional questions concerning the graduate school, please consult the graduate school <http://gradschool.missouri.edu/>

Statement of Philosophy:

The Translational Biosciences PhD program represents a new paradigm for graduate training in biomedical research because it spans the entire breadth of the biomedical research spectrum, from basic science discoveries to improved clinical outcomes. Through close collaborations with the outstanding scientists and clinicians of the Precision Health Institute, a UM System-wide effort to translate ground-breaking biomedical research into life-changing reality for patients in Missouri and around the world, this program provides state-of-the-art research training to young biomedical scientists at the beginning of their scientific careers. By combining graduate education and training with cutting-edge research, graduates will gain a deep knowledge base of their chosen discipline and the ability to communicate and collaborate across disciplines.

All students and mentors are encouraged to review the AAMC Compact between Biomedical Graduate Students and Their Research Advisors (www.aamc.org/gradcompact). In addition, students are highly encouraged to use the Individual Development Plan (IDP) during their training program (myidp.sciencecareers.org/).

Ph.D.

For the Ph.D. program, the typical duration is 4-5 years. The first year consists of required course work, teaching, and laboratory rotation. Students are expected to complete at least one semester of teaching assistantship during this year as well. By the end of the first semester, students are expected to have selected a laboratory and mentor. The second year consists of a continuation of coursework (both required and elective), a final semester of teaching assistantship, ongoing laboratory work and the formation of the dissertation committee. The formation of the dissertation committee is important because it allows students to plan programs of study, and to take comprehensive examinations that are required for official Ph.D. candidacy. The comprehensive examination is normally taken at the end of the second year. Within six months of successfully passing this examination, the student prepares and defends a dissertation proposal. The remainder of the program is spent completing the research project and preparing a dissertation.

The Doctor of Philosophy degree is the highest degree offered by the University. It is conferred only for work of distinction in which the student displays powers of original scholarship. The major emphasis of the doctoral program in Translational Biosciences is to provide an environment for the student to learn how to think, ask questions, and answer them in the

laboratory, how to write and orally communicate, and to develop into a mature, articulate, and competent biomedical scientist.

It is important that the student realize that he/she must make satisfactory progress to remain in the doctoral program according to both the University guidelines and the Advisory Committee.

An appropriate program of study is developed for each graduate student on an individual basis through regular consultation with a faculty advisory committee. This program consists of lectures and small group, student-directed learning, seminars, journal clubs, preparation of research proposals and independent research. During the first year, the student becomes acquainted with the research activities of each faculty member by attending faculty research overview and rotating through laboratories selected by the student.

Admission Requirements

General Academic Requirements:

University regulation requires that applicants for a graduate degree should have a grade point average (GPA) of 3.0 (A=4.0) or higher in the last 60 hours of undergraduate work. In addition, students should submit a departmental application that includes a Personal Statement and arrange to have three letters of recommendations. The letters should be written by individuals knowledgeable about the student's academic capability. Admission consideration is based on a variety of criteria that serve as predictors of probable success in graduate study, including GPA, letters of recommendation, and previous laboratory or research experience. Students are admitted to their program in the fall semester.

Application:

An application for the Translational Biosciences PhD Program can be obtained online at <https://applygrad.missouri.edu/apply/>.

Language Requirement:

International applicants and non-native English-speaking applicants must show evidence of English-language ability by providing acceptable scores from the Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IELTS). Exceptions include: applicants from native English-speaking countries, including: Australia, New Zealand, South Africa, the British Caribbean Islands, Canada (except French-speaking areas), Ireland, Israel, the United Kingdom and Kenya, are not required to submit TOEFL or IELTS scores and applicants who have successfully completed at least 24 credit hours of college-level work in the past two years at a school within the United States or another country where English is the native language. Applicants should contact Educational Testing Service (ETS) or IELTS to have official reports sent directly to the Graduate Admissions Office. However, we will work with copies of test results for initial admission review purposes. The minimum TOEFL score for admission are shown at:

<http://gradstudies.missouri.edu/admissions/eligibility-process/international.php>

Enrollment Requirements and Restrictions:

Students working toward advanced degrees are required to enroll in the Graduate School for courses that are part of their degree programs. In addition to fulfilling any prerequisite requirements, a graduate student may be required to take undergraduate courses that carry no graduate credit or enroll in some courses as a hearer. Enrollment is expected to reflect the course work and research in which students are engaged.

Full-time Enrollment: Without special permission from the vice provost/dean of the Graduate School, the maximum credit hours in Graduate School is 16 each regular semester and 9 for the summer session. Full-time enrollment for Ph.D. students prior to the comprehensive examination is 9 and 4.5 hours for regular and summer semesters, respectively. For post-comprehensive examination students, full-time registration is 2 and 1 hours for regular and summer semesters, respectively.

Full-time enrollment during summer session is not required for all students. It is for post-comprehensive examination students and for pre-comprehensive students **IF** enrollment is required for loan deferments, non-University health insurance, to maintain VISA status, or for other non-University entities that require full-time enrollment.

Although full-time enrollment for summer session is not required for pre-comprehensive examination students the following should be considered: Use of the recreation center requires enrollment for at least 1 hour. The fee will need to be paid at the center. There is no charge for use of the student health center (SHC), but it will bill the student accident and sickness insurance company for reimbursement. The SHC encourages students to pay the prepaid health user fee to help keep down insurance costs. This fee can be paid at the time the SHC is used and will give subsequent unlimited access to their services for the semester. The University-provided student accident and sickness insurance will remain in effect regardless of summer enrollment status provided it was signed up for it from August to August or January to August.

Participating Faculty

For information, research interests and publications for participating faculty, please refer to the website: <https://medicine.missouri.edu/offices-programs/translational-biosciences-graduate-program>

Graduate Advisory Committee

Selection of a Faculty Advisor (Major Professor):

Each graduate student must identify and select a major professor from the departmental faculty. As soon as students are accepted into the program, they should begin contacting faculty members to explore areas of mutual research interests. A major professor should be selected by the end of the first semester.

Role of the Major Professor:

The major professor guides course selection, thesis or dissertation committee formation, research, and thesis/dissertation preparation. The major professor is the official liaison between the student and the Graduate Advisory committee and between the student and administrative personnel.

Selection of the Major Professor:

The emphasis of the doctoral program is research, and the time for research will increase each year. New students will be introduced to ongoing research projects by attending overview presentations by faculty interested in attracting a student(s) to their laboratory team. After these meetings, new students will select a minimum of three faculty members for laboratory rotation. These rotations will allow the student to gain first-hand knowledge of the research in these selected laboratories and serve as a basis to select a major professor. The assignment of a major professor will be made after the student completes these rotations and provides the Graduate Education Council Director with a letter in which his/her choices for faculty advisor are listed. The student is expected to select his/her major professor by February of the first year and to initiate his/her dissertation immediately.

Every effort will be made to place the student in the laboratory of his/her choice, provided the faculty member is agreeable and space and sufficient extramural grant support are available to support the student's research.

Faculty members who accept the responsibilities of having graduate students enter their laboratory and serving as the student's advisor (major professor) are expected to make every effort to obtain financial support for the student by the start of the third year. Typically, stipend support will be derived from funded research projects. Tuition is waived for doctoral students supported by research grant funds, stipends or assistantships.

The student is expected to devote a considerable amount of time to research at the bench and in the library even when coursework and teaching is in progress. A key part of developing into a biomedical scientist is for the student to learn how to partition his/her time so that progress can be made in research while other responsibilities are met.

Ph.D. Dissertation Committee:

Once a student has committed to a laboratory, he/she should begin the process of selecting a committee. The function of the committee is to guide the student's education, monitor his/her progress, and objectively evaluate the student's ability to successfully obtain the Ph.D. degree. The doctoral program committee must be recommended by the student's advisor and approved by the departmental director of graduate studies and the Graduate School before one year has elapsed following the student's first registration as a doctoral student. The doctoral program committee shall be composed of a minimum of four members of the MU graduate faculty and will include at least three members from the student's doctoral degree program and an outside member from a different MU program*. At least two of the doctoral committee members must be members of the MU doctoral faculty. Additional committee members with specialized expertise who do not meet the criteria for the MU graduate faculty or doctoral faculty may serve on a

doctoral committee as a fifth or sixth member, with special permission of the Vice Provost/Dean of the Graduate School.

This committee is to be formed during the first year of study (D1 form) and its first function will be to meet and approve a Program of Study to be filed with the Graduate School (D2 form). All members of the doctoral program committee will be intimately involved and will actively participate in the activities of the doctoral student at all the stages of the student's career at MU, except the qualifying examination process. The committee also may participate in the assessment of a student's background and potential for success in the Department's doctoral program. Committee members may call a meeting of the full committee at any time to discuss the student's progress.

Note: If a member of the Graduate Education Committee (GEC) is not on a student's thesis or advisory committee, a member of this committee needs to be present at all of the graduate student's committee meetings.

Graduate Committee Membership for Jointly Appointed Faculty:

Chapter 320 of the Collected Rules and Regulations for the University of Missouri requires that all jointly appointed faculty members will have a designated Primary Appointment and Primary Department as well as affiliation with one or more involved departments or units. These affiliations affect membership status of jointly appointed faculty on graduate student committees as follows:

Committee Chair/Advisor:

A faculty member may serve as advisor/committee chair when their Primary Appointment is in the graduate student's home department. When the graduate student's home department is not the department for a jointly appointed faculty member, they may serve as chair/advisor with the approval of the Director of Graduate studies from the student's home department.

Committee Member:

A faculty member can only serve as an Internal Member when their Primary Appointment is in the graduate student's home department. When a graduate student's home department is the involved department for a jointly appointed faculty member, they may serve as either an Internal or External Member of the committee.

Graduate Committee Membership for Adjunct Faculty:

Adjunct faculty may serve as a Committee Chair or Committee Member only in departments in which they are appointed and approved for Graduate or Doctoral Faculty membership as appropriate for the student's degree (Master's or Doctoral). Service on graduate committees outside the department in which they are appointed requires a recommendation by the Director of Graduate Studies from the student's home department and approval by the Vice Provost for Advanced Studies and Dean of the Graduate School.

Coursework

Registration:

Registration for course work each term is the responsibility of the student. Course registration should conform to the student's plan of study. Course information may be obtained through the University myZou: <https://myzou.missouri.edu>

To be full time, students should register for a minimum of 9 hours (4 hours summer) and a maximum of 16 hours. Particular attention should be paid by PhD students to the requirement for continuous registration for Dissertation Research course credit (9090). Course selection for each term should be in close consultation with the major professor.

Course consent cards may be required for some courses. These are obtained from the professor teaching the course.

Dropping Courses:

University guidelines must be followed for dropping courses. The final dates for dropping courses change each semester.

Transfer of Credit:

The doctoral program committee may recommend that a specific number of hours in a master's or educational specialist degree be transferred toward the total hours required for the doctoral degree, and that additional hours be transferred for continued graduate work done either at MU or elsewhere. These additional hours past the master's or educational specialist's degree are limited to a maximum of six hours.

The committee may recommend that courses taken through MU's Extension division be counted toward the credit hour requirement. Extension or correspondence course work from institutions other than MU may not be used to meet the total hours required for the doctoral degree. Transfer credit for doctoral students who do not have an earned master's degree is limited to a maximum of 12 hours of graduate credit. Contact the Vice Provost/Dean of the Graduate School to request an exception to this regulation.

PhD Curriculum:

The initial Program-wide coursework, taken by all students, will emphasize the common languages of genetics and biochemistry, as well as the common skills of experimental design and data analysis, particularly for large datasets that are increasingly generated and used by biomedical scientists. As the students make progress through the program and begin to define the problem(s) that will be the focus of their dissertation research, the coursework becomes more specialized within each Emphasis Area. As a counterbalance to increased specialization, students in the Translational Biosciences program will also be required to take one 3 credit hour elective course in a different Emphasis Area or in a different PhD program. Students will be encouraged to take additional elective courses that fit their broader interests. The Translational Biosciences Journal club, which will be taken by students from each entering year as a cohort, will also counterbalance research specialization through continued exposure to research outside of their area of expertise.

Consistent with the requirements of the MU Graduate school for full-time enrollment of graduate students, all of the students in the PhD Translational Bioscience program will be full-time graduate students and will register for 9-12 credit hours per Fall or Spring semester and 5 credit hours in Summer semester until they pass their comprehensive exam. Students will take their comprehensive exam during their second year. After completing their comprehensive exam, students will take a minimum of 2 credit hours per Fall or Spring semester and 1 credit hour in the Summer Semester. The schedule of courses assumes a five-year plan of study for PhD students. A total of 72 credit hours of graduate coursework (including both didactic coursework and research) is required to earn a PhD.

The 72 credit hours of graduate coursework required for a PhD degree in the Translational Biosciences PhD program is divided into five categories: (1) Didactic coursework required of all students, including at least one elective course; (2) Didactic coursework specific to each Emphasis Area; (3) Seminars and Journal Clubs, including both Program-specific and Emphasis Area-specific; (4) Rotation Research; (5) Dissertation Research. Although the amount of didactic coursework required for each individual Emphasis Area varies, an average coursework across all Emphasis Areas was used to determine the distribution of credit hours between these different categories for an “average” student who takes 5 years to complete the PhD, as shown in the Table below.

Type of course	Average credit hours required over 5 years
Program-specific Didactic Coursework	14
Emphasis Area-specific Didactic Coursework	6 - 15
Seminars and Journal Clubs	18
Rotation Research	2
Dissertation Research	23 - 32
Total credit hours	72

Year 1 Coursework (23 credit hours): All PhD students in their first year will take a common set of courses, including coursework in molecular/cellular biology, data design and skills course, and a seminar course. In addition, all PhD students will participate in research rotations with at least three different research laboratories during their first year. After completing research rotations with three different faculty mentors, the students will select their primary faculty mentor and initiate their dissertation research during the Spring Semester of their first year.

Fall Sem. Yr. 1	
Course	Hrs
MPP 8500/BIOCHM 8240 Molecular and Cellular BioSciences	3
Data Design and Analysis I	3
Professional skills for Translational Bioscientists I	1
Rotation Research	1
Research Seminar	1
TOTAL CREDIT HOURS (Fall)	9

Spring Sem. Yr. 1	
Course	Hrs
Emphasis Area Introductory Course	3
Emphasis Area Introductory Course	3
Professional skills for Translational Bioscientists II	1
Rotation Research	1
Research Seminar	1
TOTAL CREDIT HOURS (Spring)	9

Summer Sem. Yr 1	
Course	Hrs
Dissertation Research	5
TOTAL CREDIT HOURS (Summer)	5

Year 2 Coursework (23-32 credit hours): There will be two program-wide requirements of all PhD students during years 2 – 5, including a grant-writing course during their second year and a yearly journal club with other members of their cohort. By the end of their second year, most of the PhD students will have completed didactic coursework for their Emphasis Area. The PhD students will have completed their comprehensive exam by the end of Year 2.

In the tables below, the Emphasis Area-specific coursework is identified as such, without specifying the Emphasis Area or the title of the specific courses. Additional information on the coursework components of the individual Emphasis Areas is provided in the Appendix. The elective coursework will typically be courses offered by other Emphasis Areas, although courses taught by other departments across campus will also qualify as elective coursework, provided that the course is taught at the appropriate graduate (8000 to 9000) level.

Fall Sem. Yr 2	
Course	Hrs
Translational Biosciences Journal Club (by cohort)	1
Emphasis-Area Coursework	3-6
Elective	0-3
Emphasis-Area Research Seminar	1
Dissertation Research	1
TOTAL CREDIT HOURS (Fall)	9-12

Spring Sem. Yr 2	
Course	Hrs
Translational Biosciences Journal Club (by cohort)	1
Grant-writing for Biomedical Scientists	3
Emphasis-Area Coursework	3-6
Elective	0-3
Emphasis-Area Research Seminar	1
Dissertation Research	1
TOTAL CREDIT HOURS (Spring)	9-15

Summer Sem. Yr 2	
Course	Hrs
Dissertation Research	5
TOTAL CREDIT HOURS (Summer)	5

Years 3-5 Coursework (7-25 credit hours per year): During years 3-5, the PhD students will focus on their dissertation research while continuing to take the Translational Biosciences Journal Club and Emphasis Area-specific seminars. During years 3-5, the PhD students may take additional elective coursework that are relevant to their interests. Students in their sixth year (or later) of the PhD program will continue to register for Dissertation Research, Translational Biosciences Journal Club and Emphasis Area Research Seminar until they defend their dissertation.

Fall Semester Yrs 3-5		Spring Semester Yrs 3-5		Summer Semester Yrs 3-5	
Course	Hrs	Course	Hrs	Course	Hrs
Translational Biosciences Journal Club (by cohort)	1	Translational Biosciences Journal Club (by cohort)	1	Dissertation Research	1
Emphasis-Area Coursework	0-4	Emphasis-Area Coursework	0-4	TOTAL CREDIT HOURS (Summer)	1
Elective	0-3	Elective	0-3		
Emphasis-Area Research Seminar	1	Emphasis-Area Research Seminar	1		
Dissertation Research	1-3	Dissertation Research	1-3		
TOTAL CREDIT HOURS (Fall)	3-12	TOTAL CREDIT HOURS (Spring)	3-12		

Free elective credits: Total free elective credits: One 3 credit elective is required; up to 9 elective credits will be allowed.

Requirement for thesis, an internship or other capstone experiences: A PhD dissertation is required. A PhD dissertation describes new findings, including field observations and experimental data, that address a previously unanswered question in an area of human inquiry. Students in the Translational Biosciences PhD program are required to write a dissertation and to present a public defense of the dissertation. All dissertations that are successfully defended will be published by MU. In addition, the research results described in the dissertation must be

published in one or more scientific journals as peer- reviewed manuscripts. The Translational Biosciences PhD program will require that all PhD graduates have at least 1 first-author research publication related to the dissertation research.

Any unique features such as interdepartmental cooperation: Interdepartmental cooperation is at the heart of the Translational Biosciences PhD program. By joining together into a single PhD program rather than attempting to develop individual PhD programs in each of the 21 departments within the School of Medicine, the departments have recognized the advantages of working together, across departmental and disciplines, to create a novel research training program that will integrate training across the basic and clinical biomedical sciences.

Integration of research training across the basic and clinical biomedical sciences will occur through a PhD student's career. During the first-year coursework, both the Molecular and Cellular BioSciences course and the Data Design and Analysis course will emphasize mechanisms of disease and Big Data science as well as the use of diverse genomic and biomedical databases including the Cancer Genome Atlas (<https://www.cancer.gov/about-nci/organization/ccg/research/structural-genomics/tcga>) and the UK Biobank (<https://www.ukbiobank.ac.uk>). Research rotations with clinical scientists will be encouraged. The Translational Biosciences Journal Clubs, which all PhD students will participate in during Years 2-5, will be led by faculty from both the basic and clinical sciences. We will encourage clinical scientists to become participating members of the Emphasis Areas, including serving as members of Doctoral Program Committees of the PhD students.

Student Responsibilities

Laboratory Rotations:

During orientation, many faculty members will present an overview of their own research interests. This will inform students about the ongoing research in their emphasis area. Moreover, it will help the students decide in which laboratories they wish to do rotations. Rotations are designed to allow students to get a feel for the laboratory and the viewpoints of the advisor. Ph.D. students are required to complete three 8-week laboratory rotations in their first semester, starting in the beginning of fall semester and concluding in mid-January before the spring semester begins; Faculty members and students should discuss rotation expectations. The **Student/Mentor Expectations** document should be completed by the faculty member and student *before* the start of the rotation. Faculty members should indicate in advance whether they have room and/or funding for a new student. If a student has selected a laboratory but needs to complete the required rotations, he/she should also communicate their goal for the rotation, e.g., to learn laboratory techniques. Prior to finishing the third laboratory rotation, the graduate student selects a mentor. Once the mentor has been selected, the student will perform their doctoral research under the guidance of the mentor in their lab.

Laboratory rotations will adhere to the following schedule:

First Rotation	6 weeks beginning 1 st day of class, fall semester
Second Rotation	6 weeks beginning in October
Third Rotation	Mid November to Mid January (8.5 weeks allowing for time off during

Seminar Program

Importance of a Seminar Program:

Seminar is the one occasion in which all faculty, postdoctoral researchers and graduate students meet weekly and discuss research findings and new developments in disciplines of your emphasis area. It is an important component of a training program for the pre-doctoral and postdoctoral trainee and provides a special opportunity for the graduate student to demonstrate his/her abilities as a teacher and biomedical scientist, to learn to present and discuss experimental data and to think on his/her feet. A good seminar program in which all researchers within the department participate should be an enjoyable activity that fosters unity and mutual respect among the participants and provides an atmosphere that promotes research and collaborative investigations. Attendance at departmental seminars may be required. This may vary with each emphasis area.

Journal Club Participation

One of the most profitable and enjoyable aspects of the graduate training program is the student's participation in journal clubs held in the mentor's laboratories and at the departmental level. Although the format varies amongst laboratories, each club involves a meeting of faculty, fellows and students working in an area(s) of mutual interest to discuss recent developments, findings and techniques that relate to their research areas. The presenting student selects a paper from the literature for discussion, prepares slides summarizing the background material, methods and approaches used, data presented in support of the conclusions, and leads a discussion on how the paper impacts on the field. Journal Club presentations are usually informal and promote active and often lively discussions and exchange of ideas.

All students will be required to attend Research Seminars and Journal Club courses. Attendance and participation will be used to assess learning outcomes for seminars and journal clubs. These courses will be graded on a Pass/Fail basis.

Ph.D. Program: Examinations

Qualifying Examination:

The qualifying examination for first year graduate students consists of performance in courses. Students must satisfactorily complete these courses for both semesters. In some cases, additional evaluation of writing skills and knowledge base may be required.

Comprehensive Examination:

Purpose:

The purposes of the comprehensive examination include:

1. To provide a format in which students can organize concepts from the first two years of study.
2. To provide a method by which the student and faculty on the student's committee can assess the student's knowledge of the basic concepts from the first two years of study, as well as the student's abilities to scientifically analyze and solve problems creatively and innovatively.

3. To allow the student and faculty to determine if the student possesses the motivation, desire, and abilities to continue his/her education in the PhD program. Successful completion of the comprehensive examination is a useful guideline, but no guarantee that the student will be successful in completing the dissertation.
4. Sometimes the committee uses the comprehensive topic to strengthen a student's background.
5. To prepare the student for writing grant proposals later in his/her career.

In summary, this system allows for the organization of a large body of knowledge, tests the students' mastery of that knowledge, and serves as training in grant writing. In addition, it allows for the evaluation of students to determine that they are at the appropriate level in their career.

Structure:

The comprehensive exam is a hallmark of every PhD program. Successful completion of the Comprehensive exam indicates that the student has advanced to Candidacy for the PhD degree. Graduate students in the Translational Biosciences PhD program will be expected to pass their comprehensive exam before the start of their third year. The Comprehensive Exam will have a written component and an oral component. The written component will be a research proposal written in the format of an NIH F31 proposal. The student's committee provides a broad topic or an idea for the grant often with student input. The topic may not be the dissertation project, but the topic may be associated with the dissertation, a potential postdoctoral project, a seminar topic, or be completely unrelated. AHA fellowship grant guidelines are to be followed. The grant proposal idea or topic is given to the student approximately 3-4 weeks before the submission of the grant to the committee. The committee is then given at least a week to read and critique the grant proposal in preparation for the oral defense before the entire committee. The defense typically takes 2 to 4 hours. The 2 parts of the examination are to be completed within 1 month.

The oral component will be a presentation and defense of the proposed research to the student's DPC. Following successful completion of the Comprehensive Exam, the student's F31 proposal will be submitted to NIH.

Assessment of the Comprehensive Exam: The Comprehensive Exam process will evaluate (1) the student's knowledge of core concepts in the discipline(s) relevant to the Emphasis Area; (2) the student's knowledge of core concepts in the discipline(s) relevant to the research project(s) of the student; and (3) the ability of the student to develop, write and orally defend a hypothesis-driven research proposal that outlines a series of experimental approaches to test the validity of the hypothesis. The written and oral components of the Comprehensive Exam will be assessed separately, on a Pass/Fail basis. Students must receive a Pass on both components to have passed the Exam. Students who fail the Comprehensive Exam will have one opportunity to retake the Exam, which must be completed by the end of the following semester.

Often, if the student's performance is not adequate, the committee may recommend additional work, such as rewriting the grant proposal. If the student's performance is unsatisfactory, the student must retake the examination with a new grant topic. On passing the comprehensive examination the student is a candidate for the doctoral degree.

Comprehensive examinations are to be completed within the first two and a half years of joining the department. The exams are normally administered during the summer or fall following the second year. If the examination is not taken by that time a failing grade is recorded for that student. The student is then required to finish the examinations within 5 months of the first failing grade. After two failing grades are recorded, the student is terminated from the program of study.

Dissertation

To earn their PhD degree, the graduates from the Translational Biosciences program must write and defend a dissertation that describes previously unknown findings revealed by their laboratory experiments or clinical observations. The standard expectation of all students in the Translational Biosciences program is that they must submit 2 publications, 1 of which must be a first-author publication, that describe the outcomes of their dissertation research to peer-reviewed journals prior to defending their dissertation. A public oral defense of their dissertation is required.

Student Progress and Retention

Reasonable Term of Study:

The target time required to complete a full-time graduate program is 4-5 calendar years for doctoral students. Both the graduate student and the graduate advisory committee should strive to keep the reasonable term of study from being unduly exceeded.

Maintaining Records of Progress towards a Degree:

Degree Program Forms: There are 4 forms for the Ph.D. degree (D-forms) that need to be completed and returned to the Graduate School to aid in assessing your progress towards degree completion. Once the form is complete with all necessary signatures, submit to Christa Smith, program coordinator and she will submit to the Graduate School. These forms include:

- D-1 Form:** Verifies the qualifying process and confirms your advisor and doctoral/program/dissertation advisory committee. Completed: During the 2nd year.
- D-2 Form:** Plan of Study. Lists the course work to be included in your program of study. Completed: 2nd year.
- D-3 Form:** Reports the results of the comprehensive examination. Completed: Between the end of the 2nd year to beginning of the 3rd year.
- D-4 Form:** Reports the result of the dissertation defense. Completed: After the dissertation defense, prior to graduation.

Preparing for Graduation:

The Graduate School must be notified of the semester that you plan to graduate. During the semester, the Graduate School will email students with instructions if you intend to graduate that semester. Check with the Graduate School early in the semester to find the deadlines for defending and turning in the final copy of your dissertation and submitting your D-4 form. More information about graduation can be found at this link: <https://gradschool.missouri.edu/current-students/graduation-commencement/commencement-ceremony-participation/>.

Grounds for Dismissal:

Maintaining good standing in graduate school is based on grade point average (GPA). This is achieved by a cumulative GPA of 3.0 or above. Students who do not maintain this GPA are placed on probation at the end of the semester in which this occurs. If at the end of the following semester the cumulative GPA is 3.0 or better, the probationary status is removed. A student on probation who fails to achieve a 3.0 cumulative GPA, on the recommendation of the area program, may be allowed a second and final probationary semester. A student is subject to dismissal upon failure to achieve a 3.0 or greater by the end of the second probationary semester or when the cumulative GPA falls below 2.0. To graduate, a student must have a GPA of 3.0 or above in all graduate courses taken at MU. Graduate school and /or program probation may result in loss of stipend support.

A student may be dismissed for failure to meet either the comprehensive examination or grade requirements. Additionally, departments and graduate-degree-granting area programs have the right to place on probation any graduate student who is deemed to be making insufficient academic progress or whose work is not of the quality required. Reasonable progress is judged on research progress, seminar and Journal Club attendance and overall intellectual involvement in academics. After a minimum of 30 days probation, dismissal from the program is possible. The faculty advisor or departmental chair must inform the Graduate School as soon as the student is notified and the probationary period begins. The dismissal may occur at any time during study for a graduate degree. Details of the dismissal policy and appeals process can be found at

<http://gradstudies.missouri.edu/academics/progress/requests-for-extensions-appeals.php>

Grounds for Withdrawing Financial Support:

Graduate school and /or program probation may result in loss of stipend support. Dismissal from the program will result in the loss of stipend support.

Publication of Work in Peer-Reviewed Journals**Requirements:**

The standard expectation of all students in the Translational Biosciences program is that they must submit 2 publications, 1 of which must be a first-author publication, that describe the outcomes of their dissertation research to peer-reviewed journals prior to defending their dissertation. The graduate student shall obtain assistance from the major professor in planning, reviewing, revising, and submitting the manuscript.

Authorship guidelines vary from lab to lab and students are responsible for discussing authorship guidelines with their primary advisor.

General Information

Housing:

Graduate student housing is available at the University. Housing may also be obtained off campus. More information regarding housing, both on and off campus, can be found at <https://gradschool.missouri.edu/student-life/housing-in-columbia/>.

Health Care:

The Student Health Center (SHC) is supported by mandatory health fees that are paid each semester by all full-time students. Part-time students may choose to pay this health fee at the Cashier's Office in Jesse Hall or use the SHC on a fee-for-service basis.

SHC services include, but are not limited to: Primary care, Same day care, After hours nurse.

SHC Regular Hours of Operation:

Monday, Tuesday, Thursday, Friday: 8:00am-5:00pm

Wednesday: 9:00am-5:00pm

Daily closed 11:45-12:45

The Student Health Center is located on the 4th floor of the University Physicians Medical Building at 1101 Hospital Drive. For more information, you can contact the SHC at (573)882-7481 or visit <https://wellbeing.missouri.edu/how-we-support-your-physical-health/>.

Health Insurance:

To obtain a medical insurance plan, students must enroll (sign up) for insurance through the University of Missouri's MyZou system. The graduate medical insurance subsidy covers basic plans for domestic and non-U.S. students. To learn about the details of insurance coverage see the Graduate School web site: <https://gradschool.missouri.edu/how-to-fund-graduate-school/student-medical-insurance/>

Finances:

Student stipends are paid on a monthly basis, with the first paycheck of the academic year being received on August 31, or at the end of the first month in which a student begins, if matriculation is other than August. Monthly paychecks are issued as direct deposits into students' banking accounts. Following successful completion of the comprehensive examination, a \$1,000 stipend increase will be awarded to Ph.D. candidates. As of now, graduate students at the University are not benefit-eligible employees; for example, students are not eligible for paid family leave.

Tuition and Expenses:

Along with the stipend, the Translational Biosciences PhD program provides a tuition waiver for **approved courses** for all graduate students. If a student's stipend is paid from a faculty member's grant, tuition may be paid in whole or in part by the grant. The stipend is increased following successful completion of the comprehensive examination. All courses that are relevant and applicable to a student's degree program and approved by the student's advisor will be covered by the waiver. If a student takes a course that is not approved by the department or advisor, the student will be responsible for the total cost of that course.

A student on academic probation is not eligible for the Tuition Waiver Program. While the student may still hold an assistantship, students will not be eligible for a tuition waiver until they are off academic probation. If a student earns probationary status, the department, and subsequently the student's advisor, shall be informed of the student's status. The department may request a grace period by petitioning the Graduate School dean.

Each semester there are various fees that are not waived and not paid from grants and for which students are responsible. For more information, contact the Cashiers office at (573)882-3097, or visit the website at <http://cashiers.missouri.edu/> . Questions can be directed to Christa Smith at smithchrista@missouri.edu.

Resources

Research Data, Software, and Designs:

All research data, patents, software, designs, manuscripts, creations, etc. obtained and/or created by graduate students while receiving University financial support are property of the University of Missouri-Columbia. All research data and other requested research findings must be submitted to the major professor before the student leaves the University. If any patents or publications are obtained directly from the student's thesis, both the student and major contributing advisor(s) are credited and may receive a percentage of the profits or royalties realized.

Libraries:

Elmer Ellis Library: The Elmer Ellis Library is the main library on the University campus. Ellis Library contains the principal resources for research in the humanities, the social sciences, and the physical and life sciences. The building has several specialized collections, such as Government Documents, Recorded Sound, Rare Books, and an extensive microform collection. Subject librarians provide reference assistance, collection development, database searching, and bibliographic instruction in their fields. They work closely with their faculty liaisons in academic departments.

Ellis Library is located at the intersection of Ninth Street and Conley Avenue, southeast of Jesse Hall. For more information about Ellis Library, its resources, and hours of operation, visit their website at <http://library.missouri.edu/libraries/ellis/> .

J. Otto Lottes Health Sciences Library: The J. Otto Lottes Health Sciences Library is one of several libraries that serve the UMC campus. The library occupies a building in the northwestern part of the Health Sciences Center (HSC). The library has a collection of over 235,000 volumes

and currently receives over 1,500 periodicals, pertaining to medicine, nursing, hospital administration, and related fields. The library also has over 500 online periodicals, 100 electronic books, and 100 electronic databases available to patrons from the website. Services include reference, circulation, reserve reading, interlibrary loan, database searching, current awareness service, citation verification, tours, and bibliographic and classroom instruction. The Integrated Technology Services (ITS) User Support Lab administered by ITS makes available IBM and MacIntosh computers and laser printers for Health Sciences Center faculty, students, and staff.

For more information about the library and its resources, visit their website at <http://library.muhealth.org/>. There are many additional libraries available at the University. A list of these libraries, their location, and hours of operation may be found at <http://library.missouri.edu/libraries/>

Student Organizations:

A list of student organizations can be found at: <https://gradschool.missouri.edu/student-life/student-organizations-relevant-groups/>

Parking & Transportation:

Most information can be found at: <https://parking.missouri.edu/getting-around/>.

Purchases:

Permission and account information must be obtained from the major professor before any research related purchases are made using University funds. All receipts should be given to the major professor.

E-mail Accounts:

Considerable University and department communication is done via e-mail. Upon admittance to the University, each student is issued a paw print identification. To log on to their e-mail account, students should access the University e-mail site at <http://webmail.missouri.edu/>

Recreation Facilities:

The University recently completed a \$50 million **Student Recreation Complex (SRC)** expansion and renovation project. The project updated, upgraded, and expanded the previous facilities with an additional 115,000 square feet of new space, bringing the total size to nearly 300,000 gross feet – enough space to make Mizzou’s Rec Center one of the ten largest higher education facilities in the nation. MU students voted to increase their fees to pay for the project. The SRC was featured as “Sports Illustrated” 2005 best university student recreation center in the US.

The SRC serves as the center of student involvement on campus. Students need only their MU ID for admittance, and non-students interested in using the SRC may purchase a membership pass at the RecDesk during facility hours of operation.

Both indoor and outdoor facilities and activities are available. The SRC houses basketball, volleyball, and racquetball courts; weight-training equipment, an elevated indoor track, aerobics

and combative rooms, locker rooms, a high-tech fitness club, a heavy-lifting gym, and a new climbing and bouldering wall.

All recreation services programs are designed to provide varied degrees of competitive and noncompetitive, structured and unstructured activities for members of the MU community. Activities include RecSports (men's, women's, co-rec and faculty/staff divisions for teams and individuals) open recreation, outdoor recreation, lap and recreational swimming at indoor and outdoor pools, and leisure university classes including: Club Aerobix, swing dance, and tai chi. For more information, contact the Rec Services Office in 320 SRC at (573) 882-2066 or visit the website, <http://www.mizzourec.com>.

The **Stankowski Outdoor Recreation Complex** first opened in 1996 and regularly has been updated/modified to serve the MU community. Recognized by several recreational magazines as one of the finest outdoor recreation complexes nationwide, it provides MU students, faculty, and staff with a quality venue in which to engage in competitive and recreational sports. Serving as the home of MU rec sports, the outdoor complex is lighted until 12pm each night during favorable weather conditions. The facility features include an outdoor walking/running track (1/3 mile), three artificial turf activity fields, two sand volleyball courts and two softball fields.

Laboratory Safety

All employees and students of the University of Missouri-Columbia must be protected from exposure to hazardous chemicals, radiation, etc. through a combination of safety training and safe practices in the work place. All persons in the work place must be trained regarding all hazardous chemicals, radiation safety, and animal handling prior to assignment, and at least annually thereafter. Please visit <https://ehs.missouri.edu/train/checklist> for requirements and <https://ehs.missouri.edu/student> for information about your responsibilities.

Accident and Incident Reporting:

All accidents and incidents must be reported immediately in accordance with University policies and procedures. Failure to report unsafe conditions may result in future injuries and/or property damage. To report an accident, incident, or unsafe condition, contact your work supervisor or department head.

Professional Performance Guidelines

Professionalism:

A major objective of the graduate research and teaching program is to instill professionalism in each student. A professional is a person who accepts responsibility, can direct the efforts of other people, and is self-motivated. Graduate students must depend upon their own personal productivity and dedication to acquire the sense of pride and duty needed to succeed as a professional. Graduate students are directly accountable to their major professor for their work habits, and will be treated as fellow professionals whose ideas, concepts, and approaches are integrated into the final product. As members of TBS, students should recognize and apply the values of the School of Medicine in their professional activities, as outlined in the "Policy on Professionalism and Alignment with the School of Medicine Values" attached at the end of this handbook.

Holidays, Sick Days, and Vacation:

At the start of each semester, the graduate students should establish working hours with their major professor. For the graduate student, flexible work hours are both a necessity and a privilege, and should not be abused. Graduate students do not punch a time clock and are expected to be highly task-oriented. The term full-time graduate assistantship designates a minimum of a 40-hour work week. A reality of graduate studies is that at times, all students work more than the minimum time. They also work at night, on holidays, and on weekends to effectively conduct a research project. Excused sick and personal absences are a departmental courtesy. Personnel management policies include the granting of time for graduate student recreational and personal activities, provided this does not interfere with the student's academic and/or research responsibilities. Graduate students should schedule any absences with their major professor to ensure that their absence will not conflict with their research activities. Holidays are established and annually published by the administration.

Outside Employment:

A stipend is provided to doctoral students at least at the level set by NIH in order to have the freedom to devote full time effort to scholarly endeavors. Thus outside employment is strongly discouraged. If special circumstances require such employment, students should discuss it with their major professors to ensure that it will not conflict with their research activities. During the first year, the program coordinator is to be contacted regarding outside employment.

Participation in Departmental Research Projects:

All degree recipients are required to submit a thesis or dissertation containing the results of original research. Many of the routine and specialized methods and techniques used in research are not taught in classrooms. Exposure to, and participation in, as much of the overall research program as possible is considered an essential part of graduate education. Thus, to receive the greatest benefit from their program, each graduate student should provide substantial assistance in other research projects and should solicit collaboration in their own research.

Rights and Responsibilities

A graduate student at the University of Missouri-Columbia is a person officially admitted and currently enrolled in the Graduate School. The programs, policies, courses, procedures, and minimum requirements of the Graduate School can be accessed through the Graduate School home page <http://gradstudies.missouri.edu/index.php> and an index of Graduate School Policies and Procedures can be found at <http://gradstudies.missouri.edu/policies/index.php>. Additional information for the Translational Biosciences PhD program is available in this manual. It is the responsibility of each student to be thoroughly familiar with the regulations of the Graduate School and the Department to avoid complications and delay. It is the responsibility of the Graduate School and the Department to keep the related information as current as possible.

University of Missouri-Columbia Mission Statement:

Our distinct mission, as Missouri's only state-supported member of the Association of American Universities, is to provide all Missourians the benefits of a world-class research university. We are stewards and builders of a priceless state resource, a unique physical infrastructure and

scholarly environment in which our tightly interlocked missions of teaching, research and service work together on behalf of all citizens. Students work side by side with some of the world's best faculty to advance the arts and humanities, the sciences, and the professions. Scholarship and teaching are daily driven by a sense of public service – the obligation to produce and disseminate knowledge that will improve the quality of life in the state, the nation and the world.

Professional and Academic Standards:

Graduate students have the right to be informed of departmental, professional, and academic policies and procedures that affect them. Students should be informed of these policies during the initial term in which they enroll in a program. It is the responsibility of the student to be familiar with the University policies and procedure of the Graduate School, as described in the graduate catalog, and those of the department program. Students are expected to ask questions if any information is unclear, or not provided.

Evaluation:

Graduate students will be evaluated according to basic requirements of the program under which they enter. However, departments or colleges may change program requirements and apply them to students already admitted, provided adequate notice is given and the requirements are not made retroactive to parts of the program already completed by the student. Students can expect to receive periodic evaluations of progress and performance as determined by the program or department.

Right to a Major Professor and Advisory Committee:

Graduate students select an advisor, or co-advisors, by mutual consent between the student and the respective faculty member(s) who has (have) doctoral faculty status within the Graduate School. After the advisor (and co-advisor, if applicable) has been selected, further committee members are selected.

Academic Governance:

The right to establish policies pertaining to academic programs is vested with the faculty. Students contribute in the decision-making process through representation on the Graduate Association for Pharmacology and Physiology Graduate Students (GAPPS), participation in committee efforts, and through contributions of their own initiative.

Academic Integrity:

University guidelines concerning student academic conduct may be found at <http://gradstudies.missouri.edu/policies/academic-integrity-ethics.php>.

Policy on Professionalism and Alignment with School of Medicine Values

School of Medicine Values:

Excellence: We pursue the highest goals and accept the sacrifices and responsibilities required to achieve our best possible performance.

Respect: We nurture free and open discourse, listen to new ideas, and value diverse perspectives and talents.

Service: We put forth our most diligent efforts on behalf of our patients, learners, stakeholders and partners.

Integrity: We commit to honesty, truthfulness and authenticity in our relationships and activities.

Responsibility: We exhibit a strong sense of duty, stewardship and accountability to each other and to the public.

Innovation: We pursue an ongoing, collaborative process of discovery and translate knowledge for the benefit and service of society.

Compassion: We relate to others in a caring, empathic manner and strive to prevent and relieve human suffering.

Inclusion: We promote diversity and convey a sense of belonging, respect and value for all persons.

As members of the Department of Medical Pharmacology and Physiology in the School of Medicine (SOM), we recognize and apply the values of the SOM in all of our professional work activities. In striving to apply SOM values in all that we do as professional scholars and educators, we:

- benefit from the pride and satisfaction we experience from doing our work to the best of our abilities,
- earn the trust and respect of our co-workers,
- establish ourselves as role models for each other, our trainees and our staff with regard to integrity, responsibility, diversity, innovation and service in our academic pursuits,
- expand our experience and improve our capabilities,
- create opportunities for continued professional growth, self-improvement, and accomplishment.

In short, our alignment with SOM values epitomizes professional behavior and good citizenship.

We also recognize the importance of academic freedom and shared governance, which includes the rights of the faculty to discuss, debate, or disagree on professional issues. However, we also appreciate that these rights are not without limit or personal responsibility. The Department acknowledges the value of professionalism and places great emphasis on the ability of each

faculty member to contribute to a positive environment in which all persons are treated with respect, civility, and dignity. In this environment, all opinions (whether they be dissenting or affirming) are valued and respected, as expression of opinion and open debate provides the opportunity for everyone to participate in decision-making processes and ultimately produces stronger decisions. A professional faculty works smoothly towards departmental goals and towards resolution of issues and concerns that routinely arise in academia. Professional interactions extend to relations among faculty members, faculty and staff, faculty and trainees, and faculty and administrators. Based on these beliefs, we agree that evidence of professionalism and subscription to SOM values will include such indicators as the following:

- Collaborative and interactive participation in committees, workgroups, and other mechanisms to further departmental and SOM objectives.
- Attendance at and active participation in departmental faculty meetings, seminars, other departmentally sponsored research forums or retreats, and dissertation defenses.
- Demonstrating flexibility in setting and meeting departmental, SOM, and personal professional goals.
- A pattern of good judgment in dealing with issues of concern for others that demonstrates respect for divergent opinions.
- Following through on tasks and deadlines to the greatest extent feasible in order to further departmental and SOM goals and objectives.
- Maintaining constructive relationships within the department, SOM, University, and the academic community at large.
- Communication that occurs in a clear, forthright, and respectful manner with all department constituencies, including other faculty members, trainees, and staff.
- Accessibility to colleagues, trainees, and staff and maintaining a visible presence in the department and on campus.
- Avoiding inconsiderate or self-centered behavior that results in interpersonal crises, severe inconvenience, or professional disadvantage to faculty, trainees, and staff.
- Refraining from displays of anger, abusive language, inconsiderate behavior, irritability, or similar activities that impede the professional function of the department or SOM.

Key personal attributes that allow us to apply SOM values to all of our work activities in a professional manner include:

- Character, which defines who we are, what we stand for, and how we go about pursuit of our daily work activities. We must demonstrate integrity and be responsible, diligent, and ethical in our academic pursuits.
- Attitude, which refers to our mental outlook towards pursuit of scholarly and educational activities with a positive, service-oriented mentality, where we seek responsibility and are determined to achieve our goals.
- Excellence, which refers to commitment to quality and continuous improvement.
- Competency, which refers to degree of expertise and that we understand how to apply our proficiencies to continue to develop our skills and meet our job requirements and responsibilities.
- Conduct, which refers to how we deal with others, which should be respectful, civil, compassionate, and preserves dignity.

Our collective professional approach to our work-related responsibilities permits our ability to capitalize on individual strengths and minimize individual weaknesses, the net effect of which to foster achievement of our personal, departmental and SOM goals efficiently and expeditiously.