

Translational & Molecular Medicine, Pharmacology & Physiology (TMMPP) Track

A QUICK START HANDBOOK FOR FIRST YEAR
GRADUATE STUDENTS

YALE UNIVERSITY

2023 - 2024

Important Contacts

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Participating TMMPP Faculty

Please visit <https://medicine.yale.edu/bbs/people/> for the complete list of participating faculty in the track.

Introduction

The Translational and Molecular Medicine, Pharmacology and Physiology Track offers the opportunity for students to use the tools of biochemistry, cell and molecular biology, physiology, structural biology, systems biology and genetics to investigate the mechanisms of disease and pathogenesis (including: cancer, diabetes, obesity, heart disease, inflammatory diseases, aging and others) the molecular actions of drugs that treat these diseases, and how genes, proteins and small molecules are integrated to produce the specific functions of our cells, tissues, and organs. The faculty in this interdisciplinary track is drawn primarily from the Departments of Pathology, Pharmacology, Cellular and Molecular Physiology, and Medicine, with participating faculty from Biomedical Engineering, Cell Biology, Comparative Medicine, Genetics, Immunobiology, Molecular Biophysics & Biochemistry, Microbial Pathogenesis, Molecular, Cellular & Developmental Biology, Neurobiology, Psychiatry, and Therapeutic Radiology, as well as the Yale Cancer and Stem Cell Centers.

Students will be in the TMMPP track until the end of their first year of study, at which point they will join a lab, a graduate program and meet the requirements of that program. The first-year TMMPP track curriculum has been designed for compatibility with the requirements of the major programs whose faculty are members of the track. Typically, most students join one of four track programs: Translational Biomedicine (PTB), Cellular and Molecular Physiology (CMP), Pharmacology (Pharm) or Experimental Pathology (ExPath), but have the flexibility to join other programs within the BBS. Students should consult the handbooks of any program they may consider joining to learn about additional requirements and procedures that will apply to them in years two and beyond.

Curriculum

Program of Study

In their first year, students must complete three rotations, take the seminar course (Fall and Spring) and complete the Responsible Conduct of Research course. In the fall, students typically take two of CMP550a, PATH690a, PHAR504a. Students must also take core courses from the list below.

Cellular and Molecular Physiology:

C&MP 550a: Physiological Systems

C&MP 580b: Mitochondrial Bioenergetics and Intermediary Metabolism

C&MP 560b: Cell and Molecular Physiology: Molecular Machines in Human Disease

Experimental Pathology:

PATH 690a: Molecular Mechanisms of Disease

PATH 650b: Biology of Cancer

Pharmacology:

PHAR 504a: Molecular Mechanisms of Drug Actions

PHAR 505a: Current Topics in Pharmacology

PHAR 528b: Principles of Signal Transduction

PHAR 529b: Structural Biology & Drug Discovery

Translational Biomedicine:

PTB604: Physiologic function and cellular structure of organ systems

One or more of the cross-listed courses:

PTB 504/PHAR504: Molecular Mechanisms of Drug Actions

PTB 550/C&MP550: Physiological Systems

PTB 690/PATH690: Molecular Mechanisms of Disease

TMMPP Track students choose a departmental affiliation (usually the same as that of their research advisor) at the end of their first year. Each of the major participating departments has course requirements that can be satisfied in large part by courses from the four core areas mentioned above. Additional specialized courses and electives that students take in the first and second years will enable them to fulfill the course requirements of the department they join.

Other Course Requirements

In addition to the formal course requirements listed above, students take a full-year course in lab rotations (PATH 620 and 622) as well as a Responsible Conduct of Research course (PATH 660/PHAR 580/C&MP 650/PTB650) and the full-year Seminar in Translational Molecular Medicine, Pharmacology and Physiology course (PATH 679/PHAR 501/C&MP 629/PTB501 Fall and PATH 680/PHAR 502/C&MP 630/PTB502 Spring). Electives are selected depending on the student's interests and to meet the requirements of the department the student anticipates joining (see below). Students typically take three to four course credits per semester.

Meeting Departmental Course Requirements

Students in the TMMPP track choose a departmental affiliation at the end of the first year. In addition to the Track Requirements, each of the participating departments has course requirements that can be satisfied in part by courses within the above subject areas. The following are the additional course requirements for the four departments in the track. For course requirements in other departments, please contact the department's Director of Graduate Studies (DGS) for approval.

Cellular and Molecular Physiology:

Required courses are CMP 550a (Physiological Systems) and either CMP 560b (Molecular Machines and Human Disease) or C&MP 580b (Mitochondrial Bioenergetics and Intermediary Metabolism).

Pathology:

The following courses are required:

PATH 640a, Developing and Writing a Scientific Research Proposal PATH 650b, Biology of Cancer PATH 690a, Molecular Mechanisms of Disease

Pharmacology:

Students entering Pharmacology are required to take **one** of the following courses (1) Pharm 504a (Molecular Mechanisms of Drug Actions), (2) Pharm 528b (Principles of Signal Transduction) or (3) Pharm 529b (Structural Biology and Drug Discovery). Students must also maintain an average grade of High Pass.

Translational Biomedicine:

PTB students are required to take at least one of the following in the fall semester: PTB 550/C&MP550 (Physiological Systems), PTB 690/PATH690 (Molecular Mechanisms of Disease) or PTB 504/PHAR504 (Molecular Mechanisms of Drug Actions); and the required core course PTB604 (Physiological Function and Cellular Structure of Organ Systems) in the spring. They are also required to take one course in biostatistics (from several offered). In the second year PTB students are required to take 4 three-week modules of the Mentored Clinical Experience (MCE) and the PTB Grant Writing Course.

Faculty Advisory for Incoming Students

At the start of the first year, each student plans his or her course schedule and first laboratory rotation assignment in consultation with the track DGS, David Zenisek. Meetings occur the last week in August.

Responsible Conduct of Research

Education in the ethical and moral dimensions of scientific research is an integral and essential component of the graduate program and of a research career. Specifically, the National Institutes of Health (NIH) has stipulated that: “all training programs supported by federal funds provide predoctoral and postdoctoral fellows with exposure to information dealing with recommended standards of conduct. Questions ranging from the procedures governing the appropriate use of human subjects, experimental animals, radioisotopes, etc. to issues involving conflicts of interest and commitment and the regulations that every institution must establish to deal with misconduct in science, should be addressed.”

To meet this important requirement, TMMPP students:

- 1) Are required to pass the Responsible Conduct of Research course (PATH 660/PHAR 580/C&MP 650/PTB650), at which some of the basic features of life in contemporary research and some of the personal and professional issues that researchers encounter in their work are discussed in a seminar/round table format;
- 4) Are required to participate as a Senior Student Assistant to at least one of the RCR sessions during a student’s 3rd, 5th or 6th year.
- 5) Are required to attend short re-training sessions in their fourth year, one BBS-wide session and one departmental or small group session.

Laboratory Rotations: Introduction to Research

Aug 28 – Sept 8	Rotation Shopping Period
Sept 11 – Oct 27	Rotation 1 (8 weeks)
Oct 30 – Jan 12	Rotation 2 (11 weeks which includes Thanksgiving, finals, and Winter Break)
Jan 15 – Mar 1	Rotation 3 (7 weeks – students begin selecting thesis lab at end of this rotation)
Mar 4 – May 3	Rotation 4 is optional (7 weeks)

Choosing Lab Rotations

During the academic year, students rotate through 3 laboratories. Students learn about the labs available to them by looking in the TMMPP or BBS brochures and websites, by talking to more senior students and by attending short faculty talks held in late August/early September.

Students should contact the faculty directly to set up the lab rotation and notify Carly Drozd once the arrangements have been made.

We encourage students who remain uncertain about their choice of laboratory for thesis research to take a fourth rotation following the completion of the third rotation. Labs may formally accept students beginning on April 1st.

What Students Should Do During Lab Rotations

Students should balance their time between rotations and course work, allowing time for lab work every week but not spending so much time in lab that course work suffers. Students will be given a desk and bench space in their rotation lab and will determine in discussions with the rotation advisor what to do during the rotation. Typically, a more senior student, postdoctoral fellow, or the professor will supervise the student in carrying out an experiment that will help familiarize the student with the science in the lab. While students should try to achieve results in their project, they should realize that the short period of the rotation often prevents this from being possible, and obtaining results is not necessary to the success of a rotation. Besides carrying out experiments, rotation students also should familiarize themselves with the intellectual basis of research in the lab by participating in lab meetings/seminars/discussions and by reading papers related to their rotation work. The purpose of rotations is to allow you to decide if you want to join the lab and for the lab to decide if they want you.

Rotation Talks

At the end of each rotation period, each first-year student gives a brief talk on the topic on which he or she did their rotation. These talks help students crystallize their thoughts about their rotation research and provides practice and training in the important skill of giving scientific presentations. Because significant results often have not been obtained, the talks typically focus on the background and experimental approach behind the project. Students should endeavor to give a clear and simple description of their project and its rationale. The talks are usually 10 minutes followed by a 5-minute question period. The track Registrar arranges the sessions during which the talks are given, and the talks are attended by fellow classmates, rotation supervisors, lab mates, and any other interested members of the program. After the talks, students should arrange to discuss their presentations with their rotation advisor.

GRADES

Graduate courses are graded Honors (H), High Pass (HP), Pass (P), and Fail (F). The Graduate School requires that students receive at least two Honors. The Honors requirement must be met in courses other than those concerned exclusively with dissertation research and preparation. Grades in lab rotations do not count toward this requirement. The seminar course does not count toward the two honors.

Some departments set additional requirements in addition to the university's Honors requirement. For example, Pharmacology requires that students maintain an average of High Pass. Please check with any department you are considering joining to discuss their requirements.

THE SUMMER AFTER THE FIRST YEAR

Students are expected to begin working in the lab as soon as they complete their third rotation and formally join their thesis lab. Depending on the department, students will be asked to form their research committees, begin planning for their qualifying exams (taken in year two), and arranging their first stints as Teaching Fellows. Since each department has its own requirements and timeline, it is imperative that students meet with their department's DGS and familiarize themselves with their department's Graduate Handbook early on.

Some students choose to do a summer internship the summer after their first-year. The student's adviser, DGS (of chosen department) and GSAS Dean need to approve of this. **A summer internship cannot start before June 1st.**

Additional Student Resources at Yale

Who to See About Academic or Administrative Issues

SPECIFIC GRADUATE SCHOOL PROBLEMS:

You can find general information on Yale graduate programs and policies at the following link: <https://gsas.yale.edu/programs-of-study>. If you feel your question is not answered or that your problem cannot be or has not been satisfactorily addressed by the track DGS or Registrar you may choose to contact:

GSAS Administrative Dean:

Associate Dean, Allegra di Bonaventura, 1 Hillhouse Ave, allegra.dibonaventura@yale.edu

Miscellaneous Information

Registration

All students must register online with the Graduate School in September for the Fall Term and in January for the Spring term of each academic year. Students will continue to register every term for the entire time they're a student at Yale, even if they are not taking any classes.

Annual Retreat

Students will find the retreats beneficial and enjoyable. First-year TMMPP students are required to attend the retreats in Pharmacology, Physiology and Pathology; the first PTB retreat will take place in the fall of 2023. Please be on the lookout for information about the retreats.

Seminars

Participation in the seminars and colloquia held throughout the University is an important part of every student's education. Many departments have weekly seminar series. All students are expected to attend seminars regularly.

Vacation and Leave

First-year TMMPP students are expected to be present on campus throughout the academic terms, including Fall and Spring break, with the exception of University holidays.

The course of study and graduate student stipend are based on a 12-month commitment. It is expected that students will take no more than two weeks of vacation, in addition to University holidays each year. Note that breaks in course work (Fall or Spring break, Christmas/New Year's, beyond the official university holiday days, summers) are not holidays for graduate students. The total vacation time that a student may take is negotiable with the thesis adviser. Unscheduled absences or excessive vacation time may result in a stipend reduction and/or possible suspension from the Program. In the event that the student needs to take a leave of absence, a personal leave of absence form must be filled out. In no case may vacations conflict with any academic or teaching obligations.

The policy regarding student vacations conforms to the stipulations of the federal training grants that provide support for most first through third year students. The excerpt below appears in an announcement of regulations contained in the application material for NIH National Research Service Award Institutional Grants (*i.e.* training grants), dated May 16, 1997: "In general, trainees may receive stipends during periods of vacation and holidays observed by individuals in comparable training positions at the grantee institution. For the purpose of these awards, however, the period between the spring and fall semesters is considered to be an active time of research and research training and is not considered to be a vacation or holiday."

UNIVERSITY LIBRARIES

For all Yale main library buildings and hours* go to: <http://web.library.yale.edu/buildings>
Libraries of particular interest to the sciences include:

- Center for Science and Social Science Information (CSSSI):
Location: 219 Prospect Street, Concourse Level, Kline Biology Tower, New Haven, CT
<http://csssi.yale.edu/>
- Medical Library:
Location: Sterling Hall of Medicine, 333 Cedar Street. <http://library.medicine.yale.edu/>

*Confirm all library hours online.

BUS SERVICE (all free with Yale ID)

Change to for information on bus services...insert link

Yale Shuttles

The Daytime Campus Shuttles operates from 7:20 AM to 6:00 pm Monday through Friday. Yale ID required to ride the Yale Shuttles. [View the Yale Shuttle buses in real-time.](#)

Public Safety Campus

[Public Safety Website](#).

Police Emergency: 911

University Police: 203-432-4400

Campus Crisis Services (24-Hour Hotlines): 203-789-8104

Yale Shuttle:

The free shuttle is available to all students, staff, and faculty.

Yale ID required to ride the Yale Shuttles. [View the Yale Shuttle buses in real-time](#).

Nighttime Safe Rides (via TapRide app)

Walking Escorts 203-432-9255

Students, Staff or Faculty may request a Security Escort by calling 203-432-WALK (203-432-9255).

Special Services Van

Yale Transit operates a Special Services Van that transports members of the Yale community who are permanently or temporarily disabled. Passengers are picked up on request and transported within the Shuttle boundary. To register, contact the Resource Office on Disabilities (203-432-2325).

Graduate School Organizations

The Graduate and Professional Student Center at Yale (Gryphons) located at 204 York Street provides a central meeting place for graduate and professional students, faculty, and alumni. Open only to members and their guests, Gryphons operates a full service bar with reduced prices; sponsors receptions, dances, and parties; and hosts conferences, rehearsals, and exhibitions. Gryphons is overseen by the Graduate-Professional Student Senate (GPSS), a university-wide organization of graduate and professional students. Consult the website for current restrictions during the pandemic.

The Graduate Student Assembly (GSA) is a student-run democratic organization, made up of representatives from each department in the biological and physical sciences, social sciences, and humanities. Its goal is to represent the interests of all Yale graduate students and to bring students' concerns to bear on Graduate School policy decisions. For more information on the GSA, visit the web site at <http://gsa.yale.edu/>.

The McDougal Graduate Student Center

<https://gsas.yale.edu/mcdougal-graduate-student-center>

The McDougal Graduate Student Center is located at 135 Prospect Street and is open Mondays through Thursdays from 9:00 am through 10:00 pm, Fridays from 9:00 am through 8:00 pm and on weekends from 12:00 pm through 6:00 pm during the academic term. You can contact the McDougal Graduate Student Center office at (203) 432-BLUE or at mcdougal.center@yale.edu.

See the GSAS Events calendar: <https://yaleconnect.yale.edu/gsasmcdougalgsl/events/>

Graduate Student Life

Office of Career Strategy

For students interested in exploring diverse career paths, the Office of Career Strategy provides resources and services to help students clarify career aspirations, identify employment opportunities, and obtain advice for every stage of the non-academic job search process. Students may make one-on-one appointments with an experienced adviser, attend skill-building workshops, network with alumni and employers, and take advantage of extensive online resources at ocs.yale.edu.

The Yale Poorvu Center for Teaching and Learning (CTL) <http://ctl.yale.edu>

a. Graduate and Postdoctoral Teaching Development

The Yale Poorvu Center for Teaching and Learning (CTL) supports graduate students, postdocs, and professional school students in their teaching development, from first-time teachers to seasoned instructors refining their practice. Located in Sterling Library, the Graduate Teaching Program of the CTL provides a space for instructors to reflect on their teaching, get feedback, and experiment with new ways to reach students.

Teaching at Yale Day: orientation to teaching in Yale College, required for all first-time TFs.

b. The Graduate Writing Lab (GWL)

<http://ctl.yale.edu/writing/graduate>

The GWL helps graduate students become confident and prolific academic writers. The GWL team provides individual and group support to graduate students at all stages of their academic career. The lab helps students with written and oral projects related to their academic work including written coursework, fellowships, grant applications, conference papers, dissertation prospectuses, chapters, and papers for publication. The GWL team believes that all writers benefit from sharing work in a collaborative and supportive environment and encourages students to visit the lab at various stages of their research and study.

The GWL offers free assistance to graduate students through the following programs:

- ***Individual Consultations for Written and Oral Communication*** take place at the Center for Teaching and Learning (CTL), Medical Library, and Center for Science and Social Science during the academic year. During these sessions, trained writing consultants provide feedback and comments to the students' written and oral work. Students can schedule these consultations through the [online scheduling system](#) on the GWL website.
- ***Pitch Vantage Studio for Public Speaking*** is located on the mezzanine floor of the CTL in room M104C. In that studio, graduate students can improve public speaking skills by

practicing their oral speeches, presentations, and lectures with PitchVantage software. This software focuses on different aspects of public presentation, from pacing and pausing to pitch and tone, and evaluates performance in real time. The scheduling for PitchVantage sessions is similar to scheduling writing consultations [on the GWL website](#).

- ***Academic Writing Workshops and Seminars*** are offered regularly through the academic year. These programs address critical skills graduate students need to succeed as writers, researchers, communicators, and professionals that are not usually addressed through coursework and traditional academic training. Students register for programs through the GWL website or through the weekly electronic newsletter sent to all GSAS students.
- ***Writing Retreats and Study Halls*** are a powerful tool for collaborative writing. These groups help students combat the isolation that is common in the later stages of their doctoral work. They also provide space and structured time to GSAS students to accomplish their dissertation-related projects in a distraction-free environment.
- ***Peer-review Groups*** help students discuss their work under the guidance of trained writing consultants. Groups generally have 5-7 members so that everyone receives individual attention. At each weekly meeting, two or three members present written work for detailed feedback.

The GWL team works with faculty members and students of different academic programs to design and organize workshops tuned to their needs. The GWL issues a weekly newsletter circulated among GSAS students, department DGSs, and registrars by email.

Office of International Students and Scholars (OISS) <http://oiss.yale.edu/>

OISS is Yale's representative for immigration concerns for all foreign nationals who are or will be studying or working at Yale. This office also offers many programs for international students, including English conversation groups for students and their spouses, cultural understanding workshops and celebrations, academic success skills programs, bus trips, and a host family program. OISS supports various nationality clubs where students can meet others at Yale from their home country for friendship and support. OISS works closely with many Yale offices that assist graduate students, especially the Office of Career Strategy and Graduate Student Life, on programs and publicity. OISS is housed in the International Center at Yale, 421 Temple Street, which provides a comfortable space for international community gatherings. You can reach OISS at (203) 432-2305.

Office for Graduate Student Development and Diversity (OGSDD)

<https://gsas.yale.edu/office-graduate-student-development-diversity-ogsdd>

The Office for Graduate Student Development and Diversity works to expand the diversity within the student body and to enhance awareness of diversity issues within the academic community. The Office focuses and coordinates efforts to recruit and retain students from all backgrounds and experiences at the Yale Graduate School of Arts and Sciences. Michelle Nearon, Associate Dean for Graduate Student Development and Diversity, works collaboratively with departments and programs to support the needs of students as they pursue graduate study. Associate Dean Nearon advises prospective and current graduate students and serve as the Graduate School's Title IX Coordinators. The Summer Undergraduate Research Fellowship (SURF) Program, the Post-Baccalaureate Research Education Programs (ESI PREP and NIH PREP), Diversity Recruitment Days, Diversity Preview Days, Diversity Orientation Day, and the Transitions: First Year Experience Program fall under the purview of the OGSDD. Graduate Student Diversity Fellows are appointed annually to assist the Office in the development and implementation of a wide array of programs and initiatives to cultivate awareness, appreciation, and knowledge of self and others. Through mentoring, the Peer-to-Peer Advising Program, and

the Social Justice Discussion Seminars, topics such as discrimination, bias, imposter syndrome, and stereotypes are discussed to promote constructive dialogue among students, faculty, and staff. If you have any questions, please contact Michelle Nearon, Associate Dean for Graduate Student Development and Diversity, directly via email at michelle.nearon@yale.edu or (203) 436-1301.