

BIOMEDICAL RESEARCH, M.D./PH.D.

The Biomedical Sciences and Clinical and Translational Sciences departments of the Joan C. Edwards School of Medicine offer the following degrees: Doctor of Philosophy (Ph.D.), M.D./Ph.D., and Master of Science (M.S.), both thesis and non-thesis.

The primary goal of the Biomedical Research (BMR) program is to use biomedical and translational research approaches to help reduce the numerous health disparities and improve the health of the population in West Virginia and central Appalachia. To do this, students will take an interdisciplinary approach with defined interests and special in-depth training in one of the following research areas of emphasis: Cardiovascular Disease; Cell Biology; Obesity and Related Diseases; Neurobiology and Addiction; and Toxicology and Environmental Health. These areas are designed to be flexible and research oriented in order to develop the interests, capabilities and potential of all students pursuing careers in academic, government, or industrial biomedical sciences.

In addition, the BMR program offers a non-thesis Master of Science degree with a medical sciences area of emphasis to improve the science foundation of students seeking admission into doctoral programs in medicine or other health-related professions. Admission into the BMR M.S. Medical Sciences program does not guarantee admission into medical school. Additionally, a research component to this area of emphasis is available, but not required. Students choosing the research component may work up to 19 hours per week while earning a minimum of \$10/hour. Students are expected to stay in good academic standing.

Also offered is the combined M.D./Ph.D. Students in this program blend the discovery of new knowledge with clinical medicine at the intersection of science and medicine. M.D./Ph.D. Most graduates work as physician-scientists at medical schools, conducting disease-related research and applying the results to the treatment of patients. They have a unique perspective on both the basic science and clinical science behind disease. Further general information is available at the Association of American Medical Colleges website (aamc.org (<http://www.aamc.org>)).

Biomedical Research, M.D./Ph.D.

The Joan C. Edwards School of Medicine offers a combined M.D./Ph.D. degree in partnership with the Biomedical Sciences Graduate Program at Marshall University. The curriculum takes seven to eight years to complete. Students first take years one and two of medical school. During that time they complete the requirements for BMR 785 Intro to Research. After passing the USMLE Step I exam at the end of year two, students begin their Ph.D. coursework and research. This takes three to four years. After completing the Ph.D. requirements, students then complete years three and four of medical school. All of the requirements for both the M.D. and Ph.D. degrees must be met.

The medical student course MDC 710 Elements of Medicine meets the requirements for BMR 601 Intro DNA, RNA & Proteins, BMR 602 Intro Cells and Metabolism, BMR 603 Regulation Cell Function, and BMR 604 Cell Basis of Disease. Other medical school courses can meet area of emphasis requirements, as determined by the student's advisory committee and the Graduate Studies Committee.

Admission Requirements

Applicants must meet the admission requirements of both Marshall University Graduate Admissions (<http://marshall.edu/admissions/graduate/>) (<http://marshall.edu/admissions/graduate/>) - and the Biomedical Research program of the Marshall University Joan C. Edwards School of Medicine <https://jcesom.marshall.edu/research/>.

Applicants are directed to apply through the Biomedical Sciences Centralized Application System (BioMedCAS, <https://biomedcas.liasoncas.org/>). Completion of a secondary application once admitted is also required; instructions will be sent from the department to the applicant. Interested persons should visit <https://jcesom.marshall.edu/research> (<https://jcesom.marshall.edu/research/>), e-mail mubiomed@marshall.edu, and/ or call 304-696-3365.

Biomedical Research M.D./Ph.D. Applications

Applicants interested in pursuing the combined degree should indicate this on their medical school AMCAS application.

The AMCAS application period is from June 1 to November 1, with supplemental material due by December 15.

Applications are accepted on a rolling basis and reviewed November 1 through December 15. Final decisions will be made by January 31. Applications and supplemental material will not be accepted beyond the above deadlines. A separate M.D./ Ph.D. admissions subcommittee will review the applications.

Consistent with JCESOM MD program admissions policy, all applicants are required to take the MCAT. An MCAT score of 498 or better is preferred. Provided they meet the requirements for not taking the MCAT, students from the JCESOM Medical Sciences Pathway Program who have fulfilled both the criteria for admittance to the MU JCESOM M.D. program and who have extensive research experience (e.g., co-authorship in multiple publications in peer reviewed journals) will be considered for interviews.

Graduate Assistantships for the Doctor of Philosophy Program

Accepted Ph.D. students receive tuition remission, an annual stipend, and health insurance, which are renewable for up to five years. Students also have access to Marshall University's Student Health Clinic. Students are required to pay some fees each term.

Admission to Candidacy

Admission to graduate study and enrollment in graduate courses does not guarantee acceptance as a candidate for the Doctor of Philosophy degree. This is only accomplished by satisfactorily passing a comprehensive qualifying examination and meeting all other specified requirements. The qualifying examination assesses whether the student has attained sufficient knowledge to undertake independent research. The examination should be completed at the end of the second year of study. The examination consists of written and oral components covering all areas specified in the Course of Study. The examination is prepared, administered and graded by the advisory committee. The written portion includes all coursework and relevant topics determined by the advisory committee. The student will be given 2-3 days to complete the written component of the examination.

Upon passing the written examination, the student must submit a grant proposal on the topic of his/her dissertation research or a related topic approved by the advisory committee. The proposal must be in the style of an National Institutes of Health (NIH) Predoctoral grant proposal. Links to the instructions for the proposal format can be found on the BMR Graduate Program website. The grant proposal must be submitted within two months of completion of the written exam and given to the advisory committee members at least two weeks in advance of the oral defense. The oral examination consists of a defense of the grant proposal and, at the discretion of the advisory committee, may include topics from the written portion of the exam in which the student was deemed to be deficient. Successful completion of the qualifying examination is based on approval of the committee. Only one dissenting vote is permitted on each component. If necessary, a single portion of the examination may be repeated at the discretion of the advisory committee. The student must have the approval of the advisory committee to repeat either the written or oral component of the qualifying examination. The committee assesses the deficiencies and determines the time required for the student to make corrections. A student may take a given component of the qualifying examination no more than three times. Failure to pass this examination on the third attempt will result in dismissal from the BMR Ph.D. program. The advisory committee must complete an Admission to Candidacy for Ph.D. form after the student completes the examinations and submit it for approval by the director of graduate studies and the dean of the college.

Program Requirements

Advisory Committee for Ph.D. Students

The advisory committee should be formed no later than the end of the first year of graduate education or upon completion of 18 semester hours of credit. As soon as the committee has been identified, an Approval for Dissertation Topic and Committee Membership form is completed and submitted to the director of graduate studies and the dean of the college.

The advisory committee will be selected by the student and research advisor, with approval from the director of graduate studies and the dean of the college required. The committee will be composed of at least five faculty members with appropriate expertise; one of the members may be from another institution. The student's research advisor will act as the chairperson of the committee.

Approval of Course of Study

It is essential for the student and advisory committee to carefully define a Course of Study by the end of the first year. This is considered a basic contract between the student and the program and includes:

1. Proposed dissertation topic;
2. All transfer credits;
3. Required and elective courses to be taken at Marshall University; and
4. All competencies to be achieved by the student during graduate study.

These details must be recorded on the Ph.D. Course of Study form and submitted for approval by the director of graduate studies and the dean of the college.

Academic Performance for all BMR Graduate Students

- Maintain a minimum of a 3.0 Grade Point Average (GPA). No more than six hours of C and no grades below C may be applied toward the degree.
- If the GPA falls below 3.0, the student will be placed on academic probation. Following notification of probation, the student will be counseled by his/her advisor. At this time, the deficiency will be identified and a written plan will be prepared for removing it within the next nine semester hours. This plan, co-signed by the student and the advisor, must be approved by the Graduate Studies Committee and Director of Graduate Studies before the student can register for additional coursework.
- If probationary status is not removed within nine semester hours, the dean of the college, in consultation with the vice dean for research and graduate education and the graduate studies committee, will determine whether the student is retained or dismissed from the program. Retention must be recommended by the advisor and student's advisory committee and endorsed by the graduate studies committee.

Transfer Credit

The student may transfer credits completed at other regionally accredited graduate institutions. Approval of the graduate studies committee and the dean of the college is contingent on the following:

1. the grades earned were B's or better;
2. the credits are appropriate to the student's program and acceptable to the advisory committee; and
3. the time limitations were not exceeded.

The number of transfer hours acceptable for the Ph.D. degree will be determined by the student's advisory committee and should not exceed 12 credit hours. Approval must be received from both the Graduate Studies Committee and the Dean of the Graduate College. Transfer credit will not become part of the Marshall University Grade Point Average.

Transfer of credits should be accomplished as early as possible. This should be accomplished when the student submits an approved Course of Study form (Ph.D.) or an approved Plan of Study form (M.S.). Attempts to transfer credits during the last semester may delay graduation. Official transcripts must be on file in the Graduate Studies office by the date that grades are due in the Marshall University Registrar's Office.

Validation of Outdated Coursework

The advisory committee has the option to require validation, by special examination, of courses that members deem to be outdated.

Time Limitations

Students must meet all requirements for the Doctor of Philosophy degree within seven years from the date of enrollment in the first course to be used in the degree program. The Graduate Dean may grant an extension upon recommendation by the Graduate Studies Committee. Absence due to military obligations, long serious illnesses, or similar circumstances beyond the student's control may be considered valid reasons for an extension. It is the option of the advisory committee to require validation of outdated courses by special examination.

Dissertation

All candidates must successfully complete a biomedical research project and prepare, submit, and defend a dissertation. The dissertation must present the results of the candidate's individual investigation and make a definite contribution to the current state of knowledge. While conducting research and writing a dissertation, the student must register for Research (BMR 882 Research) at the beginning of each semester or summer term for which progress is to be earned. No more than 15 hours of Research may be credited toward the degree.

Candidates are to follow the general guidelines outlined in *Publishing Your Dissertation: How to Prepare Your Manuscript for Publication and General Information About Dissertations*. Copies of these documents are on file in the Office of Research and Graduate Education. Candidates must also follow the current Guide for Preparation and Submission of Electronic Theses and Dissertations, which can be downloaded from the Graduate Studies website.

Oral Defense of the Dissertation

The oral defense of the dissertation is held during the semester or summer session in which all other degree requirements have been met. The advisory committee must read and tentatively approve the dissertation before the examination can be scheduled. The committee chairperson will complete an Approval to Schedule Dissertation Defense form and submit it for approval of the Director of Graduate Studies and the Dean of the Graduate College before the examination can be given. Such notification must occur at least two weeks before the proposed date of the defense. A portion of the defense is an open examination and sufficient time is required for adequate public notice.

The open examination usually takes the form of a one-hour seminar. This is followed by a thorough review of the dissertation by the advisory committee and the candidate. Successful completion of the defense requires the approval of all but one of the members of the advisory committee. The results (pass/fail) must be recorded on a Results of Dissertation Examination form, which is to be reported to the Office of Research and Graduate Education and forwarded to the Graduate Studies office within 24 hours. Should the candidate fail the defense, reexamination may not be scheduled without the approval of the advisory committee, the Director of Graduate Studies, and the Dean of the Graduate College.

All advisory committee members are to be present for the defense. If this is not possible, the Dean of the Graduate College, or designee, may permit one substitute for any member of the committee except the chairperson. A request for a substitute must be submitted in writing to, and approved by, the Director of Graduate Studies and the Dean of the Graduate College. The committee chairperson, the student, and both the original member of the committee to be replaced, and the substitute must sign this request. The substitute must have the same, or higher, graduate faculty status as the original member and represent the same academic discipline or area of emphasis.

Acceptance of Dissertation

Acceptance of the dissertation is a requirement for the doctoral degree. An accepted dissertation must bear the original signatures of at least all but one member of the advisory committee. If more than one member cannot approve the dissertation, the doctoral degree cannot be recommended. If the substitute member attends and approves the dissertation defense, he or she signs the dissertation. For

complete information on the preparation and submission of electronic theses and dissertations see www.marshall.edu/graduate/current-students/edt (<http://www.marshall.edu/graduate/current-students/edt/>).

Survey of Earned Doctorates

Students are asked to complete and submit the online Survey of Earned Doctorates. Survey of Earned Doctorate information is used by a number of government agencies to assess the state of doctoral education in the U.S., and also to inform their decisions concerning funding of U.S. graduate institutions. The online survey is available at <https://sedsurvey.org/>.

Publication

All doctoral dissertations and their abstracts will be microfilmed through ProQuest. This requirement cannot be satisfied by any other publication, but other publication of material in the dissertation is both permitted and encouraged.

Process Summary

1. Inquiry from prospective student to the Biomedical Research graduate program or Graduate Admissions office.
2. Receipt of the following official application materials and required fee by the Graduate Admissions office: application, GRE scores, and transcript(s). International applicants must meet the application requirements of the Office of International Student Services.
3. Receipt of the program online form, written statement addressing educational and career goals, and three recommendations in the Office of Research and Graduate Education by March 1.
4. The Ph.D. Admissions Committee will review completed applications, then interview the top applicants.
5. The Biomedical Research Graduate Program notifies the Graduate Admissions Office and the applicant of the decision of the Admissions Committee.
6. The accepted student arrives in July for boot camp, starts their first laboratory rotation, and registers for coursework.
7. An advisor is selected by the end of the first year. After the dissertation advisor has been selected, an advisory committee is formed. A Ph.D. Course of Study should be completed by the start of the second year.
8. The student completes requisite coursework and other program requirements.
9. The student takes written and oral qualifying examinations for admission to candidacy to the Ph.D. These examinations should be scheduled within two months of each other.
10. The student continues doctoral research under the guidance of his/her advisory committee. The dissertation phase begins with the approval of a dissertation project by the advisory committee, the Biomedical Research graduate program, and the college dean.
11. The student applies for graduation at the beginning of his or her last semester, no later than the university deadline. The diploma fee must be paid by this time.
12. A copy of the preliminary draft of the dissertation is given to each member of the advisory committee no later than two weeks prior to the final defense of the dissertation.
13. The chair of the advisory committee requests approval for the defense from the Biomedical Research graduate program and the college no later than two weeks before the scheduled date of the defense.

14. The time and place of the defense of the dissertation are announced.
15. The student defends the dissertation in an oral defense.
16. The student follows the steps to prepare and submit the electronic thesis or dissertation at www.marshall.edu/graduate/current-students/edt (<http://www.marshall.edu/graduate/current-students/edt/>).