



UNIVERSITY *of*
ROCHESTER
MEDICAL CENTER

Toxicology Training Program

DEPARTMENT OF ENVIRONMENTAL MEDICINE

GRADUATE STUDENT HANDBOOK

For the

PhD Degree in Toxicology

August 2020

<https://www.urmc.rochester.edu/education/graduate/phd/toxicology.aspx>

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I. PREFACE

This handbook summarizes the policies that are unique to the Toxicology PhD Program at the University of Rochester. Additional details and regulations concerning graduate study at the University of Rochester can be found in the online Trainee Handbook, which is part of the Graduate Education and Postdoctoral Affairs (GEPA) website, e.g., the Graduate Studies Bulletin and the Regulations and University Policies Concerning Graduate Studies:

<https://www.urmc.rochester.edu/education/graduate/trainee-handbook/policies-benefits.aspx>

This handbook provides a summary of the most salient information. However, it is expected that students and faculty mentors regularly consult all resources because policies, guidelines, and deadlines continue to evolve in response to the changing needs of the graduate program and students and to new or modified rules. Thus, it is important that crucial decisions are verified with the Office of Graduate Education and Postdoctoral Affairs and/or the Program Coordinator or Program Director.

II. CURRICULUM FOR THE PhD

The Toxicology graduate curriculum consists of several components: (1) core course requirements, (2) seminar requirements, (3) elective course requirements, and (4) experimental research. It is our belief that research is the most important part of this doctoral training program. As such, the PhD degree is awarded only after a student has conducted an independent, hypothesis driven research project and then written a dissertation that demonstrates a high level of intellectual competence.

A total of 96 credit hours are required to complete the PhD program and The Graduate School requires an academic load of 16 credit hours per semester. A minimum of 30 graduate credit hours must be accumulated before taking the qualifying examination. The credits are accumulated from core courses, electives, seminars, and research (TOX 595, PhD Research in Toxicology); of the total, 24 credit hours must be course work credit. Given that toxicology is highly interdisciplinary, our curriculum reflects that a thorough grounding in basic sciences is indispensable. To ensure that our trainees obtain broad and in-depth knowledge necessary for success, in addition to the Core Curriculum, 6 credit hours as electives are required, and at least **3** of these credits must be from toxicology (TOX) electives.

A. Core Curriculum (required courses):

<u>Course No.</u>	<u>Course Title</u>	<u>Credits</u>
IND 431	Foundations in Modern Biology I	5
IND 432	Foundations in Modern Biology II	5
PHP 403	Human Cell Physiology	4
PHP 404	Principles of Pharmacology	4
TOX 521	Biochemical Toxicology	4
TOX 522	Organ Systems Toxicology	4
TOX 558	Seminar in Toxicology	1 (taken 4 times)
BST 467	Applied Biostatistics in the Biomedical Sciences	3
IND 501	Ethics and Professional Integrity in Research	1
TOX 597	Intro Faculty Research in Toxicology	0

Exemptions from the Core Curriculum: A student who is interested in an exemption from any core course listed above should discuss this with the Program Director, who will help determine whether this may be appropriate. Students should come to this meeting with the details about the content of prior graduate-level courses (description, syllabus) and the grade earned. After a review of this material, the Program Director may advise the student to take the required course, or the Program Director will give the green light for the student to request a formal exemption. To do this, the student must submit the request along with a comprehensive course description (i.e., including lecture syllabus) of a prior course, grade earned, and a little bit of other information. The request then needs to be reviewed and approved by the course instructor and the Senior Associate Dean of Graduate Education and Postdoctoral Affairs. The instructions and the form for making this request are found on the GEPA website on the forms page at the following link:

<https://www.urmc.rochester.edu/education/graduate/home/forms.aspx>

B. Seminar in Toxicology (TOX 558)

This seminar is designed to give graduate students experience presenting scientific matter to an audience of peers and experts, refine public speaking skills, and to assist in the development of the student's ability to identify critical problems and ask critical questions regarding a particular research area. Therefore, in addition to giving an oral presentation, all students are expected to be active participants in the course by asking questions and by providing written feedback to peers. The seminar must be taken 4 times before the thesis defense. It is offered every spring semester. Students in years 1-4 are required to register for and attend all seminars. Students in year 5+ are strongly encouraged to continue to attend the seminars.

First year students will give an oral presentation. Topic selection will be based on discussion with the Course Director, but will generally be derived from topics pertinent to toxicology and environmental health – often closely associated with one of the laboratories in which the student rotated. **Second, third, and fourth year students** will present a seminar based on their ongoing research. The order of student presentations will be distributed at or just prior to the start of the term and will generally proceed alphabetically by year with the fourth year students going at the start of the term (and first year students presenting at the end of the term). A grade of C or below will necessitate repeating the course by the student (e.g., required registration and giving an oral presentation during the 5th year). **Poor attendance can result in a failing grade.**

C. Elective Courses

Prior to the PhD thesis defense, a minimum of 6 credit hours must be earned from elective courses, and at least 3 of these credits must be from toxicology (TOX) electives. The selection of a strong supplementary course program should be conducted in consultation with the student's faculty advisor and thesis advisory committee. Some recommendations are provided below. However, this list is by no means exhaustive, and the frequency of these courses is approximate (see the link below for the Course Directory). While the Program strives to keep updated with electives offerings and schedules, it is important that you check the scope and availability of courses in any given year since offerings change over time: <https://cdcs.ur.rochester.edu/>

*Toxicology Electives**

#-Credits	Course Title	Instructor(s)	When Offered
TOX 501-1	Forensic Pathology for Tox.	O'Donoghue	Fall '21, '23
TOX 502-1	Forensic Toxicology	O'Donoghue	Fall '20, '22
TOX 503-1	Skin Toxicology & the Environment	DeLouise	Fall '21, '23
TOX 527-1	Immunotoxicology	Lawrence	Spring '21, '23
TOX 528-1	Gene-Environ. Interactions	O'Reilly/Mariani	Spring '21, '23
TOX 530-2	Repro/Dev Toxicology	Miller	Spring '21, '23
TOX 533-1	Neurotoxicology	Sobolewski	Spring '22, '24
TOX 564-1	Pulmonary Toxicology	Finkelstein/O'Reilly	Fall '21, '23
PM 470-3	Env. & Occupational Epidemiology	Rich/Jusko	Every fall
PTH 510-4	Cell Biology of Human Disease	Faculty	Every spring
PHP 405-2	Effective Scientific Communication	Glading	Every spring

*Note that not all of these are TOX classes; they nevertheless fulfill credits towards the TOX electives requirements

Selected Additional Electives^

#-Credits	Course Title	Instructor(s)
BIO 402-4	Molecular Biology	A. Seluanov
IND 426-2	Science Communication for a Diverse Audience	D. Markowitz
GEN 506-4	Stem Cell Biology	C. Pröschel
NSC 512-5	Cellular Neuroscience	J. Holt
PTH 507-3	Cancer Biology	H. McMurray
MBI 473-3	Immunology	A. Livingstone
IND 447-4	Signal Transduction: Cell & Mol. Mechanisms	R. Freeman
BST 463-3	Introduction to Biostatistics	H. Yang

GEN 508-4 Genomics and Systems Biology
 PM 415-3 Principles of Epidemiology

A. Samuelson
 T. Jusko

^ These are provided as examples. Courses, especially electives, change regularly and new courses are created. If a course is not listed as an approved elective, but a student would like to have it considered as an elective course for his/her program of study, please discuss with your advisor, thesis advisory committee and then contact the Program Director. Providing a course description and summary of lecture topics is generally required for consideration.

D. Typical Program of Courses for Toxicology PhD Students

First Year, Fall

IND 431 Foundations in Mod. Biol. I (5*)
 PHP 403 Human Cell Physiology (4)
 IND 501 Ethics and Professional Integrity in Research (1)
 TOX 595 PhD Research in Toxicology (6)
 TOX 597 Introduction to Faculty Research in Toxicology (0)

First Year, Spring

TOX 521 Biochemical Toxicology (4)
 PHP 404 Principles of Pharmacology (4)
 IND 432 Foundations in Mod. Biol. II (5)
 TOX 558 Toxicology Seminar (1)
 TOX 595 PhD Research in Toxicology (3)

Second Year, Fall

TOX 522 Organ Systems Toxicology (4)
 TOX 595 PhD Research in Toxicology (12)

Second Year, Spring

BST 467 Applied Biostatistics in the Biomedical Sciences (3)
 TOX 595 PhD Research in Toxicology (12)
 TOX 558 Toxicology Seminar (1)

Third Year, Fall

TOX 595 Research in Toxicology (13)
 Electives (3)

Third Year, Spring

TOX 558 Toxicology Seminar (1)
 TOX 595 PhD Research in Toxicology (15)

Fourth Year, Fall

TOX 595 PhD Research in Toxicology (16)

Fourth Year, Spring

TOX 558 Seminar in Toxicology (1)
 TOX 595 Research in Toxicology (15)

*Number of credits appears in parentheses.

Students continue to earn credit until their final semester. Once all other coursework is completed, students must register for 16 credit hours of TOX 595 (Research in Toxicology) each semester. If planning to defend during the upcoming semester, please register for TOX 999 (Doctoral Dissertation).

III. PROGRESS TOWARD THE PhD DEGREE: BENCHMARKS AND TIMEFRAME (i.e., deadlines)

A. Timetable for Laboratory Rotations and PhD Research

First Year:

Aug Begin lab rotation #1, August – October
 Nov Begin lab rotation #2, November – January
 Feb Begin lab rotation #3, February – April
 These are suggested time frames. A fourth rotation is possible, particularly if one of your rotations is shorter in duration.
 May or June Provide summary (10-15 min oral presentation, or poster) of accomplishments during laboratory research rotations at the annual Tox Program Retreat
 May or June **Select thesis advisor** and inform Program Director and Program Coordinator of your selection.

Second Year:

Sept-Dec Select members of thesis advisory committee
 Jan-May Hold first meeting with Thesis Advisory Committee (this meeting should be held no later than the week of the student's first TOX 558 seminar presentation)
 May-Aug Thesis research; Qualifying Exam preparation (i.e., set a date; discuss project goals with Thesis Advisor and Thesis Advisory Committee)

Third Year:

Aug-Jul	Thesis research
Aug-Oct	PhD Qualifying Examination (Thesis Proposal): This must be completed (passed, with any required corrections reviewed by Committee) by October 15 th of the 5 th semester to maintain good academic standing
Jan-May	Meeting with Thesis Advisory Committee (this meeting should be held during the same week as the student's spring seminar presentation if possible)

Fourth Year:

Jan-Dec	Thesis research, manuscript preparation
Jan-May	Give last TOX 558 seminar; Meeting with Thesis Advisory Committee

Fifth Year: Thesis research, write dissertation, career plans (e.g., look for a post-doctoral position); defend PhD thesis

B. Laboratory Rotations

Rotations provide students an opportunity to familiarize themselves with a range of laboratory environments, research topics, mentoring styles, techniques, and approaches to research. Laboratory rotations also give faculty mentors the opportunity to get to know students better and to evaluate their work ethic, work habits, and approach to research, as well as overall research interests and aptitude. It is important for students to realize that evaluations during each laboratory rotation are a two-way process.

Students must begin a laboratory rotation immediately upon entering the program and must always remain actively engaged in laboratory research. To arrange rotations, students contact individual faculty members well in advance of the hoped-for start date. Students should discuss possible rotations with more than three faculty mentors so that possible rotation options are thoroughly explored and to ensure that space is available at the proposed time.

All rotations should have a rotation plan, prepared by the faculty mentor and given to the student at the beginning of the rotation. There is no specified format, but the document should contain a brief overview of the dates of the rotation, the goals of the project, and the faculty mentor's expectations of the rotation. The faculty mentor should also specify the format of the rotation summary (written, oral, or both) that is to be completed by the student at the end of the rotation period.

All rotations must be evaluated by the student and the faculty mentor. In addition to meeting to provide verbal feedback and discuss the rotation, written evaluations need to be completed by both the student and the faculty mentor. Evaluation forms are found on the GEPA website:

<https://www.urmc.rochester.edu/education/graduate/home/forms.aspx>.

The GEPA Office updates these forms from time to time. It is the student's responsibility to make certain that the most current evaluation form is used, and that the evaluation is completed in a timely manner. Forms should be turned in (electronically) within 1 week of completion of the rotation.

C. Evaluation of Progress

Obtaining mentoring, guidance, and constructive criticism are important aspects of developing into a PhD level scientist. Students are encouraged to seek advice from many sources as they cultivate the knowledge and skills necessary for success. Outlined herein are the required evaluation and assessment processes; however, this does not mean that other sources of guidance are not also encouraged (e.g., additional mentors are encouraged, including other faculty and peers).

Individual Development Plan (IDP): All graduate students are required to have an IDP (Individual Development Plan) in place. Tips and instructions for developing your IDP can be found at <http://myidp.sciencecareers.org/>. Students should start developing an IDP early during graduate school and revisit this throughout their time in graduate school (and beyond). The Senior Associate Dean for Graduate Education requires that all students have an IDP in place no later than the beginning of the third year of study.

Annual Reviews: Students are required to conduct an annual self-evaluation and receive feedback from faculty regarding their progress. The annual evaluation process for first year students differs slightly from that of all other students; therefore, this process is described below in two parts. This process is not only required by the Program, but by the Senior Associate Dean for Graduate Studies, who requires that each doctoral student's faculty mentor/thesis advisory committee submit a Progress Report by June 30th of each year. Forms can be found at and downloaded from the GEPA website: <https://www.urmc.rochester.edu/education/graduate/home/forms.aspx>. It is the student's responsibility to make sure this process occurs each year.

First Year Students: The Program Director serves as the advisor for all first-year students. Students are encouraged to seek guidance from the Program Director as needed throughout the academic year. At a minimum, students must schedule a meeting with the Program Director at the end of their first year in residence (generally in June). Also, the Program's Steering Committee will evaluate and discuss the progress of all students. This evaluation will include academic performance, rotation evaluations, and attendance and participation in Program and University functions. Also considered will be whether the student has selected a Thesis Advisor. The results of this meeting are communicated to each student in a meeting with the Program Director, who will also provide a summary of this evaluation to the Senior Associate Dean for Graduate Education.

All other students: Students should seek input from their mentor, members of their Thesis Advisory Committee, and other faculty as needed. However, at a minimum, students are required to meet with their full Thesis Advisory Committee at least once per year. Ideally, these annual committee meetings will be held during the same week (and preferably on the same day) as the student's spring seminar. For students in years five and above, this annual meeting should be held before June 15th.

D. MD/PhD Students in Toxicology

MD/PhD students typically enter the PhD portion after the basic science years of the MD curriculum. During their first and/or second year of the MD program, they should discuss the PhD program in toxicology with departmental faculty and the Director of the Toxicology Graduate program. During this period, they should evaluate possible dissertation research mentors. Research rotations in two or three prospective labs are conducted, typically in the summer before their entry into the PhD program.

Based on their basic science courses in the medical curriculum, MD/PhD students are granted 30 credits toward the 96-credit requirement for the PhD. Thus, many of the required courses for Toxicology PhD candidates (i.e., IND 431, IND 432, PHP 403, and PHP 404) are waived for most MD/PhD students. 30 credits can only be transferred IF the student earns more than 96 credit hours of PhD research. Please refer to the University policy on credit sharing between 2 degrees.

The required courses are: TOX 521, TOX 522, and BST 467. In addition, each student is required to take the Toxicology Student Research Seminar (TOX 558 – 1 credit hour) and Ethics (IND 501). Additional courses are typically small group seminars and journal clubs (1-2 credits) where students learn how to critically evaluate and orally present recent literature.

For the PhD portion of the combined MD/PhD, students take an oral qualifying examination based on their proposed thesis research at the end of their second year of study or by the end of their 5 semesters. Typically, the combined degree students complete the PhD portion in 3-4 years.

IV. SATISFACTORY PROGRESS

Though formally admitted to the Graduate Program in Toxicology, this admission is provisional in the sense that the student must satisfactorily complete a minimum course credit requirement and pass the Qualifying Examination before being formally admitted to candidacy for the PhD. Thus, admission to the program does not guarantee a degree. Earning a PhD entails completing all coursework, passing the qualifying exam, moving a research project forward in a substantive and demonstrable manner, writing and defending a thesis, and successfully meeting specific deadlines along the way.

Satisfactory progress is addressed in a statement under "Grades" in the University's Official Bulletin, "Regulations and University Policies Concerning Graduate Studies":

<https://www.urmc.rochester.edu/education/graduate/trainee-handbook/policies-benefits.aspx>.

One measure of progress is the grade earned in course work. Academic probation results when a student receives a C (or D) grade. **A second grade of C or lower is cause for immediate dismissal from the graduate program. Likewise, a single failing (F) grade results in immediate dismissal from the University.** Satisfactory progress is also measured by performance in the research setting and by meeting required deadlines. The Program Director, Faculty Mentor, and Thesis Advisory Committee evaluate these metrics of progress and performance. Poor performance in these areas can also result in academic probation or dismissal.

V. RESEARCH ADVISORY COMMITTEE

The Program Director initially advises new students on the selection of courses and other educational opportunities such as laboratory rotations. As the interests of the student become clarified and a thesis advisor is identified, the composition of the final committee becomes more formalized. Any difficulties in the advising process should always be brought to the attention of the Director of the Toxicology Program.

Selection of a research mentor is crucial to advancing through the academic and research requirements of the Toxicology Training Program. Careful attention to this is essential, and students are encouraged to explore all avenues for collecting information that will impact this decision. Such information may include research interests, publications, activity and funding of the research program, relationship of this work to toxicology, previous history of mentoring students and postdoctoral fellows, the number of people in the laboratory, and the level of training of these individuals. Given that this is an important commitment for the mentor, adequate discussions should take place to ensure that both parties agree about the relationship that is being established. Once a thesis advisor has been selected, the student needs to inform the Program Coordinator and Program Director (email is acceptable and it is generally good etiquette to copy the faculty mentor whose laboratory you are joining).

Only those faculty who are formally listed as members of the Toxicology Training Program (<http://www.urmc.rochester.edu/education/graduate/phd/toxicology/faculty/>) can serve as primary thesis advisors for students in this program. The recruitment of new faculty mentors who are conducting exceptional research related to the discipline of toxicology, and who will be strong mentors to our students remains a continuing objective of this program. Thus, a student's request to work with a faculty member who is not formally listed as a mentor in the Toxicology Training Program is viewed by the Director and the Steering Committee as a welcome opportunity to promote growth of our program. If a student desires to work with a tenured or tenure track University faculty member who is not already part of the program, then the Program Director and the Training Program Steering Committee must formally approve this. As part of the requirement for approval, the student must present, in writing, a request for such approval. This request should give the reason why the particular faculty was chosen over other faculty mentors in the Toxicology Program, a brief outline of the research topic that will be pursued with the faculty mentor, and a statement explaining the relationship of this research to the discipline of toxicology. The faculty member also needs to write a letter to the Program Director indicating his/her commitment to join the Toxicology Program, willingness to serve as thesis research advisor to the student, and commit to financial support for the student's doctoral program of study. The intention of this process is to ensure that students in the Toxicology Program are working with exceptional faculty who are able to support and assist in the students' research endeavors, and to comply with the requirements of the National Institute of Environmental Health Sciences Toxicology Training Grant that supports most of our students. Additionally, if the chosen faculty member has relatively little research trainee mentoring experience, they will be paired with a more senior training program mentor, who will serve as a co-mentor and is part of the trainee's advisory committee, meeting with the trainee and mentor at least once every six months.

As soon as the student has selected an advisor and a thesis project, they must form a thesis advisory committee. This committee will consist of the mentor and at least three other faculty members. At least two committee members must be members of the Toxicology Training Program, and at least one must be from outside of the Toxicology Training Program. After establishing a Thesis Advisory Committee, students must inform the Program Coordinator and Program Director about who is on the committee

(email is acceptable, there is no form to fill out).

Once the thesis advisory committee has been formed, it must meet with the student at least once a year during the student's tenure in the program, no later than June of each calendar year. It is the student's responsibility to schedule this annual meeting. In the event that research directions are substantially altered such that the composition of the Advisory Committee should be changed, this needs to be coordinated through the Program Director. If a committee member leaves the University, it is generally advised that the student should make plans for a replacement, following the same composition rules outlined above (with regard to Program member vs. non-member faculty).

VI. PhD QUALIFYING EXAMINATION

A. General Procedures

The Qualifying Examination *must* be completed (i.e., written and passed) by October 15 of the third year to maintain good academic standing. Students must have completed 30 or more credit hours before examination can be scheduled. Provided here is an overview of the process, followed by detailed guidelines. Briefly, the student prepares a written research proposal and presents it to their thesis advisory committee. The proposal should describe a specific problem, provide pertinent background information, initial exploratory or feasibility studies, and a tentative outline of the work planned (this is described in greater detail below).

B. Overview

The purpose of the Qualifying Examination is to determine whether the student is qualified and competent to conduct research on a specific project leading toward a PhD in Toxicology. The examination serves as a means of determining the potential of the student for independent thought, comprehension of the generalities and the specifics of the field(s) related to the research area, and of the elements of logic necessary for hypothesis-driven scientific research. Issues to be addressed in the document include identifying knowledge gaps and critical questions in the field that will be addressed, and cogent explanations of the critical experiments to be executed. Research should be chosen that will lead to publishable results and must have clear linkage to toxicology and environmental or public health. As such, the significance of the work is an important consideration. In addition, the Qualifying Examination serves as a point at which the student's overall breadth and depth of knowledge will be probed, and is an opportunity for significant feedback from the thesis advisory committee to enhance and/or modify the future path of the project. *Extensive data are not necessary for the Qualifying Examination process to be initiated.* Indeed, it is not necessary for the student to generate a large body of data prior to taking the Qualifying Exam.

C. Preparation

Well in advance of writing and submission of the proposal, the student should meet with his/her Thesis Advisory Committee to discuss the overall ideas of the project and obtain their approval to proceed with the exam. This meeting should provide an overview of the student's thinking and draft Aims, but should not transform into the actual qualifying examination. At this meeting, it is strongly encouraged that a specific date for the exam be set. If not set at the meeting, then the student needs to work with the committee to set a date (e.g., via email or a Doodle poll). The examination can only proceed following the approval of all committee members.

D. Specific Procedures

The organization of the proposal is structured using a format that is similar to NIH research grants, since this is a common paradigm in biomedical research. Students must follow the guidelines as given below or the document will be returned to them.

- The text should be single-spaced, and the size can be no smaller than 11 point Arial font, with ≥ 0.5 inch margins.
- Pages must be numbered

- Figures should be "full sized" with legible fonts (resist the temptation to excessively reduce the size of figures to fit into a tight space).
- The required order and page limits for each of the various sections are given below. *Do not exceed these limits.*
- A Table of Contents is not required and should not be included.

1) Cover page: This should provide the student's name, name of the mentor, and a title of the proposed research project. This does not 'count' in the page limits and should not be numbered.

2) Second page: This page should contain two separate elements: ① the project summary and ② the statement of relevance.

- **Project Summary:** Provide a succinct and accurate description of the proposed work when separated from the remainder of the document. State the broad, long-term objectives and specific aims, making reference to the health relatedness of the project. Describe concisely the overall hypothesis to be tested, research design, and methods for achieving the stated goals (do not provide methodological details, just an overview). This section should be informative to people working in the same or related fields, and insofar as possible understandable to a scientifically or technically literate reader. Avoid describing past accomplishments and using the first person. **Do not exceed 3/4 page.**
- **Relevance:** Using no more than two or three sentences, describe the relevance of this research to toxicology and environmental or public health. In this section, be succinct and use plain language that can be understood by a general, lay audience. **Do not exceed 3 sentences.**

3) Specific Aims: Concisely state the central hypothesis to be tested, goals of the proposed research, and summarize the expected outcome(s), including the likely impact that the results will have. Clearly indicate what is novel and important. Succinctly present the specific objectives (Aims) of the research proposed (e.g., to test a stated hypothesis, create a novel design, solve a specific problem, challenge an existing paradigm or clinical practice, address a critical barrier to progress in the field, or develop new technology). **Do not exceed 1 page.**

4) Research Strategy (Do not exceed 12 pages for this section): Organize the Research Strategy in the specified order and adhere to the instructions provided below. Start each section with the appropriate section heading: **Significance, Innovation, Approach**. Cite published experimental details in the Research Strategy section and provide the full reference in a separate **References Cited** section.

- The Reference section does NOT count in the page limit; however, figures and tables are included within this page limit.
- The guidelines below regarding the number of pages for each section within this 12-page limit are intended as guidelines (not rules). Depending on how you craft your document, the number of pages in each section may vary.

(a) Significance (1-2 pages)

- Provide an analysis of the strengths and weaknesses of previous research in the field.
- Explain the importance of the problem or critical barrier to progress in the field that the proposed research project addresses.
- Explain how the proposed project will improve scientific knowledge, technical capability, and/or environmental/public health.
- Describe how the concepts, methods, technologies, etc., that drive the field will be changed if the proposed aims are achieved.

(b) Innovation (~1/2 page)

- Explain how the research challenges a current problem or will shift knowledge, research approaches, public health, or clinical practice paradigms.
- Describe novel theoretical concepts, approaches or methodologies, instrumentation or intervention(s) to be developed or used, and any advantage over existing methodologies, instrumentation or intervention(s).

- Explain any refinements, improvements, or new applications of theoretical concepts, approaches or methodologies, instrumentation or interventions.

(c) Approach (~10 pages)

- Describe the overall strategy, methodology, and analyses to be used to accomplish the specific aims of the project. Include how the data will be collected, analyzed, and interpreted. Describe the controls that will be used in the proposed experiments.
- Include a defense of sample size and explain the units of replication. This point and the preceding one contribute to a thorough description of scientific rigor.
- Discuss preliminary studies, knowledge, data, and/or experience pertinent to this application.
- Discuss potential problems, alternative strategies, and benchmarks for success (i.e., what do you expect to learn, what are some limitations of the methods you plan to use, are there ways to deal with technical limitations, how will you know you have achieved your goals, what will you do if you encounter unexpected results?).
- If the project is in the early stages of development, describe your strategy to establish feasibility, and address the management of any high-risk aspects of the proposed work.
- Describe how you will evaluate the impact of relevant biological variables like sex, age, body weight, etc., if these are not inherent to the study design. If these variables are not included in the study design, explain briefly why they are not.
- Point out any procedures, situations, or materials that may be hazardous and precautions to be exercised.

HELPFUL SUGGESTION: Integration of information within and across these sections is done effectively using many approaches. **Reading some qualifying exams and research grants is highly recommended.** Herein a few suggestions for effective organizational strategies are presented as a guide. Most research projects have more than one Specific Aim. It is generally clearer to readers to have Significance and Innovations sections for the overall project, and then write a separate Approach subsection with details for each Aim. Within the Approach section, an effective style is to have the following sub-sections within each Aim: (1) Rationale and Hypothesis, (2) Experimental Approach, (3) Possible Experimental Outcomes (and how they would be interpreted or used to move you forward), and (4) Possible Difficulties and Alternate Approaches.

5) References: Provide the *complete* citation for all literature cited in the Research Plan. A summary of current practices and expectations for an acceptable format for the Qualifying Exam is outlined below:

- For peer reviewed papers, review articles, and other print (including e-print) materials: each reference must include the name of all authors (in the same sequence in which they appear in the publication), the article title, journal or book title, volume number, page numbers, and year of publication.
- For solely web-based citations, provide the author(s) if known, the date posted (if indicated), the source, the URL, and the most recent date accessed by you.
- It is important to be concise and to select only those literature references pertinent to the proposed research. As a guideline, 30 references would be too few, yet 300 would be too many. Do not reference a paper that you have not read.
- **Formatting:** Use one of the following two methods:
 - A. At the end of the sentence, within parentheses, indicate the last name of the first author and the year published. If there is more than one author, include *et al.*, after the name. For example: (Smith *et.al.*, 1998). List all cited work in alphabetical order (by the first author's last name) in the References section.
 - B. At the end of the sentence, within parentheses use a number to denote each reference. For example: (1). List all cited work in numerical order in the References section.

HELPFUL SUGGESTION: Select a top-tier journal in your field and carefully review their *Instructions to Authors* regarding the correct format for literature citations

6) Appendix: Graphs, diagrams, tables, and charts that further support the proposal may be included in this section. The use of graphical material is encouraged, provided that it aids in the interpretation and effectiveness of the written material. However, do not use this section to circumvent page limits for the exam.

E. Scheduling the exam

When the date has been selected, the student needs to inform the Program Coordinator of this date. **This notification must be officially made in writing (email is acceptable) at least 21 working days in advance of the exam. Failure to follow this rule may result in the need to postpone your exam.** The Program Coordinator will help find a room for the examination, and work with the student to get the required paperwork filed with the Senior Associate Dean for Graduate Education's office.

F. Submission of the written document

The written document **must be delivered to the entire committee no less than 10 business days** before the date of the oral exam (i.e., roughly two weeks before the exam). Hard copies are typically provided to the committee members; however, if a committee member prefers electronic version, then this is acceptable.

HELPFUL SUGGESTIONS:

It is ***strongly advised*** to have someone, (i.e. a more senior lab member familiar with the area of study) read your Qualifying Exam document before submitting it to your mentor and committee. In fact, it is wise to have more than one person provide you with constructive feedback on your document. Moreover, you are encouraged to obtain input and guidance from your faculty mentor; however, they are not permitted to write sections for you.

It is ***strongly advised*** to have several peers (e.g. students who have passed the exam and/or postdocs familiar with the broad topic area) conduct a mock oral exam, to practice answering questions 'on your feet.' The faculty mentor and members of the Thesis Advisory Committee are, of course, not permitted to participate in this practice oral exam.

G. The Qualifying Examination

The Qualifying Examination consists of a closed session with the Thesis Advisory Committee, with one member selected by the Senior Associated Dean to serve as Chair of the Examination process. The oral examination usually lasts between 2 to 3 hours. The candidate is judged on the following criteria:

- (1) Written and oral presentation of the thesis proposal;
- (2) Grasp of the fundamental issues and theoretical basis for the experimental approaches;
- (3) Knowledge of alternate approaches to achieve the outlined goals; and
- (4) Ability to critically evaluate a research area, to propose a relevant hypothesis, to design critical experiments to test the hypothesis, and to critically assess potential results of proposed experiments. The student should prepare slides for the exam that briefly explain the rationale, hypothesis(es) to be tested, and descriptions about the specific aims, i.e., the highlights of the written document. However, this portion of the exam should last ~15-20 mins; if the presentation extends beyond this period, the Committee is likely to interrupt and begin asking questions. The student should also be prepared to write additional material on a chalk/white board in response to questions. The Committee will meet privately at the conclusion of the oral examination, determine if the student has passed, and formulate a report to the Senior Associate Dean. Directly after this discussion, the committee, led by the Exam Chair, will meet with the student to discuss strengths, weaknesses, and recommendations. The student will be informed of the examination results at this time, of which there are three possibilities: pass, pass pending

modifications to the exam document, or fail. If document modifications are required, a maximum of 14 calendar days are allowed for completion. This includes all changes made by the student, a final review by the Committee, and a report to the Dean saying that the changes are acceptable. If it becomes clear that more than 14 days will be needed to complete the modifications, retaking the exam should be seriously considered. Failure of the Qualifying Examination, which can result from recommendations by only two of the four examination committee members, requires one of two possible actions based on the final guidance of the Thesis Advisory Committee: (1) dismissal from the graduate program in Toxicology or (2) repeat of the qualifying exam. Except under unusual circumstances, the second should most often be the case. If a repetition of the Qualifying Examination is required, the University requires a waiting period of 6 months before the Qualifying Exam may be retaken. Failure of the examination the second time will result in dismissal from the program per the recommendation of the advisory committee and the Program Director.

VII. ANNUAL REVIEWS

The University requires each student to meet with the Thesis Advisory Committee at least annually. To aid in this evaluation process, the Senior Associate Dean for Graduate Education's office provides a form that needs to be filed out each year by the student, mentor and committee members. This form is available on-line (<http://www.urmc.rochester.edu/education/graduate/home/forms.cfm>). Completion of this form each year is a necessary condition for continued stipend support.

As stated in Section III.C, first-year students are not required to have a thesis advisory committee meeting, but are required to meet with the Program Director by June 15. Thereafter, students should meet with their Thesis Advisory Committee at least once per year. Ideally, in years 2-4, a meeting with the Thesis Advisory Committee should occur during the same week as the student's TOX558 seminar. For students in years five and above, this annual meeting should be held before June 1. It is the student's responsibility to schedule these meetings, download the form, and fill in the student portions of the form before electronically sharing a copy with faculty. The mentor and thesis advisory committee members will complete the faculty portion of the form after the meeting. After receiving approval of the content from all committee members, the form will be electronically submitted, as per the detailed instructions provided on the form.

VIII. WRITING THE THESIS

A booklet entitled "*Preparing Your Thesis*" is available online at <https://www.rochester.edu/Theses/> or from the Program Coordinator's office. This material provides specific information on the format to be followed. It is the student's (not the mentor's) responsibility to ascertain that the format of the thesis meets the approval of their Thesis Advisory Committee and follows all rules set forth by the University. The committee for the final examination decides on the acceptability of the quality of the research and the method of presentation (written and oral), following all University guidelines.

The thesis (and all published papers) must explicitly acknowledge all sources of financial support. It is essential that students also acknowledge any individuals who assisted in the work presented, and clearly describe their specific roles. All data reported in the thesis that were not generated by the PhD candidate must be explicitly noted along with the source of the particular data.

It will usually take three to four months to prepare the thesis (after all of the laboratory work is complete), and the most common mistake lies in not allowing adequate time for writing and the preparation of figures. The cost of thesis preparation and copying is the responsibility of the student. Students should notify the Program Coordinator before the actual process of preparing the thesis is started. In this manner, the Program Coordinator can assist the student with the complex process of meeting all due dates of this final part of the PhD process.

Students wishing to leave the program (to take a postdoctoral position, for example) before submitting the final version of their thesis must obtain prior approval from their primary mentor and the Program Director. However, this early departure is strongly discouraged, and thesis advisors are not obligated to support these requests. It is strongly recommended that students complete the writing of all publications

derived from the thesis work prior to leaving the program. In the past, some students have left the program to take another position prior to completing these publications. Most often, the responsibilities of the new position have not allowed adequate time to complete the publications in a timely manner. In the long run, this practice is not good for the student's career, the advisor's grant, or the training program. Since the publication of research data prior to program completion is typical of most PhD programs, students will then be in a position to compete favorably with other job applicants.

IX. THESIS PREPARATION AND REGISTRATION PROCESS

The University establishes all guidelines and policies regarding preparation and submission of a doctoral thesis. Students are responsible for following the current rules, but the Program Coordinator is responsible for completing and submitting all the required forms. Communication and advanced planning are essential parts of this process. Therefore, after discussing plans with the Thesis Advisor and entire Thesis Advisory Committee, the student needs to inform the Program Coordinator and Program Director via email of plans to move forward with thesis preparation. This is typically done about 6 months prior to the dissertation defense. ***The timeline for the thesis defense is detailed and changes frequently.*** Thus, it is best to be in regular contact with the Program Coordinator and to ensure that the paperwork is submitted in a timely fashion. The timeline itself can be found here:

<https://www.urmc.rochester.edu/education/graduate/trainee-handbook/academic-resources/thesis-defense.aspx>

Below is some general information about scheduling the defense:

- Working with the thesis advisor, **3 individuals** will be nominated to serve as Chair for your defense. Brief guidelines regarding who may and may not serve as the Chair:
 - Must be a faculty member in the tenure track or with tenure
 - Must NOT be in the thesis mentor's primary academic department
 - Must NOT be a collaborator (i.e., the student, mentor, nor any members of the thesis advisory committee should have no co-authored papers with chair nominees in the past 3 years, nor should the chair nominee be working on something with the student or mentor that is not yet published).
- Students and mentors contact members of the Thesis Advisory Committee AND the appointed Defense Chair to set a specific date and time for the defense. Check the Academic Calendar for updates and 'blackout dates.'
- Poll your Advisor, Advisory Committee, and Defense Chair to determine their preference for thesis format (hard copy/pdf).
- At least 25 full business days prior to the scheduled defense date, a copy of the thesis must be given to the Committee members and the Defense Chair.

X. THESIS DEFENSE

You have worked hard to get to this point, so you should be feeling proud of your accomplishments! The defense is an important day in the life of a graduate student and, indeed, in the lives of those who care about you. Please keep in mind that your committee wants you to be successful in the defense. However, it is their job to ask difficult questions to determine your readiness for a scientific career. The defense is not a mere formality. It is your last exam of graduate school.

The PhD thesis defense in Toxicology is held in the following format: The first hour of the exam is a public seminar open to the faculty, students, research staff at the University, and as well as any guests. The student's presentation should last about 50 minutes, with about 10 minutes allowed at the conclusion for questions from the audience. The student should be selective about the material presented, so that the seminar does not exceed the time available. Notes, slides, charts, and the usual visual aids for a seminar are permitted; however, the student needs to make arrangements for special audiovisual equipment well in advance. Following the seminar, the student and the examining committee will adjourn to a closed session, where the remainder of the exam will be conducted.

At the start of the closed-door exam, the student will be asked to leave the room for a short period of time. Upon returning to the room, questioning for the oral exam typically lasts 1.5-2.5 hrs. At the end of

the oral exam, the student will be asked to leave the room. The committee will come to consensus regarding whether or not the student passed. The results of the closed oral exam and any changes required in the written document are communicated directly (verbally) to the student immediately at the end of the exam. The Chair of the examination committee is charged with the responsibility of conveying the results of the examination in writing to the Senior Associate Dean for Graduate Education and the Vice-Provost and Dean of Graduate Studies.

After successful completion of the PhD oral examination, and after making any necessary corrections in the thesis document, the student must submit a copy of their dissertation in the formats required by the University. A bound hard copy is submitted to the Program Coordinator and will be kept in the student room where all PhD theses are kept. Students typically give a bound, corrected copy of the thesis to each of the committee members. Although not mandated by the program, students should determine whether the committee members want a final copy.

The student must maintain continuous enrollment up until the time of submission of the corrected thesis to the Office for Graduate Education and Postdoctoral Affairs. If registration must be continued into a new semester, the student must register for TOX 999 - Doctoral Dissertation and pay the appropriate fee.

XI. GENERAL POLICIES

A. University-based training. Students are responsible for obtaining and maintaining compliance with all required training as is necessary for their work in laboratory settings. Such training includes, but is not limited to, lab safety, HIPAA, and UCAR protocols and procedures.

B. ORCID IDs. Per NIH requirements for institutional training grants, all trainees are required to obtain an Open Researcher and Contributor Identifiers (ORCID) ID. The ORCID ID is a “persistent digital identifier that distinguishes you from every other researcher and ... supports automated linkages between you and your professional activities, ensuring that your work is recognized.” There is no fee to establish an ORCID profile and it can be linked to the one that you maintain within eRA Commons. A profile can be established via a link in Commons or by visiting the ORCID website directly: www.orcid.org.

C. Space. The Program Coordinator will assign 1st-year students a desk from the general departmental “pool” of office space. Once a research advisor has been chosen, the student will be given a desk in the advisor’s area.

D. Work hours. Daily attendance in the laboratory is required unless you are in class, attending a journal club, seminar or other on-campus event, or you are ill, there is illness in the family, or you are attending an off-site research conference. Students should discuss expectations regarding work hours and attendance with the faculty member who runs the lab they are in. Scientific research often requires workdays that are longer than the traditional 8-hour workday. Sometimes work will need to be performed on Saturdays and Sundays to initiate or complete research projects. Unexplained absences of a continuous nature may result in loss of laboratory privileges, reduction to or loss of financial support, or a failing grade on research credits (which would result in expulsion from the program).

E. Keys and IDs. Keys, ID cards and electronic access codes to laboratories and other rooms at the University and Medical Center are never to be loaned out or given to other individuals. Sharing your keys or ID with another person, even if they work at the University, can result in loss of access privileges.

F. Travel: Students are encouraged to present their research at scientific conferences. The costs for attending the meeting in which a student presents research are generally paid by the student’s mentor; however, this is not guaranteed. When possible, and with advanced approval, the Toxicology Training Program can sometimes help with these expenses. Costs to attend meetings in which the student is not presenting are typically not supported by the mentor or program.

Generally, each student traveling needs to contact the Program Coordinator in advance of submitting abstracts, registration, or making any travel plans, so that the proper payment methods are followed.

Failure to do so may result in the student paying for his/her own expenses, and not being reimbursed until the completion of their travel. While traveling, make sure to retain all pertinent receipts, including conference registration receipts, airline ticket receipts, parking, taxi, meals, and housing. Expenses not covered include alcoholic beverages, internet access fees, in-room services (including meals), and family member expenses. Reimbursement for travel by personal vehicle requires prior approval. Travel receipts for reimbursement are due to the Program Coordinator within one week of return.

The following section outlines rules and regulations that pertain to student travel. **Failure to follow these guidelines may result in the student or mentor not being reimbursed for expenses.**

- Discuss your interest in attending a specific conference with your mentor well in advance of deadlines. Discuss anticipated expenses and plans to cover expenses.
- Prepare abstracts well in advance of submission deadlines, and never submit abstracts without review by and approval of all authors on the abstract.
- Abstract submission fees, meeting registration fees and, if necessary, airline tickets, should be discussed with your mentor and with the Program Coordinator well in advance of the deadlines. Not doing so could result in not being reimbursed until after travel is completed (or not being reimbursed at all).
- Itemized receipts for all meals, taxis, and all other expenses are required. Failure to provide itemized receipts will result in not being reimbursed for these expenses. This is a policy of the University.
- As a guide to reasonable daily costs for meals, the University is willing to reimburse for meals up to \$40-50/day, depending on the meeting location. Excessively expensive meals may not be reimbursed.
- Alcoholic beverages are not reimbursable expenses. If they are included on the receipt, please cross them out with a pen and deduct this cost from the total on the receipt.
- Non-meal related incidentals are not reimbursable (e.g., snacks, bottled water, in room wifi access)
- Students should advise the hotel when making their reservation that separate bills (folios) need to be prepared for each occupant when a room is shared. This alleviates confusion at the time of reimbursement, since travel reimbursement forms are submitted for individual travelers.
- Many research conferences and scientific societies offer student travel awards. Students should apply for these awards in order to relieve pressure on the limited travel funds available from mentor's grants and the training program.

G. Vacations: Graduate students are expected to be engaged in full-time study for the entire 12 months of a calendar year. Graduate students do not follow the University break schedules for undergraduate students. Graduate students are entitled to official University Holidays and may receive up to ten days (two weeks) of personal time off per year (July 1 to June 30). All absences need to be approved by the student's mentor or by the Program Director for those students that have not yet selected a mentor. For planned absences of more than 5 consecutive business days, the Program Director should be notified (email is acceptable). Any student who takes an unauthorized leave risks having his/her stipend terminated. The Program Coordinator's Office must submit monthly time reports on all graduate students, and these are subject to close scrutiny by auditors from both the governmental accounting office and the University. Unjustified absences can jeopardize our already sparse funds and can lead to academic probation or termination of stipend support.

H. Computers, tablets, and cell phones: You may consider using your cell phone, laptop or other electronic device to be a personal right without any consequences. However, legal and privacy issues that may protect you as an individual do not apply when working in an office or laboratory. In addition to research-related communications, you may use the university e-mail system for brief contact with family or friends. However, you should limit personal use of university e-mail accounts, and use your home computer and home internet service provider to conduct communications that are not related to your academic, research and professional development activities. Similar guidelines apply to usage of your cell phone, tablet, or other devices that are your own property. These cannot interfere with your daily work. Therefore, text messaging and phone conversations with friends and family need to be kept to a limited basis while in the laboratory. In other words, brief and limited email/texting/phone calls with friends and family is permitted. However, it is not acceptable to pay your bills, shop on-line, hangout in

social networking sites, plan vacations, etc., while in the lab, or to conduct extensive cell phone or text-message conversations with friends or family while in the lab (regardless of who owns the computer/device).

Social media sites should also be used judiciously. When you are in the laboratory is not the time to communicate with friends via Facebook, Twitter, etc. Regardless of ownership of the device you are using, spending time at these sites, posting or reading posts from others, should be very limited while you are in the lab. Also, be advised that any posts that you make could unknowingly be viewed by others and could ultimately affect how others perceive you, including potential future employers.

I. Photocopying: Please see the Program Coordinator for access to the Toxicology Training Program copy card. The advisor's account should pay for additional work-related items. Use of university copy accounts for personal use is not permitted.

J. Taxability of Stipends: The federal government has indicated that all fellowships and scholarships are taxable. It is the student's responsibility to file federal and state tax forms.

K. Length of Support: At the present time, University and grant funds will support an individual student for a maximum of 6 years. If a student does not complete his/her thesis within this period and completion is imminent, the student's advisor will be expected to provide the necessary documentation and any necessary funding support. However, the student should realize that even with satisfactory progress, funding beyond a 5-year period is not guaranteed.

L. Academic and Scientific Misconduct: Honesty is the cornerstone of academic integrity and scientific inquiry, and suspected infractions will be treated with utmost seriousness. Academic misconduct includes cheating on exams and assignments, plagiarism, or providing false information. Scientific misconduct includes a deliberate attempt to alter existing data, creating data that did not exist, or knowingly misrepresenting data to support an idea or to perform additional experiments. Scientific fraud also includes deliberately denying the existence of an experiment because the results of the experiment did not meet expectations, confirms the hypothesis, or were inconsistent with previous results.

Any concerns regarding possible academic misconduct that arise in the first-year of graduate school should be brought to the attention of the Program Director, who will refer the matter to the Toxicology Graduate Program Steering and Admissions Committee. For more senior students or postdoctoral fellows, suspected infractions should be referred to the Program Director, who will forward the case to the same Steering Committee. This committee, in consultation with the Senior Associate Dean for Graduate Studies, will conduct an investigation with all affected parties participating. If possible, this committee will draw a conclusion and present the results of the investigation, along with a specific recommendation to the Dean of Graduate Studies. For additional University guidelines regarding academic misconduct, please refer to the University of Rochester's "Regulations and University Policies Concerning Graduate Studies."

Consequences may include the loss of research assistantship and/or employment with the university. Depending on the findings, it may also be necessary to notify state and federal agencies, which may need to conduct further review of the case. Any publications that include fabricated data will be corrected by notifying the journal editors. If work was conducted on a government grant, the governmental agency funding the study will be notified. This may restrict or prevent future employment on any government-funded research project.

M. Harassment and Discrimination: Specific procedures to be followed in order to resolve cases of harassment or discrimination are described in the University of Rochester's "Regulations and University Policies Concerning Graduate Studies".

N. Resources: Graduate school can be stressful in many ways. There are many people and resources to help you navigate your education and training and to help you with any professional and personal struggles you may encounter along the way. In addition to faculty, staff, and students in the Toxicology Program, there are several other resources available to you, including:

Center for Professional Development (CPD) supplements scientific education in the Toxicology Program with additional the professional and career development opportunities and workshops (<https://www.urmc.rochester.edu/education/graduate/professional-development.aspx>)

University Counseling Center (UCC) provides a comprehensive initial assessment and an individualized plan. Based on the initial assessment, a treatment plan is developed by the clinician that addresses your unique needs and concerns. This plan may include recommendations such as, but not limited to: group therapy, workshops, brief therapy, referrals to community provider for specialized treatment or longer term therapy services, Therapist Assisted On-line (TAO), case management services, psychiatry or other campus services. For detailed information on services, contact information, please check out their website for more details on their many resources: <https://www.rochester.edu/ucc/>

University Health Services (UHS) provide health care services to students and is available to all matriculated students. Please review information on their website (<https://www.rochester.edu/uhs/>) to learn more about UHS services and health care providers.

The **CARE Network** allows all members of the University community to express concerns about a person, incident, or issue by submitting a report online (<https://www.rochester.edu/CARE/>).

XII. SUMMARY

This booklet has provided an overview of information concerning the PhD Training Program in Toxicology. When specific questions arise, immediately contact your thesis research advisor, the Program Coordinator, the Program Director, and/or the Senior Associate Dean of Graduate Studies. They are all prepared to assist you in reaching your educational and professional goals.

Program Coordinator, Elizabeth Williams-Velasquez: 275-6702
Elizabeth.Williams-Velasquez@urmc.rochester.edu

Program Director, Dr. Alison Elder: 275-2324
Alison.Elder@urmc.rochester.edu

Deputy Program Director, Dr. Martha Susiarjo: 273-4964
Martha.Susiarjo@urmc.rochester.edu

Sr. Associate Dean for Graduate Education, Dr. Richard Libby: 275-0906
Richard.Libby@urmc.rochester.edu

PLEASE SEE MADATORY SIGN OFF SHEET ON FOLLOWING PAGE

Toxicology Training Program

GRADUATE STUDENT HANDBOOK - AUGUST 2020

I verify that I have fully read, understand and will comply with the guidelines stated in the Toxicology Student Handbook.

Date: _____

Printed Name: _____

Signature: _____

PLEASE RETURN THIS SIGNED PAGE TO THE PROGRAM COORDINATOR