

# Biomedical Sciences PhD

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LEWIS KATZ SCHOOL OF MEDICINE

## About the Program

The PhD program is aimed at broad interdisciplinary and translational training in Biomedical Sciences and provides in-depth training in one of five areas of concentration. All students participate in an interdisciplinary first-year experience and then select an area of concentration from among Cancer Biology and Genetics, Infectious Disease and Immunity, Molecular and Cellular Biosciences, Neuroscience, and Organ Systems and Translational Medicine. The curriculum provides students with an interdisciplinary approach to research training, offering new pathways for learning and discovery. The PhD program is intended to educate premier biomedical scientists who will be tomorrow's leaders in research, education and government.

**Time Limit for Degree Completion:** 7 years

**Campus Location:** Health Sciences Center. With the permission of the student's Research Advisory Committee, elective courses not offered at HSC may be taken at other campuses.

**Full-Time/Part-Time Status:** The PhD degree program is designed as a full-time day program of study.

**Interdisciplinary Study:** The graduate program in Biomedical Sciences is interdisciplinary and emphasizes translational research. Students have the opportunity to work with faculty in disease-based research centers at the Lewis Katz School of Medicine, including the Center for Inflammation and Lung Research; Center for Metabolic Disease Research; Center for Neurovirology and Gene Editing; Center for Substance Abuse Research; Center for Translational Medicine; Comprehensive NeuroAIDS Center; Fels Cancer Institute for Personalized Medicine; Independence Blue Cross Cardiovascular Research Center; Shriners Hospitals Pediatric Research Center; Sol Sherry Thrombosis Research Center; and Temple Autoimmunity Center.

**Ranking:** In 2023, *U.S. News & World Report* ranked the Lewis Katz School of Medicine at Temple University number 68 in Research and among the Best Medical Schools.

**Areas of Specialization:** This interdisciplinary Biomedical Sciences graduate program offers five areas of concentration for students who plan to earn the PhD:

- Cancer Biology and Genetics
- Infectious Disease and Immunity
- Molecular and Cellular Biosciences
- Neuroscience
- Organ Systems and Translational Medicine

**Job Prospects:** This well-balanced program has been designed to be individually tailored to meet the interests and needs of each student and to fully prepare each student for a Biomedical Sciences career in academia, industry and government. The graduate program is designed to provide training in the theory and practice of Biomedical Sciences for eventual placement in research and teaching positions.

**Non-Matriculated Student Policy:** Non-matriculated students may enroll in some courses with permission from the course instructor and approval from the Office of Graduate Studies at the Lewis Katz School of Medicine.

**Financing Opportunities:** All students are provided with a competitive stipend, health insurance and tuition remission. First-year students are supported by Medical School fellowships. After the first year, students receive financial support from extramural funds available to their research mentor, including training grants, research assistantships and fellowships. Students are expected to work full-time toward the completion of the degree requirements. A satisfactory level of performance must be maintained at all times.

Exceptionally qualified students who apply to the program may be nominated for Presidential and University Fellowships. In order to be considered for nomination, prospective students must submit all application materials by February 15.

## Admission Requirements and Deadlines

**Application Deadline:**

*Fall:* February 15

All applicants to the PhD program must apply via BioMedical's Centralized Application Service (BioMedCAS). The system can be accessed at <https://biomedcas2024.liaisoncas.com/applicant-ux/#/login>. Applicants should check their application status on the BioMedCAS portal often and inquire directly of BioMedCAS about receipt of materials.

A supplemental application is also required to be submitted directly to Temple University. Submission of the supplemental application generates the applicant's TUID number. The BioMedCAS application will not be considered without the assigned TUID.

**Letters of Reference:***Number Required: 3**From Whom:* Letters of recommendation should be obtained from faculty and supervisors of research experiences.**Coursework Required for Admission Consideration:** Applicants should have undergraduate training in the life sciences such as Biochemistry, Biology, Cell Biology, or Molecular Biology and Genetics. Students are also expected to have training in Chemistry and Mathematics.**Master's Degree in Discipline/Related Discipline:** A master's degree is not required.**Bachelor's Degree in Discipline/Related Discipline:** A baccalaureate degree in the Biological or Chemical Sciences is required.**Statement of Goals:** In approximately 500 to 1,000 words, describe your interest in Temple's Biomedical Sciences graduate program, research interests and past experiences, future career goals, and academic and research achievements.**Standardized Test Scores:**

GRE: Optional. Students are not required to submit standardized scores, including GRE or MCAT scores, to supplement their application.

Applicants who earned their baccalaureate degree from an institution where the language of instruction was other than English, with the exception of those who subsequently earned a master's degree at a U.S. institution, must report scores for a standardized test of English that meet these minimums:

- TOEFL iBT: 79
- IELTS Academic: 6.5
- PTE Academic: 53

**Advanced Standing:** Students who enter the PhD program in Biomedical Sciences may be considered for advanced standing, based on the successful completion of graduate-level courses in the Biological Sciences or Chemistry. The completed courses must be equivalent in content to coursework offered at Temple, and the grades earned must be a "B" or better in order to transfer credits. The Associate Dean reviews the syllabus from the completed course(s) to determine equivalency and makes the recommendation to accept the credits for Advanced Standing.

## Program Requirements

**General Program Requirements:***Number of Credits Required Beyond the Baccalaureate: 37**Required Courses:*

Code	Title	Credit Hours
<b>Core Courses</b> <sup>1</sup>		
BMSC 8101	Molecules to Cells	6
BMSC 8102	Experimental Design and Biostatistics	1
BMSC 8103	Scientific Integrity and Bioethics	1
BMSC 8104	Introduction to Laboratory Research I	1
BMSC 8201	Organ Systems: Function, Dysfunction and Therapeutics	4
BMSC 8202	Scientific Communications	1
BMSC 8203	Introduction to Bioinformatic Tools and Applications	1
BMSC 8204	Introduction to Laboratory Research II	1
BMSC 8401	Scientific Grant Writing	1
Student Seminar and Journal Club (1 per year) <sup>2</sup>		4
<b>Basic and Advanced Concentration-Specific Electives</b>		<b>10</b>
<b>Research Courses</b> <sup>3</sup>		<b>6</b>
BMSC 9994	Preliminary Exam Preparation	
BMSC 9998	Postcandidacy Research	
BMSC 9999	Dissertation Writing	
<b>Total Credit Hours</b>		<b>37</b>

<sup>1</sup> All students in the Biomedical Sciences program participate in a common first-year interdisciplinary experience that includes the core courses identified.

<sup>2</sup> To complete this requirement, students select from BMSC 8500 Cancer Biology and Genetics Student Seminar and Journal Club, BMSC 8600 Infectious Disease and Immunity Student Seminar and Journal Club, BMSC 8700 Molecular and Cellular Biosciences Student Seminar and

Journal Club, BMSC 8800 Neuroscience Student Seminar and Journal Club, or BMSC 8900 Organ Systems and Translational Medicine Student Seminar and Journal Club. Students register one time a year in the Spring term. Registration begins in their second year and then continuously throughout their matriculation. Students must complete a minimum of 3 credits before defending their dissertation. Students who fulfill the BMSC-PHD requirements prior to the Spring semester of their fifth year take an additional credit of BMSC 9999 in the term they defend their dissertation to fulfill the PhD credit requirement.

- <sup>3</sup> Students must take at least 6 credits of BMSC 9994, BMSC 9998, and/or BMSC 9999, with a minimum of 2 credits of BMSC 9999 taken after elevation to PhD candidacy to defend their dissertation. Students who have fulfilled the BMSC-PHD requirements prior to the Spring term of their fifth year take 7 credits of BMSC 9994, BMSC 9998, and/or BMSC 9999, with at least 3 credits of BMSC 9999 taken after elevation to PhD candidacy to defend their dissertation.

#### **Additional Requirements:**

##### *Laboratory Research:*

In the first year, students complete three laboratory rotations. In subsequent years, they participate in seminars and journal clubs in addition to performing research in the laboratory of their choice.

##### *Research Advisory Committee Meetings:*

Students are required to meet with their Research Advisory Committee each term to evaluate their progress toward the degree.

##### *Publications:*

Students must have sufficient data for at least one full-length, high-quality, first-author publication, excluding review articles, before receiving permission to write the dissertation. If a manuscript has not been accepted for publication at the time a student requests permission to write the dissertation, the student must present a submission-ready manuscript and evidence that the manuscript has been submitted for publication. The evidence is to include the name of the journal and acknowledgement of receipt of the manuscript from the journal.

##### *Outside Research Proposal:*

In the Spring term of the second year of study, students are required to prepare and defend an NIH-style grant proposal in their area of concentration on a topic that is distinct from the student's research. This is a requirement for elevation to candidacy.

#### **Culminating Events:**

##### *Dissertation Proposal:*

The dissertation proposal demonstrates the student's knowledge of and ability to conduct the proposed research. The proposal should describe the context and background surrounding a particular research problem and a methodological plan for investigating the problem. The proposal is a requirement for admission to candidacy and should be submitted and approved during the Fall term of the third year in the program.

##### *Dissertation:*

The PhD in Biomedical Sciences is a research degree. Research training begins with three research rotations in the first year of the graduate program and continues with the selection of an area of concentration and a Dissertation Research Advisor, who is a member of the Graduate Faculty from within the selected area of concentration. The areas of concentration include Cancer Biology and Genetics, Infectious Disease and Immunity, Molecular and Cellular Biosciences, Neuroscience, and Organ Systems and Translational Medicine.

Under the direction of the Dissertation Research Advisor, the student develops an original research project. Dissertation research involves meaningful, critical thinking and the execution of ideas in the laboratory through the use of the scientific method. Dissertation research conducted by the student should be an original contribution to scientific knowledge. The quality of the student's PhD dissertation research should be equivalent to that found in reputable biomedical sciences journals.

Upon selection of an area of concentration and a Dissertation Research Advisor, a Research Advisory Committee is formed for each student. This Committee is responsible for the review of the student's research and academic progress twice yearly. It determines whether the content of the student's research is sufficient for the PhD dissertation.

The student submits the dissertation in complete form not less than 14 days prior to the date of the final examination. The dissertation must have been read and approved by the Dissertation Research Advisor prior to distribution. After the student has arranged the time, date and room for the dissertation defense, the "Announcement of Dissertation Defense" form, found in TUportal under the Tools tab within "University Forms," is completed and forwarded to the Graduate School on Main Campus and to the Office of Graduate Studies on the Health Sciences Center Campus at least 10 working days before the defense. Announcements of the defense are posted and emailed to all members of the cluster/area of concentration.

The Final Examination Committee evaluates the student's dissertation and demonstration of competence within the field of the dissertation and related areas. This Committee consists of five faculty members, including the Dissertation Research Advisor, Research Advisory Committee, and one additional faculty member from another cluster. The Committee evaluates the quality of the dissertation research and the student's ability to express, both in writing and orally, their research question, methodological approach, primary findings and implications. The Committee votes to pass or fail the dissertation and the defense at the conclusion of the public presentation and private question/answer period.

## **Contacts**

### **Program Web Address:**

<https://medicine.temple.edu/education/biomedical-sciences-graduate-program>

### **Department Information:**

Biomedical Sciences Graduate Program  
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3500 N. Broad Street, MERB 1111  
Philadelphia, PA 19140  
[tusmgrad@temple.edu](mailto:tusmgrad@temple.edu)  
215-707-2423  
215-707-6687

### **Submission Address for Application Materials:**

<https://biomedcas2024.liaisoncas.com/applicant-ux/#/login>

### **Submission Address for Supplemental Temple University Application:**

[https://apply.temple.edu/MED\\_GRAD/](https://apply.temple.edu/MED_GRAD/)

### **Department Contacts:**

*Admissions and Program Coordinators:*

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