Michigan State University

Center for Integrative Toxicology

Environmental and Integrative Toxicological Sciences Graduate Training Program

Handbook

2005

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I. PROGRAM OVERVIEW

The Center for Integrative Toxicology (CIT) serves to foster and coordinate a wide spectrum of toxicology-related activities associated with health risks resulting from exposure to chemical contaminants. Origins of CIT date back to 1978 with the creation of the Center for Environmental Toxicology after the polybrominated biphenyl (PBB) contamination incident in Michigan. The purpose of the Center for Environmental Toxicology was to take leadership of the MSU response to environmental contamination issues, to conduct research, educate students and provide outreach to the public. In the early 1980s, Center for Environmental Toxicology was renamed to the Institute for Environmental Toxicology (IET). The mission remained the same with the major emphases being on research, graduate training and outreach in environmental toxicology. In 2003, the IET was renamed to the CIT. Although still possessing a strong emphasis and major strengths in environmental toxicology, the MSU toxicology community during the previous decade continued to evolve--primarily through new faculty recruitment--expanding expertise into the areas of cellular, biochemical and molecular toxicology. The addition of new expertise and expansion of existing strengths was one of the driving forces for renaming the IET to the Center for Integrative Toxicology.

The CIT coordinates training activities on campus in the discipline of toxicology, to set uniform standards and requirements for toxicology training, and to recognize formally the training in environmental toxicology by awarding to students a dual Ph. D. degree, one Ph.D. degree awarded from a departmental program and the second in environmental toxicology. This has resulted in the current Environmental and Integrative Toxicological Sciences (EITS) Training Program. The EITS program provides environmental toxicology training and education to graduate scientists who are not solely toxicologists, but individuals who have enrolled in a rigorous departmental Ph.D. program in the basic sciences while also benefiting from a formal didactic and research training program in environmental toxicology. Accordingly, graduates are not only recognized as environmental toxicologists but as molecular biologists-environmental toxicologists, pharmacologists-environmental toxicologists, etc.

The goal of the EITS program is to train future scientists with specific research expertise in biomedical science developed in one of the department-based Ph.D. programs and with an additional working knowledge in the broad, interdisciplinary area of environmental toxicology. This approach overlays a high quality, department-based (i.e., disciplinary) Ph.D. program in the basic sciences with a broad-based, interactive education in the toxicology of chemicals found in the environment. Implicit in this approach is the recognition that environmental toxicology is a multidisciplinary effort requiring well trained scientists from a variety of disciplines to contribute to the solution of complex problems associated with environmental contamination and toxic responses. The EITS program brings together faculty and students in diverse disciplines such as biochemistry/molecular biology, zoology, pharmacology and food science and human nutrition, all of whom are interested in environmental toxicology. The active participation in toxicology-related workshops and seminars and the interactions of the students in EITS-required courses provide a setting conducive to learning the broad base of information necessary for excellence in the discipline of toxicology. Interests of individual trainees are also met through research in laboratories of department-based faculty members who have affiliations with the CIT. Successful completion of this program allows students to be knowledgeable and competitive in their chosen, basic science discipline and in a position to make significant scientific contributions to the field of environmental toxicology.

MSU-CIT graduate students can also earn a master's specialization in environmental toxicology. To earn the specialization, students must meet the requirements of their disciplinary departments and those of the CIT Multidisciplinary Masters Specialization.

There are currently 46 faculty affiliated with the CIT, most of whom participate in the EITS training program. Participating departmental and cross-disciplinary graduate programs currently include Animal

Science; Biochemistry and Molecular Biology; Cell and Molecular Biology; Chemistry; Civil and Environmental Engineering; Crop and Soil Sciences; Entomology; Environmental Geosciences; Food Science and Human Nutrition; Microbiology and Molecular Genetics; Pathobiology and Diagnostic Investigation; Pharmacology and Toxicology; and Zoology. Graduate programs continue to be added in accordance with student's interests. See Appendix A for a list of affiliated faculty and their research interests.

The Ph.D. degree awarded represents a cooperative Department-Center approach to graduate education in toxicology. Graduates receive a dual degree designation on their diplomas, i.e., name of their departmental disciplinary graduate program and Environmental Toxicology. For example, a graduate student whose home departmental program is Biochemistry & Molecular Biology receives a Ph.D. degree designated on his or her diploma as "Biochemistry & Molecular Biology-Environmental Toxicology."

Each student will have met all the requirements of the departmental disciplinary graduate program as well as those of the EITS training program. The former entails in-depth training in a fundamental basic science discipline, whereas the requirements of the latter include a series of toxicology-related courses, attendance at seminars and workshops emphasizing current problems in toxicology, association with CIT programs and faculty, and a research project that relates to this multidisciplinary area. The premise driving the program is that toxicology research requires well trained scientists from a variety of traditional disciplines. Importantly, these individuals should possess a fundamental knowledge of the principles of toxicology and of exposures of humans and wildlife to hazardous chemicals in air, water, soil and food and the potential health consequences derived from these exposures. This dual training results in laboratory research investigators who are prepared to apply excellent, basic scientific training to problems in toxicology.

At this time there have been over 140 graduate students who have successfully completed this multidisciplinary Ph.D. program, and 42 graduate students are currently enrolled. Evidence for the multidisciplinary nature of the program includes the fact that, to date, students and faculty from 16 different academic departments have been involved. Graduate students in the overall EITS program participate in three general areas of environmental toxicology: human health (biomedical), ecological/wildlife and hazardous substance management.

Graduate fellowships are available to cover tuition, health insurance and living expenses. Some of this doctoral and postdoctoral stipend support is provided by a training grant from the National Institutes of Environmental Health Sciences, of the National Institutes of Health. Other support and fellowships are available for EITS trainees through departments, faculty research grants, the CIT and the University.

II. PROGRAM COMPONENTS/PLAN OPTIONS

The CIT's EITS training program provides masters, doctoral and postdoctoral students with extensive research training in a specific basic science discipline as well as toxicology. Trainees acquire a broad base of knowledge through an interactive program of courses, seminars, workshops and scientific meetings as well as by becoming an active member of a research laboratory and the general scientific community. Each student's curriculum is customized to coordinate with the requirements of his or her departmental disciplinary graduate program and with the trainee's interests, resulting in the dual degree.

Students may choose either the Toxicology or the Environmental track for required course work. The Toxicology Track is designed for those students in graduate programs in the biological sciences, whereas the Environmental Track is meant for students with less background in biology (e.g., students in Chemistry, Engineering, Environmental Law, etc.) A student may elect either track with approval of his or her thesis advisor. This is explained in greater detail under degree requirements. Comprehensive

exams and polices for the completion of a dissertation or thesis are set within the student's chosen departmental disciplinary graduate program.

III. DEGREE REQUIREMENTS

All CIT graduate students are first enrolled in graduate study toward the Ph.D. degree in one of the training departments. By formal, additional application to the EITS training program, these candidates also indicate interest and willingness to meet the requirements of the dual degree program, i.e., those of the departmental disciplinary graduate program, as well as the additional requirements of the CIT program. This is accomplished by the submission by the candidate of a completed application form (see Appendix B: EITS Application Form) for the EITS to the Environmental Toxicology Graduate Education Committee (ETGEC) and a recommendation by that Committee to the EITS Director for acceptance into the program. Typically, students have completed their first year of graduate study before they are admitted into the EITS program. The EITS application includes identification of a thesis advisor, a tentative thesis topic as well as a plan of study for the environmental toxicology courses (required and elective) to be completed. A letter of recommendation from the department chair and a letter of support from the thesis advisor are also required. The ETGEC for the multidisciplinary program examines the information in each application to assure that students have proposed a plan of study and research that will meet all Program requirements and requirements for graduation. It is important to emphasize that a student can only enter the EITS Ph.D. program after gaining acceptance into a participating, disciplinary, departmental doctoral program.

To earn the joint Ph.D. degree, students shall meet the requirements of their disciplinary departments and those of the EITS program. Where course requirements overlap, a given course may be counted toward both the disciplinary department and EITS program requirements.

Predoctoral trainees will take courses that can be placed into three categories: those required by their department, those required by the EITS and those required by their guidance committee. The EITS requirements provide a unifying set of instruction for all students in the Program, whereas a degree of flexibility in toxicology instruction is present in the departmental requirements. This permits the student to take advantage of the wide range of courses offered by various departments, which can be utilized as electives either to broaden the scope of instruction in toxicology or to focus on a particular subject relevant to the student's toxicology-oriented thesis research topic.

EITS Program requirements include:

1. Completion of a Ph.D. thesis/dissertation, the topic of which must be in the broad area of environmental or integrative toxicology;

2. Attendance at a minimum of twelve seminars approved by the Center for Integrative Toxicology;

3. Completion (with a grade point average of at least 3.0) of the course requirements (see Appendix C for a more detailed description of the core courses) for either the toxicology or environmental track.

4. Formal training in ethical conduct of research (see section VIII for details).

Toxicology Track:

- PHM 814 Advanced Principles of Toxicology (3 credits, Spring, even years);
- PHM 980 Problems-Biostatistics (3 credits, Fall, even years);

- PTH 856 Concepts in Toxicological Pathology (2 credits, Summer, odd years)

  OR

  PTH 851 Advanced General Pathology (3 credits, Fall, even years);
- ZOL 814 Environmental Chemodynamics (4 credits, Spring, even years)

  OR

  ANS 827 Integrated Risk Assessment of Environmental Hazards (3 credits, Spring, odd years);
- Plus one course in any interest group from the Elective Courses List.

Environmental Track:

- ZOL 814 Environmental Chemodynamics (4 credits, Spring, even years)

  OR

  ANS 827 Integrated Risk Assessment of Environmental Hazards (3 credits, Spring, odd years);
- PHM 450 Introduction to Chemical Toxicology (3 credits, Spring)

  OR

  PHM 814 Advanced Principles of Toxicology (3 credits, Spring, even years);
- Plus three courses from the Elective Courses List (see Appendix D) in at least two interest groups; i.e., one course from each of three different interest groups or one course from one group and two courses from another group.

Master's Specialization:

To earn the master's specialization, students must meet the requirements of their disciplinary departments and those of the CIT Multidisciplinary Masters Specialization. Where course requirements overlap, approval of the student's departmental disciplinary graduate program and college are needed for using a given course to satisfy the specialization as well as the departmental requirements.

The Multidisciplinary Masters Specialization Program requirements include:

1. Attendance at a minimum of six EITS-approved seminars;

2. Completion of the courses used to satisfy the specialization requirements, with a grade point average of at least 3.0;

3. Completion of the following courses: (for course descriptions, see Appendix C)

- RD 836 Law of Environmental Regulation (3 credits, Fall);
- ZOL 814 Environmental Chemodynamics (4 credits, Spring, even years) OR
  ANS 827 Integrated Risk Assessment of Environmental Hazards (3 credits, Spring, odd years);
- PHM 450 Introduction to Chemical Toxicology (3 credits, Spring) OR
  PHM 814 Advanced Principles of Toxicology (3 credits, Spring, even years);
- Plus one course from the Elective Courses List (see Appendix D)

Specifically Ph.D. students should follow these guidelines by the times indicated:

1. Student must be accepted into a major department and have chosen a Ph.D. thesis advisor. Application for admission to the Training Program in Environmental and Integrative Toxicological Sciences is usually made during the first year of graduate school. A copy of the application form is included in Appendix B.

2. Return the completed application form to the CIT along with a letter of recommendation from your Ph.D. thesis advisor attesting to your motivation toward Toxicology and/or Environmental Science. Application for admission to the Program in Environmental and Integrative Toxicological Sciences should be made at least two years prior to graduation and must be approved by members of the CIT Environmental Toxicology Graduate Education Committee (ETGEC). A letter notifying you of acceptance will be sent to you by the Graduate Program Director of the CIT.

3. The Ph.D. Guidance Committee must contain two CIT-affiliated faculty (usually but not necessarily the Ph.D. thesis advisor and one other CIT affiliate). Students should notify the CIT of the names of the faculty on the Guidance Committee soon after its formation.

4. You must complete the course requirements of the Training Program in Environmental and Integrative Toxicological Sciences (see Appendix C) in addition to all requirements of the major department. The CIT requires an overall 3.0 GPA in program courses.

5. You must notify the Graduate Director of any intended changes in courses or in dissertation research topic. All courses must be taken for a numerical grade. Credit/no credit designations are not acceptable unless approved by the ETGEC.

6. At least six months prior to graduation, you must complete the "Application for Candidacy" form. The completed form should be returned to the CIT for approval by the ETGEC. You should send photocopies of the University forms entitled "Report of Guidance Committee" and "Record of Comprehensive Examinations" in support of your candidacy application. These forms should be signed by the doctoral committee.

7. A letter will be sent by the Graduate Program Director of the EITS notifying you of acceptance into Candidacy. This indicates you have completed all EITS requirements.

8. There is a specific code for each department that indicates that you are getting a joint Ph.D. degree in your Departmental Major and in Environmental Toxicology. Please do not assume that you are already correctly coded. You must fill out the section of the Application for Graduation regarding degree correctly so that the degree reflects joint status (i.e., Major Department/Environmental Toxicology). See attachment 1 for appropriate codes.

9. Upon successful completion of your thesis defense, you must submit to the CIT photocopies of University forms entitled "Record of Completion of Requirements" and "Graduate Credit Statement and Final Certification for Degree".

10. You should notify the CIT of graduation and give a forwarding address for future correspondence. Also, please keep the CIT notified of newly acquired positions so the CIT can keep an up-to-date record of positions attained by graduates.

11. Questions regarding the Program should be addressed to Dr. Robert A. Roth (or Amy Swagart) at the Center for Integrative Toxicology, C231 Holden Hall, 353-6469.

IV. SELECTION OF THESIS/DISSERTATION ADVISOR

Students are encouraged to choose their major advisor before application to the CIT. All other requirements and timelines are set by the student's departmental disciplinary graduate program. To change advisors, EITS students would follow his or her departmental disciplinary graduate program's process for changing advisors.

V. FORMATION OF THE GUIDANCE COMMITTEE

As stated above, the Ph.D. Guidance Committee must contain two CIT-affiliated faculty (typically the Ph.D. thesis advisor and one other CIT affiliate). Students should notify the CIT of the names of the faculty on the Guidance Committee soon after its formation. All other requirements and timelines are set by the student's departmental disciplinary graduate program. To change committee members, EITS students would follow his or her departmental disciplinary graduate program's process for changing committee members.

VI. THESIS DISSERTATION DEFENSE AND FINAL ORAL EXAMINATION

The thesis or dissertation must be in accordance with "The Graduate School Guide to the Preparation of Master's Thesis and Doctoral Dissertations" at http://grad.msu.edu/format.html. Final draft of dissertation is due in the major professor's office in a time determined by the department the semester in which graduate is expected. A final copy of the thesis/dissertation, an abstract and an abstract title page must be submitted to the Graduate School. All doctoral dissertations/masters theses will be micro-filmed and the abstracts published in Master's Abstracts of Dissertation Abstracts. Microfilming is considered by the University to be a form of publication but does not preclude printing the thesis in whole or in part as a journal article or monograph. A fee charged to the student covers the cost of microfilming and binding of the unbound copy submitted to the Graduate School. For more information on UMI, visit http://www.umi.com/.

Comprehensive examinations must be taken within five years and all requirements completed within eight years of initial enrollment as a doctoral student. If a degree is not completed within eight years, the written portion of the comprehensive exam must be passed again.

All other requirements and timelines are set by the student's departmental disciplinary graduate program.

VII. DEPARTMENTAL POLICIES: ACADEMIC PERFORMANCE

The progress of graduate students at MSU is monitored by a Guidance Committee as stipulated by University regulations. This Committee of at least four faculty members is selected by the student in consultation with an appointed (or student-selected) faculty advisor. It is usually formed at the end of the first year of graduate study. The Guidance Committee plans and supervises the program, making modifications, if necessary, until the degree is completed. The EITS program requires that two faculty members of the Guidance Committee be affiliated with the CIT. The two CIT faculty on the Ph.D. Guidance Committee have the responsibility to ensure that the student is adequately evaluated with regard to knowledge of the principles and concepts involved in toxicology. (Note: only students choosing a thesis advisor who is named as NIEHS Training

Grant trainers are eligible for support from the Training Grant; however, other funding mechanisms within the CIT may be available to help support graduate trainees.)

The Guidance Committee is required to meet within one academic term (3 months) of its formation and file a report to the Dean of the appropriate college listing all degree requirements that must be fulfilled by the student. The report must be signed by the department chairperson, the dean, and the student. The report also includes a timetable and a dissertation topic. The Committee has the responsibility to meet periodically (typically every 6 months) to oversee graduate student progress.

As mentioned above, the progress of the student related to knowledge of toxicology is monitored by the two CIT faculty on the Ph.D. Guidance Committee. Another level of student evaluation exists in the multidisciplinary program. The ETGEC consisting of CIT-affiliated faculty (Dr. Bob Roth, Chair) from each of the participating departments, reviews the performance of each student upon application for admission to and candidacy in the EITS doctoral program. The latter (candidacy) occurs upon completion of coursework and when the student is within approximately a year of completing the dissertation research. The ETGEC determines whether the requirements of the EITS training program have been met and, if so, makes a recommendation of advancement to Degree Candidacy to the Program Director (Dr. Roth). To graduate, the student must have attained a minimum 3.0/4.0 grade point average in EITS-required courses, attended at least twelve CIT-approved seminars, and conducted research in the area of toxicology. Finally, the student is evaluated by the Guidance Committee during the thesis defense. The two (or more) CIT-affiliated (i.e., toxicology-oriented) faculty on the Committee are charged to provide an evaluation of the student regarding the toxicological aspects of the thesis.

All other requirements and timelines are set by the student's departmental disciplinary graduate program.

VIII. DEPARTMENTAL POLICIES: INTEGRITY AND SAFETY IN RESEARCH AND CREATIVE ACTIVITIES

The importance of ethics, values, and responsible conduct is recognized and valued by Michigan State University faculty. For example, in 1977 the College of Human Medicine established a program in Medical Humanities that later became the Center for Ethics and Humanities in the Life Sciences. Formal courses have been developed and are widely available in a number of departments. Noteworthy examples include: PI 827 – The Nature and Practice of Scientific Integrity; KIN 895 – Research Ethics; NSC 830 – The Nature and Practice of Science; and PSY 926 – Scientific and Professional Ethics. These courses are used as requirements for graduate students in some of the participating departments in the EITS program. For example, the Biochemistry & Molecular Biology Department's doctoral program requires NSC830, in which responsible conduct of research is a major theme.

Institutionally, MSU recognizes the importance of promoting the responsible conduct of research and other creative activities. The office of the Assistant Vice President for Research Ethics & Standards and the University Intellectual Integrity supports, jointly with the Graduate School, a Research Ethics Education Coordinator for both regulatory and educational purposes campus wide.

The Graduate School has assumed a leadership role in offering educational and professional development resources and programs for graduate students and postdoctoral trainees under the guidance of the Dr. Karen Klomparens, Dean. The graduate school hosts nationally recognized experts and offers formal programs to facilitate a university-wide dialogue in dissertation writing, conflict resolution, and the responsible conduct of research. It has published and distributed widely since 1997 "The Research Integrity Newsletter" that focuses on important topics such as use of humans as research subjects, conflict of interest, data control & management, authorship, and preventive ethics. Past issues are available in both electronic and print versions from the Graduate School.

The Graduate School has also supported since 1998 a six-workshop series on the Responsible Conduct of Research that is "intended to provide specific information about the responsibilities of students, faculty and research staff in conducting research, interacting with others both within and outside defined research groups, and complying with policies and regulations of sponsors and the University." It is designed to stimulate local discussions, complement department activities, and reinforce issues raised by "The Research Integrity Newsletter" in responding to these needs. The 2002-2003 series included evenings devoted to:

- The Graduate Experience: Responsibilities of Students and Their Mentors
- The Ethical Challenges of Contemporary Academic Research: Who's Rights? Who's Responsibilities? Who's Common Good?
- Responsibility for Integrity: Data Collection and Stewardship, Scientific Misconduct, Whistle-blowing
- Responsibility to the Institution: Safety and Security in the Academic Workplace
- Responsibility to the Subjects of Research: Humans
- Responsibility for Objectivity: Conflicts of Interest

The series addresses each of the core instructional areas specified by the proposed policy for education in the responsible conduct of research. Attendance is monitored to assist departments, graduate programs, and others that elect to require this program as compliance with specific requirements. This program is a requirement for all trainees in each participating department as well as the EITS program. In addition, Dr. Roth will send periodic reminders to advisors of EITS students and postdoctoral trainees about this requirement.

Finally, at the request of its graduate students, the MSU Department of Pharmacology & Toxicology has recently instituted an "Enrichment Program" consisting of afternoon or evening sessions (noncredit) devoted to various topics about which the students indicated a desire for additional information. Woven throughout the various topics are discussions of ethics in research (mentoring, animal use, peer review, human subjects and clinical trials, professional relationship building, etc.). This series of more than two dozen sessions has been organized by the Graduate Program Director in the Department, who has enthusiastically agreed to open the sessions to all students in the EITS program. Attendance at this new series will be voluntary, but it is expected to provide a student-initiated venue for discussions of research ethics and other issues of concern and interest to the trainees. It can be used to supplement the Graduate School training programs described above.

The MSU Office of Radiation, Chemical and Biological Safety provides training in laboratory safety. Each laboratory should have specific training in protocols used in their laboratory. To work in a University laboratory, individuals must attend the ORCBS courses. Go to http://www.orsbs.training/training_toc.htm for more information. Use of animals requires interaction with the Michigan State University Laboratory Animal Resources at http://www.msu.edu/unit/ular/.

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(From a memo distributed by David Gift, Vice Provost, Libraries, Computing and Technology, 10/04/2004).
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All Michigan State University students, faculty, staff, and anyone else using MSU's computing systems and digital network (MSUnet), are expected to abide by the copyright laws of the United States. Unauthorized copying and sharing of copyrighted music, videos, movies, documents and other electronic files is illegal Users of MSUnet bear individual responsibility for their use of the network, and personal liability for any legal or criminal action brought against them.

Various industries are quite aggressive in their detection and pursuit of individuals they believe are infringing copyright, including seeking monetary damages in lawsuits against these individuals. MSU complies with the

federal Digital Millennium Copyright Act (DMCA), and cooperates with copyright owners and their agents who file complaints alleging copyright infringement against MSUnet users. MSU's DMCA-related policies and procedures may be found at http://lct.msu.edu/guidelines.html. The University also may refer student repeat infringers to the University student judiciary system, and may refer University employee repeat infringers to their supervisors or unit managers, for further disciplinary action as appropriate.

There are an increasing number and variety of legitimate uses of peer-to-peer file sharing programs to support the scholarship and collaborative work of students, faculty and staff. The MSU community has a collective interest in protecting these legitimate uses, as well as protecting the available bandwidth and security of our shared network."

IX. STUDENT CONDUCT AND CONFLICT RESOLUTION

Conflicts between laboratory personnel or between graduate student and their mentor should try to be resolved first within the laboratory. Should this not be feasible, the Graduate Chair and/or Department Chair of the basic disciplinary graduate program in which the student is enrolled should be contacted to discuss the situation with both parties involved. In addition, the Graduate School runs a Program entitled "Conflict Resolution" (http://www.msu.edu/user/gradschl/conflict.htm). We encourage all those involved in a situation or potential situation of conflict to consult with the Graduate School and investigate these programs.

There may be occasions when a student believes that a conflict is not resolvable within the department. A resource for the student, then, is the MSU Ombudsman (http://www.msu.edu/unit/ombud/). The ombudsman is the "complaint" person for the students. You should contact the Ombudsman when you have a problem with any part of the University and don't know where to turn for help. The University Ombudsman will provide an independent point of view in an informal and confidential way. The Ombudsman's office is the first place to contact should you need to file a Grievance. The EITS program does not have its own grievance/hearing procedure; rather, students are referred to his or her departmental disciplinary graduate program.

The following section on Grievance is copied from the Ombudsman's web page.

Grievance Procedures:
A grievance involves a formal hearing before a panel of students and faculty to resolve a student's allegation of a violation of his or her academic rights, as set down in the Academic Freedom Report (AFR) or the companion document for graduate students, called Graduate Rights and Responsibilities for Students at Michigan State University (GSRR). The AFR and the GSRR documents require departments, schools and colleges to develop grievance procedures consistent with these documents.

It's important to recall that the AFR and GSRR require a student in conflict with an instructor to attempt to resolve the dispute before filing a request for a grievance hearing. The student should start the process by meeting with the instructor and then with the department chair/school director and/or the Ombudsman. Most of the time, the parties to a dispute settle the issues during these discussions.

However, if a student remains dissatisfied with the outcome of these conversations, the student may submit a written request for a grievance hearing to the Department Chair/School Director to whom the instructor reports. The letter must state the specific nature of the complaint and the redress, or remedy, the student seeks as an outcome of the hearing. (Note the word "request" and read on.)

Upon receiving a request for a grievance hearing, the unit administrator forwards the letter to the chair of the department/school hearing board. The hearing panel for graduate students is chaired by the department chair/school director or designee and is made up of an equal number of faculty and students (undergraduate or graduate, depending on the status of the student requesting the hearing).

After receiving the written complaint, the hearing board can request a response from the instructor and then decide if the request for a hearing has merit. If so, the chair of the hearing board will schedule a hearing; if not, the hearing board can dismiss the case--a decision that the student can appeal to the college hearing board.

Both the student and the instructor are allowed to call on witnesses to appear at the hearing on their behalf, and they can seek an advisor to help them throughout the process. The advisors must be member of the MSU community—faculty, staff or students.

TERMINATION AND WITHDRAWALS

A decision to terminate may be made on the grounds of a failing academic performance, lack of sufficient definable progress (e.g. not meeting goals of yearly evaluation), or dishonest laboratory practice. The decision to terminate a student is a serious one and is not one made lightly.

Students may choose to withdraw from the department for personal or professional reasons. It is our hope that the student will talk openly and honestly with their advisor, fellow students, Graduate Director and/or Chairperson while making this decision. Should a student choose to withdraw, a letter addressed to the Graduate Director must be written that details the specifics of withdrawing, including reasons for the withdrawal and the date on which this is effective. With the approval of his or her departmental disciplinary graduate program, a student might elect to complete a Ph.D. without the environmental toxicology dual degree component. A predoctoral student might also elect to complete a master's degree with or without the environmental toxicology component, again with the approval of his or her departmental disciplinary graduate program. If a master's is pursued with the environmental toxicology specialization, the student would need to follow the EITS procedures in order to receive that designation on his or her academic transcript (see section III: master's specialization).

The following is from the University's policies and procedures:

A. Voluntary Withdrawal During the Semester:

A student may voluntarily withdraw from the University prior to the end of the twelfth week of a semester, or within the first 6/7 of the duration of the student's enrollment in a summer or special sessions (calculated in weekdays). Withdrawal is not permitted after these deadlines.

The withdrawal procedure begins in the office of the associate dean of the college in which the student is enrolled or in the Office of the Registrar, Room 150 Administration Building. Upon official voluntary withdrawal from the University, symbols are assigned to courses in which the student was enrolled according to the effective date of the withdrawal as follows:

1. If withdrawal is before the middle of the semester or summer session, no symbols will be assigned to courses in which the student was enrolled.

2. If withdrawal is after the middle of the semester or summer session, symbols will be assigned by instructors to courses in which the student was enrolled as follows: W (no grade) to indicate passing or no basis for grade regardless of the grading system under which the student is enrolled; N to indicate failing in a course authorized for P-N grading, or 0.0 to indicate failing in a course authorized for numeric grading.

In case of official withdrawal from the University, fees are subject to refund according to the refund policy. A student living in a residence hall should consult the manager regarding the policy on the refund of room and board fees. A student living in an off-campus organized living unit should consult the individual unit for policies regarding room and board refunds.

If three or more complete semesters of school are missed subsequent to withdrawal, including the summer sessions, the student must apply for readmission through the Office of the Registrar.

B. Voluntary at the Close of a Semester:
There is no formal procedure for withdrawal at the end of a semester; however, a student living in University housing should notify the manager of the appropriate unit within the timeframe designated in the lease or other agreement.

C. Unauthorized:
A student who leaves the University during a semester or summer session without obtaining an official withdrawal will be reported as having failed all courses.

The withdrawal procedure will not take place automatically for the student who leaves campus because of illness, of either self or family member, but must be initiated by the student. If this cannot be done in person, withdrawal may be initiated by writing the associate dean of the college in which the student is enrolled or the Office of the Registrar, 150 Administration Building.

A student who leaves the University without withdrawing formally forfeits any fees or deposits paid to the University.

D. Involuntary:
A student who is called in the Armed Forces during the semester should present orders for induction at the office of the associate dean of the college in which the student is enrolled or at the Office of the Registrar for appropriate action.

E. Disciplinary:
If a student is dismissed for disciplinary reasons during a semester, courses are dropped without grades and without refund and the registration canceled.

ACADEMIC RECORDS
Academic files are kept for each student in the CIT administrative offices. A student may receive copies of his or her records upon request to the CIT graduate program secretary. All academic information in the CIT student files comes from the student's departmental disciplinary graduate program. Therefore, inaccuracies should be challenged within his or her departmental disciplinary graduate program. The departmental disciplinary graduate program would then forward any changes to the CIT.

X. WORK RELATED POLICIES

Students are not encouraged to seek outside employment. The stipends provided through fellowship opportunities are intended to enable the student to focus solely on the graduate training program.

Students are to inform their mentors ahead of their vacation time. This is typically a two week period during the year and is at the discretion of the thesis advisor. Travel should not, ideally, be done during a time in which class occurs.

Graduate students and student employees are not eligible for worker's compensation if injured on the job. Those who suffer a work-related illness/injury should immediately report the injury to the supervisor. If the illness/injury is a critical emergency, 911 should be called.

Stipends:
The following is modified from the Academic Programs catalog of Michigan State University:

Financial aid for graduate students is available in several forms. A number of scholarships and fellowships are awarded each year by The Graduate School to the colleges, and there are many opportunities for graduate assistant appointments for part-time teaching or research.

Students already admitted to regular graduate status at Michigan State University and seeking an assistantship or other financial aid should consult the department concerned. Since graduate assistantships and fellowships are usually awarded beginning in February for the following academic year, it is essential that the applications and supporting documents be submitted in December or early in January to assure adequate consideration.

A variety of graduate fellowships are available to Michigan State University students. Stipends and sources of support vary widely. In addition to applying for fellowships offered by the University and through the University by outside agencies, students are encouraged to consult such publications as the following, which are found in most libraries:
i) Financial Aids for Graduate Students, Bernard G. Maxwell, Editor.
ii) The Foundation Directory, Marianna O. Lewis, Editor.
iii) Scholarships, Fellowships, and Loans, Normal Feingold.

Michigan State University annually awards a number of fellowships and tuition scholarships to encourage and assist high achieving students to pursue study leading to a graduate degree. A recipient of one of these awards must be enrolled in a degree program but is not required to give formal service to the University or to the department. For a student not currently enrolled in a graduate program at Michigan State University, the application for admission also serves as an application for these awards. A student currently enrolled may apply through the respective department or college.

(1) Registration and credit Load Requirements:
Most fellowships require full-time pursuit of a graduate program. Unless the fellowship carries specific requirements for determining eligibility, the department or school is responsible for determining and certifying the full-time status of the student. All predoctoral graduate fellows paid through the University must be registered during the period for which payment is made.

2) Graduate School Dissertation Completion Fellowships:
These fellowships allow students to devote full time to writing the doctoral dissertation. This fellowship program is for students in the final months of their programs. About 75 fellowships are awarded each year. For more information, contact the Graduate School or visit the web site: http://grad.msu.edu.

(3) Sponsored Fellowships:
Fellowships sponsored by industries, foundations, and government agencies are available to high achieving students for graduate study in various departments or college as Michigan State University. These fellowships are awarded through individual departments or colleges. Information on available fellowships and the procedure for applying may be obtained by writing to the department or college concerned. EITS students interested in the NIEHS training fellowships and Graduate School fellowships available through the CIT should write to Dr. Bob Roth, rothr@msu.edu.

4) University Distinguished and University Enrichment Fellowship Program:
The Graduate School offers fellowship programs that provide financial support for outstanding students who plan to enroll in a doctoral or master of fine arts program. In assisting MSU achieve its educational mission, our goal is to foster an intellectually vital and diverse educational community that will prepare graduate students to assume their professional roles in a diverse society. MSU is particularly aware of the special role that graduate education plays in training the next generation of leaders in academia, government and the private sector. To support that role, The Graduate School's recruitment fellowships assist departments and programs in attracting a cohort of students who: have demonstrated academic excellence; articulate their commitment to research goals well matched to department or program doctoral emphasis areas; show evidence of leadership potential or the capacity

to make a distinctive professional or scholarly contribution; contribute to a diverse educational community, as evidenced in personal history and experience, research goals, or the promotion of understanding among persons of different backgrounds and ideas; have different racial, ethnic, gender and disciplinary backgrounds.

Two kinds of fellowship awards are available:

University Distinguished Fellowships: recognizing academic achievement, research goals, demonstrated leadership potential, and contribution to a diverse educational community.

University Enrichment Fellowships: recognizing academic achievement, research goals, contribution to a diverse education community, and a record of overcoming obstacles.

Fellowship recipients beginning study in Fall 2004 received a 12-month stipend of $22,000, plus health insurance. In addition, tuition and related fees were waived up to a maximum of 12 credits during fall and spring semesters and 6 credits during summer session. The first and fourth years are funded by The Graduate School, with no teaching or research service required of the student. During the second and third years of support, students receive a departmental assistantship that may require them to assist in teaching or research. For more information, contact the Graduate School or visit the web site: http://grad.msu.edu.

(6) University Graduate Recruiting Fellowships and University Graduate Fellowships:
These awards are for recruiting new master's or doctoral students or for outstanding masters or doctoral students who are making good progress toward their degrees. Students must be U.S. citizens or permanent residents. Stipend levels are set by colleges.

Health Insurance:
Graduate assistants (domestic and international) enrolled for 9 or more credits are automatically enrolled in a health insurance plan, the premium of which is paid by the University. Students may elect to waive coverage if done by the yearly deadline. The plan provides the following coverage:
(i) Fall appointment only—coverage from August 15 to February 14 of the following year.
(ii) Fall and Spring appointments—coverage from August 15 to August 14 of the following year.
(iii) Spring appointment only—coverage from January 1 to August 14.
(iv) Summer appointment only—coverage from May 15 to August 14.
Enrolled students may also insure their eligible spouse and/or dependent children (residing with the insured). For questions regarding coverage, enrollment or premium payment, contact The Chickering Group directly at 1-800-859-8452.

Additional information regarding assistantships and specific fellowship policies are available through the CIT or the student's departmental disciplinary graduate program.

XI. UNIVERSITY RESOURCES

On-line links to University Policies Related to Graduate Students

- *Academic Programs*
  http://www.reg.msu.edu/ucc/ucc.asp
- *Graduate Students Rights and Responsibilities* (*GSRR*)
  http://www.vps.msu.edu/SpLife/default.pdf
- *MSU/GEU Contract*
  http://grad.msu.edu/geu/agree.pdf
- *Guidelines for Graduate Student Advising and Mentoring Relationships*
  http://grad.msu.edu/staff/mentoreport.pdf

- *Guidelines for Integrity in Research and Creative Activities*
  http://grad.msu.edu/staff/mentoreport.pdf

Many of the Graduate School requirements, and a number of helpful sites, can be found by visiting:
http://www.msu.edu/user/gradschl/

A. Publications of The Graduate School that may be of help throughout a student's tenure at MSU are:
1. By Degrees
http://grad.msu.edu/bydegrees.htm
These are brief, single-topic newsletters designed to help students advance through graduate and professional school at MSU.

Issue 1 – Looking out for yourself
Issue 2 – Mentoring
Issue 3 – The Registrar's Office
Issue 4 – Before turning in your thesis or dissertation
Issue 5 – The Office of Financial Aid
Issue 6 – Becoming a Professional Teacher
Issue 7 – The role of graduate students
Issue 8 – Computer literacy
Issue 9 – Research and intellectual matters
Issue 10 -- Alternative careers for Ph.D.s
Issue 11 – The perfect Ph.D. guidance committee
Issue 12 – Comps!
Issue 13 – Thinking of leaving?
Issue 14 – Non-academic enrichment

2. Research Integrity Newsletter:
http://grad.msu.edu/integrity.htm
A semi-annual newsletter devoted to bringing critical ethical issues before the community for reasoned debate and discussion. This newsletter is sponsored by the Office of Intellectual Integrity, the Center for Ethics and Humanities in the Life Sciences, and the Graduate School. The research integrity newsletter is published semi-annually by the Office of Intellectual Integrity, the Center for Ethics and Humanities in the Life Sciences, and the Graduate School. Visit http://grad.msu.edu to view current and archived issues.

3. The Graduate Post:
http://grad.msu.edu/gradpost.htm
A Graduate School newsletter focusing on ideas and observations about graduate life and academic life in general. This newsletter is published in the fall and in the spring.

4. Deadline Dates
Verify deadline dates for each semester through one of the following:

Registrar's Office: University Calendar
http://www.reg.msu.edu/ROInfo/Calendar/Aademic.asp

The Graduate School: Important dates
http://grad.msu.edu/current/final.htm

Some procedures and deadline dates may vary slightly in the colleges or departments.
If this is the case, student should be informed.

5. Formatting Guide for Theses/Dissertations:
http://grad.msu.edu/format.htm
Sets forth the thesis/dissertation formatting requirements established by MSU. Students can access it on the web.
Judy Ward
The Graduate School
118 Linton Hall
355-0301
wardj@msu.edu

6. Thesis/Dissertation Submission Packet:
http://grad.msu.edu/current/packet.htm
A thesis/dissertation packet of forms is available via the web to graduate students submitting a Plan A master's thesis or doctoral dissertation.
Judy Ward
The Graduate School
118 Linton Hall
355-0301
wardj@msu.edu

7. Submitting an Unbound Copy of the Thesis/Dissertation to The Graduate School:
A preliminary copy of the thesis/dissertation is reviewed bay the Graduate School before the final unbound copy is submitted.

The final unbound copy of the thesis/dissertation, the required forms (from the thesis/ dissertation submission packet), and fee must be submitted to the Graduate School, 118 Linton Hall, by the thesis/dissertation deadline date.

A copy of the thesis/dissertation title page is forwarded to the Registrar's Office upon acceptance by the Graduate School.

If the department requires a copy of the thesis/dissertation, it is the responsibility of the graduate student to provide that copy. This information should be made available to the graduate student by the department.

The student is not required to be enrolled the semester in which the final unbound copy of the thesis/dissertation is submitted to the Graduate School if that semester is different from the semester of the oral defense.

8. Final Certification Form:
This form is actually the Graduate Credit Statement and Final Certification for Degree but is more commonly referred to as the "Final Cert" or "Final Certification" form. After the Application for Graduation is submitted by the graduate student to the Registrar's Office, the Final Certification form will be mailed to the student's department. The department will verify the student's records for completion of program requirements at both the department and University levels. The Final Certification form is then forwarded to the college for approval before it is sent to the Registrar's Office.

The Registrar's Office, Degree and Certification will verify approval of the Final Certification form submitted by the department and college and will also verify the courses listed and their approved completion, including the required number of research credits. In addition, the Registrar's Office will check for any outstanding parking tickets, holds, or fees owed to the University before approving the Final Certification form.
Registrar's Office, Degree and Certification, 432-5911.

9. Application for Graduation:

https://www.reg.msu.edu/stuforms/gradapp/gradapp.asp
An Application for Graduation must be submitted by the graduate student to the Registrar's Office early in the semester of graduation. By completing this form, the Registrar's Office will forward the Final Certification form to the department.

10. Commencement and Graduation Requirements:
http://grad.msu.edu/graduation.htm
Links to detailed commencement information, doctoral hooding instructions, and general graduation requirements can be found on this website.

11. Other Resources for Graduate Students:

The Graduate School's Website
http://grad.msu.edu
On-line resources for faculty, staff and students relating to graduate education.
Cathie Allison, Webmaster
The Graduate School
110 Linton Hall
353-3220
allisonc@msu.edu

Career and Professional Development
http://grad.msu.edu/career.htm
This website contains career and professional development resources for graduate students and postdoctoral fellows. Students should check the site often for new links to career resources within and outside of academe, help with the career search process, and professional development ideas and opportunities.

Council of Graduate Students (COGS)
http://www.msu.edu/~cogs
COGS is the all-University graduate and graduate-professional student governing body. COGS' goals are to: promote the academic, economic and social aims for all graduate students; establish effective communication among these students and the academic/administrative units of the University; and create channels of effective communication with other student organizations. They also provide a copy service for students completing a thesis/dissertation as part of their degree requirements.
COGS
313-316 Student Services
353-9189
cogs@msu.edu

Student Health Insurance
A health insurance plan is available to all graduate students/assistants. Please refer to the website below for complete details.
The MSU Benefits Office
353-4434
http://www.hr.msu.edu/HRsite/Benefits/Students/HealthCov

Counseling Center
http://www.couns.msu.edu
207 Student Services or 330 Olin Student Health Center
355-8270 or 355-2310

Fees and Scholarships

http://www.ctlr.msu.edu/studrec
140 Administration Building
355-5050

Office of Financial Aid
http://www.finaid.msu.edu/
252 Student Services
353-5940, finaid@msu.edu

Ombudsman
http://www.msu.edu/unit/ombud
129 N. Kedzie
353-8830, soffin@msu.edu

Payroll Office
payroll@ctlr.msu.edu
http://ww.ctlr.msu.edu/Payroll
355-5010

Registrar's Office
http://www.reg.msu.edu
150 Administration Building
355-3300, reg@msu.edu

Resource Center for Persons with Disabilities
http://www.rcpd.msu.edu
120 Bessey Hall
353-9642, 355-1293 (TTY)
rcpd@msu.edu

For International Students:
English Language Center
http://IIc.msu.edu/elc
The English Language Center (ELC) provides English language instruction to two groups of international students: those needing to improve their English language skills before beginning academic course work and those wanting to improve their English skills but who are not seeking a degree at MSU. Such students can apply directly to the ELC or may enroll through the Eurocentres program.

A714 Wells Hall
353-0800
elc@msu.edu

Office for International Students and Scholars (OISS)
http://www.isp.msu.edu/OISS
This office supports and enhances the international students' and scholars' academic, cultural, and social interaction at MSU. It also aims to serve as the primary link between the international students/scholars and the university, community, federal government, and public and private agencies. OISS also desires to promote a positive and symbiotic cross-cultural environment through international education and exchange.

Peter Briggs, Director
OISS
103 International Center

353-1720

Appendices

Appendix A: CIT-Affiliated Faculty

Appendix B: EITS Program Application Form
ATTACHMENT 1: Major Curriculum Codes

Appendix C: Core Required Courses

Appendix D: Elective Courses by Interest Areas

Appendix E: Application for Candidacy

Appendix A
CIT Faculty and their Research

Leslie D. Bourquin, Assistant Professor of Food Science and Human Nutrition. Nutrition and colon cancer; food safety.

Stephen A. Boyd, Professor of Crop and Soil Science. Movement of organics in soil; microbial and catalytic degradation.

Daniel A. Bronstein, Professor of Resource Development. Regulatory toxicology; use of toxicological information.

Steven J. Bursian, Professor of Animal Science. Toxicity of chlorinated organic compounds eg. PCBs in wildlife and laboratory animals.

Karen C. Chou, Associate Professor of Animal Science. Reproductive toxicology, chemical effects on fertilization and early growth.

Susan L. Ewart, Associate Professor of Large Animal Clinical Sciences. Molecular mechanisms of inherited diseases.

Patricia E. Ganey, Associate Professor of Pharmacology and Toxicology. Mechanisms of liver injury; role of phagocytic cells in hepatotoxicity.

John P. Giesy, Professor of Zoology. Chronic and acute effects of contaminants on aquatic ecosystems; Environmental chemistry and risk assessment.

Jay I. Goodman, Professor of Pharmacology and Toxicology. Genetic toxicology; carcinogen-induced changes in genes related to chemical carcinogenesis.

Jack R. Harkema, University Distinguished Professor of Pathobiology and Diagnostic Investigation. Inhalation toxicology.

Syed A. Hashsham, Assistant Professor of Civil and Environmental Engineering. Environmental molecular biology and mathematical tools to address environmental engineering issues.

Robert M. Hollingworth, Professor of Entomology. Effects of insecticides on neurological function; Risk assessment and regulatory toxicology.

Lee W. Jacobs, Professor of Crop and Soil Sciences. Fate of environmental chemicals in soil; impact of sludge applications to soils.

Norbert E. Kaminski, Professor of Pharmacology & Toxicology and Director Center for Integrative Toxicology. Immunotoxicology; modulation of immune response.

John B. Kaneene, Professor of Large Animal Clinical Sciences. Veterinary epidemiology.

Wilfried J. Karmaus, Associate Professor of Epidemiology. Reproductive epidemiology; effects of polychlorinated hydrocarbons and metals on pregnancy.

Michael J. Klug, Professor of Microbiology and Molecular Genetics. Bioremediation in surface and ground water; the relationship of changing structure in associated biofilm communities and the rate and extent of metabolism of contaminant organic compounds.

John J. LaPres, Assistant Professor of Biochemistry. Intracellular regulation of dioxin-like activity.

John E. Linz, Professor of Food Science and Human Nutrition and of Microbiology and Molecular Genetics. Regulation and genetics of mycotoxin biosynthesis.

David T. Long, Professor of Geological Sciences. Analytical toxicology; movement of inorganics in water.

Jane F. Maddox, Associate Professor of Pharmacology and Toxicology. Hepatic toxicology of chemicals.

Burra V. Madhukar, Associate Professor of Pediatrics and Human Development. Molecular and biochemical mechanisms of carcinogenicity of environmental toxicants.

Veronica M. Maher, Professor of Microbiology and Public Health. Biochemical toxicology; cytotoxic, mutagenic, and transforming effects.

Susan J. Masten, Associate Professor of Civil and Environmental Engineering. Environmental engineering; chemical oxidation processes.

J. Justin McCormick, Professor of Microbiology and Public Health. Biochemical toxicology; cytotoxic and mutagenic effects.

Thomas P. Mullaney, Professor of Pathology. Veterinary toxicology; hepatoxic effects in domestic animals.

L. Karl Olson, Associate Professor of Physiology. Chemical-induced alterations of the regulation of pancreatic islet B cell physiology and signal transduction.

Victoria L. McGuffin, Professor of Chemistry. Development of novel packed and open tubular capillary columns for liquid and supercritical fluid chromatography and electrophoresis.

Nigel S. Paneth, Professor of Pediatrics and Epidemiology; Chairperson of Epidemiology. Perinatal and child health epidemiology, environmental hazards to reproduction.

James J. Pestka, Professor of Food Science and Human Nutrition. Food toxicology; immunotoxicology.

Tom J. Pinnavaia, University Distinguished Professor of Chemistry. Phase transfer and heterogeneous catalysis; surface coordination chemistry.

N. Edward Robinson, Wilson Professor, Large Animal Clinical Sciences. Equine airway disease; automatic regulation of airway smooth muscle; mucus secretion; neuromuscular regulation of nasopharynx; therapy of airway disease**.**

Kenneth D. Rosenman, Professor of Medicine. Clinical toxicology; occupational and environmental medicine; dust diseases.

Robert A. Roth, Professor of Pharmacology & Toxicology and Director, Environmental and Integrative Toxicological Sciences (EITS) Training Program. Hepatic toxicology biochemical mechanism of action on liver structure and function.

Clayton L. Rugh, Assistant Professor of Crop & Soil Sciences. Natural and transgenic plant processes for pollution detoxification and removal.

Wilson K. Rumbeiha, Assistant Professor of Pathobiology & Diagnostic Investigation. Veterinary clinical and diagnostic toxicology; renal toxicology.

James G. Sikarskie, Associate Professor of Small Animal Clinical Sciences. Wildlife toxicology; wildlife as environmental sentinels.

Greg M. Swain, Associate Professor of Chemistry. Electroanalytical chemistry; development of new electrode materials for pollutant analysis.

James M. Tiedje, University Distinguished Professor of Crop and Soil Sciences and director of the Center for Microbial Ecology. Soil microbiology; ecology, physiology and biochemistry of pollutant biodegradation and denitrification; molecular methods to study soil bacteria, DNA probes.

James E. Trosko, Professor of Pediatrics and Human Development. Mechanisms of carcinogenesis and mutagenesis.

Bruce D. Uhal, Associate Professor of Physiology. Lung epithelial stem cell function; regulation of epithelial cell death (apoptosis); molecular mechanisms of lung fibrogenesis and repair

Brad L. Upham, Assistant Professor of Pediatrics and Human Development. Genetic toxicology/oncology.

Thomas C. Voice, Professor of Civil and Environmental Engineering. Environmental engineering; waste management.

James G. Wagner, Assistant Professor of Pathobiology and Diagnostic Investigation. Inhalation toxicology.

Jack Throck Watson, Professor of Biochemistry. Analytical toxicology; chemistry of protein interactions in chemical toxicity.

Timothy R. Zacharewski, Assistant Professor of Biochemistry. Endocrine disrupters; receptor-mediated mechanisms of toxicity.

Appendix B
EITS Program Application Form (contact CIT for an official copy)

APPLICATION FOR ADMISSION

Training Program in Environmental and Integrative
Toxicological Sciences (EITS)
Robert A. Roth, Graduate Program Director

(Please Print or Type)

Date: _____

Student No: _____

Applicant's Name: _____
(First) (Last) (Middle)

Home Address: _____

Home Phone: _____ Campus Phone: _____

Email: _____

Campus Address: _____

Undergraduate Education:

University Attended: _____

Grade Point Average: _____

Degree Received/Major: _____

Date of Graduation: _____

Graduate Education:

In which Department are you currently enrolled? _____ Grade Point Average: _____

Date of entry into Departmental Ph.D Program: _____ Major Professor: _____

Major Curriculum Code: _____(See Attachment C)

In which Program Track do you plan to enroll? (Circle one): Environmental Track Toxicology Track

List the courses you intend to use to fulfill the Environmental and Integrative Toxicological Sciences (EITS) requirements (see Appendix C and D). (For those courses you have already completed, please include the term/year completed and your grade (0.0 - 4.0). Future changes in this list should be brought immediately to the attention of the Center for Integrative Toxicology Admissions and Policy Committee.

EITS Required Course Number and Name	Year Competed or Scheduled	Grade Received

Please list other courses that you have completed since enrolling in your Departmental graduate program at Michigan State.

Course Number and Name	Year Competed or Scheduled	Grade Received

Research Interests:

Please indicate your research interests, including dissertation topic if available. (Be specific, please.)

Indicate below how you will meet the requirement for ethical research training.

If your Ph.D. Guidance Committee is known, please list the members and indicate their department affiliation. Indicate (*) those faculty affiliated with the Center for Integrative Toxicology:

Endorsement:

I affirm that the above information is correct and understand that to participate in this program and receive the Doctor of Philosophy Degree in Environmental Toxicology, I must meet the requirements of my affiliated department and the Program in Environmental and Integrative Toxicological Sciences.

_____ _____

Applicant's Signature

Date

As the department chairperson of the applicant's affiliated department, I will recommend the candidate for the degree, in conjunction with the Graduate Director of the Program in Environmental and Integrative Toxicological Sciences, when the necessary requirements have been fulfilled.

_____ _____

Department Chairperson

Date

Support for Application:

The completed application <u>and a letter of recommendation from your major thesis advisor</u> in support of your application should be sent to:

Admissions and Policy Committee
Center for Integrative Toxicology
C231 Holden Hall
Michigan State University
East Lansing, MI 48824

ATTACHMENT 1

Training Program in Environmental and Integrative Toxicological Sciences (EITS)

Major Curriculum Codes

0472	Animal Science-Environmental Toxicology
7029	Biochemistry and Molecular Biology-Environmental Toxicology
3938	Chemistry-Environmental Toxicology
0473	Crop & Soil Sciences-Environmental Toxicology
3939	Entomology-Environmental Toxicology
2450	Environmental Engineering-Environmental Toxicology
3968	Environmental Geosciences-Environmental Toxicology
0474	Food Science-Environmental Toxicology
2706	Human Nutrition-Environmental Toxicology
4901	Microbiology and Molecular Genetics-Environmental Toxicology
4900	Pathobiology and Diagnostic Investigation-Environmental Toxicology
4902	Pharmacology & Toxicology-Environmental Toxicology
3941	Zoology-Environmental Toxicology

Appendix C
Core Required Courses

Core Courses

Environmental and Integrative Toxicological Sciences Training Program

Center for Integrative Toxicology
Contact: Amy Swagart, swagart@msu.edu, 517-353-6469
www.cit.msu.edu

Toxicology Track

1. PHM 814	*Advanced Principles of Toxicology* **Recommended Background:** (PHM 819) **Description:** Biochemical, molecular and physiological mechanisms of toxicology. Responses of major organ systems to chemical insult. Mechanisms of mutagenesis and carcinogenesis.	3 credits	Spring (even years)
2. PHM 980	*Problems:Biostatistics* **Restrictions:** Open only to graduate students. Approval of department. **Description:** Limited work in selected research projects.	3 credits	Fall (even years)
3. PTH 856	*Concepts in Toxicologic Pathology* **Restrictions:** Approval of department. **Description:** Pathologic changes in tissues of animals used in toxicologic studies. Clinical pathologic assessments. Gross, histologic, and ultrastructural changes in organ systems.	2 credits	Summer (odd years)
OR			
PTH 851	*Advanced General Pathology* **Recommended Background:** (PTH 852) concurrently. **Restrictions:** Approval of department. **Description:** Fundamental concepts of cell injury, inflammation, and oncogenesis. Mechanisms of disease.	3 credits	Fall (even years)
4. ZOL 814	*Environmental Chemodynamics* **Restrictions:** Open only to graduate students in the College of Agriculture and Natural Resources or College of Engineering or College of Human Medicine or College of Natural Science or College of Osteopathic Medicine or College of Veterinary Medicine. **Description:** Chemical and environmental factors controlling the distribution of organic and inorganic chemicals in air, water, and soil. Environmental monitoring. **Alias:** FW 814	4 credits	Spring (even years)

OR

ANS 827	*Integrated Risk Assessment of Environmental Hazards* **Restrictions:** Open only to graduate students in the College of Agriculture and Natural Resources or College of Engineering or College of Human Medicine or College of Natural Science or College of Osteopathic Medicine or College of Veterinary Medicine. **Description:** Alternative approaches to assessing environmental and health risk. Analyzing, interpreting, and using scientific data from ecology, agriculture, environmental chemodynamics, biology, geological sciences, and toxicology in the risk assessment process.	3 credits	Spring (odd years)

5. plus one course chosen from among the courses in the five interest groups

Environmental Track

1. ZOL 814	*Environmental Chemodynamics* **Restrictions:** Open only to graduate students in the College of Agriculture and Natural Resources or College of Engineering or College of Human Medicine or College of Natural Science or College of Osteopathic Medicine or College of Veterinary Medicine. **Description:** Chemical and environmental factors controlling the distribution of organic and inorganic chemicals in air, water, and soil. Environmental monitoring. **Alias:** FW 814	4 credits	Spring (even years)

OR

ANS 827	*Integrated Risk Assessment of Environmental Hazards* **Restrictions:** Open only to graduate students in the College of Agriculture and Natural Resources or College of Engineering or College of Human Medicine or College of Natural Science or College of Osteopathic Medicine or College of Veterinary Medicine. **Description:** Alternative approaches to assessing environmental and health risk. Analyzing, interpreting, and using scientific data from ecology, agriculture, environmental chemodynamics, biology, geological sciences, and toxicology in the risk assessment process.	3 credits	Spring (odd years)
2. PHM 450	*Introduction to Chemical Toxicology* **Prerequisite:** (BS 110 or LBS 144) and (BS 111 or LBS	3 credits	Spring

145) and (CEM 251)
Restrictions: Not open to freshmen or sophomores.
Description: Mammalian toxicology. Disposition of chemicals in the body, detoxication, elimination, and mechanisms of toxicity in major organ systems. Selected toxic agents.

OR

PHM 814 — 3 credits — Spring (even years)

Advanced Principles of Toxicology

Recommended Background: (PHM 819)
Description: Biochemical, molecular and physiological mechanisms of toxicology. Responses of major organ systems to chemical insult. Mechanisms of mutagenesis and carcinogenesis.

3. plus three courses selected from among the courses in at least two interest groups; i.e. one course from each of three different interest groups or one course from one group and two courses from another group.

Appendix D

Elective Courses

Environmental Dynamics

CE 481	Environmental Engineering Chemistry	3 credits	Fall
CE 821	Groundwater Hydraulics	3 credits	Fall
CSS 455	Pollutants in the Soil Environment	3 credits	Fall
ENE 801	Dynamics of Environmental Systems	3 credits	Spring
GLG 421	Environmental Geochemistry	4 credits	Spring
GLG 821	Aqueous Geochemistry	3 credits	Fall (odd years)
MMG 425	Microbial Ecology	3 credits	Spring
MMG 841	Soil Microbiology	3 credits	Spring (even years)
ZOL 897	Ecosystem Ecology	4 credits	Spring

Economics, Policy and Law

AEC 810	Institutional & Behavioral Economics	3 credits	Fall
AEC 829	Economics of Environmental Resources	3 credits	Fall
RD 415	Environmental Impact Assessment	4 credits	Fall
RD 831	Role of the Expert Witness	3 credits	Fall (odd years)
RD 836	Law of Environmental Regulation	3 credits	Fall

Waste Management

CE 483	Water and Wastewater Treatment	3 credits	Fall
CE 485	Solid and Hazardous Waste Management	3 credits	Spring
CE 487	Microbiology for Environmental Health Engineering	3 credits	Spring
ENE 804	Biological Processes in Environmental Engineering	3 credits	Fall

Analytical Chemistry

CEM 835	Spectrochemical Methods of Analysis	3 credits	Spring (even years)
CEM 836	Separation Science	3 credits	Spring (odd years)
CEM 845	Structure and Spectroscopy of Organic Compounds	3 credits	Fall
ENE 807	Environmental Analytical Chemistry	3 credits	Fall
ENE 808	Environmental Analytical Chemistry Lab	1 credit	Spring

Mechanisms of Toxicity

ANS 407	Food and Animal Toxicology	3 credits	Fall
EPI 810	Introduction to Descriptive and Analytical Epidemiology	3 credits	Fall
FSC 807	Advanced Food Toxicology	3 credits	Fall (even years)
FSC 840	Advanced Food Microbiology	3 credits	Spring (odd yrs)
PHM 815	Concepts in Tumorigenesis	2 credits	Spring (odd years)
ZOL 868	Aquatic Toxicology	4 credits	Spring (odd years)

Appendix E

APPLICATION FOR CANDIDACY

(copy, obtain official form from the CIT)

Training Program in Environmental and Integrative
Toxicological Sciences (EITS)
Robert A. Roth, Graduate Program Director

Date: _____

Track: Toxicology Environmental

Applicant's Name: _____

_____

Student No: _____

Department: _____

_____

_____

Major Professor: _____

_____

GPA: _____

At Time of Preliminary Comprehensive Examination:

Courses completed and grad received:

Course Number and Name	Grade Received

Courses remaining and estimated date of completion:

Environmental Toxicology Requirements: (Core Courses and Electives)

Course Number and Name	Grade Received

Requirement for Ethical Research Training (describe your formal training)

	Estimated Completion

Record of Participation in Seminars, Symposia & Colloquium:

Seminar Topic (List 12 seminars)	Speaker

Dissertation Topic:

Ph.D. Guidance Committee:*
Chair:

*Two members of the committee must be members of the Center for Integrative Toxicology faculty.