

# **M** | PHARMACOLOGY

## GRADUATE STUDENT HANDBOOK

Ann Arbor, Michigan

2020-2021

# TO OUR STUDENTS

This handbook is a consolidated source of information and guidelines relating to graduate study for the faculty and graduate students of the Department of Pharmacology at the University of Michigan. Students and faculty should also refer to the Rackham Graduate School website which outlines the Rackham Graduate School guidelines for graduate study at the University.

The Department of Pharmacology Graduate Student Handbook contains information concerning the organization of the Department, its personnel, and their duties. We hope you will find it helpful and convenient for reference.

The Pharmacology Graduate Program offers the Doctor of Philosophy (Ph.D.) and Master of Science (M.S.) degrees, through the Rackham School of Graduate Studies.

Pharmacology is the study of how drugs affect the body and how the body affects drugs. Pharmacology is one of the most exciting areas of biomedical research because you can have a real impact on human health while working in the lab. Pharmacology is multidisciplinary, bringing together ideas from chemistry, biochemistry, cell biology and integrative biology to create a comprehensive framework for understanding and treating disease. Here, at the University of Michigan Department of Pharmacology, we have assembled a diverse group of outstanding scientists who work together to advance the forefronts of new knowledge to develop novel therapeutic approaches for treatment of disease. There are a number of exciting opportunities for students to work with leaders in the field in one of the top Pharmacology departments in the world.

The goal of our graduate program is to train the next generation of pharmacologists for careers in academia, government, biotech, the pharmaceutical industry, as well as emerging novel careers in which their knowledge provides value. To do this we provide a rigorous and supportive learning environment and individual mentorship from our faculty comprised of the very best academic pharmacologists.

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# WHERE TO GO FOR INFORMATION

## Graduate Student Handbook

This handbook outlines the requirements for the Ph.D., M.S., and the Ph.D. segment of the M.S.T.P. degree programs in Pharmacology. This includes requirements for coursework, laboratory rotations, preliminary examinations, and completion of the degree, together with advice on the selection of a thesis advisor and dissertation committee. There is also general information on matters necessary for your life as a graduate student. Please be familiar with requirements of the Department and the Rackham Graduate School. Graduate School rules/regulations can be found in their entirety on the Rackham Graduate School website at [http://www.rackham.umich.edu/policies/academic\\_policies/](http://www.rackham.umich.edu/policies/academic_policies/).

## Graduate Bulletin Board

Bulletin boards are located in the 1<sup>st</sup> floor hallway of MSRB III outside the 1301 media suite. Job postings, events, fellowships, scholarships, and grants offered *outside* the University are posted there. Rackham Doctoral Degree deadlines and available campus resources are also posted.

## Graduate Program Committee

Departmental requirements for all graduate degrees are administered by the Graduate Program Committee, a committee of seven faculty members and one student representative. This Committee has been delegated the authority by the faculty and the Chair to interpret rules and requirements and, when the circumstances warrant, to grant exceptions upon formal appeal. The Committee is also a resource for any questions or concerns regarding progress to the Ph.D. and can assist with conflict resolution.

First year students in the M.S. & Ph.D. programs are required to meet regularly with their respective program director. Advising regarding coursework selection will be provided at orientation, but you may contact your program director at any time during your studies for guidance on any matter. Ph.D. students must meet with Dr. Gnegy or Dr. Jutkiewicz on a yearly basis. After your first year of Ph.D. training, your Research Mentor (Dissertation Committee Chair) will serve as your primary resource for academic advising and mentorship for your thesis project. In addition, the Graduate Coordinator is also an excellent resource.

Margaret Gnegy	<a href="mailto:pgnegy@umich.edu">pgnegy@umich.edu</a>	3-5358	Co-Chair/Ph.D. Program Director
Emily Jutkiewicz	<a href="mailto:ejutkiew@umich.edu">ejutkiew@umich.edu</a>	4-8612	Co-Chair/Ph.D. Program Director
Stephen Fisher	<a href="mailto:skfisher@umich.edu">skfisher@umich.edu</a>	3-4376	M.S. Program Director
Jorge Iniguez-Llhui	<a href="mailto:iniguez@umich.edu">iniguez@umich.edu</a>	5-6565	Member
David Jones	<a href="mailto:davekj@umich.edu">davekj@umich.edu</a>	6-8639	Member, MSTP Representative
Yoichi Osawa	<a href="mailto:osawa@umich.edu">osawa@umich.edu</a>	6-5797	Member
Greg Tall	<a href="mailto:gregtall@umich.edu">gregtall@umich.edu</a>	7-9824	Member
Amanda France	<a href="mailto:acatalf@umich.edu">acatalf@umich.edu</a>		Graduate Student Representative
Liz Oxford	<a href="mailto:oxforda@umich.edu">oxforda@umich.edu</a>	4-5969	Graduate Coordinator

## Graduate Student Representative

The Pharmacology Graduate Student Representative (GSR) serves as a leader within the department, representing the voice of students and advocating for their concerns. In July, there will be a call for nominations, students may self-nominate, followed by a vote. All students who have become candidates are eligible. In August, the new GSRA will begin their one-year term. In addition to planning the monthly graduate student meetings, the GSR will also attend all meetings of the Pharmacology Graduate Program committee which meets monthly. Discussions of the GPC may include, but are not limited to, topics like departmental and class requirements, preliminary exams, applications for direct admission to the PhD program, and student policies/expectations. Our current GSR is Amanda France ([acatalf@umich.edu](mailto:acatalf@umich.edu)).

## Faculty Areas of Assistance

Below is a list of faculty and the specific areas that they assist students within the department. Graduate students are encouraged to seek advice and assistance from any of the departmental faculty. Contact information can be found in the directory on page 8.

<b>Academic Planning and Issues</b>	Margaret Gnegy, Emily Jutkiewicz	Grad Program Co-Chairs
<b>Diversity, Equity &amp; Inclusion</b>	Alan Smrcka, Carrie Ferrario,	Dept. DEI Committee Chair, Faculty Ally for Diversity
<b>Conflict and Resolution</b>	Carole Parent, Jorge Iniquiez-Lluhi	Departmental Ombudsperson
<b>General Student Issues</b>	Lori Isom	Department Chair

## Administrative Complex

The Offices of the Chair, Executive Assistant to the Chair, Chief Departmental Administrator, IT & Financial Specialists are located in 2301 MSRB III. Our HR Specialist and Student Affairs Program Manager/Graduate Coordinator are located in 1301 MSRB III.

## Graduate Student Shared Google Calendar & MBOX Resource Folder

Graduate students are encouraged to use the shared calendar, which is maintained in Google. The Pharmacology graduate students have set an MBOX folder of shared resources for students. All graduate students will be given access to the calendar and MBOX folder when they begin the program. Students can also request access at any time by contacting the Graduate Coordinator.

## Departmental Email Groups

All incoming Ph.D. students, including PIBS students who choose to join Pharmacology labs after their rotations, will be added to the Pharmacology PhD student email group, [pharmphdstu@umich.edu](mailto:pharmphdstu@umich.edu), to receive relevant announcements and other pertinent information. All incoming M.S. students will be added to the Pharmacology Master's student email group, [pharmmsstu@umich.edu](mailto:pharmmsstu@umich.edu).

## Departmental Scholarly Activities

Students are expected to attend the following events:

**Wednesday Lunchtime Seminars:** On 3 of the 4 Wednesdays per month, a distinguished invited speaker presents a research seminar to the Department. All PhD and MS students are expected to attend. Students are encouraged to take advantage of the opportunity to have lunch with the speaker following the seminar. The Executive Assistant to the Chair will email a sign up for lunch the week before.

**Friday Student Seminars:** The required course, PHARM 646, trains PhD students in seminar preparation and presentation (see course requirements below). Attending this Friday seminar series is compulsory for all PhD and MS students. All Pharmacology faculty also attend these seminars, thus providing an excellent learning experience

**Annual Pharmacology Retreat:** The Pharmacology Retreat brings together faculty, students, postdocs, and staff for a program of scientific communication, career/professional development, and social interactions/community building. This event includes a poster session as well as research talks by trainees and faculty. The retreat is generally held overnight at an off-site venue early in the fall semester and includes lunch, dinner, and breakfast the following morning.

**Pharmacological Sciences Training Program (PSTP) Annual Symposium:** Our NIH-funded PSTP T332 holds an annual symposium for all faculty and students in the Department of Pharmacology, Departments of Medical Chemistry and Pharmaceutical Sciences in the College of Pharmacy, and several other Medical School Units including Biological Chemistry. Two nationally or internationally renowned scientists are invited to speak: one on their cutting-edge research and the other on the

critical topic of research responsibility and ethics. All second year and above Pharmacology PhD students are required to present their research in the form of a poster or short talk. MS students are welcome, but not required, to present as well. This event is an excellent opportunity to network and develop interdisciplinary collaborations. The PSTP symposium is organized entirely by PSTP students, providing them with a unique leadership experience in planning and executing a scientific meeting. **Alumni Steering Committee Weekend:** Each year the Pharmacology Alumni Steering Committee makes an in-person visit to review the Department, meet with our trainees, and to present the Outstanding Alumnus Award. This event provides an opportunity not only to network with experienced pharmacologists in a variety of different careers, but also provides a forum for the students to discuss ways to improve the program.

## Student Meetings & Groups

The University of Michigan has hundreds of student organizations and associations. You can find lists on the websites of the Office of Graduate & Postdoctoral Studies:

<https://ogps.med.umich.edu/resources/student-groups/> and the Office of Student Life: <https://campusinvolvement.umich.edu/managing-your-student-organization>.

**Pharmacology students** meet as a group at noon on the first Wednesday of each month (at the same time as the Departmental Faculty Meeting) to discuss all, and any, aspects of their graduate experience. Decisions/suggestions for improvement etc. made at these meetings are communicated to the Graduate Program Committee and/or Graduate Coordinator for consideration by the Department. These meetings are organized by the Graduate Student Representative to the Graduate Program Committee. The Graduate Student Representative is selected each July, students interested in serving in this role self-nominate and then the Pharmacology graduate students vote to select their representative for the coming year.

**Pharmacology Bagel Nosh:** The Pharmacology department gathers weekly on Fridays from 9:30-10:30 in 1301 MSRB III to socialize. This event is open to all members of the department and is a good opportunity to meet others.

**Pharmacology Trainee Chalk Talk:** Chalk Talk is a weekly lunch gathering where students present pretty much whatever they'd like-their research, a cool paper, ideas they want feedback on, prelims, job application talks, anything - without the burden of preparing slides. Graduate students are expected to present at least once a year, and all students, postdocs, and research staff are invited to come join us and ask questions, offer ideas, and learn about the cool stuff other people in the department are working on. It's also a great way to get used to asking questions during talks.

**Rackham Student Government (RSG):** RSG serves as a conduit between the student body and the Rackham Graduate School, the University administration, the State Legislature, and even the Federal Government. RSG also hosts and funds social events. RSG is a founding member of the Student Advocates for Graduate Education (SAGE), a coalition that works to lobby State and Federal decision makers on behalf of graduate and professional students. <https://rsg.umich.edu/>

**Biomedical Graduate Student Government (BGS):** The purpose of BGS is to promote and represent the interests of graduate students in the biomedical sciences. BGS provides an organized way for graduate students to voice their opinions on their education and to provide services and programs which enhance their graduate experiences. BGS aims to support the needs of all students associated with the Office of Graduate and Postdoctoral Studies. BGS includes representatives from each of the 14 home programs of PIBS, as well as the PIBS first year class, the MSTP program, and the PREP program. If you are interested in getting involved or becoming a representative, please contact either the current representative from Pharmacology or the BGS E-board at [biogradsg@gmail.com](mailto:biogradsg@gmail.com).

**Campus Student Organizations:** The University of Michigan has over 1,600 of our student organizations. The [Maize website](#) allows you to search organizations, see when mass meetings are and join those groups you're interested in.

# DEPARTMENTAL STAFF

## Administration

Chair	Lori Isom, Ph.D.	2301E MSRB III	6-3050	<a href="mailto:lisom@umich.edu">lisom@umich.edu</a>
Associate Chair, Education	Margaret Gnegy,	A220D MSRB III	3-5358	<a href="mailto:pgnegy@umich.edu">pgnegy@umich.edu</a>
Associate Chair, Innovation	Yoichi Osawa,	1301A MSRB III	6-5797	<a href="mailto:osawa@umich.edu">osawa@umich.edu</a>
Associate Chair, Research	John Traynor, Ph.D.	A240 MSRB III	7-7479	<a href="mailto:jtraynor@umich.edu">jtraynor@umich.edu</a>
Department Administrator	Dennis Ondreyka	2301B MSRB III	4-8165	<a href="mailto:ondreyka@umich.edu">ondreyka@umich.edu</a>

## Administrative Staff

Josh Daniels	Exec. Assistant, Chair	2301 MSRB III	4-8166	<a href="mailto:jdani@umich.edu">jdani@umich.edu</a>
Thomas Larmee	Pharmacology Shop	2655/2659 MS II	4-9124	<a href="mailto:tlarmee@umich.edu">tlarmee@umich.edu</a>
Dar-Weia Liao	IT Support	2301 MSRB III	4-9949	<a href="mailto:dwliao@umich.edu">dwliao@umich.edu</a>
Audrey Morton-Dziekani	HR Specialist	1301C MSRB III	4-9248	<a href="mailto:almorton@umich.edu">almorton@umich.edu</a>
Liz Oxford	SA Program Manager	1301D MSRB III	7-5969	<a href="mailto:oxforda@umich.edu">oxforda@umich.edu</a>
Debra Paris	Senior Fin. Specialist	2301 MSRB III	3-5387	<a href="mailto:deblh@umich.edu">deblh@umich.edu</a>
Ingrid Shriner-Ward	Admin. Assistant Sr.	2301 MSRB III	7-3123	<a href="mailto:ingridw@umich.edu">ingridw@umich.edu</a>
Bo Zhao	Grant Specialist	2301 MSRB III	4-5647	<a href="mailto:bzha@umich.edu">bzha@umich.edu</a>

## Areas of Assistance

## Staff Contact

Building & equipment issues	Dennis
Building & laboratory access & key and ID card replacement/renewal	Dennis, Audrey
Computers, software and internet	Dar-Weia
Course registration	Liz
Degree requirements & planning	Liz
Departmental events & planning	Liz
Departmental email groups/listservs	Dar-Weia, Liz, Audrey
Email and Level II Passwords	Dar-Weia
Grants	Bo, Debra
General student & postdoc matters and questions	Liz, Audrey
Healthcare issues	Audrey, Liz
Ordering laboratory equipment and supplies	Ingrid
Personal & confidential matters	Dennis, Audrey, Liz
Reimbursements/Concur	Ingrid
Room scheduling	Josh, Liz
Seminar set up	Josh, Ingrid, Dar-Weia
Stipend payments	Audrey, Liz
Student Funding	Liz, Audrey, Debra
Travel Awards/Summer Students	Dennis, Liz, Audrey
Visa information	Audrey, Liz
Website updates	Dar-Weia, Liz

## GRADUATE INSTRUCTIONAL FACULTY

Name	Title	Uniquename	Phone	Office
Arun Anantharam	Associate Professor	arunanan	764-1821	2220A MSRB III
Richard Auchus	Professor	rauchus	764-7764	5560D MSRB II
William Birdsong	Assistant Professor	wtbird	936-8752	A220B MSRB III
Dean Brenner	Professor	dbrenner	647-1417	2150 CCGC
J. Chad Brenner	Assistant Professor	chadbren	763-2761	9301B MSRB III
Matt Brody	Assistant Professor	majbrody	763-3255	1220B MSRB III
Chris Canman	Associate Professor	cmanman	764-7178	1301B MSRB III
Thomas Carey	Professor	careyte	764-4371	5311 MS I
Yuqing Chen	Professor	echenum	936-9548	B26-363S NCRC
Mark Cohen	Professor	cohenmar	615-4741	2920K TC
Adam Courtney	Assistant Professor	adamhc	2220E MSRB III	763-3083
Carrie Ferrario	Associate Professor	ferrario	763-8637	4742D MS II
Stephen Fisher	Professor, Emeritus	skfisher	763-4376	5039 BRSB
Margaret Gnegy	Professor	pgnegy	763-5358	A220D MSRB III
Colin Greineder	Assistant Professor	coling		NCRC B10-Rm154A
Vincent Groppi	Director, MDD	vegropi	763-1811	4403 LSI
Michael Holinstat	Associate Professor	mholinst	764-4046	2220D MSRB III
Ronald Holz	Professor	holz	764-2267	2301C MSRB III
Jorge Iniguez-Lluhi	Associate Professor	iniguez	615-6565	1220E MSRB III
Lori Isom	Chair, Professor	lisom	936-3050	2301E MSRB III
Paul Jenkins	Assistant Professor	pjenkins	764-1279	2220B MSRB III
David Jones	Assistant Professor	davekj	936-8639	1220D MSRB III
Kevin Jones	Assistant Professor	kevjon	763-8826	A220E MSRB III
Emily Jutkiewicz	Associate Professor	ejutkiew	764-8612	A220A MSRB III
Robert Kennedy	Professor	rtkenn	615-4363	4815 CHEM
Kyoung Eun Lee	Assistant Professor	kyoungle	936-8770	1220A MSRB III
Jonathan Maybaum	Professor	maybaum	615-9560	4742E MS II
Richard Mortensen	Professor	rmort	763-2021	7726 MS II
Yoichi Osawa	Professor	osawa	936-5797	1301A MSRB III
Carole Parent	Professor	parentc	647-2209	4437 LSI
Manojkumar Puthenveedu	Associate Professor	puthenve	936-6640	3422D MS I
James Rae	Associate Professor	jimmyrae	764-1460	6310 CCGC
Leslie Satin	Professor	lsatin	615-4084	5128 Brehm
Emily Scott	Professor	scottee	764-3530	2020 Pharmacy
James Shayman	Professor	jshayman	763-0992	1560A MSRB II
Alan Smrcka	Professor	avsmrcka	615-4945	5560C MSRB II
Gregory Tall	Associate Professor	gregtall	647-9824	1220C MSRB III
John Traynor	Professor	jtraynor	647-7479	A220C MSRB III
Shaomeng Wang	Professor	shaomeng	615-0362	NCRC B520-Rm1245

# GRADUATE DEGREE PROGRAMS

## A. The PhD Program

This section provides information on the requirements for the degree of Doctor of Philosophy. A description of all graduate courses in Pharmacology is provided later in the handbook. The requirements stated here include those set by the Department and those set by the Rackham School of Graduate Studies. Students are urged to consult the Rackham Graduate School Academic Policies (<http://www.rackham.umich.edu/current-students/policies/academic-policies>).

### Admission

Ph.D. students mainly enter the Department of Pharmacology through the Program in Biomedical Sciences (PIBS) admissions umbrella through the Office of Graduate and Postdoctoral Studies at the University of Michigan Medical School (<https://medicine.umich.edu/medschool/education/phd-programs/phd-admissions>). It is also possible for outstanding students to gain admission to the Ph.D. program after completing the Department's M.S. Pharmacology degree.

## REQUIREMENTS FOR THE Ph.D. DEGREE

The Doctor of Philosophy is the highest degree conferred by the University. It is a research degree. It is never conferred solely as a result of study, no matter how faithful, extending over any prescribed time period or for any amount of course work or research accumulated. The Ph.D. represents more than merely the sum of semesters in residence and of credits for courses taken. The length of residence and the plan of study are of secondary importance. The Ph.D. is granted solely upon evidence of proficiency in the specialty field chosen by the candidate, including independent and insightful investigation as demonstrated in a written thesis based upon original research combined with creative scholarship that is presented with a high degree of literary skill.

### Rackham and Departmental Ph.D. Requirements

The basic requirements for the degree of Doctor of Philosophy set by the Rackham Graduate School and the Department include:

1. Total of 36 Rackham course credits is required for graduation. Minimum coursework in residence requirement (18 hours of graded graduate coursework registered as a Rackham student in Ann Arbor).
2. An overall GPA of B (3.0 on a 4.0 scale) grade point average or higher in the graduate student's record.
3. 4 credit hours of cognate coursework with a B- grade or better.
4. Appointment of a Dissertation Committee to oversee the student's program and progress in research.
5. Completion of a yearly departmental seminar beginning in the 2<sup>nd</sup> year of study (PHRMACOL 646).
6. Recommendation by the Department for admission to candidacy, which includes successful passing of the Prelim Exam.
7. Obtain proficiency in the core competencies of graduate training (determined by the research mentor and the GPC; see annual Mentor Evaluation Form)
8. Generate novel ideas and information that contribute to scientific knowledge
9. Obtain approval from the Dissertation Committee that the student has produced a sufficient quantity and quality of novel information to generate a cohesive dissertation
10. Obtain approval from the Dissertation Committee to proceed toward graduation (e.g., finish running experiments, finish writing dissertation, and plan a date for the thesis defense)
11. Approval of the written dissertation by the Dissertation Committee and the Graduate Dean and a final oral examination by the Committee (Thesis Defense).

## Chronology of the Ph.D. Degree in Pharmacology for Students Entering Through PIBS:

	Year 1			Year 2			Year 3	Year 4	Year 5
	Fall	Winter	Spring/ Summer	Fall	Winter	Spring/ Summer			
Summer research (option)	Research Rotation(s)	Research Rotation(s)	Full-time research						
		Choose lab for Ph.D. (due by July)			Prelim Exam (completed by 4/30)		Select Dissertation Committee (09/30)		Submit and defend thesis
							Yearly Dissertation Committee Meeting		
Coursework (PHRMACOL)	601, 603, 614	612, 615, 616, 617		502, 646, 990 *cognate	646, 990 *cognate		646, 995	646, 995	646, 995
				Complete 646 Seminar & IDP (every year until graduation)					

### Pre-Candidacy

<b>Milestone</b>	<b>Deadline</b>
Lab rotations (3-5)	Complete by end of Year 1
Identify lab for Ph.D. research	By end of Year 1
Finish coursework	Winter semester Year 2
First student seminar	Fall or Winter semester Year 2
Preliminary Examination	April Year 2
Annual Pharmacology IDP	Due May 31 of Year 2

### Post-Candidacy

<b>Milestone</b>	<b>Deadline</b>
Student seminar	Fall or Winter semester (each year until graduation)
Dissertation Committee formed	Due September 30 of Year 3
Annual Committee Meeting	By May 31 of Year 3 & 4
Thesis Defense & Graduation	Year 5
Annual Pharmacology IDP	Due May 31 of Year 3 & 4

## Course Requirements/Registration

### YEAR 1:

#### Fall Semester

- PIBS 503 - Research Responsibility and Ethics (1 credit)
- PIBS 800 - PIBS Seminar Series (1 credit) \*cognate credit
- PIBS 600 - Biomedical Sciences Independent Study (Research Rotation: 3-4 credits)
- PHRMACOL 601 - From Molecules to Patients: Basic Quantitative Principles of Pharmacology (3 credits)
- PHRMACOL 614 - Seminars in Autonomic Pharmacology (2 credits)
- PHRMACOL 646 - Student Seminars (1 credit)
- PHRMACOL 603 - Practical Statistics (2 credits)
- Or Cognate/Elective Course (see list below of common choices)

### Winter Semester

- PIBS 800 - PIBS Seminar Series (1 credit) \*cognate credit
- PIBS 600 - Biomedical Sciences Independent Study (Research Rotation: 3-4 credits)
- PHRMACOL 612 - Antimicrobial & Cancer Pharmacology (2 credits)
- PHRMACOL 615 - Seminar in Molecular Neuropharmacology (2 credits)
- PHRMACOL 616 - Cardiovascular Pharmacology (2 credits)
- PHRMACOL 617 - Endocrine Pharmacology (2 credits)
- PHRMACOL 646 - Student Seminars (0.5 Credits)

### YEAR 2:

#### Fall Semester

- PHRMACOL 502 - Introduction to Scientific Communication (2 credits)
- PHRMACOL 646 - Student Seminars (1 credit)
- PHRMACOL 990 - Pre-candidacy Research (1-8 credits)
- PHRMACOL 603- Practical Statistics (2 credits)  
Or Cognate/Elective Course (see list below of common choices)

#### Winter Semester

- PHRMACOL 646 - Student Seminars (1 credit)
- PHRMACOL 990 - Pre-candidacy Research (8 credits)

*\*Students on the PSTP training grant must also enrolled in the required course for that program (PHMACOL 604) during the fall and winter semesters in their second year.*

### YEARS 3+:

- PHRMACOL 646 - Student Seminars (1 credit)
- PHRMACOL 995 - Dissertation Research (8 credits)

### Cognate/Elective Courses

Cognate courses are those in a discipline or area different from a student's field of study but that are related or connected with some aspect of this field. The Rackham Graduate School requires 4 credit hours of coursework in approved graduate-level cognate courses with a grade of B-. Cognate courses must be approved by Graduate Program Committee. Pharmacology courses that are cross-listed in another department may be used to satisfy the cognate requirement. See below for a list of common cognate course for Pharmacology student. Please consult with the Graduate Coordinator, GPC Chair or your Research Advisor for additional courses. Check the schedule of classes for courses offered in a particular term. Student who are appointed to a training grant, should check with the Graduate Coordinator to determine if any courses requirement by the training grant can be counted as a cognate course.

- PHRMACOL 621- Translational Pharmacology (2 credits)
- PHRMACOL 622- Translational Research (2 credits)
- PHRMACOL 625- Translation Pharmacology Journal Club (1 credit)
- PHYSIOL 502 - Human Physiology (4 credits)
- BIOLCHEM 515 - Introduction to Biological Chemistry (3 credits)
- BIOLCHEM 550 - Macromolecular Structure & Function (3 credits)
- CDB 530 - Cell Biology (3 credits)
- HUMGEN 541 - Molecular Genetics (3 credits)
- PIBS 550- Biomedical Innovation and Entrepreneurship (2 credits)
- BIOINF 525- Foundations in Bioinformatics and Systems Biology (1-3 credits)

## Other Registration Information

Students must be registered full time (9 units for pre-candidates and 8 for candidates) for the fall and winter terms of each academic year, unless they are on an approved leave of absence. There are no registration requirements for the spring/summer term. However, a student must be registered for the full term in which they will defend their dissertation; this may include the spring/summer term.

Registration deadlines can be found on the University of Michigan's Registrar's Office website (<https://ro.umich.edu/calendars>).

Registration is required of any person using University facilities (classes, laboratories, libraries, computing center, consultations with faculty, etc.) in progress toward a degree, with the exception of Spring/Summer terms. During Spring/Summer you only need to register if you defend between May and September. In this case, you must register for the entire Spring/Summer term, regardless of which month you defend.

Course selections for each term must be reviewed by the appropriate Program Director (Dr. Peggy Gnegy, Dr. Emily Jutkiewicz, or Dr. Stephen Fisher). For overrides and specific registration information or other questions or problems, please contact the Graduate Coordinator, Liz Oxford.

In selecting PHRMACOL 990, (pre-candidate dissertation research), which is usually registered for in the 2<sup>nd</sup> year of study in addition to the remaining required coursework, the number of hours taken for credit may range from one to eight per term as approved by the advisor. However, the student must register for a total of 9 hours per term prior to candidacy. For PHRMACOL 995 (candidate research), for which 3<sup>rd</sup> year and above students usually register, the number of registration hours is fixed at eight. After passing candidacy and being formally designated as candidates by Rackham Graduate School, students may register for up to 4 credits per term in addition to PHARM 995 without incurring additional tuition. Enrollment in PHRMACOL 646 would count towards these additional credits each term.

## General Course Requirement Information

The Graduate Program Committee and the student's Mentor are collaboratively charged with the responsibility to see that each student has a program of course work that is both broadly supportive of the student's specialized field of study and also indicative of the breadth and range of interest which the graduate student may need to call upon.

Each student in the Department must be 'in good standing' (see 'Good Standing Policy' section). Part of being in 'good standing' means that the student must maintain a grade point average of B (3.0 on a 4.0 scale) or better. Credit in independent research (PHRMACOL 990, 995) and seminar courses (PHRMACOL 646) do not count toward the GPA. Instead, grades in these courses are S (satisfactory) or U (unsatisfactory).

A grade of Incomplete (I) may be assigned to a student only if the unfinished part of the student's work is small, the work is unfinished for reasons acceptable to the instructor, and the student's standing in the course is a "B" grade or higher. Grades of Incomplete can be changed to letter grades only after the incomplete work is made up within the time frame allowed by the instructor. Please check with the Rackham website (<https://rackham.umich.edu/academic-policies/section3/>) for specific information on the incomplete policy.

## Research Requirements

**Research Rotations & Choice of Research Advisor Policy for Students Entering Through PIBS.** (Please note: students who are admitted directly to the Pharmacology Ph.D. are required to obtain prior, written, financial commitment from a faculty research mentor)

The choice of a Research Mentor generally occurs at the close of the second term of enrollment, following research rotations. The formal steps preceding the choice include:

1. All first-year graduate students entering through PIBS are required to take two terms of the research rotation course, one in the fall and one in the winter (PIBS 600) to gain practical lab experience. Students will complete 2 eight-week rotations per semester. PIBS offers students the choice to start July 1 or September 1, and so the first rotation may be conducted in the summer semester before formal classes begin. The rotations have two purposes: 1) to allow the student to choose a research mentor/laboratory for their thesis research 2) to expose the student to multiple methods of research inquiry, areas of research investigation, and technologies. Ph.D. students entering through PIBS who start in the Fall term must complete a minimum of three rotations, with a maximum of five rotations. Students who start in July will complete four or five rotations. The earliest date students can match to a lab is March 1. Detailed descriptions of pharmacology faculty and their research are available at: <https://www.umms.med.umich.edu/faculty-search/search>
2. Prior to the start of classes, the Graduate Program Chair will meet with incoming PIBS students who indicate a primary program choice of Pharmacology to present an overview of the graduate program and the research projects of Pharmacology faculty who are accepting new students. Students should then follow up by scheduling individually appointments with faculty of interest. They may also contact faculty prior to arriving on campus to arrange their first rotations.
3. Once students identify a faculty rotation mentor, they must complete the required the rotation worksheet through the PIBS program. All rotation worksheets must be approved and signed by the Pharmacology GPC Chair or the Graduate Coordinator. Students must complete rotation paperwork for each of the 2 eight-week rotations each term. At the end of each rotation, the research mentor will complete a rotation evaluation that is then reviewed in person with the student. Based on the rotation evaluations for the two half-term rotations, the PIBS Director will assign an overall grade for the student for PIBS 600 for the term.
4. Until a Research Mentor is officially selected, the student should discuss any questions or problems with the Graduate Program Committee Chair and/or Graduate Coordinator. After the Research Mentor is chosen, questions regarding course work, career objectives and goals, or any other concerns may be first directed to that faculty member. However, the members of the Graduate Program Committee and the Graduate Coordinator are always available for consultation.
5. Near the end of the Winter term, near the end of rotations, the student should meet with their intended Research Mentor to mutually confirm that they will be joining that lab.
6. After choosing a Research Mentor, students must meet with the Graduate Program Committee Chair and Graduate Coordinator to discuss formally joining the Pharmacology graduate program, fulfilling program requirements, and funding. **A Pharmacology Financial Guarantee Form must be completed by the student and Research Mentor and approved by the Departmental Chair.** Students wishing to join the Pharmacology program with a Research Mentor who does not have an appointment in the Pharmacology Department must obtain explicit approval from the Graduate Program Committee Chair and select a Dissertation Co-Chair/Co-Mentor with an appointment in Pharmacology. A Memorandum of Understanding (MOU) between the co-mentors and the student must be submitted and approved by the Graduate Program Committee Chair.
7. Once confirmed with the program, the Pharmacology Graduate Coordinator will notify the Academic & HR Coordinator in the Office of Graduate and Postdoctoral Studies.

8. Finally, students must complete Rackham's online Change of Status Application (a step-by-step document is on PIBS 600 Canvas course website). Look for the big blue button in the middle of the webpage that says "Begin the Change of Status Application." After the form has been submitted, please notify the Pharmacology Graduate Coordinator so they may follow-up with Rackham and approve the change.

## Co-Mentorship

Our graduate students have a wide range of research choices available to them, including working on a Pharmacology Ph.D. in a different department, with a research advisor who is not a member of the Pharmacology department. Students who select an advisor outside of the department must have a co-mentor who is a Pharmacology faculty member. A co-mentor serves in two main roles: (1) acting as an official liaison for the student to the Pharmacology department and (2) insuring that the student's dissertation has a pharmacology component that is sufficient for granting a Ph.D. in Pharmacology. The co-mentor also serves as the student's contact to the department for any academic issues that would be more appropriately dealt with by Pharmacology, rather than a faculty member in another department. Students who are working in a Pharmacology lab may also choose to have a co-advisor. This can be common when a student is working on a joint project. After talking with your advisor, please alert the Graduate Coordinator, so any necessary paperwork may be completed.

Students should select the co-mentor as soon as they have decided on a research lab with an advisor in a department other than Pharmacology. The student must obtain explicit approval from the Graduate Program Committee Chair and a Memorandum of Understanding (MOU) between the advisor, co-mentor and the student must be submitted and approved by the Graduate Program Committee Chair.

In addition to the student's annual committee meeting, they must meet with their co-mentor on a monthly basis until the completion of their degree. The advisor, co-mentor and student should also work together to complete the annual Individual Development Plan and select a dissertation committee. The student will register in the co-mentor's section of either Pre-Candidacy Research (PHRMACOL 990) or Dissertation Research (PHRMACOL 995) each each term. The co-mentor is responsible for consulting with the advisor and entering a grade each semester for the student.

## Individual Development Plans

Pharmacology doctoral students should initiate the Pharmacology Individual Development Plan (IDP) at the beginning of their second year in the graduate program. This plan is intended to help students monitor progress towards completion of their graduate training, including identifying skills and strengths, but also areas for improvement as well as helping make decisions about possible career paths. The IDP process also provides a mechanism for students to communicate ideas or problems with their mentors in a neutral setting.

2<sup>nd</sup> year students should complete their initial IDP document by December 1 of their second year. All Ph.D. students 2<sup>nd</sup> year and above will be required to complete an update of their IDP by May 31 each year to remain in good standing in the program.

## Electronic Portfolio

Pharmacology Ph.D. students will build an electronic portfolio using M-Box. Portfolios will include annual Assessment Forms including an annual mentor/mentee competency checklist, IDP (updated annually), specialized documentation of competencies (teaching evaluations, teaching philosophy statement, publications, and other scholarly works), transcripts, a curriculum vitae, documentation of participation in Graduate Certificate Programs, professional organizations, or Diversity & Inclusion activities, and other relevant materials. Research mentors will encourage their trainees to be proactive in crafting and updating these documents, as they are crucial to their professional growth. As a part of their yearly review of trainee progress the GPC will review the portfolio contents of each Ph.D. student.

## Preliminary Examination

The preliminary examination for advancement to doctoral candidacy in Pharmacology is an oral exam based on a short research proposal chosen by the student; the topic may not be related to the student's own research topic. Students are asked to conceive and design their own research project. Each student initially submits a research idea to the Graduate Program Committee which then chooses an Examination Chair and a three-member examination committee (including one member from the GPC). The examination committee comprises members of the Pharmacology faculty (but not the student's thesis advisor) and may include a non-Pharmacology faculty member who is an expert in the research area chosen. The exam is generally given in April of the student's second year, however under specific conditions a student may take the exam in December. The purpose of the oral exam is to evaluate and strengthen the student's abilities to conceive and organize an original research project, and to discuss that project in a critical manner with other scientists. Progress to candidacy is determined by the GPC based on the examination performance and general performance in all other parts of the program. Failure of the preliminary examination for advancement to candidacy may lead to immediate dismissal. The Graduate Program Committee may vote to offer remediation including, but not limited to, a second attempt at a written proposal and/or oral examination.

### Step 1: Choose a Topic

Students will decide on two potential exam topics and write a very brief paragraph describing each topic for the GPC (deadline set by GPC each term). The paragraph should contain one sentence for each of the following items of information (4 total): 1) 'What is the 'unmet need' or gap in the literature the proposed work will help remedy; 2) a concisely-stated and testable hypothesis; 3) the types of methods employed to test the hypothesis; 4) the significance of the project. The nature of the chosen research problem often has a great impact on the course of discussion during the exam, and the care given to its selection should not be underestimated. Consultation with the GPC chair is highly encouraged.

Each project should follow these rules:

- Must be unrelated to the scope of the student's laboratory in three domains: biological problems, model systems, and experimental approaches. (For example: a student whose thesis work includes behavioral tests in rats should not write a proposal using mainly behavioral tests in rats or mice; a student whose thesis work focuses on studying the role of potassium channels in cardiovascular disease should not write a proposal on studying potassium channels in the pancreas.)
- Cannot be identical to material contained in the student mentor's current or previous grants.
- Must be a question relevant to pharmacology and pharmacological principles.
- Sets specific aims that are realistically achievable using available experimental means. However, students could invent a necessary antibody or a receptor ligand if that is necessary for the research.
- The project should involve a basic pharmacological process, such as one involving receptors or signaling mechanisms. The project should be relevant but does not need to be grandiose, for instance, curing a disease, etc.

The first page of the student's proposal from Pharm 502 must be submitted along with the topics so that the GPC can evaluate possible areas of overlap. The GPC will review the submissions, approve the best topic, and assign a prelim committee chair. In the event that neither topic is approved, new topics should be submitted, and finalized with the GPC.

### Step 2: Outline the project and Meeting with Prelim Committee Chair

The next step is to examine and research the topic for critical data that will support their hypothesis, then write an outline of the complete proposal including their hypothesis. This document should then be discussed with the exam Chair as soon as possible after approval of the project. When both the chair and student are satisfied with the topic and hypothesis, then specific aims should then be developed. Each student should have a minimum two specific aims that do not depend upon each

other for success. Students should also consult with the other committee members during this process.

### Step 3: Submit the Specific Aims Page

Students should provide a specific aims page with formulated hypothesis, significance and at least two specific aims to their committee chair (deadline set by GPC). The student and chair will then assess the feasibility of the proposal. Following conversations with the Chair, changes or corrections may need to be made to the specific aims page. While it is acceptable to make changes, students are highly encouraged to meet with their Chair, for advice and feedback, in advance (multiple times) prior to submitting their specific aims, as it will help avoid major changes in their specific aims.

### Step 3: Communicate with the Committee

Students are encouraged to use the members of their committee to clarify specific issues in their proposal and generally to get feedback with reference to the overall logic of the aims and to get specific information about methods and protocols. Students may also consult any faculty members outside of their committee, with the exception of their mentor.

### Step 4: Organize and Submit a Written Proposal

Format: The document format should be 4-6 pages in total length including figures, Arial, 11 points, 0.5" margins, type density under 15 characters per linear inch (including characters & spaces), line spacing under six lines per vertical inch. The organization of the final proposal should be as follows and should be submitted to your committee chair (deadline set by the GPC each term):

- A. Overall Objective: A concise statement of the hypothesis to be tested.
- B. Specific Aims: The specific intermediate goals that will be achieved in order to test the hypothesis.
- C. Significance: The reasons why the proposal topic is important. Brief background to the present proposal, critical evaluations of existing knowledge, and specific identification of the gaps in our knowledge that the project is intended to fill.
- D. Experimental Design and Methods: A discussion of the overall experimental approach that will be used to accomplish the specific aims (diagrams or flow charts may be useful here).
  - o Brief outline of the procedures to be used (details such as amounts of materials used, etc., should not be included unless they are variables in the experiment; but students should be sufficiently familiar with these details to discuss them during the exam, if necessary).
  - o Examples of the sorts of results you anticipate, and intended analysis and interpretation tools. One or two graphs of made-up data (per hypotheses) that would be expected if the hypothesis were correct. Sufficient positive and negative controls in the experimental design and results.
  - o The difficulties that are likely to be encountered and what contingency plans have been made to deal with such issues.
  - o A tentative timetable or sequence for the investigation should be included.

### Step 5: The Oral Exam

Students will present their proposal, using their written proposal structure as a guide. Students will have a short, uninterrupted period of time (10-15 minutes) for presenting the Overall Objective and Specific Aims of the proposal, after which questioning may begin. The total length of the exam should not exceed 2 hours. Remember, that the focus of the exam is on pharmacological and basic scientific principles, as well as any principles from the didactic classes. Students are highly encouraged to schedule their exam early in the semester (deadline set by the GPC each term)

### Step 6: Receive Evaluation

In order to facilitate an objective and consistent assessment of the student's performance, each examiner will be asked to consider how well the student:

1. Clearly and concisely stated the proposed hypothesis and its significance.
2. Anticipated some of the results that would be expected from the planned line of

- experimentation.
3. Derived a logical interpretation or course of action, when challenged with an alternative explanation of the data or by flaws in the proposed experimental design.
  4. Explained how the proposed line of experimentation satisfactorily answered the major questions posed.
  5. Defined a critical experimental endpoint at which the likelihood of success of the project could be determined.

Note: The examination committee will make a recommendation to the GPC regarding your performance on the exam, but it is the GPC who ultimately decides whether to recommend each student for advancement to candidacy with Rackham.

## Advancement to Candidacy

Once a student has completed all necessary Departmental and Rackham Graduate School requirements\* and has passed their preliminary exam, the Graduate Program Committee will consider them for candidacy. If successful, advancement to candidacy will occur in the following term (for example if the preliminary exam is passed in April, the student may become a candidate at the beginning of the spring/summer term, May 1, of that year). As a requirement for good academic standing, students must be advanced to candidacy by the Fall semester of their 3<sup>rd</sup> year, unless there are extenuating circumstances that have been approved by the Graduate Program Committee.

Before admission to candidacy can be recommended, the following requirements must be met:

- Completion of all course requirements, including 4 credits of cognate coursework by the end of the term in which the preliminary exam is completed.
- Achievement of 3.0 or better grade point average (graded courses only).
- Passage of the oral examination.

## Forming a Dissertation Committee

A Dissertation Committee should be assembled by each graduate student in consultation with his/her Research Mentor by September 30 of their third year following their preliminary exam. Students should submit the Departmental Dissertation Committee form to the Graduate Coordinator so it can be recorded with the Graduate School. Students must have a dissertation committee in place, with the dissertation committee form properly submitted to the Department to remain in good standing in the program. Note however, that students may, at any time, switch or add committee members. The Research Mentor serves as Chair and shares with the Committee the responsibilities of guiding the student toward the doctoral degree. For detailed guidelines on forming your dissertation committee see: (<http://www.rackham.umich.edu/current-students/dissertation/committees/guidelines-dissertation-committee-service>).

### Assembling a Dissertation Committee

The process of assembling a dissertation committee is accomplished through conversations between the student and their Research Mentor.

- a) After consultation with their Research Mentor, students should contact potential dissertation committee members via email or in person asking if they would be willing to serve on their dissertation committee. In so doing, they should:
  - i. Introduce themselves and the research of their lab (1-2 sentences)
  - ii. Include 2-3 sentences describing their general project
  - iii. Ask if are willing to serve on their dissertation committee
  - iv. **Committee Composition:**
    - i. A minimum of **4 members**, Dissertation committees must have at least four member
    - ii. **3 members must be Graduate Faculty** (tenure or tenure-track instructional faculty holding an unmodified (not visiting, adjunct) appointment at the

University of Michigan) At least 2 of the Graduate Faculty members must be Pharmacology Faculty.

- iii. **Must have either a sole chair (mentor) or two co-chairs**
  - iv. **A cognate member who is familiar with the standards for doctoral research** and holds at least a 0.50 appointment in a Rackham doctoral program, other than the student's home department/program, and may include a University faculty member who is not Graduate Faculty, a University staff member, or a qualified individual outside the University to provide expertise in the candidate's discipline
- b) Once all members of the dissertation committee have agreed to serve, an email should be sent to all members acknowledging and thanking them for their willingness to serve as well as other detailed information, as needed.
  - c) Students should complete the Departmental Dissertation Committee form and submit it to the Graduate Coordinator by Sept 30<sup>th</sup> of their third year. The Departmental Dissertation Committee form requires signatures from all faculty serving on the committee. The Graduate Coordinator will then submit the proposed committee to Rackham, who will email the Graduate Program Committee, the dissertation committee Chair/Research Mentor and Student for approval prior to finalizing the committee.

## Functions of the Dissertation Committee

The Dissertation Committee consults with the student and the Research Mentor as appropriate with respect to the student's professional development, course work, seminar participation, and experience in examinations and research performance.

The committee will meet yearly beginning in the third year to discuss the student's research and academic progress, submission of manuscripts, presentation at scientific meetings, future scientific and career goals, and progress toward writing a thesis satisfying the requirements of scientific merit. If the student is not making satisfactory progress, the committee is encouraged to meet on a more frequent basis. Finally, the committee will meet for acceptance of the written dissertation as certified on the form supplied by the Graduate School following the Oral Thesis Defense.

Students are encouraged to work with their committee members outside of the formal meetings when relevant.

Prior to each meeting, the dissertation committee should receive:

- The student's academic transcript
- The student's PHRMACOL 646 annual seminar evaluation
- A Research Progress Report written by the student.

The student's electronic portfolio should ultimately contain:

- Annual Committee Meeting reports
- Assessment forms including the annual mentor/mentee competency checklist
- Individual Development Plan (updated yearly)
- Specialized documentation of competencies including teaching evaluations, teaching philosophy statement, publications, and other scholarly works.
- Documentation of participation in Graduate Certificate Programs, professional organizations, or Diversity & Inclusion
- Transcripts
- Curriculum Vitae
- Review of the written dissertation
- Final signed approval of the dissertation and the degree

## Dissertation Committee Meeting

Starting in their 3<sup>rd</sup> year students are required to meet with their thesis committee each year, preferably within two months of their PHARMACOL 646 seminar, but no later than May 31<sup>st</sup>. Dissertation committees may meet more often at the request of the student, advisor(s) or committee.

A student who has not completed their yearly Dissertation Committee Meeting by May 31 will not be considered in good standing in the program.

The function of the committee is to guide and support students throughout their research and writing. Committee meetings are more important when things are not working than when they are. Regular committee meetings can serve to reduce the time to degree.

Students should plan to have a dissertation committee meeting at least once a year (or more often).

1. Students should invite dissertation committee members from outside of the department to attend their PHARMACOL 646 seminar soon after the course schedule is released/finalized. Dissertation committee members are not required to go.
2. Students should email their dissertation committee 2-3 months in advance of their desired window for the dissertation committee meeting in order to find an available time for everyone. Plan for two hours only. After the committee has responded, an email should be sent to all members confirming the date and time.
3. The Graduate Coordinator must be informed of the planned date/time of the student's yearly dissertation committee meeting. They can also assist in scheduling a room for the meeting.
4. Every dissertation committee member should be sent an email reminder about the student's dissertation committee meeting (including the date, time, building/room) one week in advance. This email message should include a project summary/outline (see below) for the committee to review, as well as attachments of manuscripts in review or in press. Please copy the Graduate Coordinator on this email.

Before EACH dissertation committee meeting, students should:

- a. Prepare project summary/outline, approximately 1 page in length.
  - i. Provide a very brief background.
  - ii. State the project goal and hypothesis.
  - iii. Describe results to date, experiments that are on-going, and future experiments.
  - iv. Potential outline of 2-4 data chapters of the dissertation.
- b. Pick up or print a copy of the Annual Dissertation Committee Meeting Report Form to bring to the dissertation committee meeting for all committee members need to at the end of the meeting.

At EACH dissertation committee meeting, the student should:

- a. Leave the room at the start of the meeting so the chair/mentor can talk briefly with the committee.
- b. Present slides, provide brief background on project, as well project goals & hypothesis(es) and show relevant data (describe methods/procedures/etc.)
- c. Outline their progress, including:
  - i. Describing potential data chapters
  - ii. What experiments are complete?
  - iii. What are you doing now/what experiments are in progress?
  - iv. What are the future experiments?

- v. Timeline for future activities
- vi. Struggles or things that are not working (if relevant): trouble-shoot with your committee, consider the go-no go decision points: when a goal/experiment/method is not achievable and consider alternative options/experiments/goals.
- d. Students are encouraged to include information about long-term career goals and career development opportunities in which they are participating, including conferences they have attended/will attend, other course work they plan to take, certificates, etc.
- e. The student may be asked to leave after the committee meeting so that the dissertation committee can discuss briefly.
- f. The Dissertation Chair will leave the meeting briefly at the end of the meeting so the student can discuss any mentoring concerns with the other members of the committee.
- g. Have all members sign the Dissertation Committee Meeting Report Form

After EACH dissertation committee meeting, the student should:

- a. Return the signed Dissertation Committee Form to the Graduate Coordinator in 1301D MSRB III or by email. The GPC will reach out to students to schedule a meeting to discuss the meeting-progress, successes, troubles, etc.
- b. Update their IDP including the Mentor/Mentee Checklists in collaboration with their mentor and send it electronically to the Graduate Coordinator by June 30<sup>th</sup> each year.

## Dissertation

The regulations governing the preparation of the dissertation are located on Rackham Dissertation website (<http://www.rackham.umich.edu/students/navigate-degree>). The subject matter of the dissertation is to be presented at a public seminar (Thesis Defense) in the last term of the student's program. The student is responsible for setting up his/her thesis defense in consultation with his/her Dissertation Committee.

The dissertation must be submitted in draft form (i.e., before the final typing and final reproduction of figures) to the members of the Dissertation Committee for their suggestions at least two weeks prior to the defense. Students are also required to complete a pre-defense meeting with Rackham, at least three weeks in advance. Prior to signing up for the meeting, students should confirm the Dissertation Committee in Wolverine Access.

All dissertations will be submitted electronically to Rackham during the post-defense submission. The final digital copy will be the copy of record. To submit your dissertation, you will access the Rackham dissertation online submission website. You will be asked to provide bibliographic keywords, or tags, that describe the content of your dissertation, including subject, concepts, theory and methods. These will help others to find and retrieve your dissertation. You will copy your abstract to the website and upload a PDF of the final digital copy of your dissertation. The staff of Rackham's Academic Records and Dissertations will review your submission, and may require you to make final changes before the submission is approved. No further changes will be allowed once the dissertation is approved and submitted. Rackham will hold your dissertation until your degree is conferred (which happens three times a year in April, August, and December). After your degree is conferred, Rackham will forward your dissertation as the copy of record to Deep Blue (<http://deepblue.lib.umich.edu/>), the permanent digital repository of the University Library.

## Degree Deadlines

The Graduate School establishes deadlines related to finishing the degree requirements. The first is related to the intended final term of enrollment. Full candidacy tuition must be paid in the term in which the final examination is held, but a grace period is allowed under which the examination may be held within about 30 days after the end of the term without paying additional fees. This grace period or 2<sup>nd</sup> "extended" deadline does not require formal request or approval, but the degree conferral date changes. The exact dates and conditions of the deadlines can be found at

## Dissertation & Graduation Resources:

- [Rackham Dissertation Handbook](https://rackham.umich.edu/wp-content/uploads/2020/03/oard-dissertation-handbook.pdf) (<https://rackham.umich.edu/wp-content/uploads/2020/03/oard-dissertation-handbook.pdf>)
- [Dissertation Timeline](https://www.rackham.umich.edu/downloads/oard-dissertation-timeline.pdf) (<https://www.rackham.umich.edu/downloads/oard-dissertation-timeline.pdf>)
- [Deep Blue @umich.edu](https://www.umich.edu) Helpful resource for examples of dissertation formatting, etc. Students can look at dissertations from other students in their lab or the Pharmacology program.
- [Registration for Pre and Post Defense Meeting](https://rackham.umich.edu/navigating-your-degree/completing-doctoral-degree-requirements/#before) (<https://rackham.umich.edu/navigating-your-degree/completing-doctoral-degree-requirements/#before>)
- [Commencement Information](http://commencement.umich.edu/rackham-graduate-exercises/rackham-graduate-exercises/) [http://commencement.umich.edu/rackham-graduate-exercises/](http://commencement.umich.edu/rackham-graduate-exercises/rackham-graduate-exercises/)

## Student Seminars

This Pharmacology Student Seminar course, PHRMACOL 646, provides students with the confidence and ability to present their work clearly and succinctly to an audience and is considered the most important course offered in the department. Consequently, it is a required course throughout the student's entire time in the graduate program. All students including first-year PIBS students who are Pharmacology primaries are required to attend Pharmacology 646 and register for the 1 credit course Pharmacology 646 each term, a grade of "Satisfactory" or "Unsatisfactory" will be given. The student seminar is scheduled weekly on Fridays at 12 pm. Each year prior to the start of the academic term, one of the PHRMACOL 646 course directors with all students who will be presenting in the coming year. Students are also provided with a list of seminars before the start of each academic year.

Beginning in their second-year students must present a yearly seminar. Students directly admitted to the Ph.D. program will present in their first year in the program, having previously completed one year of research in their lab as an MS student. Students must present on a yearly basis to remain in good standing. Students may opt out of this presentation in the year in which they present their thesis defense. However, in order to opt out, a scheduled defense date must be in place by the time the 646 schedule is prepared for the current year.

Third- and fourth-year students are encouraged to present a description of their own research. Second-year students should present a critical review of 1-2 reports in the current scientific literature, or if their own research is sufficiently advanced, they may present their own research. A second-year seminar presenting critical reviews of published research should deal with a recent significant advance in pharmacology or an advance in physiology, chemistry, cell biology, etc., that provides techniques or concepts that are important for understanding drug action. The presentation should be a critical evaluation of the work, not simply a summary. Discussion and criticism of the research by the audience is encouraged; the speaker should be prepared to answer questions about the work. Presentations of purely clinical literature are discouraged (although exceptions can be made) because of the empirical nature of most clinical work and the specialized expertise required for its proper evaluation. In keeping with the tradition of the university being open to all forms of inquiry, students should not present data on compounds whose structures cannot be revealed because of patent or other considerations.

For the benefit of both presenter and audience, the following protocol should be observed:

1. Students are expected to review the seminar with their faculty member 2-4 weeks prior to their seminar.
2. The student should present the seminar to a 646-class instructor (Drs. Fisher, Broday, Osawa or Lee) at least 2 weeks prior to formal presentation. This will allow time for the necessary restructuring, changing order of slides or handout material, etc. Note: Pharmacology has standing practice times reserved during the fall and winter 646 seminar season. Please check

with Josh Daniels to see what they are. It is the student's responsibility to contact one or more of the course faculty to arrange to practice the seminar

3. One week prior to the seminar, the student provides Executive Assistant to the Chair with an abstract (see example attached): a paragraph summarizing the topic, the principal references, and a few secondary references, if necessary. A seminar announcement will be created and distributed electronically, as well as posted on the 1st floor bulletin board and the 2nd floor main office window next 2301 MSRB III.
4. The seminar faculty mentors will meet with each student immediately after the presentation to discuss strengths and weaknesses of the seminar. Written feedback will be provided to the student, the student's mentor and thesis committee, and filed in the student's electronic portfolio.

## Teaching Requirement

Teaching is a valuable and integral part of graduate training in pharmacology. During the third year of study, all students are expected to assist in the teaching of pharmacology in the department and will be encouraged to take coursework that will complement the chosen field of specialization. In early summer teaching assignments for the upcoming academic year will be made by GPC & the Graduate Coordinator with student and faculty input. Please note: T32 appointments may alter this schedule. Courses that have a GSI include: the fall semester are PHRMACOL 502, 601, 603, 621 and MEDCHEM 600 and for the winter semester are PHRMACOL 425, MEDCHEM 510 and 610. All Pharmacology students must complete the CRLT (Center for Research on Learning and Teaching) GSI Orientation/Training prior to the term they teach. The GSIO is typically offered in August and December.

(<http://crlt.umich.edu/gsis/gsisio>) . You can also find additional training resources at <http://crlt.umich.edu/gsis/gsittraining>.

There are also a number of course available through the College of Education, including (these course may also count as cognate courses):

- EDUC 554- Chemistry Education
- EDUC 662- Learning and Development in Higher Education
- EDUC 695- Research and Educational Practice
- EDUC 791- Foundations of Learning and Teaching
- EDUC 762- Curriculum in Postsecondary Education
- EDUC 834- Designing Science Learning Environments
- EDUC 832- Theory and Research Development in Science Teaching

## “Good Standing” Policy

A Ph.D. student in the Department of Pharmacology at the University of Michigan will be considered in “good standing” if he/she complies with all rules and regulations of the University, the Medical School and the Department and performs the duties of their appointment as a Graduate Student Research Assistant(GSRA), Graduate Student Instructor(GSI) or Fellow in a professional and timely manner and if the following conditions are also met:

1. The student must maintain an overall GPA of greater than or equal to 3.00 for all academic courses taken, including cognate courses, throughout their residence in the program. They must complete all required courses for the Pharmacology Ph.D. program.
2. The student must successfully complete a course on Research Responsibility and Ethics (PIBS 503) and participate in annual refresher programs, as scheduled by the Department of Pharmacology.
3. Students entering the program through PIBS must take two semesters of the Graduate Research rotation course (PIBS 800) and receive a passing grade in both terms. By the end of their first year in residence (September 1), the student must identify a research mentor who will agree to oversee and assume financial responsibility for their Ph.D. research.

4. In the absence of approved, extenuating circumstances, the student must achieve Ph.D. candidacy by the beginning of the fall term of their third year in residence. See section on Preliminary Exam.
5. Students must be engaged in full-time work, including coursework, research and other relevant scholarly activities and must receive Satisfactory (S) grades for all terms enrolled in PHRMACOL 990 or PHRMACOL 995. If a student receives an 'Unsatisfactory' grade in PHRMACOL 995, this will trigger an immediate meeting of their Dissertation Committee to review the student's progress, and report back to the Graduate Program Committee. Based on this report, the Graduate Committee may determine that the student is not in "Good Standing" and recommend dismissal from the program. Alternatively, the Graduate Program Committee may recommend that the student find a new mentor or look for other resolutions.
6. Beginning in their second year (1<sup>st</sup> year for direct admit Ph.D. students) students must present an annual seminar as a part of the PHRMACOL 646 course.
7. Student must form their Dissertation Committee by no later than the September 30 following their Preliminary Exam (typically September 30 of their third-year in the program).
8. Beginning in their third year, students must meet with their Dissertation Committee on an annual basis and must submit the Annual Dissertation Committee Meeting Report Form by May 31 each year.
9. Students must complete their first IDP with their mentor by December 1 of their 2<sup>nd</sup> year (1<sup>st</sup> year for direct admit Ph.D. students) and update their IDP each year by May 31.
10. Ph.D. students may not have outside employment.

### Academic Probation and Dismissal Policy

At no time after the first year of study should a student be without a research mentor. If a research mentor intends to terminate the relationship, they must follow the program's academic probation procedures, during which time a student may look for a new mentor with the assistance of the Department. If a student intends to terminate the relationship, they should work closely with the Graduate Chair to first establish an alternative mentorship strategy.

Students who fail to maintain good standing will be placed on academic probation by the Rackham Graduate School and the Pharmacology Graduate Program Committee, who will provide a letter stating the requirements that have not been met, the duration of the probationary period, and expectations for improvement. Probation may be recorded on the transcript and become a permanent part of the student's academic record. Failure to meet the outlined expectations within the defined probationary period may result in dismissal from the program.

The minimum length of academic probation is two months, as determined by the Rackham Graduate School. This period may be extended at the discretion of the Graduate Program Committee Chair. The research mentor's original funding commitment to the student remains in force throughout the probationary period. In the event that the probationary status renders the student ineligible for a given funding source (e.g. GSI appointment), the Department of Pharmacology will be consulted to provide funding from a general fund.

The group of faculty charged with deciding whether to dismiss a student for academic reasons will include the Graduate Program Committee Chair, the student's research mentor, and a member of the Graduate Program Committee designated by the Graduate Chair. Students who have been placed on academic probation or recommended for dismissal have the option of appealing the decision to a separate faculty committee comprised of the Department Chair and two additional non-GPC Pharmacology faculty members. The ultimate decision for dismissal lies with the Department Chair.

Approved by Graduate Program Committee November 2018.

## B. THE MSTP PROGRAM

MSTP students enter the Pharmacology Program after their M2 year and are considered to be at the same level as PIBS students entering the second year.

### Pharmacology MSTP Course Requirements

MSTP students must complete a minimum of 18 graduate credits including, Pharmacology/MSTP students must complete the following courses:

- PHRMACOL 601 - Basic Quantitative Principles of Pharmacology (3 credits)
- PHRMACOL 646 - Student Seminars (1 credit per semester)
- PIBS 503- Responsible Conduct of Research Training (1 credit)
- Elective coursework to meet minimum credit requirement.

Graduation requirements for MSTP students are the same as for the PhD students as listed above except for the following:

1. Preliminary exams will be taken after one year in the Ph.D. program, on the same schedule as the Ph.D. students.
2. There is no teaching requirement.
3. Each student has an individualized Research Rotation Advisory Committee to provide guidance in selecting research rotation mentors and a PhD program. Two research rotations are required; many fellows do three. The first research rotation is generally taken during the summer after the Scientific Trunk, and the others are scheduled after completion of the Clinical Trunk and board exams.

## C. The Master's Program

The MS degree program is designed to be flexible and to serve a variety of career objectives. Examples of individuals who might benefit from the MS degree Program are those who desire to enter the Pharmaceutical Industry, those already in the Pharmaceutical Industry who would like to increase their opportunities for advancement, teachers at Community Colleges wishing to extend their skills, those who are planning to enter a career in Government Agencies (such as FDA) and also, individuals who desire to obtain a higher degree prior to entry into Medical, Dental or Veterinary Schools or a PhD program. The MS degree program involves a mixture of coursework and independent research (or literature review) and may be taken on a full- or part-time basis. In approved cases, it may be possible for the research component to be conducted off-campus. Much of the coursework for the MS degree is the same as that taken by Pharmacology PhD students.

### Admission

Applicants are expected to have a minimum cumulative GPA of 3.0 in major science courses (i.e. Biology, Biochemistry, Physiology, Chemistry, Physics). Applicants must pay the application fee and submit a completed online application along with the official transcripts from previous academic records, three letters of recommendation, a statement of purpose, and a personal statement. The GRE is not required. Applicants whose native language is not English must demonstrate English proficiency in accordance with Rackham Graduate School requirements. Prospective students can apply at [www.rackham.umich.edu/admissions](http://www.rackham.umich.edu/admissions). The deadline for international applicants to apply is March 15 and for domestic applicants (U.S. Citizens & Permanent Residents) is April 15 for the following Fall semester. The M.S. program does not accept applications for the winter term.

## REQUIREMENTS FOR THE M.S. DEGREE

### Rackham and Departmental M.S. Requirements

The basic requirements for the degree of Doctor of Philosophy set by the Rackham Graduate School and the Department include:

1. 33 Rackham course credits are required for graduation. A minimum of 24 credit hours of graded graduate coursework (including the grade of S-Satisfactory).
2. Completion of all required coursework with an overall GPA of B (3.0 on a 4.0 scale) grade point average or higher in the graduate student's record.
3. 4 credit hours of cognate coursework with a B- grade or better.
4. Completion of a written thesis and short oral presentation of the research project or literature survey.

### Course Requirements

The plan below is for full-time students completing the program in 11 months. Part-time students work with the Program Director to develop a schedule based on their timeline.

#### Fall Semester

- PIBS 503 - Research Responsibility and Ethics (1 credit)
- PHRMACOL 605 - MS Degree Research (4 credits)
- PHRMACOL 601 - From Molecules to Patients: Basic Quantitative Principles of Pharmacology (3 credits)
- PHRMACOL 603 - Practical Statistics (2 credits)
- PHRMACOL 614 - Seminars in Autonomic Pharmacology (2 credits)
- PHRMACOL 621 - Translational Pharmacology (2 credits)
- PHRMACOL 646 - Student Seminars (1 credit)
- Cognate/Elective Course (see list below of common choices, the Program Director and/or Grad Coordinator can assist in finding other courses that meet this requirement)
  - PHARMACOL 622 - Translational Research (2 credits)

- BIOLCHEM 690 - Biochemical Regulatory Mechanisms (2 credits)
- PIBS 550 - Biomedical Innovation & Entrepreneurship (2 credits)

#### Winter Semester

- PHRMACOL 605 - MS Degree Research (8 credits)
- PHRMACOL 612 - Antimicrobial & Cancer Pharmacology (2 credits)
- PHRMACOL 615 - Seminar in Molecular Neuropharmacology (2 credits)
- PHRMACOL 616 - Cardiovascular Pharmacology (2 credits)
- PHRMACOL 617 - Endocrine Pharmacology (2 credits)
- PHRMACOL 646 - Student Seminars (0.5 Credits)

#### Spring/Summer Semester

While MS students do not register for the Spring/Summer, they do continue their research and then write, defend and submit their MS thesis.

### Research Requirements

The Research Project provides the student with an intense, in-depth research experience. Under specified circumstances, students who are engaged in scientific research outside the University and whose supervisor has an active collaboration with a faculty member within the Department of Pharmacology may be permitted to conduct the research component of the MS degree off-campus. For those MS students whose primary focus is not laboratory research, an in-depth review of the research literature may substitute.

### Thesis

As part of the requirements for completion of the MS degree in Pharmacology, all students are required to write a short thesis (approximately 25-35 pages total in length) on their research project. The latter can be based on either a research project conducted in the laboratory or an in-depth literature survey.

Each thesis must contain the sections indicated below and, in the order, listed. The thesis should be paginated with the Title page numbered as 1. Font size should be 12-point. Spacing of either 1.5 or 2 can be used with 0.75" margins. Arial or Helvetica fonts are recommended.

#### Instructions for preparation of a thesis involving a laboratory project:

Overall goal: The student's thesis must have a clearly defined hypothesis, a logical experimental approach and justified conclusions.

- a. Title page: The title must be clear and concise and abbreviations should be avoided, if at all possible. The title page must list the student's name and laboratory of origin.
- b. Table of Contents: All major sections of the thesis must be listed along with page numbers.
- c. Acknowledgements: This section is optional.
- d. Abbreviations: A list of all abbreviations used must be included. The list of abbreviations should be in alphabetical order.
- e. Abstract: This must concisely state the hypothesis that is being tested, general experimental approach, results and conclusions. The Abstract section can be no longer than 250 words in length.
- f. Introduction: This section must contain a clear statement regarding the aims of the study and an account of the relevant background that supports the rationale behind the study. It is suggested that the length of the Introduction section should be ~10% of the total length of the thesis.

- g. **Materials and Methods:** The Materials and Methods section must contain a clear and concise description of the methods and techniques employed. Description of the methods must be of sufficient detail to allow for reproducibility of the experiments. Names of the commercial suppliers of chemicals and reagents used must be identified.
- h. **Experimental Results:** In this section, the experimental results are usually presented without discussion of their significance. Results are typically presented as Tables or Figures. Whenever possible, the statistical significance of the results should be presented. It is important to note that positive results are not a pre-requisite for successful completion of the MS thesis. Given the short time period available to students, negative results will be accepted provided that the starting hypothesis is tenable.
- i. **Discussion:** Conclusions drawn from the study are presented in this section. Unnecessary repetition of the Results section should be avoided. Some indication of future directions of the research should be mentioned. Occasionally, it may be advantageous to combine the Results and Discussion sections.
- j. **Overall summary or conclusion:** This section is optional. In some studies, one or two paragraphs summarizing the principal findings and conclusions derived from a study can be helpful.
- k. **References:** References are cited in the text and in the list of references at the end of the text according to guidelines listed in the journal *Molecular Pharmacology* (<http://molpharm.aspetjournals.org/site/misc/ifora.xhtml#References>). References must be arranged alphabetically and not numbered. The names of all authors must be given in the references. It is usual to cite 25-40 references for a laboratory project.
- l. **Figure Legends:** Figures are numbered consecutively with Arabic numerals and listed in order. Legends must provide sufficient detail for the reader to understand the Figure independent of the text.
- m. **Tables:** Each Table must be placed on a separate page, each page numbered consecutively with the remainder of the thesis. Tables are numbered with Arabic numerals. A brief description is provided at the top of each Table. General statements about the Table are provided below the title.
- n. **Figures:** Figures can be positioned at the end of the manuscript, or within the text, if preferred. All Figures must be accompanied by Figure legends.

#### Instructions for preparation of a thesis involving an in-depth literature survey:

- a. **Overall Goal.** This type of thesis provides detailed coverage of a topic that is of current pharmacological interest, with effort made by the student to integrate conflicting data sets and to synthesize an overall conclusion. Title page: The title must be clear and concise and abbreviations should be avoided, if at all possible. The title page must also list the student's name and laboratory of origin.
- b. **Table of Contents:** All major sections of the thesis must be listed along with page numbers.
- c. **Acknowledgements:** This section is optional.
- d. **Abbreviations:** A list of all abbreviations used must be included.
- e. **Abstract:** This section presents the overall topic that has been investigated, results and major conclusions. The Abstract section can be no longer than 250 words in length.
- f. **Introduction:** This section must include a broad introduction to the topic under discussion, its relevance and pharmacological significance. It is suggested that the length of the Introduction section should be ~10% of the total length of the thesis.
- g. **Discussion:** This section is the major part of the thesis and is composed of a distillation of the available published evidence supporting or refuting the concept under investigation. A selective rather than exhaustive coverage of the literature is required. The Discussion section must include coverage of the basic and cellular pharmacology of the topic under investigation as well as studies that focus on physiological consequences. Students must provide a critical evaluation of previous conclusions and when warranted, challenge accepted concepts. Conflicting points of view should be presented in an objective manner. It may be advantageous

to divide the text in this section by means of sub-headings. It is strongly recommended that Figures and/or Tables be used to supplement this section.

- h. Overall summary or conclusion: A summary (two or three paragraphs) detailing the principal findings and conclusions derived from the study must be included.
- i. References: References are cited in the text and in the list of references at the end of the text according to guidelines listed in the journal *Molecular Pharmacology* (<http://molpharm.aspetjournals.org/site/misc/ifora.xhtml#References>). References must be arranged alphabetically and not numbered. The names of all authors must be given in the references. It is usual to cite 40-75 references for a literature survey.
- j. Figure Legends: Figures are numbered consecutively with Arabic numerals and listed in order. Legends must provide sufficient detail for the reader to understand the Figure independent of the text.
- k. Tables: Each Table must be placed on a separate page, each page numbered consecutively with the remainder of the thesis. Tables are numbered with Arabic numerals. A brief description is provided at the top of each Table. General statements about the Table are provided below the title.
- l. Figures: Figures can be positioned at the end of the manuscript or within the text, if preferred. All Figures must be accompanied by Figure legends.

Each MS thesis will be read and evaluated by at least two faculty members, at least one of whom is a current member of the GPC. It is assumed that when the thesis is submitted that the student's P.I. will have read and approved the submission. The thesis must be carefully written and grammatically correct. Theses that do not conform to these standards will be immediately returned to the student for revision prior to re-evaluation. Following review, most theses will require some revision, according to the reviewers' comments. Unless they wish to rebut the reviewers' comments, students should make every effort to incorporate reviewers' suggestions for improvement into the revised text. Successful completion of the MS thesis and a satisfactory oral defense are required for fulfillment of the requirements for the MS degree. All thesis and course work submitted for the MS degree must comply with the Rackham Academic and Professional Integrity Policy guidelines as stated here: <http://www.rackham.umich.edu/current-students/policies/academic-policies/section11>. Theses may require revisions after review. Students are encouraged to incorporate reviewers' comments or concerns (if warranted) into the text of their revised thesis.

## CURRENT GRADUATE COURSE OFFERINGS

### Descriptions of Authorized Courses

The offerings in any given term should be checked in the current time schedule (<http://www.ro.umich.edu/schedule/>). The entries below give the course number, title, credit hours, prerequisite(s) and description of each course offered by the Pharmacology Department.

**PHRMACOL 502. Introduction to Scientific Communication (2 hrs.)** This course introduces second-year graduate students to essential scientific communication skills. Students will write a grant over the course of the term on a chosen topic. Class meetings alternate between presentations by local experts and students. In-depth analysis of student writing/presentation skills provided in class by instructor, small groups, and guest scientists. By term's end students will have a high-quality product to be presented in oral and written form. Finally, students will participate in a mock study section to constructively evaluate the grants. *Offered in the fall semester.*

**PHRMACOL 601. From Molecules to Patients: Basic Quantitative Principles of Pharmacology. (3 hrs.)** This is a graduate level course that examines the fundamental principles of pharmacology and their quantitative treatment as a basis for understanding the properties and mechanism of action of drugs. The course is aimed at, but not limited to students of Pharmacology, Medicinal Chemistry, Chemical Biology, Toxicology, Bioinformatics or Biological Chemistry. Topics include: Structure and physical properties of drugs; quantitative structure-activity and dose-response relationships; receptors as determinants of drug action; concepts, analysis and modeling of agonists, antagonists, and receptor mechanisms; signal amplification, selectivity, and regulation; drug absorption, distribution and metabolism; modern approaches to drug design. *Offered in the fall semester.*

**PHRMACOL 603. Practical Statistics: Data Processing and Analysis for Biomedical Scientists. (2 hrs.)** This course is aimed at providing students of pharmacology and other biomedical sciences training on practical approaches to data handling, analysis, interpretation, and presentation as well as experimental design. The course provides basic, working knowledge and best practices that can be directly applied to everyday laboratory research activities. It is comprised of weekly session in a computer lab with access to hardware and software and a combination of didactic lectures, exercises, and hands-on data manipulation. *Offered in the fall semester.*

**PHRMACOL 604. Collaborative Projects in the Pharmacological Sciences. (1 hrs.)** This newly developed, value-added course focuses on team-based innovation in pharmacology, development of INDs, and exploration of future career options. This course is designed to foster educational, research and social interactions between the biology- and chemistry-track trainees and to guide all PSTP trainees to plan and work together on interdisciplinary-based research projects. *Offered in the fall and winter semesters for PSTP trainees.*

**PHRMACOL 605. MS Degree Research. (1-8 hrs.)** This course is solely for MS degree students to register for laboratory research or independent study credits. *Offered in the fall and winter semesters for MS students.*

**PHRMACOL 612. Seminar in Antimicrobial and Cancer Pharmacology. (2 hrs.)** Advisory Pre-requisite: BIOCHEM. This course uses a combination of textbook and literature reference to provide students with an understanding of the different classes of drugs and used to treat infectious diseases and cancer. The course will focus on the mechanisms of drug action, the basis of selectivity and therapeutic applications. Traditional as well as novel approaches to therapeutics will be discussed, as well as the role of drug resistance and strategies for its management. *Offered in the winter semester.*

**PHRMACOL 614. Seminar in Autonomic Pharmacology. (2 hrs.)** Advisory Pre-requisite: BIOCHEM. This course focuses on the organization of the sympathetic and parasympathetic nervous systems, the function of autonomic synapses, and principles of autonomic pharmacology. Prototypic adrenergic and cholinergic drugs will be highlighted. Students will read relevant textbook material before seminars. Approximately half of each 90-minute seminar will be devoted to discussing basic principles. The other half will be devoted to student presentations of research articles that are either of great historical importance or of current interest that further the understanding of autonomic pharmacology. *Offered in the fall semester.*

**PHRMACOL 615. Molecular Neuropharmacology. (2 hrs.)** At the end of this course all students will understand the central nervous system function and dysfunction as it relates to the use of pharmacological agents to alter neurotransmission and neuroplasticity in the treatment of disease.

Students will also learn how to approach the development and evaluation of new therapeutics to treat, slow, or prevent diseases of the CNS and/or alter CNS state to aide in medical treatment (e.g., anesthetics). Students will gain these insights in part by learning about the development, evaluation, and proper use of prototypical drugs for prominent CNS disease, as well through discussion of novel approaches to CNS drug therapies. *Offered in the winter semester.*

**PHRMACOL 616. Seminar in Cardiovascular Pharmacology.** (2 hrs.) Advisory Pre-requisite: BIOCHEM /PHYSIO. This course consists of seminar presentations along with the use of self-instructional, computer assisted learning modules in the Learning Resource Center. Emphasis will be placed on pharmacologic interventions used in the management of disorders affecting the cardiovascular system. Major topics of discussion will focus on the following drug categories: Drugs affecting the Autonomic Nervous System; Vasoactive Substances; Water, Electrolyte Metabolism and Diuretic Drugs, Antihypertensive Drugs; Calcium Channel Blockers, Cardiac Glycosides and other Cardioactive Agents; Antianginal Drugs; Antiarrhythmic Agents. *Offered in the winter semester.*

**PHRMACOL 617. Seminar in Endocrine Pharmacology.** (2 hrs.) This course is designed to provide the student with an exposure to endocrine pharmacology, with a major emphasis on the feedback mechanisms within the endocrine system that are responsible for the maintenance of normal endocrine function as well as the interventions necessary to correct disorders stemming from hormonal imbalances. Emphasis is also placed on the development of drug (hormone) therapy in treating endocrine disorders and still maintaining essential hormonal and metabolic feedback relationships. *Offered in the winter semester*

**PHRMACOL 621. Translational Pharmacology: From Drug Discovery to Therapeutics.** (2 hrs.) Experts from academic and industry will take you on a journey from bench science to new therapeutic agents. Students will learn how to translate preclinical studies to clinical trials and FDA approval. Critical evaluation of clinical trials, patent issues and pharmacoeconomics will also be taught. *Offered in the fall semester. \*counts as a cognate course*

**PHRMACOL 622. Translation Research.** (2 hrs.) This course will discuss the pathway from discovery to clinical development for devices, diagnostics, biologics, etc. Issues such as FDA regulations, ethical considerations and affordability will also be addressed. For those considering careers in and outside of academia, this course will help to make informed decisions. *Offered in the fall semester. \*counts as a cognate course*

**PHRMACOL 625. Translational Sciences Journal Club and Seminar Series.** (1 hr.) Translation of basic science discoveries into clinical practice in the cornerstone of improved healthcare. Learn how scientific advances progress from bench to bedside through literature reports and seminars by experts in academia and industry. The course highlights entry of new small molecules, biologics, devices, diagnostics, etc. into clinical practice. *Offered in the fall semester.*

**PHRMACOL 646. Student Seminar.** (1 hr.) *Offered in the fall and winter semesters.*

**PHRMACOL 990 Dissertation Research/Pre-Candidacy.** (1-8 hrs. every term except Spring/Summer) Prereq. Instructor permission. Election for dissertation work by doctoral student not yet admitted as a Candidate.

**PHRMACOL 995 Dissertation Research/Candidacy.** (8 hrs. every term. In Spring/Summer only if defending). Prereq. Instructor permission. This course number is used for doctoral research by students who have been admitted to candidacy.

## EXTENDED EDUCATIONAL OPPORTUNITIES

**Pharmacology and Experimental Therapeutics Career Day:** This takes place each July and provides students with information about careers especially non-traditional career paths. There are talks and panel discussions with academic faculty from large and smaller schools, biotechnologists, medical writers, patent attorneys, etc.

**Annual Pharmacology Colloquium:** This research colloquium brings together graduate students and faculty from the pharmacology departments of the Michigan State University, the University of Michigan, Wayne State University, and the University of Toledo, for a day long scientific program. Each of the schools takes turns in hosting this annual event. The colloquium primarily provides a forum for students to present their research in both oral and poster presentations and an opportunity for all participants to exchange ideas.

### Journal Clubs:

- Signal Transduction Data/ Journal Club (contacts: Alan Smrcka, Ph.D., [avsmrcka@umich.edu](mailto:avsmrcka@umich.edu))
- Intracellular Trafficking Club (Bob Fuller, Ph.D., [bfuller@umich.edu](mailto:bfuller@umich.edu))
- Hemostatis and Thrombosis Journal Club (Mike Holinstat, [mholinst@umich.edu](mailto:mholinst@umich.edu))

**Pathways to Pharmacology** is a graduate student-run program run in the Department of Pharmacology in collaboration with the [University of Michigan Wolverine Pathways Program](#). In this free, college readiness program, admitted middle and high school scholars join Wolverine Pathways from Detroit, Southfield, and Ypsilanti to take part in extracurricular classes and activities designed to strengthen their knowledge and preparedness for college. (contact: [jumariep@umich.edu](mailto:jumariep@umich.edu) and [ampesch@umich.edu](mailto:ampesch@umich.edu))

**SOAR (Scientist for Outreach on Addiction Research):** As a student organization at U of M, SOAR provides community outreach on topics relating to addiction and addiction research. SOAR is comprised of scientists from a variety of fields. (contact: [addiction.research@umich.edu](mailto:addiction.research@umich.edu))

**Certificate Programs:** The department encourages students to take advantage of the opportunities offered by the University to extend their educational experiences. These include a variety of certificate programs to prepare students for future careers (<https://rackham.umich.edu/navigating-your-degree/certificate-program-information/>), for example:

- Translational Research Education Certificate: (<https://www.michr.umich.edu/education/predocctoral/trec>)
- Graduate Teacher Certificate ([http://crlt.umich.edu/um.gtc/introduction\\_to\\_program](http://crlt.umich.edu/um.gtc/introduction_to_program))
- Science, Technology and Public Policy Certificate (<http://stpp.fordschool.umich.edu>)

## CONFLICT RESOLUTION POLICY

Usually the best approach to resolving a problem is through informal discussion and negotiation when the problem first arises. Discussion and negotiation amongst the parties in a conflict may not only help to resolve the original conflict, but can lead to better communication and more positive working relationships in the future. Before approaching the individual, gather your thoughts and composure, and develop a plan for what you want to say. In your conversation with the individual, focus on the issue over which you have a conflict; you may want to bring specific examples that illustrate the issue. Try to think of ways to present the situation in a way that might help the person understand your perspective. Give the person the chance to explain their perspective about the situation. It may be helpful to think of the conflict as an opportunity for the two of you to develop a better understanding of each other and a better working relationship. Regardless of the outcome of this meeting, it is a good idea to follow it up with a note (via email is fine) to the person, describing the situation (dates, events) that you discussed, as well as how things stand after your meeting. That way, if there is still a misunderstanding, the conversation can continue. Also, having documentation of your efforts to resolve the present situation or in the event that a similar future situation arises with that same person. Even when a student may not feel comfortable talking with the other party in the conflict, the process below should be used.

If you find that in spite of your best efforts, the conflict has not been satisfactorily resolved, you can lodge an informal complaint with the department. If your problem cannot be resolved at the departmental level or if you prefer discussing the matter with someone from outside the department, consider seeking help from the Office of the Ombuds, the Office of Student Conflict Resolution or the Rackham Resolution Office.

### **Informal Complaint**

An informal complaint is handled primarily within the Pharmacology Department following the sequences listed below, depending on the situation. Every effort would be made to resolve the conflict internally through this informal procedure. Unless the complaint involves a conflict between you and your thesis advisor, you can talk the situation over with your thesis advisor if you feel comfortable. It will be helpful to hear your advisor's perspective, and it's good for them to know about the situation.

In lodging an informal complaint, you should:

- Clearly explain to the contact person the nature of the complaint, including specific details of the events that transpired, and the dates of those events.
- Provide a copy of any documentation of your efforts to resolve the situation with the other party, as well as any evidence relevant to your complaint.
- Indicate what you suggest as a satisfactory resolution.

If you can't comfortably discuss the situation with the first person in the sequence, contact the next person in the sequence. Depending on the nature of your complaint, it may be necessary to involve additional people. The sequence for involving others is listed below for each type of complaint. If a person in the listed sequence is the person with whom you have a conflict, your complaint will be addressed to an alternate person (listed in parentheses). Each person handling your complaint should notify you in writing. Specifically, each person handling your case should: 1) acknowledge receipt of your complaint, and 2) describe the actions taken. In the event that you are not satisfied by the resolution of your complaint, you may appeal to the next person in the sequence.

*Please use the following sequences for conflicts with:*

#### **Your thesis advisor:**

- Other committee members.
- Pharmacology Student Affairs Program Manager/Graduate Coordinator
- Pharmacology Faculty Ombudsperson or Pharmacology Graduate Program Chair (alternate: Pharmacology Graduate Committee faculty member).
- Pharmacology Department Chair
- Graduate Student Affairs Officer, Rackham Graduate School or OSCAR

#### **A thesis committee member:**

- Thesis Advisor.
- Pharmacology Student Affairs Program Manager/Graduate Coordinator
- Pharmacology Faculty Ombudsperson or Pharmacology Graduate Program Chair (alternate: Pharmacology Graduate Committee faculty member).
- Pharmacology Department Chair
- Graduate Student Affairs Officer, Rackham Graduate School or OSCAR

#### **Another graduate student:**

- Pharmacology Student Affairs Program Manager/Graduate Coordinator
- Pharmacology Faculty Ombudsperson or
- Pharmacology Graduate Program Chair (alternate: Pharmacology Graduate Committee faculty member).
- Pharmacology Department Chair
- OSCAR

**Lab member:**

- Thesis Advisor
- Pharmacology Student Affairs Program Manager/Graduate Coordinator
- Pharmacology Department Chair

**Pharmacology Department staff:**

- Thesis Advisor.
- Pharmacology Department Chair

**Pharmacology faculty member:**

- Thesis Advisor
- Pharmacology Student Affairs Program Manager/Graduate Coordinator
- Pharmacology Faculty Ombudsperson or
- Pharmacology Department Chair
- Graduate Student Affairs Officer, Rackham Graduate School or OSCR

**Graduate Program Chair:**

- Thesis Advisor
- Pharmacology Student Affairs Program Manager/Graduate Coordinator
- Pharmacology Faculty Ombudsperson or
- Pharmacology Graduate Committee faculty member
- Pharmacology Department Chair

**Pharmacology Department Chair:**

- Thesis Advisor
- Pharmacology Student Affairs Program Manager/Graduate Coordinator
- Pharmacology Faculty Ombudsperson or
- Pharmacology Graduate Program Chair (alternate: Pharmacology Graduate Committee faculty member).
- Graduate Student Affairs Officer, Rackham Graduate School

**The Graduate School:**

- Thesis Advisor
- Pharmacology Student Affairs Program Manager/Graduate Coordinator
- Pharmacology Graduate Program Chair (alternate: Pharmacology Graduate Pharmacology Department Chair)

**On Campus Conflict Resolutions Resources**

- **Office of the Ombuds** is a place where student questions, complaints and concerns about the functioning of the University can be discussed confidentially in a safe environment. 6015 Fleming, Phone: (734) 763-3545 <https://ombuds.umich.edu>
- **Office of Student Conflict Resolution (OSCR)** Promotes justice by facilitating conflict resolution for the Michigan community and creating a just and safe campus climate. 100 Student Activities Building, Phone: (734) 936-6308. <https://oscr.umich.edu/>
- **Rackham Graduate School's Designated Resolution Officer (RO)**  
Advises faculty, staff and students on matters related to student emergencies, crisis situations, disputes, and student conduct violations. The RO also provides information about Graduate School and University policies and procedures, makes referrals, and provides resources when appropriate. <https://rackham.umich.edu/academic-policies/section9/>

**Pharmacology Faculty Ombudsperson**

The role of the faculty Ombudsperson is to listen to, coach, and potentially mediate interpersonal conflicts that arise at any point of student participation in the Pharmacology Ph.D. program. This person is meant as a resource for students to confidentially discuss issues that do not obviously require formal conflict resolution. The student and the Ombudsperson together will have the option of

determining whether the issue discussed requires formal conflict resolution, in which case the issue will be handled through the process outlined in the student handbook. Problems with coursework should be directed to the GPC. The ombudsperson will be chosen by graduate student from a slate of candidates initially proposed by the students, plus other interested parties. The ombudsperson will serve a term of 3 years and will have direct access to the Pharmacology Department Chair to assist with mediation if necessary. Dr. Carole Parent ([parentc@umich.edu](mailto:parentc@umich.edu)) and Jorge Iniguez-Lluhi are the current Graduate Student Ombudspersons.

## Diversity, Equity and Inclusion (DEI) Committee.

The primary role of the DEI Committee is to help gather and disseminate information as well as to advise the Chair on strategies, policies, and activities to improve diversity, equity, and inclusion in the Department.

The goals of the Committee are to promote diversity at the trainee, staff, and faculty levels and to ensure that all members of the Department feel welcomed as essential participants in our overall academic and research missions. To achieve these goals, the DEI Committee will liaise with members of the Department to identify broad issues that need to be addressed, and develop resources and approaches to resolve the issues that are identified. The Committee will communicate the issues and approaches to the Chair, along with suggestions on how to implement them. The Committee will meet monthly to discuss ongoing efforts, evaluate progress, and set future goals as the Department environment evolves. The minutes of each meeting will be made available to the Department in an M-Box folder.

The DEI Committee will generally not take part in individual conflict resolution other than the DEI leaders being available as a resource for reporting incidents as described below. While the Committee is not charged with implementing policy changes, it can advocate for faculty, staff, and trainees and facilitate meeting with those who enact policy changes.

<b>Size of Committee</b>	8-10 members
<b>Method of Appointment</b>	Members of the Department shall vote for candidates (self-nominated or nominated by other Department members). Final appointments are subject to approval by the Department Chair and agreement from the candidate.
<b>Term of Office</b>	<p>This committee shall consist of 3 tenure track Faculty including one representing the Medical School (the DEI Lead), one Research Faculty, one representing student interests, one representing post doc interests, and one representing research staff and one representing administrative staff. All members will serve staggered three-year terms such that two members will be replaced, or reappointed each year. The Committee members can be reappointed only one time for an additional three-year term.</p> <p>The Pharmacology Student Affairs Program Manager and the Faculty Ombudsperson shall serve as non-voting <i>ex-officio</i> members.</p>

## DISCRIMINATION & HARASSMENT POLICY

The Department of Pharmacology and the University of Michigan are committed to maintaining an academic and work environment free of discrimination and harassment for all trainees, faculty, and staff. Discrimination or harassment are contrary to the standards and values of the Department and University community. They diminish individual dignity and impede educational opportunities, equal access to freedom of academic inquiry, and equal employment. Discrimination or harassment are barriers to fulfilling the University's scholarly, research, educational, patient care, and service missions. Discrimination or harassment on the basis of race, color, national origin, age, marital status,

sex, sexual orientation, gender identity, gender expression, disability, religion, height, weight or veteran's status as set forth in the [SPG 201.35, Nondiscrimination Policy Notice](#) will not be tolerated in the Department of Pharmacology or at the University of Michigan.

### Reporting an Incident

Members of the Michigan Medicine Department of Pharmacology who witness or experience any type of discrimination or harassment are highly encouraged to report the incident. Several options are available to report. First, Department members are encouraged to discuss the incident with the Chair of the Department. If members are not comfortable reporting directly to the Chair, they can report the incident to the Pharmacology Faculty Ombudsperson or to DEI Committee faculty leaders. If they do not feel comfortable, for any reason, reporting the incident themselves, a trusted advocate or intermediary of their choosing can describe the situation to one of the aforementioned Department representatives. Department members will retain the option whether to remain anonymous. In this case, the Chair will be informed in a deidentified manner, if necessary, so that the nature of the situation and any specific incidents that have occurred can be fully understood. The DEI [Taskforce](#) also has a method of reporting. The link to this reporting system is [here](#). Revealing your identity is optional, and you are at liberty to disclose as little or as much as you would like. Since the DEI Taskforce organization is not a mandatory reporter, their system will allow you to control whatever level of engagement or action you prefer. Please see their website and FAQs for more information.

### Resolution Process

The Chair will first meet with the person making the complaint, the intermediary, or the reporting faculty member to understand the situation and any incidents that have occurred. Together, they will discuss options and strategies to resolve the situation, including bringing other members of the Department into the discussion if necessary. Incidents of sexual or gender-based misconduct must be reported to the Office of Institutional Equity (OIE) as per University policies. Following the meeting, the Chair will respond to the complaint in writing to the person or their advocate, formally acknowledging the complaint and outlining next steps, including actions that will be taken for each case. The Chair will provide updates to the person or their advocate as below.

The Chair will meet with the Department member making the complaint, or the intermediary, on a biweekly basis to discuss current and on-going actions. Ongoing communication will determine whether the complaint has been satisfactorily resolved for all parties. If not, the Department member and Chair will continue to work together to determine additional steps, or, when appropriate, refer the case to Rackham Graduate School Resolution Officer, or the OIE.

The ultimate outcome will be decided based on the nature and severity of the situation. Ideally, all parties will come to a mutually agreed upon mediation that addresses the concerns of the injured party. These actions may include activities and interventions to increase awareness and education or prohibition of individuals from meetings/events where the injured party is present. Further action that would require reporting by the injured, backed by the department, to Rackham Graduate School, or the Medical School, or the Office of Institutional Equity.

The following excerpt from the Standard Practice Guide for the University of Michigan outlines the University policy on discrimination and harassment (<https://spg.umich.edu/policy/201.89-1>)

A claim under this policy may be brought by the University or by a faculty, staff or student member of the University community. Complaints based on conduct of students who are not acting as employees of the University are addressed in the [Statement of Student Rights and Responsibilities](#), which is administered by the Office of Student Conflict Resolution. The Rackham Graduate School has created a [Discrimination and Harassment Resource Guide](#), as well as a website with information on how to file a formal complaint, resources and university policies and reporting procedures. (<https://rackham.umich.edu/rackham-life/discrimination-and-harassment/>).

## LEAVE, ABSENCES AND VACATIONS

### Leave and Absences

Effective Fall 2010, Ph.D. students may request a temporary leave of absence when certain life events prevent continued active participation in their degree program. The policy enables students to officially suspend work toward their degree for a limited time. Students may request a leave of absence as early as six months prior to the term the leave is to start. A leave will be granted to students for illness (either physical or mental) or injury, to enable them to provide care or assistance for family or dependents, to allow them to meet military service obligations, or for other personal reasons.

See Rackham's Leave of Absence Policy for a checklist for graduate students, faculty and staff.

<https://rackham.umich.edu/academic-policies/section2/#2-2-2>

<https://rackham.umich.edu/navigating-your-degree/leave-of-absence/>

Unapproved absences are not allowed. Students that are not engaged in full-time work, including coursework, research and other relevant scholarly activities, will not be considered in good standing in the program and will be subject to dismissal. The mentor and program director will meet with the student to discuss the absences and performance and outline a plan for remediation during a probation period. After the probationary period, the student's work in the laboratory, productivity, participation in programmatic activities and attendance at critical research meetings will be evaluated by the Graduate Program Committee, which will make a final recommendation.

### Vacations

Students can take two full weeks of vacation (10 business days) of their choice per year (in consultation with their thesis mentor). Additional vacation days include recognized Federal holidays, Season Days (i.e., the 4 working days that fall between Christmas Day and New Year's Day), and other times when the University is officially closed. Your thesis mentor and/or the PIBS Director if you are a first-year student must approve any exceptions.

### Parental Accommodation Policy:

All eligible students will be granted a Parental Accommodation period up to six weeks long immediately following the birth of a child or the adoption of a child under the age of 6 for whom the student has parental responsibilities. During this period of accommodation, the student may continue to be enrolled as a full-time student. Additional information can be found at the following Rackham website (<https://rackham.umich.edu/navigating-your-degree/parental-accommodation-policy/>)

# FINANCIAL INFORMATION (for Ph.D./MSTP students)

## Financial Support

The Pharmacology Department is committed to providing all graduate students full financial support for their graduate program tenure. This support frees the student to concentrate on research and full-time study. Students must be making satisfactory progress toward the Ph.D. degree to be eligible for support.

### Fellowship Funding & Support Beyond the First Year

First-year students entering through the PIBS program will be funded through a fellowship that will provide full coverage of stipend, tuition & fees, tuition and health care during their first 10 months. For first-years starting in July, the last month they will receive a stipend from their PIBS fellowship is April, for those who start in September, their last month is June. For students entering through PIBS following their choice of a thesis advisor and for student entering through direct admission, support will be provided by some mix of the following funding mechanisms: 1) a Research Assistantship (GSRA) supported by an individual grant of their thesis advisor; 2) a Teaching Assistantship (GSI); or 3) a fellowship. Generally, after the first year, unless a student is on fellowship (see below for more details, they will be a GSRA. Typically, students in their third-year will be a GSI for one term. Students will be notified of their funding type on an annual basis and when any change in their funding type occurs (fellowship to GSRA and vice versa). Students can also talk with the Graduate Coordinator or HR Specialist they have questions about their funding.

### Fellowships

Fellowship support may be in the form of a fellowship awarded directly to the student by a national agency or research foundation (e.g., NIH), by the Department, the University, or Rackham. Students on training grants and other types of scholarships, such as Rackham Merit Fellowships and NSF awards, are also paid from fellowships.

- Tuition and fees are covered in full for students on fellowship.
- Students on fellowship are eligible for University's healthcare program for graduate students, GradCare as well as dental coverage Option 1, which is processed by the department.
- Students on fellowship will not have income taxes withheld from their paychecks. Students will be responsible for paying these taxes when they file their annual Income Tax Return. To avoid additional fees, students should plan to pay estimated taxes during the year. Consult Rackham's website (<https://rackham.umich.edu/rackham-life/finances/>) for more information on taxation and estimated tax payments.

### Graduate Student Research Assistantships (GSRAs)

Students who are not on fellowships are generally paid as Graduate Student Research Assistants (GSRAs) or, if helping to teach a course, as Graduate Student Instructors (GSIs). The source of funding for all GSRA appointments is through their thesis advisor. GSRAs and GSIs are considered "employees" of the university and as such, will have taxes deducted from their paychecks, and they will receive a W-2 form. A student on GSRA performs personal research (including thesis or dissertation preparation) or who assists others in performing research that is relevant to his or her academic goals. In those cases where the student will be engaged in his/her dissertation research, full-time activity is expected; otherwise, conditions of the appointment are governed by the standard employment practices of the University.

- Tuition and fees for a GSRA with a 25% (10 hours of expected work per week) or greater appointment fraction for four or more consecutive months will be fully covered and applied directly to the student's account.
- Domestic students holding a GSRA appointment during the summer months, when students are typically not enrolled, will see FICA taxes withheld from their monthly pay. Once a student achieves candidacy they are eligible to file a FICA Exemptions Request with the Office of Finance, they must do so for each spring/summer term they are a GSRA. Students of fellowship during the spring/summer term and international students do not have FICA taxes withheld. <http://finance.umich.edu/finops/payroll/tax/studentemployeesficaexemption>

## GradCare (Health) and Dental Insurance

All graduate students, regardless of their funding source/type, are entitled to GradCare health insurance and Dental option 1. If you plan to leave the State of Michigan for any length of time, please contact the Benefits Office (615-2000) or visit the [benefits office website](#) to inquire about off- site or emergency coverage.

## **Rackham Fellowships, Awards, Grants & Scholarships.**

Rackham provides a variety of faculty nominated, Department nominated, and student-initiated funding opportunities. Selection of departmental nominees is made by the Pharmacology Graduate Program Committee. These fellowships are typically awarded on the basis of scholastic record and the student's research achievements. Follow the link at the following site for detailed guidelines for each competition, including eligibility requirements, nomination forms and selection criteria:

<https://rackham.umich.edu/funding/>

- Rackham Travel Grants. The Rackham Graduate School provides up to \$800-\$1,050 for travel to domestic (up to \$1300 for international) professional conferences and meetings. You can only receive one travel grant per fiscal year (July 1 - June 30). Refer to Rackham's website for detailed information and forms to apply for travel funds: <https://rackham.umich.edu/funding/funding-types/rackham-conference-travel-grant/>
- Rackham Research Grants. The Rackham Graduate Student Research Grant is designed to support Rackham graduate students who need assistance to carry out research that advances their progress toward their degree. Applications are accepted at any time and reviewed individually on a rolling basis by faculty reviewers. <https://rackham.umich.edu/funding/funding-types/rackham-graduate-student-research-grant/>.
  - Master's students are eligible for an award up to \$1,500
  - Precandidates are eligible for an award up to \$1,500
  - Candidates are eligible for an award up to \$3,000

**Fellowships Awarded by the Pharmacology Department.** The department has a number of endowed fellowships that are awarded on a yearly basis. Talk with the Graduate Coordinator about the award criteria and timeline for these fellowships.

- Dr. Benedict and Diana Lucchesi Graduate Education Fellowship
- Charles W. Edmunds Fellowship
- Pharmacology Centennial Fellowship

## **Departmental Travel Awards.**

Attendance and presentations at national conferences such as the American Society of Pharmacology and Experimental Therapeutics ([www.aspet.org](http://www.aspet.org)) and the Society for Neuroscience ([www.sfn.org](http://www.sfn.org)) are strongly encouraged. Grants to attend such conferences are available from the department (see the Graduate Coordinator) and Rackham (see below) as well as the societies themselves. The Graduate Coordinator will solicit nominations in March and August of each year for the Thomas Baum Travel Awards. For students on PSTP, contact the Graduate Coordinator for more information about the annual travel grant reimbursement you are eligible for.

## **Stipend Payment Schedules**

Stipends for students on GSI or GSRA appointments are paid in four equal installments per term. Checks are available on the last working day of each. They are mailed to your current address in Wolverine Access (<http://wolverineaccess.umich.edu>) or directly deposited into your bank account, which can also be set up in Wolverine Access. Full information is available on your appointment confirmation.

Fellowship and training grant payments are also typically paid monthly, though the payment dates are usually closer to the middle of the month.

([https://drive.google.com/file/d/1uZnJtO\\_6u9cac9dnolM1PX-Kt\\_hgyUH-/view](https://drive.google.com/file/d/1uZnJtO_6u9cac9dnolM1PX-Kt_hgyUH-/view), pg. 2, 02-Disbursement Plan STANDARD MONTHLY). Please see the Graduate Coordinator and/or HR Specialist if you have questions or problems with payments.

Once you declare the Department of Pharmacology as your department, we will cover registration and mandatory fees for the fall and winter terms. If you wish to use the campus recreation facilities, you will need to buy your own user pass during the months you are not officially enrolled as a student (May-August). Some mentors will pay for the summer recreation facilities user pass, if asked.

Any questions related to stipend payments, student bills, insurance supplements, etc., should be directed to the Graduate Coordinator and/or HR Specialist. If you receive a student bill indicating a balance owed, notify them as soon as possible; do not wait until the following month or semester. By that time a financial hold will have been placed on your account and you will be unable to register. A \$30.00 late charge may be assessed and a negative service indicator established if payment is received after the due date or if payment is received in less than the amount due. A negative service indicator will prevent you from registering, and/or from receiving an official transcript, diploma, and financial aid.

## Supplementary Income

Appointment to a half-time assistantship or to an equivalent fellowship is intended to provide sufficient financial support to enable a student to devote full time to his/her graduate program. Consequently, a condition of the appointment is that no outside employment be undertaken other than tutoring. In conditions of unusual financial hardship, such as may result from extra dependents or special circumstances, the student should discuss other options with their Research Mentor and the Chair of the Graduate Committee.

## Tutoring

Tutoring not only offers the graduate student a chance to obtain a small supplementary income, but also offers a chance to better his/her teaching methods and to review the basics of a particular course. At the beginning of the semester, a questionnaire will be sent out to determine each graduate student's willingness to tutor and his/her preference for specific courses. The principal restriction on tutoring is that Graduate Student Instructors must not tutor students enrolled in the course in which they are teaching.

## Loans

Loan funds administered through the Office of Financial Aid (<http://www.finaid.umich.edu>) are available to meet the needs of any educational expense for students while enrolled in the University. The extent of this financial need must be clearly established by providing a complete statement of the applicant's financial resources and expenses for the academic year.

Loans are NOT available for any non-educational expense which is normally financed by a commercial lending institution, nor are they available for the repayment of previously incurred indebtedness. The graduate college also has Rackham Graduate Student Emergency Fund (<http://www.rackham.umich.edu/prospective-students/funding/student-application/graduate-student-emergency-funds>) that is intended to help meet the financial needs of Rackham graduate students who encounter an emergency situation or one-time, unusual, or unforeseen expenses during their degree program.

## Income Tax Liability

Current practice is subject to review by the IRS and may change at any time. Graduate Student Instructor and Graduate Student Research Assistantship stipends are considered salary for services performed and, as such, are subject to withholding and income tax. Under the income tax law of 1986, stipends for fellowships and other forms of student aid are subject to income tax and must be reported quarterly. It is the student's responsibility to report fellowship/award aid to the IRS. If you have questions regarding your taxability status you should call the IRS at 800-424-1040, or visit the University's Office of Finance <http://finance.umich.edu/finops/payroll/tax>.

# RESOURCES

In addition to your Advisor, the Graduate Coordinator, the Graduate Committee (including the Chair), and the Rackham Graduate School staff, there are many resources on campus to help you succeed as a graduate student at the University of Michigan.

## Mentoring Resources

- ***How to Get the Mentoring You Want*** <http://www.rackham.umich.edu/downloads/publications/mentoring.pdf>  
A general guide for graduate students about the importance of the student-mentor relationship.
- **Mentoring Others Results in Excellence (MORE)** <http://www.rackham.umich.edu/diversity-equity-inclusion/mentoring> A senior faculty committee providing information and resources on mentoring to students and faculty.

## Selected Campus Academic Resources

- **Center for Research on Learning and Teaching (CRLT)** <http://www.crlt.umich.edu/>  
CRLT offers programs and services designed to support graduate students in all stages of their teaching careers from training for their first teaching experience through preparation for the academic job market.
  - ✓ Preparing Future Faculty Conference
  - ✓ U-M Graduate Teacher Certificate
  - ✓ Seminars for Graduate Student Instructors
- **Sweetland Center for Writing** <http://www.lsa.umich.edu/sweetland/>  
The Sweetland Center for Writing supplements formal writing instruction by providing free programs that help students understand assignments, develop ideas, support arguments and claims, cite sources, and revise at the paragraph and sentence level.
  - ✓ Writing workshops
  - ✓ Writing references and resources
  - ✓ Peer tutoring
  - ✓ Dissertation Writing Institute
- **English Language Institute (ELI)** <http://www.lsa.umich.edu/eli>  
The English Language Institute offers opportunities for students to participate in courses and workshops aimed at improving their language and communication skills.
  - ✓ English for Academic Purposes Courses
  - ✓ Workshops
  - ✓ Writing Clinics
  - ✓ English Learning Links
- **Center for Statistical Consultation and Research (CSCAR)** <http://cscar.research.umich.edu>  
CSCAR emphasizes an integrated, comprehensive statistical consulting service, covering all aspects of a quantitative research project ranging from the initial study design through to the presentation of the final research conclusions.
  - ✓ Workshops and seminars
  - ✓ In-house Mental Health and Wellness Counselor
    - Kate Hagadone, PhD, LP: [OGPScounselors@med.umich.edu](mailto:OGPScounselors@med.umich.edu)
  - ✓ Student Support
- **Office of Graduate & Postdoctoral Studies (OGPS)** <https://ogps.med.umich.edu>  
OGPS is an information hub for the outstanding and diverse young scholars of Michigan Medicine, and a resource for their trainees, faculty, and staff. They aim to provide a foundation and a community for trainees to explore the next step of their career in the biomedical sciences. Their team develops programs and pathways for students and postdocs to grow intellectually, personally, and professionally on their scientific journey.
  - ✓ Career & Professional Development (workshops and career advising)
  - ✓ Software help
  - ✓ Software access
  - ✓ Spatial Analysis/GIS
- **Scholar Space** <http://www.lib.umich.edu/scholarspace>  
Scholar Space teaches individuals how to use technology in coursework, teaching, or research.
  - ✓ One-on-one technology consultations

- ✓ Workshops
- ✓ Digitalization of documents
- **University of Michigan Library** <http://www.lib.umich.edu/>  
MLibrary supports, enhances, and collaborates in the instructional, research, and service activities of the faculty, students, and staff, and contributes to the common good by collecting, organizing, preserving, communicating, and sharing the record of human knowledge.
  - ✓ Borrowing and circulation
  - ✓ Course reserves
  - ✓ Instruction and workshops

### **Selected Sources of Campus Support**

- **The Career Center** is committed to preparing U-M students and alumni to be active, life-long learners in developing and implementing their career decisions. <http://www.careercenter.umich.edu/>
- **Center for the Education of Women (CEW+)** offers support services to students, faculty, staff and community members. <http://www.cew.umich.edu/about>
- **Counseling and Psychological Services (CAPS)\*\*** offers a variety of confidential services to help students resolve personal difficulties. Services include brief counseling for individuals, couples and groups. <https://caps.umich.edu>
- **Department of Recreational Sports** is the place for fun and fitness on campus. Rec Sports offers both informal activities and structured programs: Club Sports, Challenge Program, Drop-in Program, Intramural Sports and/or Outdoor Adventures. <https://recsports.umich.edu/>
- **Diversity, Equity and Inclusion Resources** <https://diversity.umich.edu/resources/>
- **Division of Public Safety and Security (DPSS)** The DPS website contains information about police services as well as other units such as parking enforcement, Communications Center and Criminal Investigations. <http://police.umich.edu/>
- **Emergency Preparedness and Alert System** UM Emergency Alert is an urgent, mass notification system that keeps students, faculty and staff informed about major active emergencies on campus. This system will be activated without undue delay by the Division of Public Safety and Security (DPSS). Sign up for voice and text emergency alerts at <https://dpss.umich.edu/content/emergency-preparedness/emergency-alerts/>.
- **International Center** provides a variety of services to assist international students, scholars, faculty and staff. <https://internationalcenter.umich.edu/>
- **Psychological Clinic** provides psychological care for students. Services include consultation, short-term and long-term therapy for individual adults and couples. <http://www.psychclinic.org/>
- **Department of Public Safety (DPS)** provides information on crime prevention strategies, the law enforcement authority of the University police, and policies and statistics about crime on campus. <http://www.dpss.umich.edu/>
- **Mental Health and Wellness Resources** <https://uhs.umich.edu/stressresources> & <https://caps.umich.edu/article/um-mental-health-resources>
- **Sexual Assault Prevention and Awareness Center (SAPAC)** provides educational and supportive services for the University of Michigan community related to sexual assault, dating and domestic violence, sexual harassment, and stalking. <https://sapac.umich.edu>
- **Spectrum Center**  
Spectrum Center provides a comprehensive range of education, information and advocacy services working to create and maintain an open, safe and inclusive environment for lesbian, gay, bisexual, and transgender students, faculty, and staff, their families and friends, and the campus community at large. <https://spectrumcenter.umich.edu/>
- **Services for Students with Disabilities (SSWD)** provides services to students with visual impairments, learning disabilities, mobility impairments, hearing impairments, chronic health problems and psychological disabilities, so they may enjoy a complete range of academic and non academic opportunities. <https://ssd.umich.edu/>
- **Student Legal Services (SLS)** is a unit of The Division of Student Affairs, is a full service law office available to currently enrolled students at the University of Michigan. Student Legal Services is staffed by attorneys who are licensed to practice in the State of Michigan as well as the United States District Court and the Sixth Circuit Court of Appeals. <https://studentlegalservices.umich.edu>
- **University Health Service (UHS)** is a health care facility, located on central campus that offers

many outpatient services in one building for U-M students, faculty, and staff. Many of UHS services provided to registered students are covered by the Health Service fee.

<https://uhs.umich.edu/>

### **Conflict Resolution**

- **Office of the Ombuds** is a place where student questions, complaints and concerns about the functioning of the University can be discussed confidentially in a safe environment. 6015 Fleming, Phone: (734) 763-3545  
<https://ombuds.umich.edu>  
**Office of Student Conflict Resolution (OSCR)** Promotes justice by facilitating conflict resolution for the Michigan community and creating a just and safe campus climate. 100 Student Activities Building, Phone: (734) 936-6308. <https://oscr.umich.edu/>
- **Rackham Graduate School's Designated Resolution Officer (RO)**  
Advises faculty, staff and students on matters related to student emergencies, crisis situations, disputes, and student conduct violations. The RO also provides information about Graduate School and University policies and procedures, makes referrals, and provides resources when appropriate. <https://rackham.umich.edu/academic-policies/section9/>

### **Resources of International Students**

- **International Center** University resource for international students, postdocs and faculty. Providing information on Immigration & Visas, Taxes and Social Security, Health Insurances and Forms. <https://internationalcenter.umich.edu>
- **International Student Associations** There a number of international student associations at the Michigan, here is a list <https://internationalcenter.umich.edu/students/international-student-associations>
- **UM International Student Loan Program** <https://finaid.umich.edu/international-students/>
- **Sweetland Writing Center** Courses, workshops and assistance for multilingual writers <https://careercenter.umich.edu/article/international-student-resources>
- **English Language Institute** courses, clinic and studios. ELI classes are small, interactive, and provide students with extensive one-on-one feedback. The curriculum is based on the latest research on the kinds of speaking and writing students need to achieve their academic and professional goals. The faculty provides every student with a high-level of personalized guidance and support. <https://lsa.umich.edu/eli/academic-english-courses.html>
- **Rackham International Resources website** <https://rackham.umich.edu/rackham-life/international-students/>
- **UM Career Center International Student Resources** including information on writing support, conversation and listening skills, Co-curricular engagement, US and Global Job/Internship Preparation and Search as well as graduate and professional school applications. <https://careercenter.umich.edu/article/international-student-resources>

### **Resources for Students with Children**

- **Students with Children Website** University resources for students with children. <http://www.studentswithchildren.umich.edu>
- **Child Care Subsidy Program** Students who have young, dependent children in childcare maybe eligible for this program, which provides funds to assist students with the cost of child care. <https://finaid.umich.edu/child-care-subsidy/>
- **UM Housing for students with children.** The University's Northwood housing is apartment style living with an active and kid-friendly social scene. They also have playground areas, basketball and volleyball courts, and softball fields. Many students with children and families live in the Northwood community. [www.Housing.umich.edu](http://www.Housing.umich.edu)
- **Graduate Student Parental Accommodation Policy.** This policy assists graduate students immediately following the birth or adoption of a young child. The purpose of this policy is to make it possible for a student to maintain registered full-time student status, along with all the benefits of such a status, while facilitating participate in courses, research and teaching. <https://rackham.umich.edu/navigating-your-degree/parental-accommodation-policy/>
- **University Childcare Resources.** On-campus childcare, emergency childcare and many more

resources.

<https://hr.umich.edu/benefits-wellness/work-life/child-care-resources>

- **Rackham Graduate Student Professional Travel with Children Grant.** The grant is intended to support Rackham graduate student parents who incur expenses while traveling with small children (under the age of 6) while attending conferences, workshops, meetings or other academic events as a part of their scholarly research or in pursuit of professional career readiness both within and outside of academia.  
<https://rackham.umich.edu/funding/funding-types/graduate-student-professional-travel-with-children-grant/>
- **Lactation Rooms on Campus** This list, provided by the Work/Life Resource Center, indicates the location of lactation rooms on campus.  
<https://hr.umich.edu/benefits-wellness/work-life/lactation-resources>
- **University Center for the Child and Family (UCCF)** This University of Michigan facility offers a comprehensive range of mental health services for children and families in the community.  
<https://mari.umich.edu/uccf>
- **University Center for the Development of Language and Literacy (UCLL)**  
The University Center for the Development of Language and Literacy provides language and literary services to adults and children. Their variety of programs helps families and individuals cope with the challenges of special education, learning disorders, learning disabilities, ADHD, ADD, and more.  
<https://mari.umich.edu/ucll>
- **Benefits Enrollment for Birth or Adoption**  
<https://hr.umich.edu/benefits-wellness/benefits-enrollment/changing-your-benefits/life-events/birth-or-adoption>