

# MEDICAL SCIENTIST TRAINING PROGRAM (MSTP), PHD/MEDICINE, MD

**Degree:** Doctor of Philosophy (PhD)

**Field of Study:** Various (Biochemistry, Biomedical & Health Informatics, Biomedical Engineering, Cell Biology, Clinical Translational Science, Epidemiology and Biostatistics, Genetics and Genome Sciences, Molecular Biology and Microbiology, Molecular Virology, Neurosciences, Nutrition, Pathology, Pharmacology, Physiology and Biophysics, or Systems Biology and Bioinformatics)

**Degree:** Doctor of Medicine (MD)

Medicine (MD) Program Information

## Program Overview

A combined MD/PhD program in biomedical sciences, the Medical Scientist Training Program (MSTP) is available for students desiring research careers in medicine and related biosciences. This program takes seven to eight years to complete, depending on the time needed to complete the PhD dissertation research. Financial support includes a stipend and full tuition support.

Candidates must meet established prerequisites for admission to both the School of Medicine and the School of Graduate Studies. Criteria include demonstrated capabilities in research and superior undergraduate academic credentials. Applicants must have either U.S. citizenship or permanent residency status to be considered for admission to the MSTP. Information can be obtained by contacting the MSTP program or from the program website. Admissions are coordinated via the School of Medicine admissions program and the AMCAS application.

The first two years of the MSTP are centered on the University Program pre-clinical core medical school curriculum, which occupies five mornings each week. Afternoons include time for graduate courses and/or research rotations, as well as clinical training, thus integrating the medical school and graduate school experiences. The next three to four years are devoted to completion of graduate courses and PhD thesis research in one of the multiple MSTP-affiliated graduate programs. During the PhD phase, MSTP students participate in the MSTP Clinical Tutorial, a program designed to enhance clinical skills and allow students to develop connections between their research and clinical interests (this further addresses the goal of integrating medicine and science). After completion of the PhD program, students return to medical school for two years to complete clinical clerkships and finish the MD curriculum.

The program is administered by the MSTP Steering Committee, which consists of faculty from both basic science and clinical departments. Its functions include selecting candidates for admission, designing and administering the program curriculum, advising students and evaluating student progress.

## MSTP Activities

The MSTP supports several activities that enhance the scientific and professional development of students. These activities also foster a vibrant and collegial MSTP community with a strong sense of mission in the training of physician scientists. The student-directed MSTP

Council coordinates many activities of the CWRU MSTP. The Council meets once each month to discuss activities that are run by different student committees. The overall goals of the MSTP Council are to identify objectives for the program, to allow students to initiate programs to enhance the MSTP, to encourage increased student involvement in the operation of the MSTP, and to enhance development of leadership skills of MSTP students. The president, vice president, and secretary are all elected for a one-year period. Committees are led by 1-3 committee chairs who take charge of committee activities and coordinate the involvement of other students in the committee activities. All students are welcome and encouraged to participate in the various committees and to attend the council meetings. Recent Council committees and other program activities have included the following:

### 1. Monthly Dinner Meeting Committee

This committee is responsible for planning monthly dinner meetings, selecting topics, speakers, and menus. The series is organized by students and is attended by students, Steering Committee members, and research mentors. Invited speakers (students, faculty, alumni and outside speakers) address issues pertinent to research, professional issues, career development or other topics of interest. The informal environment at these gatherings promotes social and professional interactions.

### 2. Communications and Webpage Committee

This committee organizes communications and the CWRU MSTP website content.

### 3. Summer Retreat Committee

This committee plans the summer retreat.

### 4. M1 bonding

This committee organizes events for first year MSTP students, to integrate them into the program and the community.

### 5. Community Service Committee

Plans events for involvement of MSTP students in community service.

### 6. Social Committee

This important committee plans fun events throughout the year!

### 7. Student Representative to Faculty Council

One student is selected to represent the MSTP on Faculty Council.

### 8. Student Representative to the Committee on Medical Education

One student is selected to represent the MSTP at the monthly School of Medicine CME meetings

### 9. Representative to the Graduate Student Senate

### 10. MSTP Women's Committee

Women in the MSTP organize luncheons or other meetings to discuss issues that face women pursuing careers in science. Students may invite a successful woman scientist who provides a role model as a physician scientist.

**11. Scientific meetings**

The program strongly encourages students to present their research at national or international meetings and provides financial support to pay for part of meeting travel expenses (other funding is obtained from the research mentor). In addition to the general meeting support for all students, each year two students are offered the opportunity to attend the annual MD/PhD national student conference in Colorado or the American Physician Scientist Association annual meeting in Chicago, with all expenses paid by the MSTP.

**12. Research symposia**

MSTP students are encouraged to present their research at CWRU student symposia, including the annual Graduate Student Symposium and the Irwin H. Lepow Student Research Day. These symposia feature a nationally recognized keynote speaker, and students have the opportunity to interact extensively with the noted scientist. A committee awards prizes for outstanding student presentations.

**13. Summer retreat**

The annual MSTP summer retreat is a two-day event focusing on scientific presentations, professional development and program planning for the upcoming academic year.

**14. Works in Progress Seminar Series**

Students in their research years present their thesis work to the department through an oral presentation.

## Assessment of MSTP Students

Students in the MSTP are assessed for the medical school component of the program in the same manner as students in the University Program, with the exception that grades are awarded for those courses in the MD curriculum in years one and two that receive graduate school credit and are used to satisfy requirements for the PhD degree. Students must satisfactorily complete all requirements for both the MD and the PhD.

## Program Requirements

### MSTP Program by Year

**Year 1**

- University Program MD curriculum
- Summer Intro to MSTP course
- One graduate course or research rotation each semester (fall and spring)

**Year 2**

- University Program MD curriculum
- Summer research rotations (1 or 2)
- Graduate course or research rotation in the fall semester

**Year 3**

- PhD program

**Year 4**

- PhD program
- MSTP Clinical Tutorial

**Year 5**

- PhD program
- Optional MSTP Clinical Tutorial

**Year 6 (If Needed)**

- PhD program
- Optional MSTP Clinical Tutorial
- All PhD work, including dissertation defense and publications, to be completed before starting the 3rd year MD curriculum

**Year 7**

- Third year MD curriculum (core clinical clerkships)

**Year 8**

- Fourth year MD curriculum (completion of core clinical clerkships if necessary, clinical and research electives)

## General Description

The Case Western Reserve University Medical Scientist Training Program (MSTP) provides training for future physician-scientists by integrating well-developed curricula in science and medicine. Unique aspects of the program include the integration of graduate school and medical school in many phases of the program to optimize dual-degree training and a high degree of student involvement in running the program.

The MSTP includes three major phases of training.

*First phase:* During the first two years, each student completes the first two years of the University Program medical school curriculum, including early clinical experiences, completes at least three research rotations, takes graduate courses, and chooses his or her PhD graduate program and thesis lab. During the summer between the first two years of medical school, students complete one or two research rotations. During the fall and spring semesters of year one and the fall semester of year two, students take a graduate course or complete a research rotation.

*Second phase:* During the PhD phase, students complete all requirements of their PhD program. They also participate in the MSTP Clinical Tutorial for at least one year in a patient-based clinical specialty. A second year of MSTP Clinical Tutorial is optional.

*Third phase:* In the final phase, students complete years three and four of the University Program medical school curriculum. The focus is clinical training, but research electives can be taken for part of year four.

Although each of these three phases has a different focus, opportunities exist for students to pursue both research and clinical training in each phase. The philosophy of the Case MSTP is to integrate medicine and science throughout the program as much as possible.

The CWRU MSTP is run by faculty, staff, and students. The MSTP Council is a body of students that plans and runs certain aspects of the program. The administrative director, program coordinator, and program assistant have many important roles and run the day-to-day management of the program. The associate directors are involved in decisions at all levels of the program and are the primary advisors for students in the first two years of the program. The clinical associate director is responsible for the clinical activities in the MSTP program. The director is responsible for all aspects of the program, is a primary advisor for students in the first two years of the program, and is available to students for advice at any stage. The MSTP Steering Committee makes decisions on MSTP policy, curriculum planning, student admissions, approval of mentors and evaluation of students.

Incoming MSTP students are expected to enter the program on or about July 1. The MSTP summer retreat, usually held in early July, provides an important orientation to the program and includes sessions and workshops for program and professional development.

## Advising System

The program director provides advising to students in all phases of the program. The MSTP has a team of associate directors who advise students in the first two years on research rotations and course work. Students may also meet with an MSTP Steering Committee member representing an area of research interest or with the MSTP director. During the PhD training period, mentoring is provided by the thesis advisor and thesis committee, which includes a member of the MSTP Steering Committee and a member with an MD degree. MSTP students are full members of the medical school class and enter one of the four academic societies of the University Program when they matriculate in the program. The society dean provides important advice on matters concerning the MD curriculum.

## Classes and Research Rotations in Years One and Two

During years one and two of the University Program, MSTP students register for 9 credit hours of graduate course work each semester.

IBIS 401, IBIS 402 and IBIS 403 are 4 credits each. IBIS 411, IBIS 412, and IBIS 413 are 2 credit hours each. In contrast to their fellow medical students, MSTP students are graded during years one and two of the medical school curriculum for these graduate courses, which provide graduate school credit for the medical school curriculum. These grades are for graduate school purposes and do not affect standing in the medical school.

In addition to the medical curriculum, students take MSTP 400 or one 3-4 credit graduate school course per semester in the first two years. Graduate courses are scheduled in the afternoon in the fall and spring semesters to avoid conflict with the medical school curriculum. MSTP students will be registered for MSTP 400 during the summer terms before each of the first two years of medical school. Students also may complete a research rotation instead of a graduate school course during the fall or spring semester.

## The PhD Phase

After completion of the second year of medical school, each student chooses a PhD thesis mentor, joins a specific PhD program, and completes any remaining graduate school course work and other requirements for the PhD degree. The following training programs are affiliated with the MSTP. (If the training program is not itself an independent PhD program, the program through which it is offered is indicated in parentheses.)

- Biochemistry
- Biomedical & Health Informatics
- Biomedical Engineering
- Cancer Biology (Pathology)
- Cell Biology
- Clinical Translational Science
- Epidemiology and Biostatistics
- Genetics and Genome Sciences
- Immunology (Pathology)
- Molecular Biology and Microbiology
- Molecular Virology

- Neurosciences
- Nutrition
- Pathology (Molecular and Cellular Basis of Disease)
- Pharmacology
- Physiology and Biophysics
- Systems Biology and Bioinformatics

All MSTP students are required to take IBMS 450 and IBMS 500 during the spring semester of their third year in the program. The SOM requires that MSTP students who are preparing to re-enter medical school, register for IBMS 501.

## Clinical Tutorial, Clinical Refresher Course and Years Three and Four of Medical School

During the PhD thesis phase, MSTP students take the MSTP Clinical Tutorial, which provides a unique longitudinal part-time clinical experience. The MSTP Clinical Tutorial is a year-long course that enhances clinical skills for year three of medical school. It also serves a special career development objective by allowing students to balance medical and scientific interests and explore the connections between these areas. The MSTP Clinical Tutorial, offered during the PhD phase, is an example of the integration of science and medicine in the CWRU MSTP. An optional MSTP Clinical Refresher course may be taken before the start of year three. After completion of the PhD, MSTP students are enrolled in medical school to complete the requirements for the MD (see description provided for the University Program).