



TEXAS TECH UNIVERSITY  
Graduate School™

# Graduate Program Review

## 2005-2011

Department of  
Environmental Toxicology

*Ron Kendall, Chair*

*Chris Salice, Advisor*

College of Arts and Sciences

*Lawrence Schovanec, Dean*

November 2011

## PROGRAM REVIEW OUTLINE

### Department of Environmental Toxicology

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**VII. Appendices** – should include, but not be limited to, the following:

Table of Contents

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- C. Graduate Course Offerings (table)
- D. Graduate Student Handbook
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## **I. Program Overview**

The Department of Environmental Toxicology represents the academic home of the core faculty of The Institute of Environmental and Human Health (TIEHH). TIEHH began in 1997 and the Department of Environmental Toxicology was formed 3 years later. The Department of Environmental Toxicology underwent a graduate program review in 2005 and received very favorable reviews and recommendations. This is especially noteworthy considering at the time it was essentially a brand new program at Texas Tech University. TIEHH integrates the efforts of Texas Tech University, the School of Law, and the Health Sciences Center in a joint venture to assess toxic chemical impacts on the environment. Attracting graduate students at both the masters and doctoral level, TIEHH also includes adjunct faculty from biological sciences, medicine, epidemiology, biostatistics, engineering, chemistry, computer science, law, mathematics, pharmacology, physiology, and range, wildlife, and fisheries management.

TIEHH operations are reviewed annually by an external Science Advisory Board (SAB). The SAB evaluates research and academic activities (among others) and makes recommendations for programmatic improvement. Copies of the SAB's reports for the last 2 years are included in the Appendix (G-1). The SAB has communicated that our program "is the largest integrated program in environmental health" in North America, expanding its impact on research and development in the area of environmental toxicology and chemistry, offering an outstanding academic program for students, and contributing to the doctoral and master's degree graduates as Texas Tech University strives to be further recognized as a research university. The TIEHH Science Advisory Board is chaired Dr. Anne Fairbrother, Exponent, and co-chaired by Dr. Mary Anna Thrall, Colorado State University. Other members of the board include:

Dr. Joel Coats, Iowa State University

Dr. Elaine Dorward-King, Richards Bay Minerals, South Africa

Dr. Patrick Guiney, S. C. Johnson & Son, Inc.

Dr. Thomas Lacher, Texas A & M University

## **B. Department Vision**

The vision of the Department (as outlined in its Strategic Plan) is to "stimulate and develop environmental and health sciences research and education at Texas Tech University/Texas Tech Health Sciences Center within an atmosphere of superior scholarship and collegiality so as to position Texas Tech to be premier in the state, nation and the world in the integration of environmental impact assessment of toxic chemicals and other anthropogenic stressors with human health and ecological consequences, framed in the context of science-based risk assessment to support sound environmental policy and law".

## **C. Department Goals**

The goals of the Department (as outlined in its Strategic Plan) are "to be a leader in research and education integrating environmental and human health sciences and to contribute to innovative solutions to environmental problems by embracing disciplinary diversity, creating partnerships, and committing to excellence".

## **II. Graduate Curricula and Degree Programs**

### **A. Scope of programs within the department**

Because of the multidisciplinary nature of environmental toxicology research and training, prospective students need a strong background in the natural, physical, or health sciences. The M.S. Program (36 hours) and the Ph.D. Program (72 hours) are composed of course work emphasizing the principles of toxicology, the environmental fate of chemicals, statistical approaches to study design and data handling, analytical chemistry laboratory, and seminars in environmental toxicology. Supplemental course work, research, and thesis or dissertation hours are chosen by the student with the guidance of their committee, allowing for focus on the student's particular research emphasis. Students pursuing either degree must perform an original research project, prepare a written thesis or dissertation, and defend the work in a public defense.

#### **1. M.S. Program**

The purpose of the M.S. program is to provide students with graduate education in the specialized areas of science that comprise Environmental Toxicology; further, to provide an introduction to interdisciplinary research, manuscript preparation, and effective oral communication; and lastly, prepare the student for employment or for obtaining a Ph.D. or other advanced degree.

It is expected that M.S. students will (1) have an advanced working knowledge of the paradigms of toxicology and will have demonstrated critical thinking and scientific reasoning skills, (2) have participated with their mentors to secure research or travel funds, (3) make research presentations at local, regional, national, or international scientific meetings, and (4) have served as primary author of one refereed manuscript on their research.

#### **2. Ph.D. Program**

The purpose of the Ph.D. program is to provide students with graduate education in the specialized areas of science that comprise Environmental Toxicology; further, to provide an introduction to interdisciplinary research, manuscript preparation, effective oral communication, and development of effective teaching skills; and lastly, prepare the student for employment as faculty and researchers.

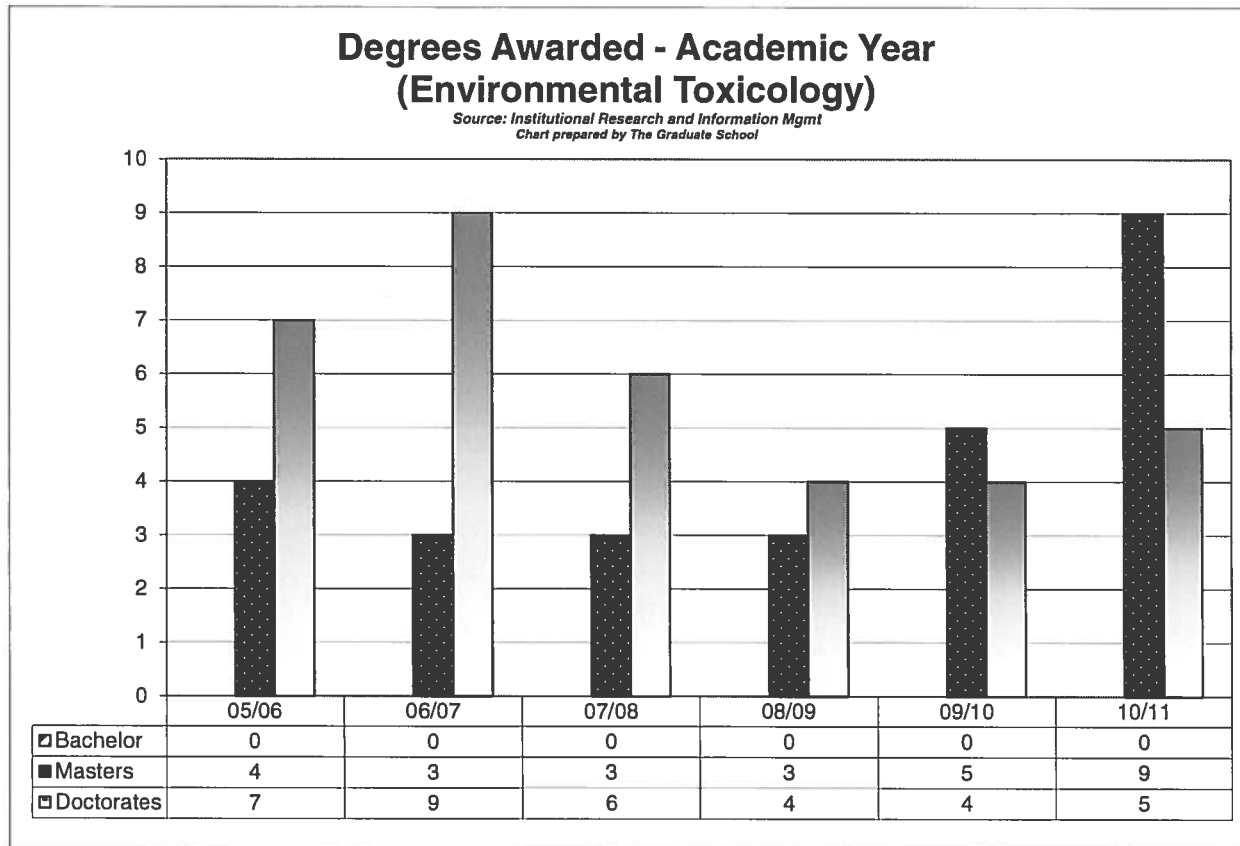
It is expected that Ph.D. students will (1) have an advanced working knowledge of the paradigms of toxicology and will have demonstrated critical thinking and scientific reasoning skills, (2) have participated with their mentors to secure research or travel funds, (3) make research presentations at local, regional, national, or international scientific meetings, and (4) have served as primary author of two refereed manuscript on their research.

#### **3. Joint Degree Programs**

The Department also offers 2 joint degree programs in cooperation with the TTU Law School (J.D./M.S.) and the Rawls College of Business (M.B.A./M.S.). While the background of students that enter these programs varies slightly from the traditional M.S. program students, the goals of those programs are consistent with the M.S. Program described above. A joint degree has the advantage of reducing the total time required to obtain both degrees separately, while allowing students to develop additional expertise.

The programs are organized and administered similarly to the other joint degree programs in the School of Law and the Rawls College of Business. Students must meet the admissions requirements of both programs. All ENTX or other non-law or non-business courses applied toward a joint degree must be approved either by the Law or Rawls faculty or the ENTX faculty before a law student can take these courses for credit.

B. Number and types of degrees awarded



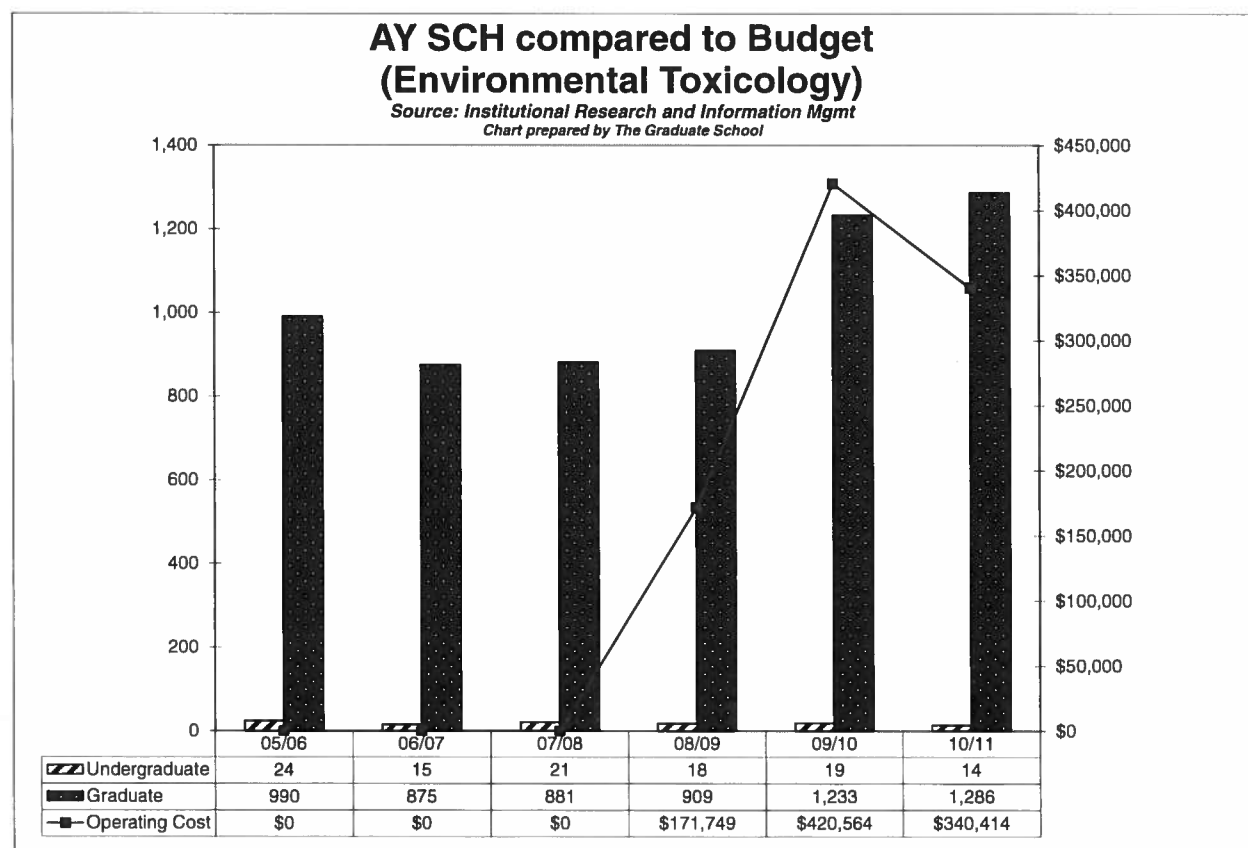
### Graduate Program Degrees Awarded

*Source: Institutional Research Services*

Name of Program	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011
Environmental Toxicology	11	12	9	7	9	14

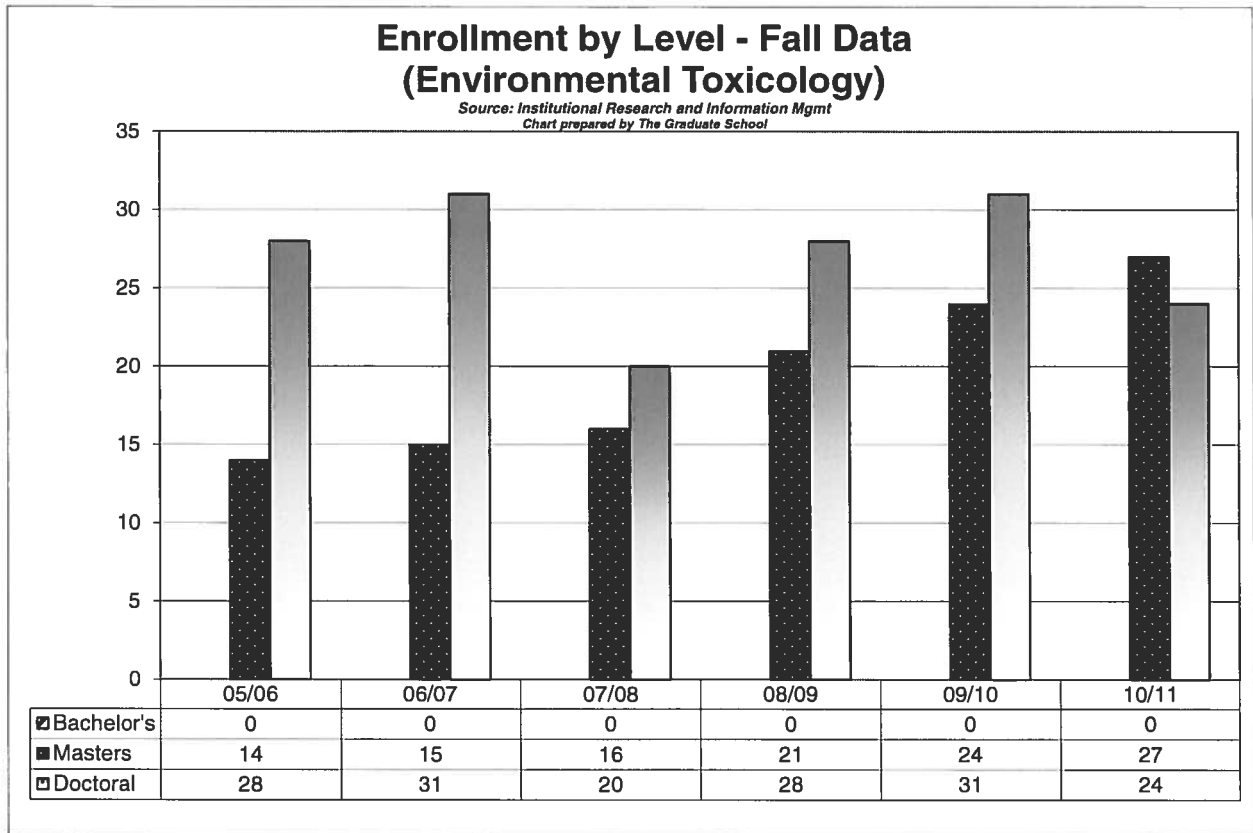
Comparison of Degrees Awarded - Fall Data	05/06	06/07	07/08	08/09	09/10	10/11
<b>Clemson University</b>						
Bachelor						
Master	4	4	1	2	8	1
Doctoral	3	2	3	5	2	2
<b>Iowa State University</b>						
Bachelor						
Master	2	5	2	2	3	1
Doctoral	3	1	5	3	0	5
<b>North Carolina State University</b>						
Bachelor	0	0	0	0	0	0
Master	3	4	6	7	1	5
Doctoral	3	8	4	4	5	3
<b>University of Saskatchewan</b>						
Bachelor	11	15	14	19	22	16
Master	3	5	9	2	8	1
Doctoral	1	1	1	3	1	4
<b>Texas Tech University</b>						
Bachelor	0	0	0	0	0	0
Master	4	3	3	3	5	9
Doctoral	7	9	6	4	4	5

C. Undergraduate and graduate semester credit hours





D. Number of majors in the department for the fall semesters



### Graduate Program Enrollment

Source: Institutional Research Services

Name of Program	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011
Environmental Toxicology	42	46	36	49	55	51

<b>Comparison of Enrollment - Fall Data</b>	05/06	06/07	07/08	08/09	09/10	10/11
<b>Clemson University</b>						
Bachelor						
Master	8	8	8	8	9	8
Doctoral	18	14	15	25	19	21
<b>Iowa State University</b>						
Bachelor						
Master	5	9	7	6	5	4
Doctoral	13	15	16	20	20	20
<b>North Carolina State University</b>						
Bachelor	0	0	0	0	0	0
Master	11	12	12	9	7	3
Doctoral	32	27	21	23	20	23
<b>University of Saskatchewan</b>						
Bachelor	70-80	70-80	80-90	90-100	100-110	90-100
Master	27	22	23	24	18	25
Doctoral	10	13	12	10	14	13
<b>Texas Tech University</b>						
Bachelor	0	0	0	0	0	0
Master	14	15	16	21	24	27
Doctoral	28	31	20	28	31	24

E. Course enrollments over the past six years (enrollment trends by course)

- Figures are totals – classes may be offered more than once a year

**Course Enrollments by Academic Year**

*Source: Institutional Research Services*

Department	Subject	Course	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	Total
BIOL	ENTX	6000							0
BIOL	ENTX	6100							0
BIOL	ENTX	6300							0
BIOL	ENTX	6345							0
BIOL	ENTX	7000							0
BIOL	ENTX	8000							0
ENTX	ENTX	6000	17	14	12	21	26	16	106
ENTX	ENTX	6100	52	28	38	36	71	69	294
ENTX	ENTX	6105				11	21	16	48
ENTX	ENTX	6115				29	30	17	76
ENTX	ENTX	6251	9	6	5	5	12	19	56
ENTX	ENTX	6300	15	12	8		11	14	60
ENTX	ENTX	6312	2		5	7	10	10	34
ENTX	ENTX	6314					9		9
ENTX	ENTX	6325	10	14	17	18	23	19	101
ENTX	ENTX	6326	9	12	16	13	21	15	86
ENTX	ENTX	6327			7			8	15
ENTX	ENTX	6331		1					1
ENTX	ENTX	6332	5						5
ENTX	ENTX	6345							0
ENTX	ENTX	6351	10	6	6	4	12	23	61
ENTX	ENTX	6361							0
ENTX	ENTX	6365				8	8	7	23
ENTX	ENTX	6366							0
ENTX	ENTX	6371	9	5	8	23	17	18	80
ENTX	ENTX	6385	17	12	16	18	22	19	104
ENTX	ENTX	6391					5	7	12
ENTX	ENTX	6431							0
ENTX	ENTX	6445	12	12	13	9	23	18	87
ENTX	ENTX	7000	115	97	98	97	113	106	626
ENTX	ENTX	8000	32	40	28	29	24	15	168
ENTX	TOX	6105	6	10	16				32
ENTX	TOX	6115	43	34	34				111
<b>Totals</b>			<b>363</b>	<b>303</b>	<b>327</b>	<b>328</b>	<b>458</b>	<b>416</b>	<b>2195</b>

F. Courses cross listed (syllabus included behind)

ENTX 4325/6325 Principles of Toxicology I

ENTX 4326/6326 Principles of Toxicology II

# Principles of Toxicology I

## ENTX 4325 and ENTX6325

Fall 2011

### Instructors and Peer Mentor Information:

#### Instructor

Dr. Céline Godard-Codding  
The Institute of Environmental and Human Health  
Reese Center, Building 555, Room 101C  
Phone: 806-885-0337  
Email: [celine.godard-codding@tiehh.ttu.edu](mailto:celine.godard-codding@tiehh.ttu.edu)

Office hours: Wednesdays (2-3:30pm) or by appointment.  
Emails will be addressed within 3 business days

#### Teaching Assistant:

Kaylyn Germ  
The Institute of Environmental and Human Health  
Reese Center, Building 555  
Email: [Kaylyn.Germ@tiehh.ttu.edu](mailto:Kaylyn.Germ@tiehh.ttu.edu)

Office hours: Tuesdays 10-11am, Wednesdays 10-11am or by appointment.  
Emails will be addressed within 3 business days

### Course Information:

Course name and number: Principles of Toxicology I, ENTX 4325 and ENTX6325

Meeting place and time: Reese Technology Center, TIEHH Building 555, Lecture Hall, Tuesdays and Thursdays 11:00am-12:20pm (access maps at [http://www.tiehh.ttu.edu/contact\\_us.html](http://www.tiehh.ttu.edu/contact_us.html))

Pre-requisites for the course: None but appropriate background in biology, biochemistry and physiology recommended.

#### Required textbooks:

- 1) Casarett & Doull's Essentials of Toxicology (Casarett and Doull's Essentials of Toxicology) (Paperback) by Curtis Klaassen (Author), John B. Watkins III (Author). ISBN 0-07-138914-8
- 2) Casarett & Doull's Toxicology: The Basic Science of Poisons (Casarett & Doull Toxicology) 7th Edition by Curtis Klaassen (Author). ISBN 978-0-07-147051-3

#### Supplemental texts (with citation for current editions; some on reserve in TIEHH library):

-Hayes, A.W. 2007. *Principles and Methods of Toxicology*, 5th Edition. Taylor and Francis. Philadelphia, PA.

-Hodgson, E. and R.C. Smart. 2001. *Introduction to Biochemical Toxicology*. 3rd Edition. Wiley-Interscience. New York, NY. *Reserve copy is available at the TA's desk.*

-Biochemistry texts such as Stryer, Lehninger, Rahn or Voight.

-Guyton and Hall. 2011. *Textbook of Medical Physiology*. 12<sup>th</sup> Edition. Elsevier Health Sciences. (In depth treatment with everything you could ever want to know about physiology)

### **Course Purpose:**

Principles of Toxicology I (Entx 4325) is for upper level undergraduate students with the appropriate background in biology and chemistry and an interest in how chemicals interact with biological systems.

Principles of Toxicology I (Entx 6325) is a required core course for all students in the MS and PhD graduate programs in Environmental Toxicology (ET). At the PhD level, it provides information necessary for the completion of ET qualifying examinations. It is considered an elective in the TTUHSC Graduate School of Biomedical Sciences and TTU Forensics Sciences graduate curriculums.

At both the undergraduate and graduate levels, these courses provide a background in toxicology encompassing general toxicological principles and tissue-, mechanism- and toxicant-specific processes related to toxicological responses. Students who take this course will obtain the ability to 1) understand the response of organisms to toxicants, 2) anticipate the toxicity of many toxicant classes, 3) work with the literature to obtain toxicant-specific data, and 4) develop hypothesis-driven scientific approaches to toxicological issues. These skills provide a necessary foundation for application of toxicology to most basic and applied sciences and the background needed for all other toxicologically-oriented courses offered within the ET curriculum.

### **Expected Learning Outcomes**

After completing this course, students will be able to:

1. Understand and apply the basic tenets of toxicological sciences to establish cause and effect relationships between chemical stressors and affected targets, at levels from the molecule to the whole organism.
2. Describe and discuss:
  - a. Basic principles of toxicology including dose-response relationships, chemical interactions with molecular targets and other chemicals, dispositional factors, and risk assessment;
  - b. Enzyme systems responsible for the biotransformation of toxicants, including phase I and phase II systems;
  - c. Tissue level effects and their mechanisms for the liver, kidney, heart, vascular system, and nervous system; and
  - d. Examples of pesticides, metals, solvents, polychlorinated aromatics (PCBs, dioxins, etc.), natural toxins and food-associated chemicals and contaminants, their sources and fate in the environment and the effects they exert.
3. Analyze toxicological scenarios to determine potential causes of toxic responses and suggest methods for determining the accuracy of the analyses.

4. Apply their knowledge of the role that age, sex, nutritional and physiological status, socioeconomic level, and other ancillary factors play in influencing the toxicity of chemicals to living organisms, so that they can better identify populations at risk.

## Course Schedule:

The following course schedule is a general outline and is subject to change by the instructor.

Instructor: Dr. Celine Godard-Codding

TA: Kaylyn Germ

T/TH 11:00AM - 12:20 PM; Room: TIEHH Lecture Hall

3 Credit hours

Week	Date	Topic	Reading (Essentials) *	Reading (Hard Copy Book)	Lecturer
1	Aug 25	Introduction, Scope and Chemical Types History of Toxicology	Handouts 1, handouts	1  2: p11-19 (inclusive of "Duration and Frequency of Exposure paragraph")	Godard-Codding
	Aug 30				Godard-Codding
	Sept 1				Godard-Codding
2	Sept 6	Basic Principles I Basic Principles II	2	TBA	Godard-Codding
	Sept 8	Mechanisms of Toxicity I	3	TBA	Godard-Codding
3	Sept 13	Mechanisms of Toxicity II	3	TBA	Godard-Codding
	Sept 15	<b>Quiz 1</b> Absorption, Distribution, Excretion of Toxicants	5	TBA	Godard-Codding
4	Sept 20	Absorption, Distribution, Excretion of Toxicants	5	TBA	Godard-Codding
	Sept 22	Absorption, Distribution, Excretion of Toxicants	5	TBA	Godard-Codding
5	Sept 27	<b>EXAM I</b>	-	-	-
	Sept 29	Metabolism of Toxicants - Phase I	6	TBA	Godard-Codding
6	Oct 4	Metabolism of Toxicants - Phase I	6	TBA	Godard-Codding
	Oct 6	Metabolism of Toxicants - Phase I	6	TBA	Godard-Codding
7	Oct 11	Break	-	-	-
	Oct 13	Metabolism of Toxicants - Phase II	6	TBA	Godard-Codding
	Oct 18	Metabolism of Toxicants - Phase II	6	TBA	Godard-Codding
8	Oct 20	<b>Quiz 2</b> Metabolism of Toxicants - Phase II	6	TBA	Godard-Codding
	Oct 25	Hepatotoxicology I	13	TBA	Godard-Codding
9	Oct 27	Hepatotoxicology II	13	TBA	Godard-Codding
	Nov 1	Nutritional and Physiological Factors	Handouts	TBA	Godard-Codding
10	Nov 3	<b>EXAM II</b>	-	-	-
	Nov 8	Renal Toxicology I	14	TBA	Godard-Codding
11	Nov 10	Renal Toxicology II	14	TBA	Godard-Codding
	Nov 15	Neurotoxicology I	16	TBA	Gao
12	Nov 17	Neurotoxicology II	16	TBA	Gao
	Nov 22	<b>Hwrok</b> Blood Toxicology	11	TBA	Gao
13	Nov 24	Thanksgiving Break	-	-	-
	Nov 29	Risk Assessment	4	TBA	P. Smith
	Dec 1	Heart and Vascular Toxicology	18	TBA	E. Smith
14	Dec 6	Applications of Toxicology	30-34	TBA	Godard-Codding
	Dec 12	<b>FINAL EXAM, 7:30AM-10AM</b>	-	-	-

Hwrok refers to Homework due date

\* Numbers refer to chapters in Casarett & Doull's Essentials of Toxicology (Paperback) by Curtis Klaassen (Author), John B. Watkins III (Author).

ISBN 0-07-138914-8



## **Methods of Assessing Student Progress:**

Techniques will employ ongoing assessments of student learning throughout the semester of the class. Short and/or comprehensive examinations will test student development, understanding of reading material, and achievement of expected learning objectives at 1 to 2-week intervals. An Evaluation Questionnaire will also be filled by students on the first day of class and again at the end of the semester in order to assess the students' overall progress. Between these intervals, direct interaction with students in twice weekly lecture periods will present to them summarized and condensed accounts of reading materials and provide for direct interaction with the instructor and other students in an open and encouraging environment that is supportive of questions, discussion and clarification of course topics.

Examinations are formatted to allow student expression of their reasoning for all answers, and employ only essay and demonstration type questions that allow for partial credit and evaluation of areas of strengths and weaknesses. Follow-up discussions of areas of weakness will occur following each examination. Team exercises allow students to discuss topics in peer setting and explain concepts to one another while honing in their communication skills.

### **Grading:**

Exams: There will be two midterms and a final exam. Exams are cumulative, though each focuses more heavily on the coursework since the previous exam. Students are expected to know and understand the information presented in the lectures, handouts, and reading assignments. Exams will cover material presented in all three.

In Class Quizzes: There will be two in class quizzes (Sept 15 and Oct 20). Each quiz is 20 min long and will be done first individually then in team.

Homework: There will be 10 short homework quizzes/assignments throughout the semester and one long homework assignment (due Nov 22). The homework assignments are due before 11:05 the next day of class. Late submission will be marked 50% the first time and 0 the next. Submission is to be made to the TA, Kaylyn Germ, by email or in person.

### **Grades:**

Modality	Points
Exam 1	100
Exam 2	100
Final Exam	100
Quiz 1	50 (25 individual points, 25 team points)
Quiz 2	50 (25 individual points, 25 team points)
Long Homework	50
Short Homework Quizzes/Assignments	100
Total Points	550
Final Grade	Total points/5.5 (e.g. 528/5.5 = 96 = A)

Team points are calculated as a function of team score and participation to the team work assignment.

Cutoff percentages are 90, 80, 70 and 60 for A, B, C, and D, respectively, though the instructor may curve the cutoffs downward based on final distribution of scores.

### **Lecture and Exam Attendance Policy:**

Attendance is expected of all students. Announcements and information may be distributed in class that can modify assignments, tests and class policy. If you miss a class, work with your fellow students to obtain notes for the missed lectures. It is your responsibility to coordinate with your TA to insure you have all handouts and are aware of homework assignments.

The instructor must be notified in advance if an exam is to be missed due to religious observance or an officially approved trip. Prior notification of an absence for an exam or an in-class assignment is required in order to be provided with a make-up exam or presentation time. Make-up exams and presentation times will also be provided if absence is due to illness and if a doctor's note is presented to the instructor at the next class or if a family death has occurred. According to TTU policies: "the Center for Campus Life is responsible for notifying the campus community of student illnesses, immediate family deaths and/or student death". "Generally, in cases of student illness or immediate family deaths, the notification to the appropriate campus community members occur when a student is absent from class for four (4) consecutive days with appropriate verification" and "at the student's request". "It is always the student's responsibility for missed class assignments and/or course work during their absence". "The student is encouraged to contact the faculty member immediately regarding the absences and to provide verification afterwards". "The notification from the Center for Campus Life does not excuse a student from class, assignments, and/or any other course requirements. The notification is provided as a courtesy". More details on this service can be found on the Center for Campus Life website and in the 2008-2009 Student Handbook, see [http://www.depts.ttu.edu/centerforcampuslife/general\\_services.aspx](http://www.depts.ttu.edu/centerforcampuslife/general_services.aspx).

### **Academic Integrity:**

The highest level of academic integrity will be expected during all aspects of the course. The following Texas Tech University statement on academic integrity describes the expectations for students within this course: "It is the aim of the faculty of Texas Tech University to foster a spirit of complete honesty and a high standard of integrity. The attempt of students to present as their own any work that they have not honestly performed is regarded by the faculty and administration as a serious offense and renders the offenders liable to serious consequences, possibly suspension." Texas Tech University Catalog (p.51), 2008-08 Student Handbook (p.8) and (OP 34.12).

According to University policy:

"The instructor in a course is responsible for initiating action in each case of dishonesty or plagiarism that occurs in that class". "When a faculty member determines, according to the Student Handbook, that academic dishonesty has occurred and assigns a grade of F for a course, the grade of F will stand as a final grade, notwithstanding a subsequent withdrawal from the course by the student". "In cases of repeated violations, either the instructor (through his or her department chair and/or academic dean) or the academic dean may refer

the case to the Director of Judicial Programs for further disciplinary proceeding". Excerpts from 2008-08 Student Handbook (p.8).

"Scholastic dishonesty" includes, but is not limited to, cheating, plagiarism, collusion, falsifying academic records, misrepresenting facts, and any act designed to give unfair academic advantage to the student (such as, but not limited to, submission of essentially the same written assignment for two courses without the prior permission of the instructor) or the attempt to commit such an act (TTU OP 34.12). There will be zero tolerance for scholastic dishonesty. It is the student's responsibility to insure his or her actions are free from scholastic dishonesty. Please refer to the TTU statement of academic integrity and TTU definition of cheating, plagiarism, collusion, falsifying academic records, and misrepresenting facts at <http://www.depts.ttu.edu/studentjudicialprograms/academicinteg.php>.

Special note on plagiarism: there will be zero tolerance for plagiarism on written assignments. The following definition of plagiarism as outlined on page 51 of the Texas Tech University Undergraduate / Graduate Catalog will be applied during this course: "Plagiarism includes, but is not limited to, the appropriation of, buying, receiving as a gift, or obtaining by any means material that is attributable in whole or in part to another source, including words, ideas, illustrations, structure, computer code, other expression and media, and presenting that material as one's own academic work being offered for credit. Any student who fails to give credit for quotations or for an essentially identical expression of material taken from books, encyclopedias, magazines, Internet documents, reference works or from the themes, reports, or other writings of a fellow student is guilty of plagiarism." Please find a classification and examples of various types of plagiarism on the last page of this syllabus, including those that will be considered "Not Acceptable" and "Not Acceptable and Egregious". **Detection of types of plagiarism that are considered "Not Acceptable" and/or "Not Acceptable and Egregious" on any exams, in-class assignments, homework assignments, or any other written works will result in zero points earned for that particular assessment endpoint.** Other types of plagiarism will incur a reduction of points as determined appropriate by the instructor. Please, visit <http://www.aresearchguide.com/> for a more detailed resource for students on plagiarism, including writing smart and academically honest papers.

### **Civility in the Classroom:**

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**Principles of Toxicology  
Preview of Second Semester Topics**

**Systemic Toxicology (Continued From Fall)**

Introduction and Review  
Methods in Toxicology  
Genetic Toxicology  
Mutagenesis  
Carcinogenesis  
Genotoxicity  
Immunotoxicology  
Lung Toxicology  
Reproductive Toxicology  
Developmental Toxicology  
Teratogenesis  
Endocrine Toxicology

**Chemical Agents: Effects and Issues**

Pesticides  
Metals  
Chlorinated Aromatics  
Solvents  
Radiation  
Plant Toxins  
Animal Toxins  
Food Additives and Contaminants  
Pharmaceutical

### A general classification of plagiarism with examples and comments on level of severity.

Type	Description	Example	Comment
1	Coincidental / Common Phrases	...can have effects on the immune system...	Difficult to avoid.
2	Lists of items such as dose levels	...0.01, 0.1, 1.0, 10, and 100 mg/kg...	Difficult to avoid. Must be referenced back to original article.
3	Lists of signs or symptoms	...apoptosis in the cerebrum, cerebellum, optic tecta, and brainstem...	Can be avoided with more careful paraphrasing or should be put in quotation marks. Must be referenced back to original article.
4	Verbatim use of text with appropriate reference given	More than 5 or 6 words that are identical to the original text	Requires use of quotes or should be paraphrased. <b>NOT ACCEPTABLE.</b>
5	Verbatim use of text without appropriate reference given	Similar to 4, though more serious due to lack of credit to original author. <i>This is stolen work.</i>	Requires use of quotes or should be paraphrased. <b>NOT ACCEPTABLE AND EGREGIOUS.</b>
6	Verbatim use of review text, using review references, but without appropriate reference given to the review article	Similar to 5, except use of a review article that pulls together information and provides additional references. <i>This is stolen work.</i>	Requires use of quotes or should be paraphrased. Original articles should be used and not the review article. <b>NOT ACCEPTABLE AND EGREGIOUS.</b>
7	Verbatim use of review text, without using review references and without appropriate reference given to the review article	Same as 5, except without citing references from the review article. <i>This is stolen work.</i>	Requires use of quotes or should be paraphrased. Original articles should be used and not the review article. <b>NOT ACCEPTABLE AND EGREGIOUS.</b>

Table developed by Dr. Michael Hooper from written assignments at the graduate level during his teaching experiences and reproduced with his permission.

## Peer Rating of Team Members†

Your Name \_\_\_\_\_ Your Team \_\_\_\_\_

Date \_\_\_\_\_

Please write the names of all your team members, INCLUDING YOURSELF, and rate the degree to which each member fulfilled his/her responsibilities in completing the team assignments. *DO NOT LEAVE ANY COMMENTARY BLANK!* Place this form in a sealed envelope, with your team name on the outside, and give it to your instructor. The possible ratings are as follows:

**Excellent:** Consistently carried more than his/her fair share of the workload

**Very Good:** Consistently did what he/she was supposed to do, very well prepared and cooperative

**Satisfactory:** Usually did what he/she was supposed to do, acceptably prepared and cooperative

**Ordinary:** Often did what he/she was supposed to do, minimally prepared and cooperative

**Marginal:** Sometimes failed to show up or complete assignments, rarely prepared

**Deficient:** Often failed to show up or complete assignments, rarely prepared

**Unsatisfactory:** Consistently failed to show up or complete assignments, unprepared

**No show:** No participation at all

*These ratings should reflect each individual's level of participation and effort and sense of responsibility, not his/her academic ability.*

Name of team member	Rating	Commentary (DO NOT LEAVE BLANK!)
---------------------	--------	----------------------------------

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Your Signature: \_\_\_\_\_

†Adapted from R.M. Felder & R. Brent, *Effective Teaching*, North Carolina State University, 2000.

## Principles of Toxicology Web Resources

<http://www.environmentalhealthnews.org/> The mission of Environmental Health News is to advance the public's understanding of environmental health issues by publishing its own journalism and providing access to worldwide news about a variety of subjects related to the health of humans, wildlife and ecosystems.

<http://www.atsdr.cdc.gov/toxpro2.html> The Agency for Toxic Substances and Disease Registry (ATSDR) produces "toxicological profiles" for hazardous substances found at National Priorities List (NPL) sites. These hazardous substances are ranked based on frequency of occurrence at NPL sites, toxicity, and potential for human exposure. Toxicological profiles are developed from a priority list of 275 substances. ATSDR also prepares toxicological profiles for the Department of Defense (DOD) and the Department of Energy (DOE) on substances related to federal sites.

<http://www.epa.gov/ncct/dsstox/> **Distributed Structure-Searchable Toxicity (DSSTox) Database Network** is a project of EPA's National Center for Computational Toxicology, helping to build a public data foundation for improved structure-activity and predictive toxicology capabilities. The DSSTox website provides a public forum for publishing downloadable, structure-searchable, standardized chemical structure files associated with toxicity data.

<http://www.epa.gov/> Environmental Protection Agency

<http://ntp.niehs.nih.gov/> National Toxicology Program

<http://www.niehs.nih.gov/> National Institute of Environmental and Human Health

<http://www.nsf.gov/> National Science Foundation

<http://www.fda.gov/> Food and Drug Administration

<http://www.cancer.gov/> National Cancer Institute

<http://www.cdc.gov/> Center for Disease Control and Prevention

<http://www.osha.gov/> Occupational Safety and Health Organization

<http://www.cpsc.gov/> Consumer Product Safety Commission

<http://www.setac.org/> The Society of Environmental Toxicology and Chemistry is a not-for-profit, worldwide professional organization comprised of individuals and institutions dedicated to the study, analysis and solution of environmental problems, the management and regulation of natural resources, research and development and environmental education. Our mission is to support the development of principles and practices for protection, enhancement and management of sustainable environmental quality and ecosystem integrity.



**PRINCIPLES OF TOXICOLOGY II**  
**ENTX4326 and ENTX6326**  
**Spring 2011**

**Instructor, Lecturers and Teaching Assistant Information:**

Instructor of Record:

Dr. Weimin Gao

The Institute of Environmental and Human Health

Reese Center, Bldg. 555, Room 101D

Phone: (806)885-0252

Email: [weimin.gao@tiehh.ttu.edu](mailto:weimin.gao@tiehh.ttu.edu)

Office hours are 9:30-10:30 am Tuesdays or by appointment

Lecturers:

Dr. Todd Anderson

The Institute of Environmental and Human Health

Reese Center, Bldg. 555, Room 101A

Phone: (806)885-0231

Email: [ernest.smith@tiehh.ttu.edu](mailto:ernest.smith@tiehh.ttu.edu)

Dr. Celine Godard-Codding

The Institute of Environmental and Human Health

Reese Center, Bldg. 555, Room 101AA

Phone: (806)885-0337

Email: [celine.godard-codding@tiehh.ttu.edu](mailto:celine.godard-codding@tiehh.ttu.edu)

Dr. Greg Mayer

The Institute of Environmental and Human Health

Reese Center, Bldg. 555, Room 101B

Phone: (806)885-0245

Email: [greg.mayer@tiehh.ttu.edu](mailto:greg.mayer@tiehh.ttu.edu)

Dr. Kamalleshwar Singh

The Institute of Environmental and Human Health

Reese Center, Bldg. 555, Room 110E

Phone: (806)885-0320

Email: [kamalleshwar.singh@tiehh.ttu.edu](mailto:kamalleshwar.singh@tiehh.ttu.edu)

Teaching Assistant:

Chuanwen Lu



The Institute of Environmental and Human Health  
Reese Center, Bldg. 552  
Email: [chuanwen.lu@tiehh.ttu.edu](mailto:chuanwen.lu@tiehh.ttu.edu)

**TIME:**

Tuesdays and Thursdays, 9:30 – 10:50 am

**LOCATION:**

TIEHH Lecture Hall

**COURSE PURPOSE:**

Principles of Toxicology I and II (Entx 4325 and 4326) are courses for upper level undergraduate students with the appropriate background in biology and chemistry and an interest in how chemicals interact with biological systems. These courses are considered an elective that can be applied to the Forensic Sciences minor program.

Principles of Toxicology I and II (Entx 6325 and 6326) are required core courses for all students in the MS and PhD graduate programs in Environmental Toxicology (ET). At the PhD level, they provide information necessary for the completion of ET qualifying examinations. They are considered electives in the TTUHSC Graduate School of Biomedical Sciences curriculum.

At both the undergraduate and graduate levels, these courses provide a background in toxicology encompassing general toxicological principles and tissue-, mechanism- and toxicant-specific processes that encompass a toxicological response. Students who take these courses will obtain the ability to 1) understand the response of organisms to toxicants, 2) anticipate the toxicity of many toxicant classes, 3) work with the literature to obtain toxicant-specific data, and 4) develop hypothesis-driven research proposals associated with chemical toxicants. These skills provide a necessary foundation for application of toxicology to most basic and applied sciences and the background needed for all other toxicologically-oriented courses offered within the ET curriculum.

**EXPECTED LEARNING OUTCOMES:**

After completing these courses, students will be able to:

1. Understand and apply the basic tenets of toxicological sciences to establish cause and effect relationships between chemical stressors and affected targets, at levels from the molecule to the whole organism.
2. Describe and discuss:
  - a. Basic principles of toxicology including dose-response relationships, chemical interactions with molecular targets and other chemicals, dispositional factors, risk assessment and epidemiology;

b. Tissue level effects and their mechanisms for the liver and kidney, as well as the cardiovascular, nervous, reproductive, respiratory, immune and endocrine systems. This also includes the processes and mechanisms of genotoxicity/mutagenesis, carcinogenicity, and teratogenicity in different species;

c. Examples of pesticides, metals, solvents, polychlorinated aromatics (PCBs, dioxins, etc.), natural toxins and food-associated chemicals and contaminants, their sources and fate in the environment and the effects they exert.

3. Analyze toxicological scenarios to determine potential causes of toxic responses and suggest methods for determining the accuracy of the analyses.

4. Apply their knowledge of the role that age, sex, nutritional and physiological status, socioeconomic level, and other ancillary factors play in influencing the toxicity of chemicals to living organisms, so that they can better identify populations at risk.

5. Search through the extant toxicological literature and accumulate references that provide sufficient background for the development of a toxicological profile of a chemical of interest.

6. Develop and present a hypothesis-driven research proposal that builds on an accumulated chemical-specific database and provides the means by which omissions or gaps in the toxicological profile for a chemical can be rectified in a reasonable and scientifically justifiable manner.

### **METHODS OF ASSESSING STUDENT PROGRESS:**

Assessment techniques will employ ongoing assessments of student learning throughout the two semesters of the class. Comprehensive examinations will test student development and expression of expected learning objectives at 4 to 5 week intervals. Between these intervals, direct interaction with students in twice weekly lecture periods will present to them summarized and condensed accounts of reading materials and provide for direct interaction with the instructor and other students in an open and encouraging environment that is supportive of questions, discussion and clarification of course topics. Examinations are formatted to allow student expression of their reasoning for all answers, and employ only essay and demonstration type questions that allow for partial credit and evaluation of areas of strengths and weaknesses. Follow-up discussions of areas of weakness will occur following each examination. Writing assignments progress through a series of activities that allow sequential assessment and feedback of each step in the development of toxicological profiles. The proposal that students create in the second semester will proceed through a stepwise process that allows feedback at each step along the way to assure that student understanding and application of the proposal development process progresses appropriately.

### **GRADING:**

**EXAMS:** There will be two midterms and a final exam. Exams are cumulative, though each focuses on the coursework since the previous exam.

**GRADES:** Each exam (3 exams total, 100 points each) is worth 1/4 of final grade. Writing/presentation assignments are worth 1/4. Graduate students will be graded separately

from undergraduates. Cutoff percentages are 90, 80, 70 and 60 for A, B, C, and D, respectively, though the instructor may curve the cutoffs downward based on final distribution of scores.

**HOMEWORK:** Students are required to complete a research proposal based on the selected chemical contaminant. Work will entail computer searches of current literature. The due date for the pre-proposal (a quad chart) will be Tuesday, February 22, 2011. The final proposal will be due on Thursday, April 21, 2011.

**COURSE PREREQUISITE:**

Undergraduate background in biology, chemistry, biochemistry, pathology, pharmacology, and/or epidemiology is required. Graduate background in Principle of Toxicology I (ENTX 6325) is required or consent of the instructor.

**REQUIRED TEXT:**

C.D. Klassen. 2007. Casarett and Doull's Toxicology: The Basic Science of Poisons. 7th Edition. McGraw Hill Medical. New York, NY.

**SUPPLEMENTAL TEXTS** (with citation for current editions; many on reserve in TIEHH library):

Hayes, A.W. 2007. Principles and Methods of Toxicology, 5th Edition. Taylor and Francis. Philadelphia, PA. Reserve copy (4th edition) is available through the Reese receptionist desk

Hodgson, E. and R.C. Smart. 2001. Introduction to Biochemical Toxicology. 3rd Edition. Wiley-Interscience. New York, NY. Reserve copy is available through the Reese receptionist desk.

Biochemistry texts such as Stryer, Lehninger, Rahn or Voight.

Ganong, W.F. 2003. Review of Medical Physiology (Lang Medical Publications). 21st Edition. McGraw Hill. Stamford, Conn. (Concise, basics written for med school students)

Guyton and Hall. 2000. Textbook of Medical Physiology. 10th Edition. Saunders. Philadelphia, PA. (In depth treatment with everything you could ever want to know about physiology)

**CLASS ATTENDANCE POLICIES:**

Attendance is expected of all students. Announcements and information may be distributed in class that can modify assignments, tests and class policy. Tests will cover material from both lectures and reading assignments. Students are expected to understand all reading materials unless specific instructions focus on particular materials. If you miss a class, work with your fellow students to obtain notes for the missed lectures. Missing tests, and the subsequent necessity for make-up tests, is strongly discouraged and frowned upon.

The instructor must be notified in advance if an exam is to be missed due to religious observance or an officially approved trip. Prior notification of an absence for an exam or an in-

class assignment is required in order to be provided with a make-up exam or presentation time. Make-up exams and presentation times will also be provided if absence is due to illness and if a doctor's note is presented to the instructor at the next class or if a family death has occurred. According to TTU policies: "the Center for Campus Life is responsible for notifying the campus community of student illnesses, immediate family deaths and/or student death". "Generally, in cases of student illness or immediate family deaths, the notification to the appropriate campus community members occur when a student is absent from class for four (4) consecutive days with appropriate verification" and "at the student's request". "It is always the student's responsibility for missed class assignments and/or course work during their absence". "The student is encouraged to contact the faculty member immediately regarding the absences and to provide verification afterwards". "The notification from the Center for Campus Life does not excuse a student from class, assignments, and/or any other course requirements. The notification is provided as a courtesy". More details on this service can be found on the Center for Campus Life website and in the 2008-2009 Student Handbook, see [http://www.depts.ttu.edu/centerforcampuslife/general\\_services.aspx](http://www.depts.ttu.edu/centerforcampuslife/general_services.aspx).

### **ACADEMIC INTEGRITY/ACADEMIC MISCONDUCT:**

The highest level of academic integrity will be expected during all aspects of the course. The following Texas Tech University statement on academic integrity describes the expectations for students within this course: "It is the aim of the faculty of Texas Tech University to foster a spirit of complete honesty and a high standard of integrity. The attempt of students to present as their own any work that they have not honestly performed is regarded by the faculty and administration as a serious offense and renders the offenders liable to serious consequences, possibly suspension." Texas Tech University Catalog (p.51), 2008-08 Student Handbook (p.8) and (OP 34.12).

According to University policy:

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### **COURSE SCHEDULE:**

The following course schedule is a general outline and may be changed by the instructor.

**Principles of Toxicology II (3 credits)**  
**ENTX 4326 & ENTX 6326**  
**Spring 2011**

Instructor: Dr. Weimin Gao  
 TA: Chuanwen Lu  
 T/TH 9:30-10:50 AM TIEHH Lecture Hall

<b>DATE</b>	<b>TOPIC</b>	<b>CHAPTER *</b>	<b>LECTURER</b>
13-Jan	Introduction, Review, Assignments	Handout	Gao
18-Jan	Immunotoxicology	12	Gao
20-Jan	Inhalation Toxicology	15, 24, 28	Gao
25-Jan	Reproductive Toxicology I	20	Gao
27-Jan	Reproductive Toxicology II	20	Gao
1-Feb	Developmental Toxicol/Teratogenesis I	10	Gao
3-Feb	Developmental Toxicol/Teratogenesis II	10	Gao
8-Feb	Endocrine Toxicology I	21	Gao
10-Feb	Endocrine Toxicology II	21	Gao
<b>15-Feb</b>	<b>EXAM I</b>		Gao
17-Feb	Genetic Toxicology/Mutagenesis I	9	Gao
22-Feb	H Genetic Toxicology/Mutagenesis II	9	Gao
24-Feb	Pesticides I	22, 29	Godard-Codding
1-Mar	Pesticides II	22, 29	Godard-Codding
3-Mar	Food Toxicology	30	Godard-Codding
8-Mar	Carcinogenesis I	8	Gao
10-Mar	Carcinogenesis II	8	Gao
15-Mar	<b>SPRING BREAK</b>		
17-Mar	<b>SPRING BREAK</b>		
22-Mar	Metals I	23	Mayer
24-Mar	Metals II	23	Mayer
<b>29-Mar</b>	<b>EXAM II</b>		Gao
31-Mar	Epigenetics	Handout	Singh
5-Apr	Forensic Toxicology	31	Anderson
7-Apr	Methods in Toxicology I	H&S 2-4	Gao
12-Apr	Methods in Toxicology II	H&S 2-4	Gao

14-Apr		Epidemiology	Handout	Gao
19-Apr		Epidemiology	Handout	Gao
21-Apr	H	Radiation	25	Gao
26-Apr		Occupational Toxicology/Student presentation	33	Gao
28-Apr		Student presentation		
3-May		Student presentation		

**5-May Thu 7:30 - 10:00 AM FINAL EXAMINATION** Gao

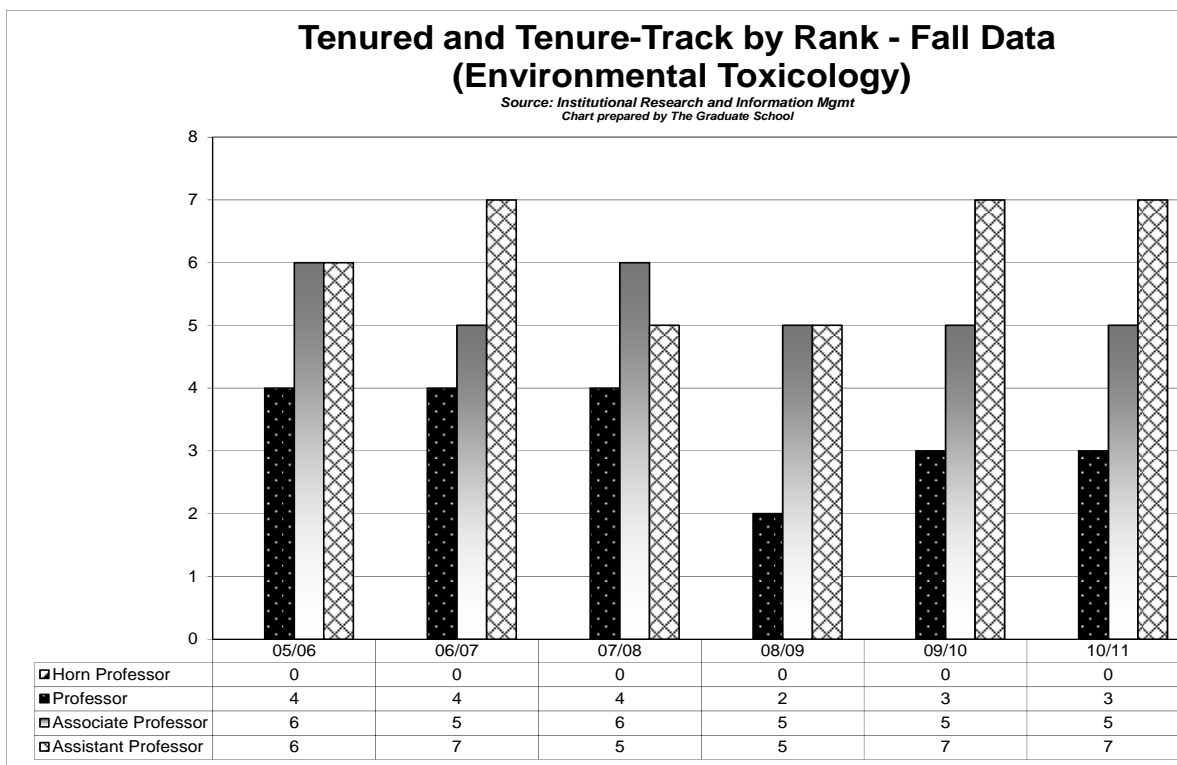
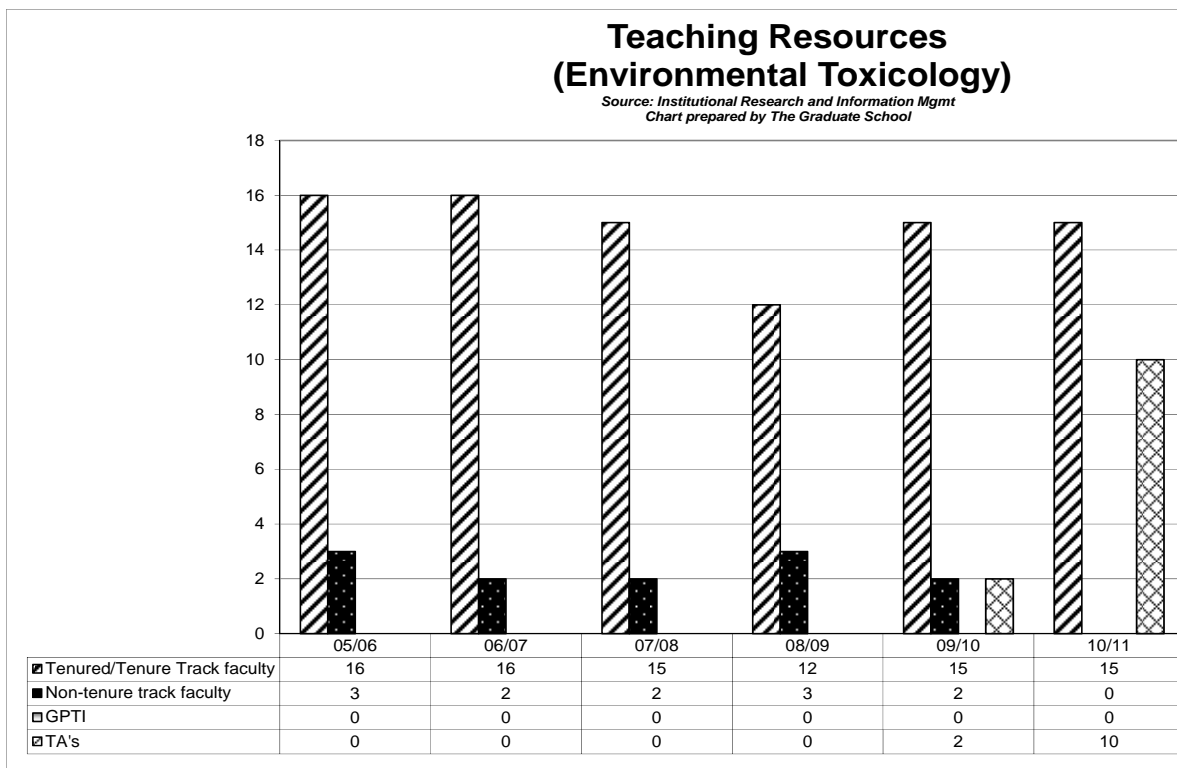
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\* Numbers refer to chapters in Casarett and Doull's Toxicology. H&S = Hodgeson and Smart

H indicates homework due this date

### III. Faculty

#### A. Number, rank, and demographics of the graduate faculty





<b>Comparison of Full-time Faculty</b>	<b>05/06</b>	<b>06/07</b>	<b>07/08</b>	<b>08/09</b>	<b>09/10</b>	<b>10/11</b>
<b>Clemson University</b>						
Tenure/Tenure Track	10	18	22	23	23	19
Non-tenure track	0	0	0	0	0	0
TA's						
<b>Iowa State University</b>						
Tenure/Tenure Track	31	29	30	31	34	37
Non-tenure track	3	4	4	3	3	3
TA's						
<b>North Carolina State University</b>						
Tenure/Tenure Track	9	9	12	12	12	12
Non-tenure track	2	2	2	2	2	2
TA's	1	1	1	1	1	1
<b>University of Saskatchewan</b>						
Tenure/Tenure Track	6	9	9	8	8	8
Non-tenure track	0	2	3	4	4	3
TA's	N/A	N/A	N/A	N/A	N/A	N/A
<b>Texas Tech University</b>						
Tenure/Tenure Track	16	16	15	12	15	15
Non-tenure track	3	2	2	3	2	0
TA's	0	0	0	0	2	10

B. List of faculty members

*List all faculty who were employed by your department during the six years of this review*

FACULTY NAME	JOB TITLE	HIRE DATE	END DATE	Member of Grad Faculty? Y or N
Todd A. Anderson	Professor	08.18.97	--	Y
Jaclyn Cañas	Assistant Professor	09.01.06	--	Y
Kenneth Dixon	Professor	08.18.97	--	Y
Weimin Gao	Assistant Professor	01.01.06	--	Y
Céline Godard-Codding	Assistant Professor	08.01.03	--	Y
Ron Kendall	Professor, Director	05.01.97	--	Y
Jonathan Maul	Assistant Professor	01.08.07	--	Y
Greg Mayer	Assistant Professor	07.15.08	--	Y
Steve Presley	Associate Professor	06.10.02	--	Y
S.S. Ramkumar	Associate Professor	06.01.05	--	Y
Christopher Salice	Assistant Professor	09.01.08	--	Y
Kamaleshwar Singh	Assistant Professor	09.01.08	--	Y
Ernest Smith	Associate Professor	08.18.97	--	Y
Philip N. Smith	Associate Professor	09.01.02	--	Y
George Cobb	Professor	08.18.97	08.15.11	Y
Stephen Cox	Associate Professor	05.15.02	05.02.11	Y
Michael Hooper	Associate Professor	08.18.97	05.23.08	Y
Scott McMurry	Associate Professor	08.18.97	08.15.07	Y
Trey Brown	Research Assistant Prof.	06.01.06	01.31.10	Y
Jia-Sheng Wang	Professor	05.01.00	08.31.08	Y
Lili Tang	Research Assistant Prof.	04.01.02	07.31.08	Y
Thomas Rainwater	Research Assistant Prof.	05.01.05	08.31.07	Y
Burnella Gentles	Research Assistant Prof.	12.01.03	02.02.07	Y

C. Summary of the number of refereed publications and creative activities by faculty currently in department.

<b>Publication Type</b>	<b>2005 N= 7 F=7</b>	<b>2006 N=10 F=10</b>	<b>2007 N= 11 F=11</b>	<b>2008 N=12 F=13</b>	<b>2009 N=13 F=14</b>	<b>2010 N= 13 F=14</b>
Refereed Articles/Abstracts	47	73	34	30	25	39
Books/Book Chapters	5	14	2	11	2	8
Other Publications	10	8	13	50	36	34
Presentations/Posters	56	43	32	59	62	60
Patents	1				1	
Invention Disclosures	1		1	1		2
N = # of full time faculty contributing      F = # of full time faculty in department						

D. Responsibilities and leadership in professional societies by faculty currently in department.

<b>Professional Leadership</b>	<b>2005 N= 6 F=7</b>	<b>2006 N= 6 F=10</b>	<b>2007 N=6 F=11</b>	<b>2008 N= 8 F=13</b>	<b>2009 N= 8 F=14</b>	<b>2010 N= 9 F=14</b>
Editor/Editorial	11	12	14	12	12	16
Executive Board	3	3	3	3	3	5
Officer in National Org.	2	2	2	3	2	5
Committees	11	16	22	17	24	23
N = # of full time faculty contributing      F = # of full time faculty in department						

Graduate Student Committee's faculty have served for the past 6 years by faculty currently in department.

Faculty Name	Committees Chaired		Committees Served in department		Committees Served outside department	
	Masters	Doctoral	Masters	Doctoral	Masters	Doctoral
Dr. Todd Anderson	3	5	4	15	6	5
Dr. Jaclyn Cañas	2	2	4	4		
Dr. Céline Godard-Codding	2	2	1	1		1
Dr. Jonathan Maul	1	6	7	10	2	3
Dr. S. Ramkumar	16	4	11	4	5	
Dr. Weimin Gao	1	3	4	11	3	
Dr. Christopher Salice	2	3	1	2	4	
Dr. Greg Mayer	1	3	2	5		
Dr. Kamaleshwar Singh	2	1	1	1		
Dr. Steven Presley	10	8	8	7	6	1
Dr. Phil Smith	8	2	6	3		1
Dr. Ernest Smith	3	5	1	19	3	1
Dr. Ron Kendall	1	1	1		1	3
Dr. Ken Dixon	1	2	1	1		1

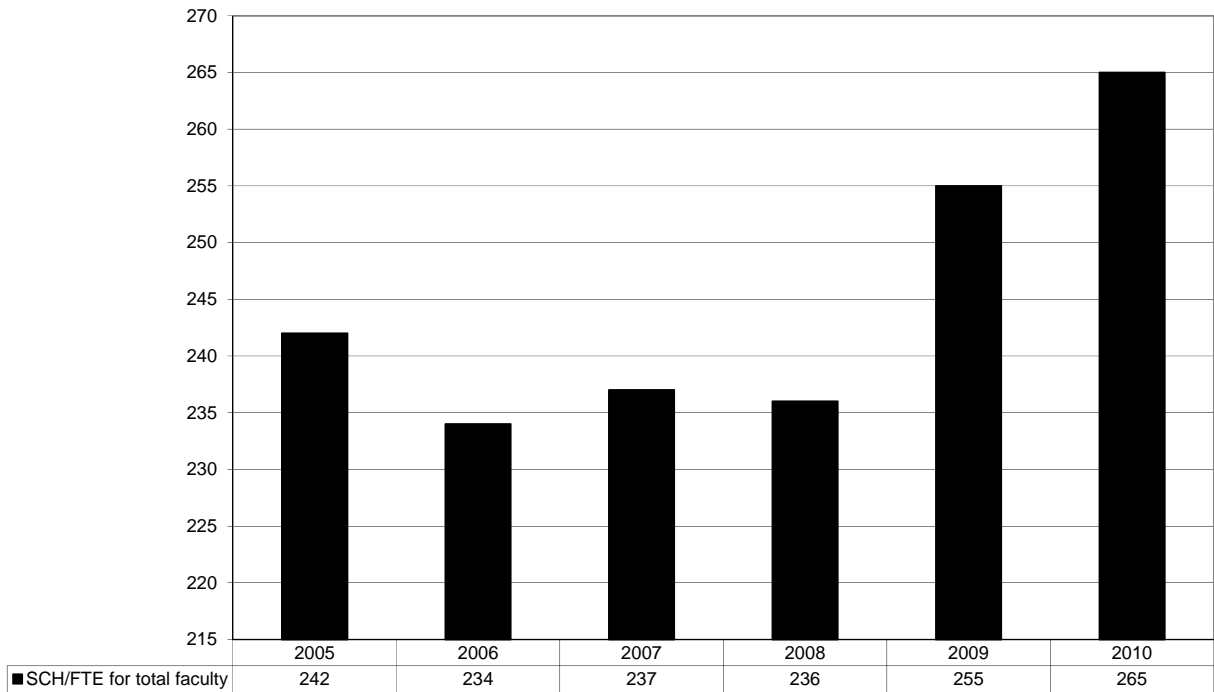
E. Assess average faculty productivity for Fall semesters only (use discipline appropriate criteria to determine)

#### FACULTY WORKLOAD

	2005	2006	2007	2008	2009	2010
University	15.82	16.08	15.44	15.55	16.30	17.42
College	17.18	17.09	16.71	17.06	17.82	17.77
Department	8.07	6.71	6.97	9.17	10.53	8.55

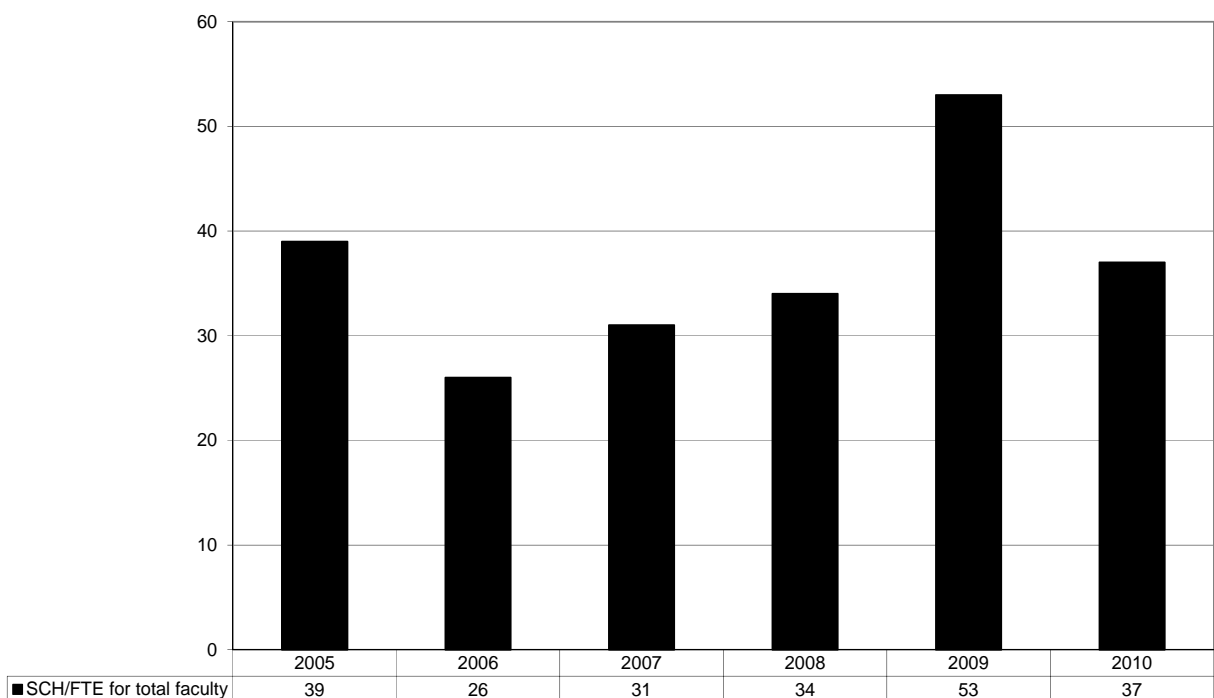
## College SCH/FTE - Fall Data (Arts and Sciences)

*Source: Institutional Research and Information Mgmt  
Chart prepared by The Graduate School*



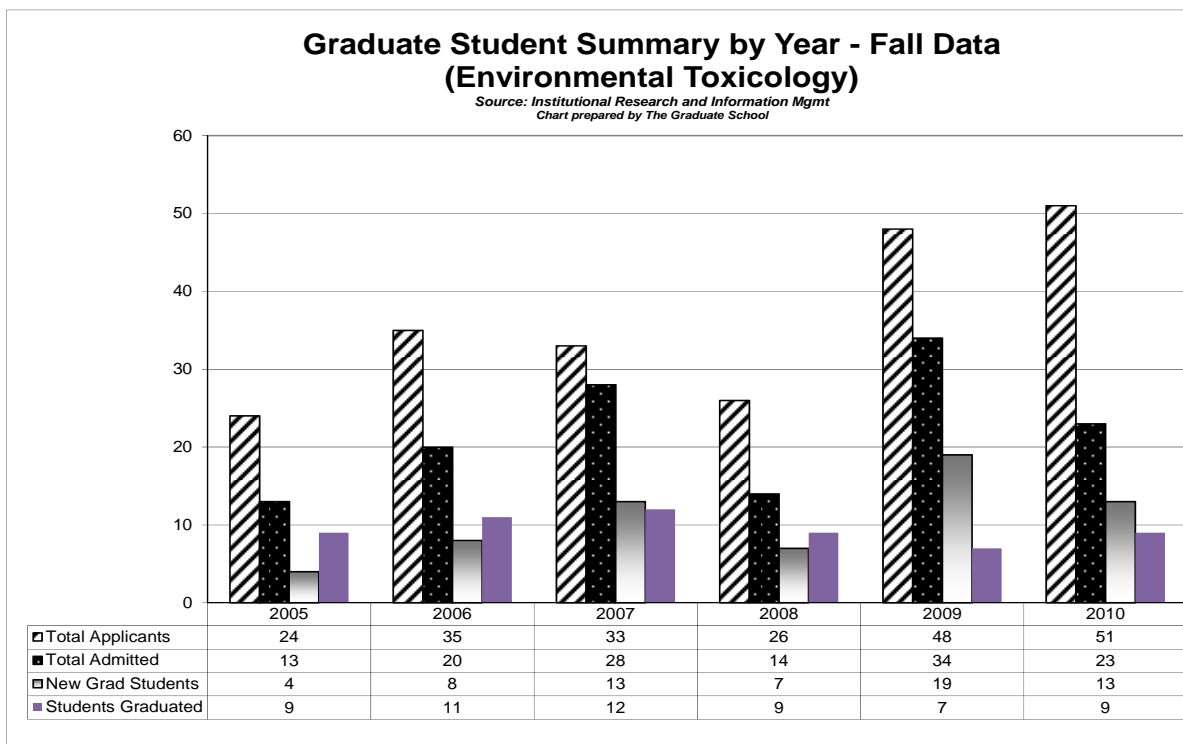
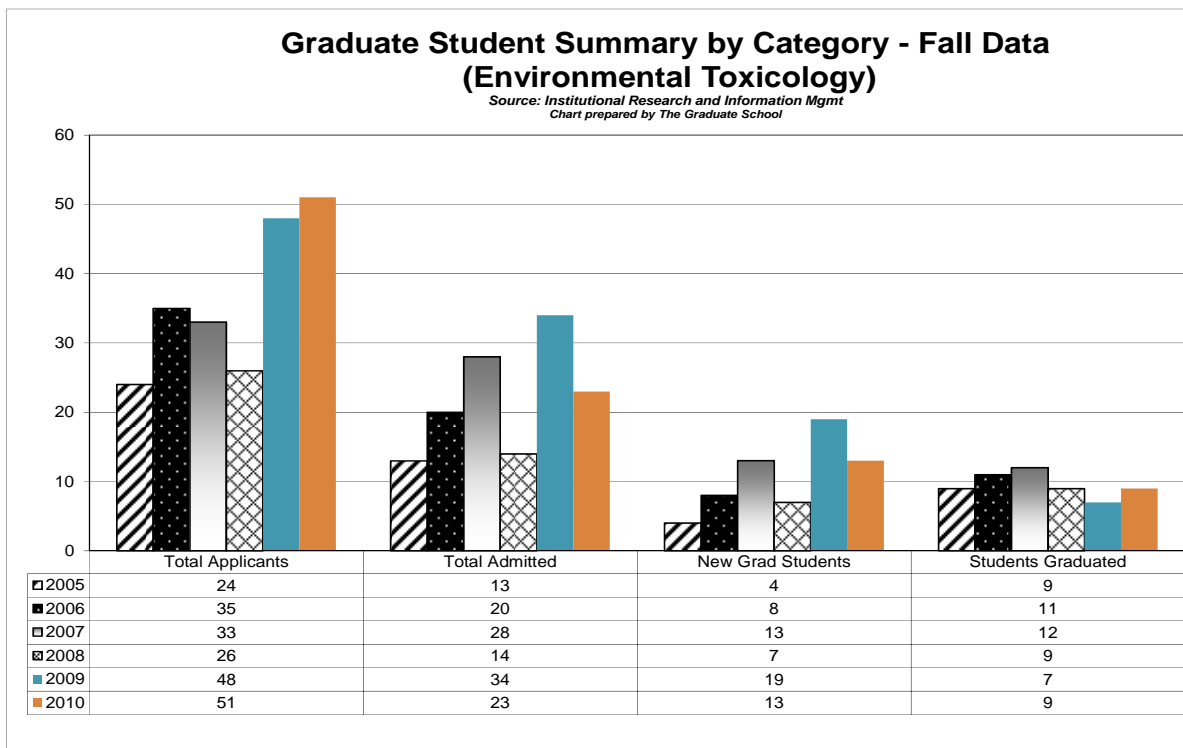
## Department SCH/FTE - Fall Data (Environmental Toxicology)

*Source: Institutional Research and Information Mgmt  
Chart prepared by The Graduate School*



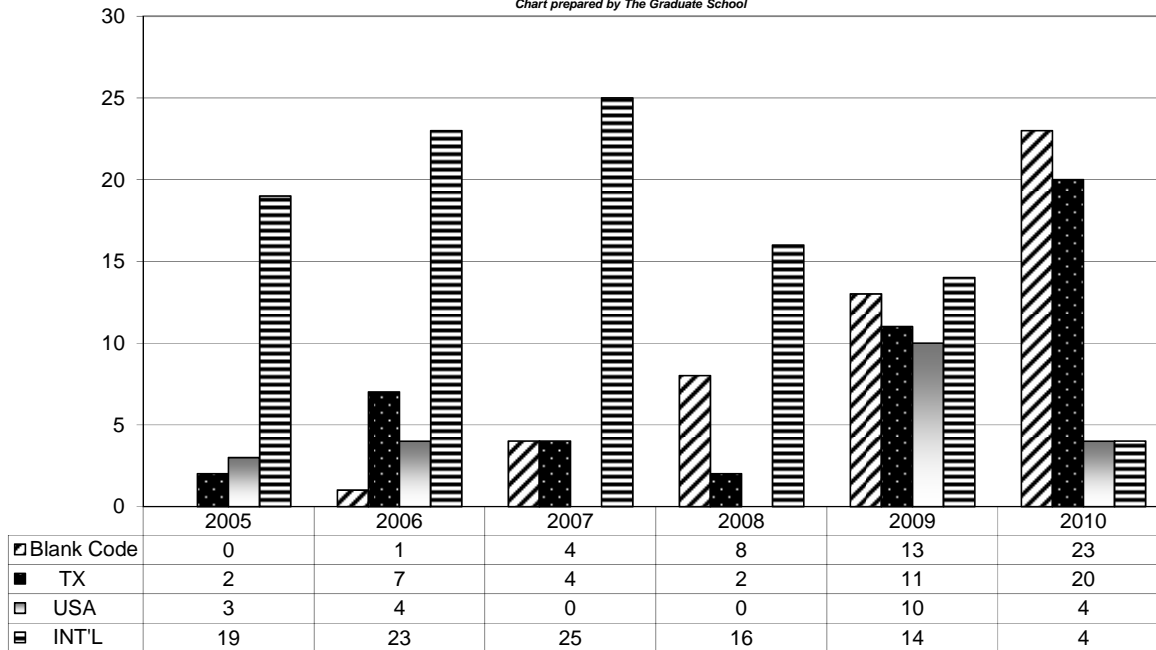
## IV. Graduate Students

### A. Demographics of applicants and enrolled students



## Graduate Applicants by Region - Fall/Summer Data (Environmental Toxicology)

*Source: Institutional Research and Information Mgmt  
Chart prepared by The Graduate School*

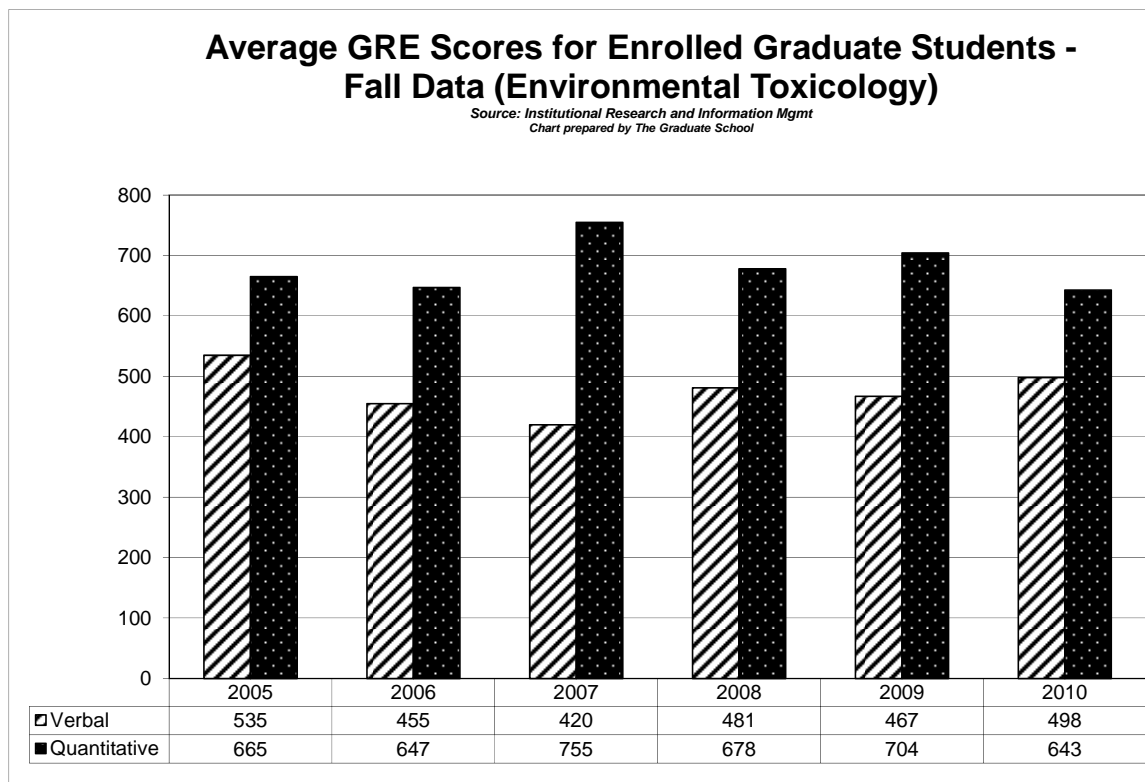


Graduate Applicants - Fall Data												
	2005		2006		2007		2008		2009		2010	
	F	M	F	M	F	M	F	M	F	M	F	M
American Indian	0	0	0	0	0	0	0	0	0	0	0	0
Asian	1	0	3	1	2	0	0	1	0	1	1	0
Black	0	0	1	0	0	0	0	2	1	1	1	0
Hispanic	0	0	1	0	0	0	1	0	0	0	1	0
Multiple	0	0	0	0	0	0	0	0	0	0	2	1
Nat Haw/Pac Island	0	0	0	0	0	0	0	0	0	0	0	0
Non-Resident	8	10	4	9	11	11	4	12	13	17	5	24
Unknown	0	1	4	1	0	1	0	0	0	0	0	0
White	2	2	5	6	5	3	4	2	7	8	7	9
Gender Total	11	13	18	17	18	15	9	17	21	27	17	34
Total Applicants	24		35		33		26		48		51	
Admitted Graduate Students - Fall Data												
	2005		2006		2007		2008		2009		2010	
	F	M	F	M	F	M	F	M	F	M	F	M
American Indian	0	0	0	0	0	0	0	0	0	0	0	0
Asian	0	0	2	0	2	0	0	1	0	0	1	0
Black	0	0	1	0	0	0	0	0	1	0	1	0
Hispanic	0	0	0	0	0	0	1	0	0	0	1	0
Multiple	0	0	0	0	0	0	0	0	0	0	1	1
Nat Haw/Pac Island	0	0	0	0	0	0	0	0	0	0	0	0
Non-Resident	5	6	2	5	7	10	1	5	7	12	1	5
Unknown	0	0	4	0	0	1	0	0	0	0	0	0
White	1	1	4	2	5	3	4	2	7	7	6	6
Gender Total	6	7	13	7	14	14	6	8	15	19	11	12
Total Admitted	13		20		28		14		34		23	
Enrolled New Graduate Students - Fall Data												
	2005		2006		2007		2008		2009		2010	
	F	M	F	M	F	M	F	M	F	M	F	M
American Indian	0	0	0	0	0	0	0	0	0	0	0	0
Asian	0	0	0	0	0	0	0	1	0	0	0	0
Black	0	0	0	0	0	0	0	0	0	0	1	0
Hispanic	0	0	0	0	0	0	0	0	0	0	1	0
Multiple	0	0	0	0	0	0	0	0	0	0	1	0
Nat Haw/Pac Island	0	0	0	0	0	0	0	0	0	0	0	0
Non-Resident	1	2	0	1	2	6	0	3	5	3	0	3
Unknown	0	0	4	0	0	1	0	0	0	0	0	0
White	0	1	2	1	1	3	2	1	6	5	3	4
Gender Total	1	3	6	2	3	10	2	5	11	8	6	7
Total Enrolled	4		8		13		7		19		13	

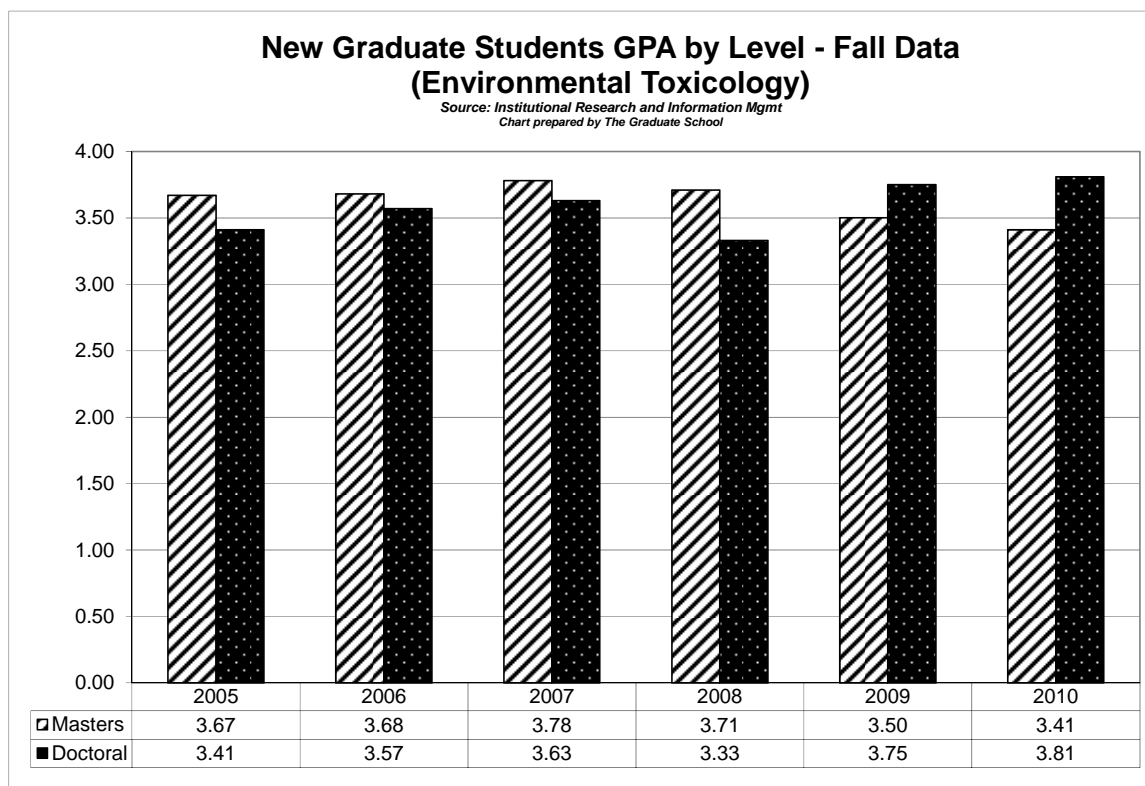


<b>Demographics of Enrolled Graduate Students - Fall Data</b>												
	2005		2006		2007		2008		2009		2010	
	F	M	F	M	F	M	F	M	F	M	F	M
American Indian	1	0	1	0	1	0	0	0	0	0	0	0
Asian	0	0	0	0	0	0	0	1	0	0	0	1
Black	0	0	0	0	0	0	0	0	0	0	1	0
Hispanic	1	1	2	1	1	0	0	0	0	0	1	0
Multiple	0	0	0	0	0	0	0	0	0	0	1	0
Nat Haw/Pac Island	0	0	0	0	0	0	0	0	0	0	0	0
Non-Resident	12	13	7	12	6	14	4	12	11	15	8	15
Unknown	0	1	4	1	4	2	3	1	0	0	0	0
White	2	8	4	10	6	12	9	6	13	10	16	12
Gender Total	16	23	18	24	18	28	16	20	24	25	27	28
Graduate	39		42		46		36		49		55	
<b>Demographics of Enrolled Undergraduate Students - Fall Data</b>												
	2005		2006		2007		2008		2009		2010	
	F	M	F	M	F	M	F	M	F	M	F	M
American Indian	0	0	0	0	0	0	0	0	0	0	0	0
Asian	0	0	0	0	0	0	0	0	0	0	0	0
Black	0	0	0	0	0	0	0	0	0	0	0	0
Hispanic	0	0	0	0	0	0	0	0	0	0	0	0
Multiple	0	0	0	0	0	0	0	0	0	0	0	0
Nat Haw/Pac Island	0	0	0	0	0	0	0	0	0	0	0	0
Non-Resident	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
White	0	0	0	0	0	0	0	0	0	0	0	0
Gender Total	0	0	0	0	0	0	0	0	0	0	0	0
Undergraduate	0		0		0		0		0		0	

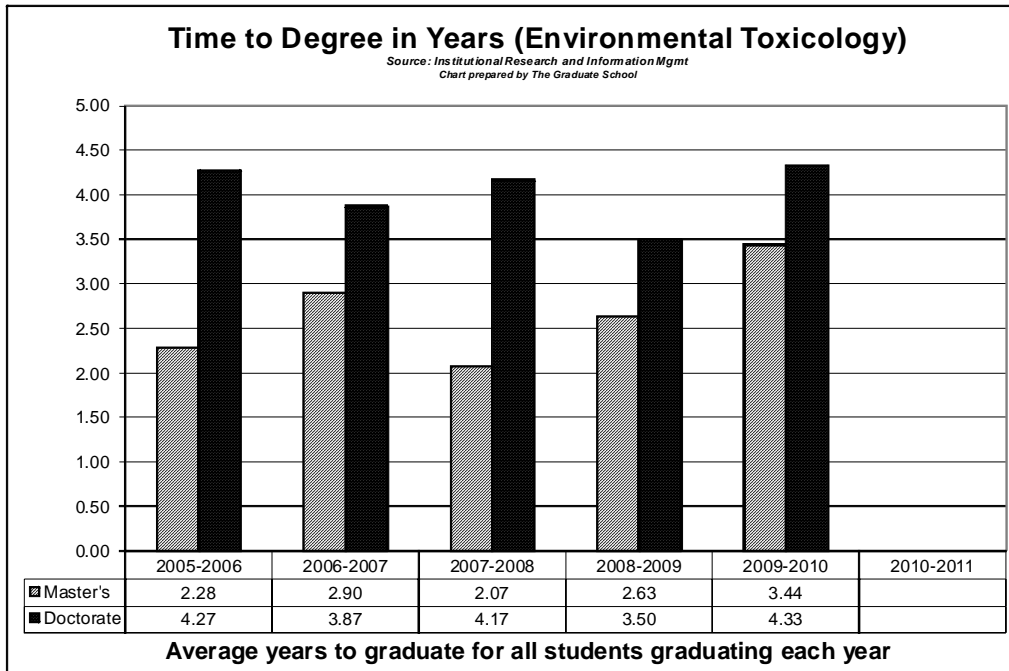
B. Test scores (GRE, GMAT and/or TOEFL) of enrolled students



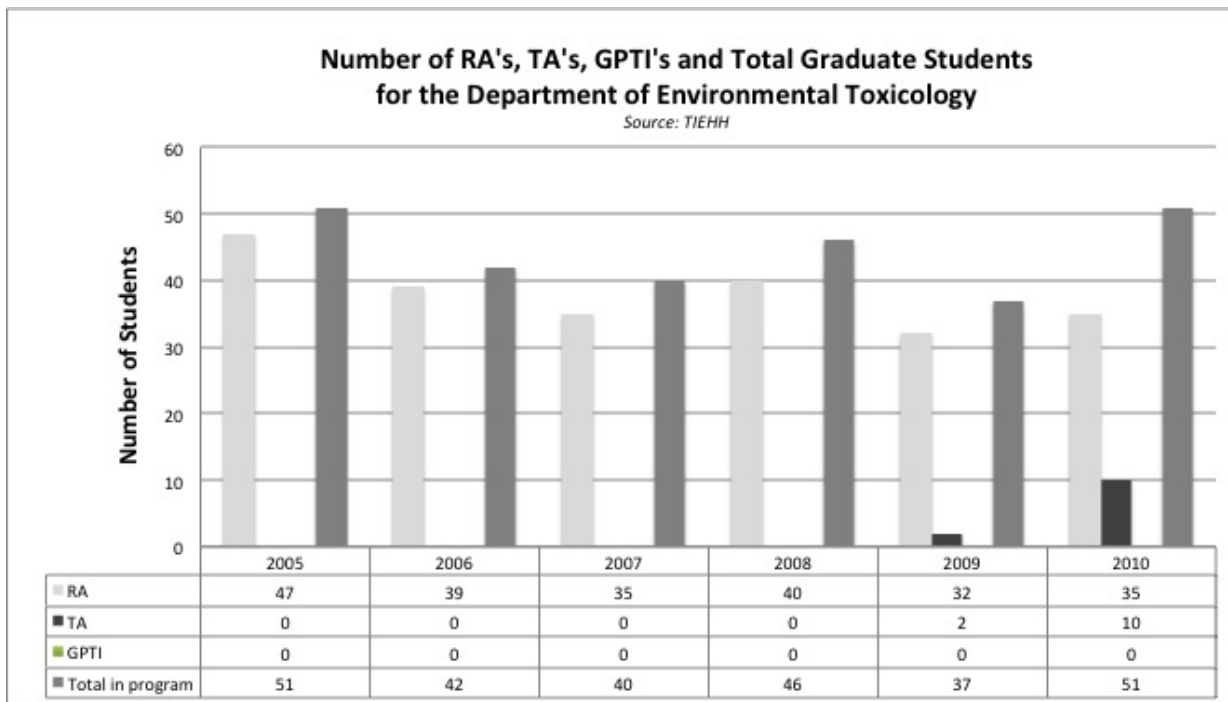
C. GPA of new students



D. Time to Degree in Years – Average years to graduate for all students graduating each year



E. Number of RA's, TA's or GPTI's, with total number of graduate students in the program.



F. Initial position and place of employment of graduates over the past 6 years

Name	Initial Position	Initial Employer	Location
<b><u>2005-2006</u></b>			
Carrie Bradford	Toxicologist	Tx. Dept. of Health	Texas
Jaclyn Canas	Post-Doc	EPA	Oregon
Andrea Kirk	Lecturer	UNT	Texas
Haitao Luo	Asst. Professor	Alderson Broaddus College	West Virginia
Craig McFarland	Veterinarian	US Army, CHPPM	Maryland
Corey Radtke	Toxicologist	Idaho National Laboratory	Idaho
Bharath Ramachandran	Toxicologist	Amgen	California
Aaron Scott	Toxicologist	Tx. Dept. of Health	Texas
Judit Szabo	Post-Doc	Univ. of Wollongong	Australia
Tara Wood	Assistant DA	City Attorney's Office	New Mexico
<b><u>2006-2007</u></b>			
Madhavi Billam	Asst. Professor	Rutgers Univ.	New Jersey
QQ Cheng	Scientist	International Flavors & Fragrances	New Jersey

Hongxia Guan	Ph.D. Student	Univ. of SC	South Carolina
Fujun Liu		Univ. of RI	Rhode Island
Ying Lu	Post-Doc	Washington Univ.	Missouri
Sandeep Mukhi	Ecotoxicologist	FMC Agricultural Products	Maryland
Vrishali Subramanian	Ph.D. Student	Georgia Tech	Georgia
Louise Venne	Ph.D. Student	Univ. of Florida	Florida
Kar Sata	Post-Doc	Texas Tech Univ.	Texas
Munim Hussain	Quality Assurance Lab Manager	MGP Ingredients, Inc.	Illinois
Baohong Zhang	Assistant Professor	East Carolina Univ.	North Carolina
Min Lian	Post-Doc	Washington Univ.	Missouri
<b><u>2007-2008</u></b>			
Hongmei Wu	Asst. Professor	Vanderbilt	Tennessee
Jun Liu	Embryologist	TTUHSC	Texas
Rene Vinas	Ph.D. Student	Univ. Tx. Medical Branch	Texas
Jenninifer Humphries	Post-DOc	Pioneer Hi-Bred	Iowa
Jordan Smith	Post-Doc	Pacific NW National Lab	Washington
Lindsey Jones	Toxicologist	TCEQ	Texas
Zemin Wang	Post-Doc	Indiana Univ. SoM	Indiana
Xiaoping Pan	Asst. Professor	East Carolina Univ.	North Carolina
Qingsong Cai	Research Associate	Texas Tech Univ.	Texas
Toby McBride	Biologist	US FWS	California
Rachel McNew		Corrigan Consulting, Inc.	Texas
Blake Beall	Scientist	Kirby Inland Marine	Texas
<b><u>2008-2009</u></b>			
Ben Barrus	Lieutenant	US Naval Hospital	Washington, DC
Norka Paden	Toxicologist	GEI Consultants	Colorado
Yuntian Tang	Medical Doctor	Guangxi General Hospital	China
Piwen Wang		David Geffen School of Medicine, UCLA	California
Pamela Bryer	Scientist	Trinity Consultants	Louisiana
John Isanhart	Toxicologist	USFWS	Utah
<b><u>2009-2010</u></b>			
John Brausch	Toxicologist	BASF	North Carolina
Shawna Nations	Project Manager	AnalySys, Inc.	Texas
Jinqui Zhu	Post-Doc	Emory Univ.	Georgia
Arvind Purushothaman	Product Development Scientist	Ahlstrom Nonwovens	Connecticut

Monique Long	Ph.D. Student	Purdue	Illinois
Deborah Carr	Res. Asst. Professor	Texas Tech Univ.	Texas
Cameron Gulley	Attorney	Dallas	Texas
Rodica Vadan	Post-Doc	Texas Tech Univ.	Texas
Beibei Qi	Analyst	The Nielson Company	China
Mike Abel	Analyst	TraceAnalysis	Texas
Richie Erickson	Ph.D. Student	Texas Tech Univ.	Texas
<b>2010-2011</b>			
Kathryn Brausch	Law Student	George Washington School of Law	Washington, DC
Lixia Chen	Post-Doc	Texas Tech Univ. Health Sciences Ctr.	Texas
Raga Avanasani		ERMI Environmental Laboratories	Texas
Fa Karnjanipiboonwong	Post-Doc	Univ. of Science & Technology	Missouri
Changxia Shao	Post- Doc	Scripps Research Institute	California
Roland Eshiet	Intern	Miden Systems USA	Texas
Christena Stephens	Author	Self Employed	Texas

#### G. Type of financial support available for graduate students

Although the department is graduate-only, teaching assistantships are available to support up to approximately seven graduate students per year. Teaching assistantships are allocated to more senior students that have successfully completed courses for which they will assist in teaching. Most students are therefore supported as research assistants on research grants obtained by the faculty. In addition, the Department has made available “Departmental Assistantships” which have been allocated out of the base budget for TIEHH. This pool of money is approximately \$226,000 and funds approximately 16 students (some fully, others partially). Additional financial support (SBC Chancellors, etc.) is available, but is used as a supplement to the research or departmental assistantships rather than a substitute.

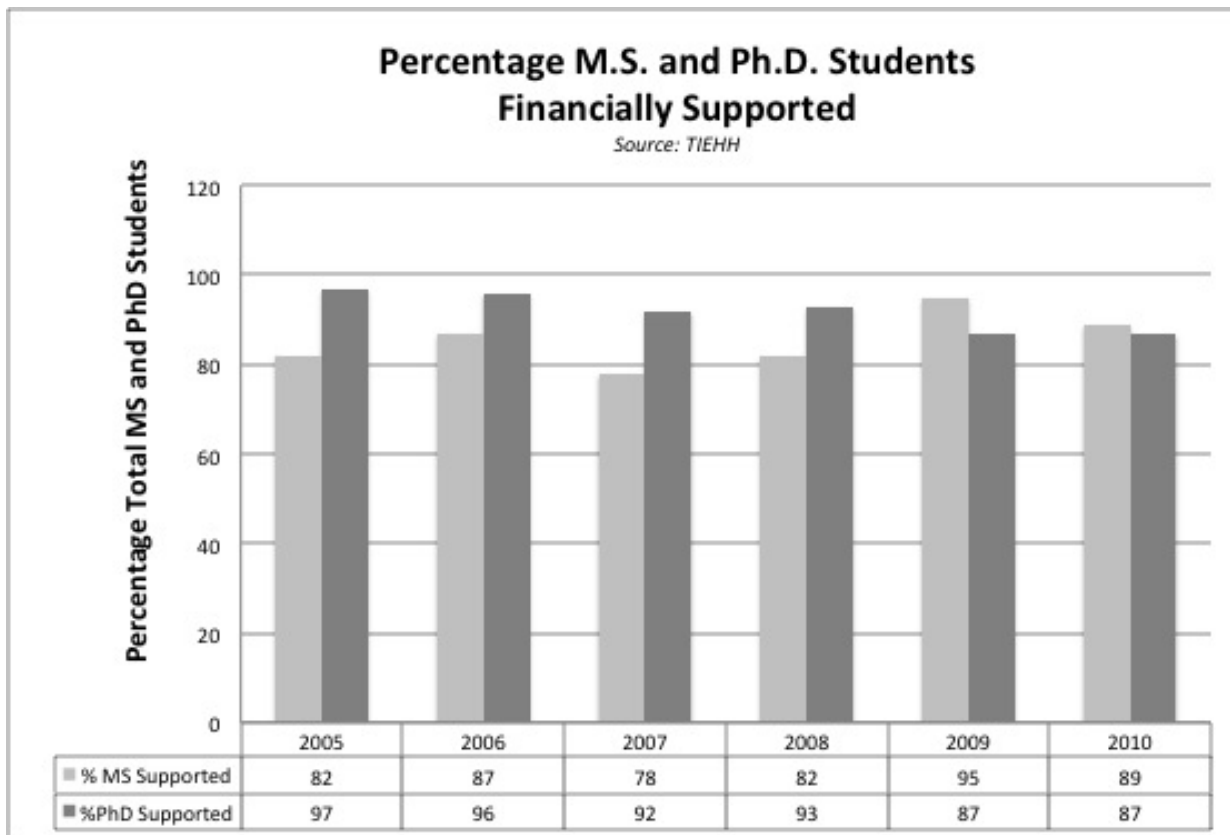
H. Number of students who have received national and university fellowships, scholarships and other awards

AWARD	05/06		06/07		07/08		08/09		09/10		10/11	
	\$	# Stud	\$	# Stud	\$	# Stud	\$	# Stud	\$	# Stud	\$	# Stud
ACS NSF Scholars											\$1,000	1
Alex's Lemonade Stand											\$6,000	1
ARCS							\$10,000	2	\$10,000	2	\$20,000	4
Am. Assoc. of Univ. Women							\$18,000	1				
AT&T Chancellor's	\$6,000	2	\$6,000	2	\$6,000	2	\$9,000	3	\$9,000	3	\$12,500	4
C. Lamar Meek									\$1,500	1		
Cash Family Endowed			\$3,000	1							\$3,000	1
CH Foundation Doctoral											\$4,000	1
Chancellor's			\$200	1								
Colgate Palmolive									\$3,200	1		
Conchologists of America Grant to Malacology											\$3,000	2
East Tx. Herpetological Society											\$300	1
Funding in Aid of Research											\$400	1
Hazlewood	\$3,000	1					\$3,000	1				
Helen Devitt Jones											\$10,500	3
IFF									\$3,000	1	\$6,000	2
Int'l Philanthropic Org.									\$10,000	1		
J. Watmull									\$1,000	1		
James Gus Foyle											\$2,500	1
Junction Summer	\$500	1										
LE SETAC											\$565	2
NIMBioS											\$1,000	1

Travel												
Ocean/Human Health Gordon Conference							\$915	1				
Outstanding Doctoral Student TIEHH	\$1,500	1	\$1,500	1	\$1,500	1	\$1,500	1	\$1,500	1	\$1,500	1
Oustanding Master's Student TIEHH	\$500	1	\$500	1	\$500	1	\$500	1	\$500	1	\$500	1
SACS											\$2,460	4
Preston & Ima Smith											\$1,000	1
SC SETAC									\$750	2	\$500	1
SETAC							\$600	1			\$335	2
SETAC Student Exchange									\$1,000	1		
Sigma Xi Grants in Aid of Research											\$400	1
Smith Endowed											\$1,000	1
SOT											\$1,500	2
Summer Dissertation	\$2,325	1					\$2,300	1	\$6,900	1	\$6,900	3
TTU Grad School					\$611.75	1	\$1,750	3	\$2,430	5	\$2,925	6
TTU Poster											\$995	4
US EPA Star											\$36,666	1
Water Conservation											\$500	1
Waste Control							\$1,000	1			\$1,000	1
West Tx Assoc. Women in Science Wildlife Society					\$1,000	2			\$200	1		



I. Percentage of full time master and doctoral students who received financial support.



J. Graduate Student Publications and Creative Activities – Number of discipline-related refereed papers/publications, juried creative/performance accomplishments, book chapters, books, and external presentations by Master and Doctoral students in the department.

Publication: Year	Refereed		Non-Refereed		Poster presentations		Other activities	
	Thesis	Diss.	Thesis	Diss.	Thesis	Diss.	Thesis	Diss.
2010	4	12		5	10	27	2	11
2009	1	2			5	10	2	4
2008	2	1			4	3	4	
2007	2						1	1
2006	2				1			
2005								

## K. Programs for mentoring and professional preparation of graduate students

The purpose of our graduate program is to provide students with graduate education in the specialized areas of science that comprise Environmental Toxicology and to provide an introduction to interdisciplinary research, manuscript preparation, and effective oral communication. Because of the interdisciplinary nature of environmental toxicology research, students work closely with their committee, probably more so than in other more traditional scientific disciplines.

For the most part, coursework is used to train students in the paradigms of the discipline and to provide a foundation of research skills for statistical analysis, experimental design and laboratory research. The training of students in the other aspects of the sciences (conducting research and obtaining funding, preparing manuscripts, and giving poster and platform presentations) begins during the first semester with TOX 6105 (required course for all new students). This seminar course provides an introduction to graduate education and includes discussions on the publication process, presentations, scientific meetings, funding, and collegiality.

A variety of other informal programs are available to facilitate the professional development of graduate students. Various courses within the Department are considered writing intensive and include the development of research proposals or the preparation of conference presentations and/or manuscripts. Students are encouraged to work with their mentor to seek out funding (research and travel) through agencies, foundations, and professional societies. Journal club seminars have become more common the last 3 years in an effort to improve students' ability to critically evaluate the scientific literature and present research findings in a formal setting. At least one journal club, in addition to the departmental seminar, is offered each semester. In addition, we have implemented a new format for departmental seminars where student enrolled in this course provide a 15 minute, conference style presentation on their research.

Students in the Environmental Toxicology program also contribute to the mentoring process through the Graduate Student Association and the annual Tox Expo. In addition to its various service activities, the Graduate Student Association provides small travel grants to help students attend regional meetings. The Tox Expo, a completely student-run event, provides a forum for students to present their research and be evaluated on their presentation skills.

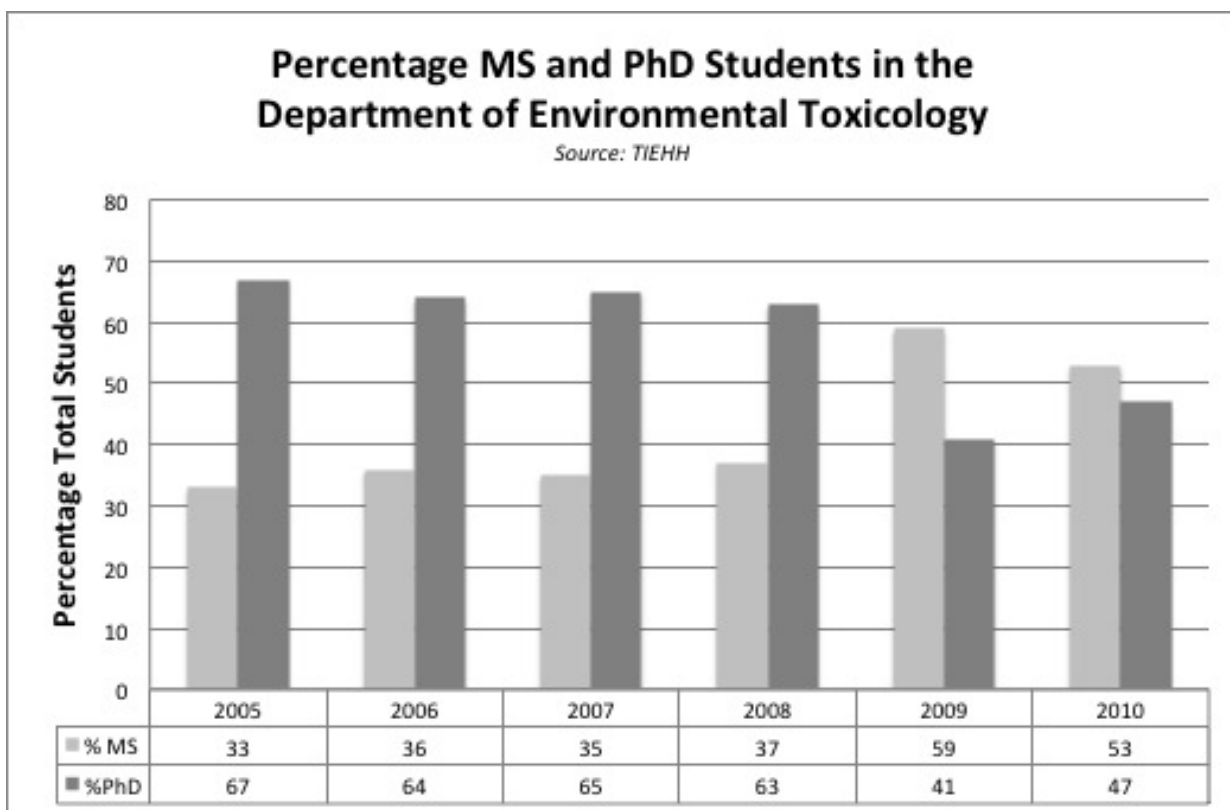
L. Department efforts to retain students and graduation rates.

One effort that has been successfully implemented to retain students and graduation rates has been to enforce the admissions requirements and course pre-requisites. This has improved the overall quality of students in the program and has improved the quality of students in a particular class. As such, our retention rates for students are extremely high.

The “Introductory Seminar” (TOX 6105 described above) is also designed to ease the transition to graduate school by informing students early on of what is expected, but also introducing them to the support system that is in place through TIEHH. The Department employs a Graduate Officer and an Academic Program Coordinator that help students with registration and all interactions with the Graduate School. Our philosophy has always been that our students are our legacy and we strive to create an environment that fosters their success.

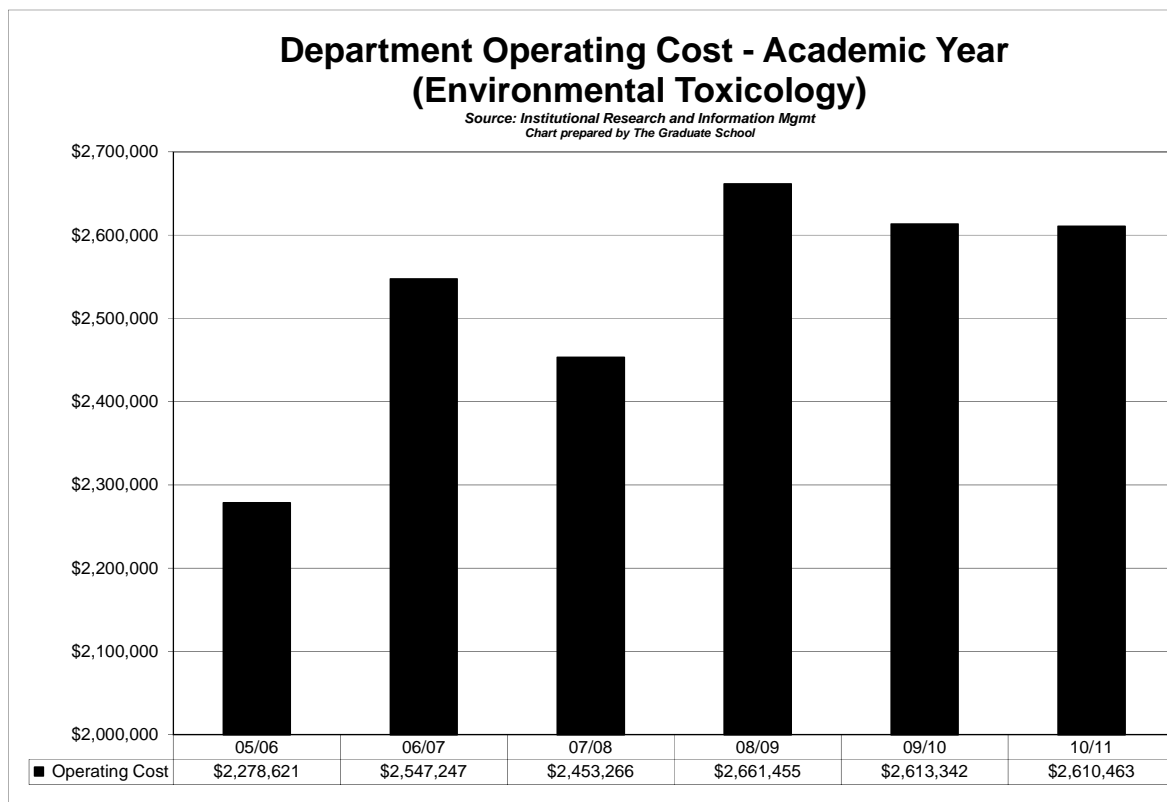
Based on the feedback of former students, we have adjusted the sequence of required course work to more evenly balance workload. The intent was to not overburden students with class requirements thereby allowing them more time to engage in research. We have emphasized strongly the importance of beginning research as soon as possible. Our experience has been that students who get a chance to get into the lab during that first semester adjusted to graduate school much better than students who were too buried with classes to spend any time in the research lab.

M. Percentage of Full-Time Master and Doctoral students per year – Fall Data



## V. Department

### A. Department operating expenses\*



\*Data taken from the UQDS; due to transition to a new financial platform, FY 2009 and FY 2010 data comparable to prior years was unavailable and is not included with this longitudinal data.

### Department Operating Costs as a Fraction of Employees

	05/06	06/07	07/08	08/09	09/10	10/11
Dept Operating Cost	2,278,621	2,547,247	2,453,266	2,661,455	2,613,342	2,610,463
Faculty & Staff	42	46	43	40	41	40
Dept Op Cost /FS	54,252.88	55,374.93	57,052.70	66,536.38	63,740.05	65,261.58

B. Summary of Proposals (submitted)

**Summary of Number of Proposals Written and Accepted**

	Foundation		State		Federal		Others		Successfully funded	
	D	M	D	M	D	M	D	M	D	M
<b>2010</b>	5	0	16	2	33	13	9	0	24	6
<b>2009</b>	8	0	16	0	34	10	16	2	20	6
<b>2008</b>	11	0	19	0	17	4	9	1	27	2
<b>2007</b>	15	1	15	0	38	1	10	4	31	4
<b>2006</b>	5	0	9	0	22	6	4	3	24	4
<b>2005</b>	7	0	7	0	37	6	9	2	30	1

**D = proposals written by CO-PI's from your department only**

**M = proposals written by CO-PI's from multiple departments**

C. External Research expenditures

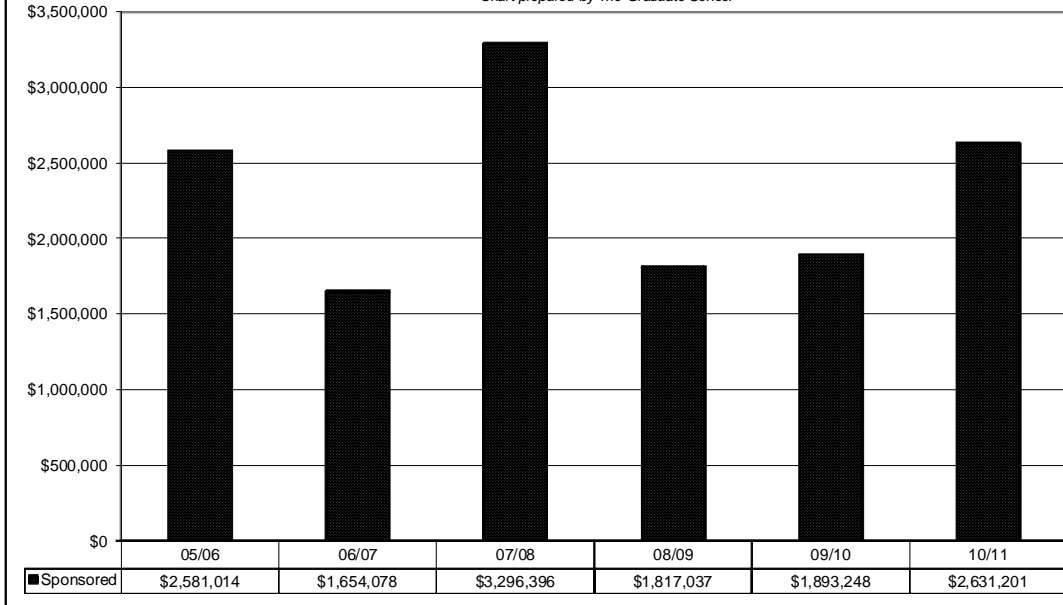
**SUMMARY OF FACULTY AWARDS BY HOME DEPARTMENT**

*Source: Office of Research Services*

<i>Year</i>	<i>Number of Awards</i>	<i>Facilities &amp; Administrative</i>	<i>Award Amount</i>
05/06	<b>29.17</b>	<b>\$575,429</b>	<b>\$2,581,014</b>
06/07	<b>20.45</b>	<b>\$355,999</b>	<b>\$1,654,078</b>
07/08	<b>19.98</b>	<b>\$792,090</b>	<b>\$3,296,396</b>
08/09	<b>18.52</b>	<b>\$384,846</b>	<b>\$1,817,037</b>
09/10	<b>18.13</b>	<b>\$426,523</b>	<b>\$1,893,248</b>
10/11	<b>17.13</b>	<b>\$505,132</b>	<b>\$2,631,201</b>
<i>Totals:</i>	<b>123.38</b>	<b>\$3,040,020</b>	<b>\$13,872,974</b>

## Research Expenditures (Environmental Toxicology)

*Source: Office of Research Services  
Chart prepared by The Graduate School*



Comparison of Research Expenditures	05/06	06/07	07/08	08/09	09/10	10/11
<b>North Carolina State University</b>	\$2,907,170	\$2,821,976	\$2,803,543	\$2,145,011	\$3,745,927	\$4,106,954
<b>University of Saskatchewan</b>	N/A	N/A	N/A	\$3,124,965	\$2,042,918	\$2,207,928
<b>Texas Tech University</b>	\$2,581,014	\$1,654,078	\$3,296,396	\$1,817,037	\$1,893,248	\$2,631,201

D. Internal Funding

**Source of Internal Funds (TTU)**

	05/06	06/07	07/08	08/09	09/10	10/11
Research Enhancement			68,470	61,426		
Research Incentive	144,813	190,980	535,043	199,049	202,288	187,486
Line Items						
Interdisciplinary Seed Grants						
New Faculty Start-ups	150,000	353,908	100,000	212,550	200,00	155,000
Matching from VP of Research						
Special needs and opportunities	152,000					
Research Promotion				80,000	71,000	317,500
Graduate School Fellowships					63,000	126,000
HEAF	220,000			165,000	157,830	407,710
<b>TOTALS:</b>	<b>666,813</b>	<b>544,888</b>	<b>703,513</b>	<b>718,025</b>	<b>694,118</b>	<b>1,193,696</b>

E. Scholarships and endowments

Besides the departmental and teaching assistantships described previously (Chapter 4), the Department of Environmental Toxicology has two endowments from Syngenta and Waste Control Specialists. The endowments are used to honor top M.S. and Ph.D. students with cash awards from \$1,000 to \$1,500 per year. Each year four awards total are given to the two top M.S. and two top Ph.D. students as determined by faculty vote based on graduate student productivity.

F. Departmental resources for research and teaching (i.e., classroom space, lab facilities)

Type of Space	Number of Rooms	Total Assignable Square Feet
<b>OFFICES:</b>		
<b>Faculty &amp; Administration</b>	28	5,022
<b>Graduate Assistant</b>	58 cubicles	3,497
<b>Technician</b>	9	972
<b>LABS:</b>		
<b>Research Labs</b>	21	17,574
<b>STORAGE:</b>	6	10,648
<b>LIBRARY:</b>	1	379
<b>CLASSROOMS:</b>	4	3,800
<b>CONFERENCE ROOM:</b>	1	447
<b>TOTAL SQUARE FEET</b>		42,339

G. HEAF expenditures

	Labs	Classroom	Other (identify)	TOTAL
<b>10/11</b>	\$407,710		\$16,060	\$423,769
<b>09/10</b>	\$157,830		\$2,661	\$160,491
<b>08/09</b>	\$165,000			\$165,000
<b>07/08</b>				0
<b>06/07</b>				0
<b>05/06</b>	\$150,000		\$220,000	\$370,000

Moving of equipment to new facility - \$220,000

TIEHH student library – FY11 - \$16,060

TIEHH student library – FY10 – 2,661



H. External Program Accreditation – Name of body and date of last program accreditation review, if applicable. Include description of body and accreditation specifics.

Not applicable to TIEHH and the Department of Environmental Toxicology.

#### **IV. Self-Study Conclusions**

The results of this self-study were very valuable in allowing us to develop additional perspectives on progress in the maturation of our graduate program in Environmental Toxicology at Texas Tech University. Overall, the program has made great strides in continuing to produce quality graduate students and subsequent degree granting from Texas Tech University. Employment of our graduate students remains very high in quality jobs and one can view the placement of our alumni on our homepage at [www.tiehh.ttu.edu](http://www.tiehh.ttu.edu). We believe that job placement has been most impressive in academics, state and federal government positions, as well as private industry. The critical issue that we identified in our previous program review was the lack of an animal care facility at The Institute of Environmental and Human Health, which is located at Reese Technology Center. We are at this time developing new animal care facilities at TIEHH and we believe that this will address the particular need of our students by providing access to additional facilities to evaluate the response of animals to toxic substances, which of course requires animal testing facilities. Our external TIEHH Scientific Advisory Panel has identified this issue as a top concern and we are very pleased to finally have a remedy. We believe it will even further stimulate our grants program, which in turn will provide additional support for graduate students, as well as providing students with diverse research experiences and educational opportunities.

TIEHH essentially serves as a model for interdisciplinary research at Texas Tech University. TIEHH is the principal vehicle through which research grants and the TIEHH operating budget fund the academic program through the Department of Environmental Toxicology. Principally, the Department of Environmental Toxicology houses the academic tenure-track faculty and provides the vehicle for tenure and promotion review, which has proceeded extremely well through the College of Arts and Sciences. For issues of academic concern, other than tenure and promotion review for faculty candidates, the Provost's office is the principal point of reportage. Neither TIEHH nor the Department of Environmental Toxicology receives any funding through the College of Arts and Sciences. It is challenging to integrate a complex multi-disciplinary research institute, which is the financial backbone for a growing graduate education program. As evidenced by our reviews by the TIEHH Scientific Advisory Panel, TIEHH and the Department of Environmental Toxicology complement each other very well, which has contributed to the growing success of both entities. As always, new models will continue to be developed in efforts to foster growth in novel research and academic collaborations in environmental toxicology.

One of the issues evident is that our academic program has matured since our previous program review over five years ago. Although we are going through this self-study to evaluate an approximate ten-year time frame, this represents a blueprint model that has worked at Texas Tech University. In other words, we had to develop our program and then validate our operational model, and we will continue to do so into the future. However, our blue ribbon products from TIEHH and the Department of Environmental Toxicology are our Ph.D. and M.S. graduates, which continue to represent us well in terms of job placement and career advancement. We are also continuing to see true excellence in our graduate students as evidenced in this review. Our students are winning top university, state, and national awards. For instance, this year student Richie Erickson is a United States Environmental Protection Agency Star Fellow, which is the highest fellowship offered through the EPA. This competitive award is currently only held by approximately 130 students across the nation. Recently, the

research being sponsored by the EPA Star Fellowship was represented in a poster contest in Washington, DC, where Richie competed against the 130 Star Fellows. He was selected in the top 20, which subsequently were featured with sponsorship from EPA, NSF, and the National Council for Science in the Environment, in a reception on Capitol Hill. In addition, Congressman Randy Neugebauer personally invited Richie to his office to acknowledge this extremely high honor from a graduate student at Texas Tech University. Another one of our graduate students, Brett Blackwell, has just been notified that he has received the Procter and Gamble Doctoral Research Fellowship offered through the Society of Environmental Toxicology and Chemistry. This is the highest award for a graduate student given by the Society of Environmental Toxicology and Chemistry, which is the major professional society in which we participate in the field of environmental toxicology. This is a further testimonial that our students are aspiring to the highest level of competition in the field of environmental toxicology and we are very proud of all of our students. The examples I have brought to this review in Richie and Brett are just a couple of our truly outstanding successes being enjoyed by our students here at Texas Tech University and subsequently in the professional arena. I would encourage a review of the awards that have been received even over the last year or two by our graduate students and the tradition of excellence in seeking out these awards have become the norm vs. the exception in the Department of Environmental Toxicology.

A point that we identified in this self-study is that, with the maturation and the national reputation that our program in the Department of Environmental Toxicology and TIEHH has received, it has also resulted in outstanding job opportunities elsewhere for our faculty. For instance, the University of Georgia recruited Dr. Jia-Sheng Wang to be the new Department Head in Environmental Science there. Dr. Scott McMurry was recruited by Oklahoma State University to set up a new environmental and wildlife toxicology program. Dr. George Cobb was recruited by Baylor University to be the new Head of the Department of Environmental Science. The United States Geological Survey recruited Dr. Mike Hooper, who now is an environmental contaminant specialist with significant responsibility in the United States Geological Survey. These are examples of impact in the field of environmental toxicology, which has challenged us with a rotation of senior faculty with new younger faculty coming in. In consultation with Provost Bob Smith here at Texas Tech University, this is normal for outstanding, respected programs to have faculty recruited away for tremendous job opportunities and, at the same time, we are bringing new highly motivated younger faculty to our program. Although we have lost some senior faculty members, there has been much momentum and commitment by our younger faculty that continuity has been maintained quite nicely and research grants and graduate student recruitment has continued at an excellent level. In addition, we still have multiple faculty with over a decade with the program including Dr. Ken Dixon, 25 years, Dr. Todd Anderson, 15 years, Dr. Ernest Smith, 20 years, to name a few, and these individuals are excellent mentors to our younger faculty and enhance program stability.

Another point worth mentioning is that the Department of Environmental Toxicology is located off campus, as it is located in TIEHH facilities at Reese Technology Center. Since we do not have an undergraduate program, and are off-campus, it does create some challenges for obscurity, related to undergraduate students, who perhaps could be future graduate candidates in our program. We are remedying this situation by creating an undergraduate class in environmental toxicology, which will be co-listed with programs in the College of Arts and Sciences and the College of Natural Resources at Texas Tech. We also continue to engage the

Honors program at Texas Tech and, particularly, the Howard Hughes Medical Institute Scholars program to host outstanding undergraduate students, some of which ultimately end up in our graduate program. In addition, we have regular articles in the student newspaper, *The Treader*, and have created work-study opportunities for undergraduate students, some of whom become interested in the program. Nevertheless, this is a continuing challenge, which we recognize and are engaging, and we continue to have very strong applicant pools for our graduate program in environmental toxicology.

The field of environmental toxicology has been and continues to be an excellent career opportunity, and this does not appear to be changing, especially with the many environmental problems continuing to challenge mankind. For this reason, we anticipate continued strength and employment of our graduates. Although we face many challenges, particularly with current economic conditions facing the nation, we do maintain a communication network of past students and host an annual reception for them when attending the annual meeting of our professional organization, the Society of Environmental Toxicology and Chemistry. In addition, Texas Tech University's Department of Environmental Toxicology/TIEHH, with other collaborators at Texas Tech, now represents the largest academic-based membership in the field of environmental toxicology. We continue to enjoy the highest number of members in the Society of Environmental Toxicology and Chemistry than any other academic institution in the world. This is an outstanding reflection of the rapid and diverse growth in our program which, did not have a single member in the Society of Environmental Toxicology and Chemistry during the late 1990s. We believe this growth has been achieved through the ongoing support by Texas Tech University's faculty, staff, and administration, and the great support we have received from the City of Lubbock and the State of Texas. This self-study challenges us to reflect on our past, evaluate our current situation, and continue to aspire to the future to be an even more outstanding academic and research program in the field of environmental toxicology and chemistry.

## **VII. Appendices**

- A. Strategic Plan
- B. Curriculum Map
- C. Graduate Course Offerings
- D. Graduate Student Handbook
- E. Graduate Student Association(s)
- F. Graduate Faculty Information
- G. Science Advisory Board Reports
- H. Recruiting Materials

# APPENDIX A

## Strategic Plan

The ENTX departmental strategic plan is located at the following website:

<http://techdata.irs.ttu.edu/stratreport/index.asp>









# APPENDIX C

## Graduate Course Offerings

4000. Undergraduate Research in Environmental Toxicology (V1-3). Prerequisite: 15 hours of biology or chemistry, junior or senior standing, and consent of instructor. Selected research problems according to the needs of the student. May be repeated for credit.

4325. Principles of Toxicology I (3:3:0). Prerequisite: Senior standing or consent of instructor. First half of two-semester course. Examines foundations of toxicological sciences, covering principles, disposition and half of toxicity mechanisms. (Writing Intensive)

4326. Principles of Toxicology II (3:3:0). Prerequisite: ENTX 4325. Second half of two-semester course. Covers remaining toxicity mechanisms, toxic agents and applied toxicology. (Writing Intensive)

4301. Special Topics in Environmental Toxicology (3:3:0). Prerequisite: Consent of instructor. Special areas of current interest not commonly included in other undergraduate courses (e.g., wildlife toxicology, pesticides in the environment).

6000. Master's Thesis (V1-6).

6100. Graduate Seminar (1:1:0). Prerequisite: Graduate standing or consent of instructor. A participatory seminar where graduate students condense, review, and present research findings on focused topics. Subject matter varies by semester. May be repeated for credit.

6251. Analytical Toxicology Laboratory (2:0:2). Corequisite: ENTX 6351 or consent of instructor. Extraction, cleanup, and quantitative analysis of environmental chemicals and their degradates. Reinforces and applies theories taught in ENTX 6351. (Writing Intensive)

6300. Advanced Topics in Environmental Toxicology (3:3:0). Special areas of current interest not generally covered in other courses. Content normally different each time offered. May be repeated for credit.

6312. Biological Threats in the Environment (3:3:0). Prerequisite: Undergraduate biological background or consent of instructor. Detailed examination of characteristics, surveillance, and control of naturally-occurring zoonoses and diseases exploitable as biological weapon agents. (Writing Intensive)

6314. Chemical Warfare and Protective Countermeasures (3:3:0). Coverage of chemical warfare agents, their protective measures, and technologies. Suitable for science and engineering majors.

6325. Principles of Toxicology I (3:3:0). Prerequisite: Graduate standing in the department or consent of instructor. First half of two semester course. Examines the foundations of toxicological sciences. Covers principles, disposition, and first half of toxicity mechanisms. (Writing Intensive)

6326. Principles of Toxicology II (3:3:0). Prerequisite: ENTX 6325. Second half of two semester course. Covers remaining mechanisms, toxic agents, and applied toxicology. (Writing Intensive)

6327. Molecular Toxicology (3:3:0). Prerequisite: ENTX 6325 and 6326 or consent of instructor. Molecular mechanisms and control of phase I and phase II xenobiotic metabolizing enzymes, oxidative stress, and carcinogenesis. Emphasizes prototypical chemicals with multiple modes of action.

6331. Reproductive and Developmental Toxicology (3:3:0). Prerequisite: ENTX 6325 and 6326 or consent of instructor. Mechanistic treatment of chemical effects on reproductive and developmental processes and the resulting impacts on reproductive function, fertility, and the developing offspring.

6332. Biotxin Detection Methods (3:2:1). Prerequisite: ENTX 6326. Toxic effects of mycotoxins, bacteria, and cyanobacteria toxins. Historic and current status of biotoxin research. Laboratory stresses breadth for biotoxin detection.

6351. Analytical Toxicology Lecture (3:3:0). Prerequisite: ENTX 6445 or consent of instructor. Theory of isolation, detection, identification, and quantification of toxic substances and their transformation products in environmental and biological samples.

6361. Environmental and Wildlife Toxicology (3:3:0). Prerequisite: Organic chemistry, ecology, or consent of instructor. Examines exposure and effects of chemicals in wildlife, their study in the lab and field, and use of conducting ecological risk assessments.

6365. Fundamentals of Aquatic Ecotoxicology (3:3:0). Prerequisite: Graduate or advanced undergraduate background in biological, chemical, or environmental sciences or consent of instructor. Covers effects of water pollution on aquatic organisms and human health. Subjects include fate and transport in aqueous systems, acute toxicity and toxicity tests, and effects of pollutants on aquatic systems from molecular to global levels.

6366. Advanced Environmental Toxicology (3:3:0). Prerequisite: ENTX 6325 and 6326, 6445, or consent of instructor. Examines toxicological principles at population, community, and ecosystem levels stressing population dynamics, life history changes, community composition, and ecosystem dynamics.

6367. Advanced Wildlife Toxicology (3:3:0). Prerequisite: ENTX 6325 and 6326, 6445, or consent of instructor. Environmental contaminant effects on reproduction, health, and well being of wildlife species and applications to ecological risk assessment.

6371. Procedures and Techniques in Ecological Risk Assessment (3:3:0). This course is designed to provide students with a solid foundation in risk assessment methods. Students will learn how the ecological risk assessment framework developed by the U.S. EPA is used to assess the potential hazards of chemicals.

6385. Statistical Applications in Environmental Toxicology (3:3:0). Prerequisite: STAT 5302 or equivalent. Designed for students who wish to understand the interrelationships of statistical distributions and particular statistical approaches to environmental toxicology data analysis.

6391. Modeling and Simulation in Ecotoxicology (3:2:1). Prerequisite: Calculus. Model development, implementation, and simulation applied to ecotoxicology; stressor responses; toxicokinetics; individual organism effects; individual-based models; population, community, and landscape effects; parameter estimation; design and analysis of simulation experiments; and model validation.

6431. Biomarkers in Toxicology (4:2:2). Prerequisite: ENTX 6325 and 6326. Lecture and laboratory on biomarker theory and use. Biochemical, physiological, histological responses to chemical exposure, effects and susceptibility are studied. Laboratory stresses individual and team approaches.

6445. Chemical Sources and Fates in Environmental Systems (4:4:0). Prerequisite: Organic and analytical or environmental chemistry or consent of instructor. Environmental phenomena and physical properties of chemicals are used to understand processes governing chemical fate in the environment from global to micro scales.

7000. Research (V1-12).

8000. Doctor's Dissertation (V1-12).

**Our graduate course offerings are located at the following website:**

<http://www.depts.ttu.edu/officialpublications/courses/ENTX.php>

# **APPENDIX D**

## **Graduate Student Handbook**

# **GRADUATE STUDENT HANDBOOK**

**2011-2012**



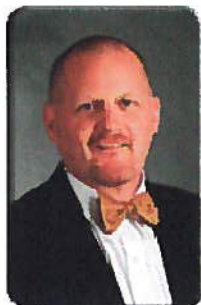
**THE INSTITUTE OF ENVIRONMENTAL AND  
HUMAN HEALTH (TIEHH)**

**&**

**THE DEPARTMENT OF ENVIRONMENTAL  
TOXICOLOGY**

**TEXAS TECH UNIVERSITY  
AND  
TTU HEALTH SCIENCES CENTER  
LUBBOCK, TEXAS**

## TIEHH/ENVIRONMENTAL TOXICOLOGY GRADUATE FACULTY



**Dr. Todd Anderson, Professor**

Teaching and research focuses on the movement of organic chemical contaminants in the environment in order to evaluate and better characterize potential exposure of organisms to contaminants, as well as support tests on chemical effects.

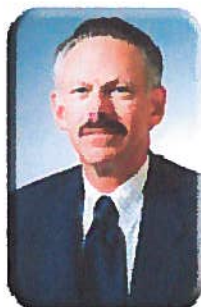
Ext. 231



**Dr. Jaclyn Cañas, Assistant Professor**

Interest focuses on analytical toxicology and environmental fate and in using analytical methods to characterize exposure. Also interested in the fate and transport of chemicals in the environment.

Ext. 308



**Dr. Ken Dixon, Professor**

Research interests include developing and applying computer simulation models to predict the movement and effects of toxic chemicals on wildlife populations and environment.

Ext. 234



**Dr. Weimin Gao, Assistant Professor**

Research interests focus on etiological study and early detection of human chronic diseases including lung, liver and esophageal cancers by using molecular epidemiology, genomics, proteomics and metabolomics.

Ext. 252





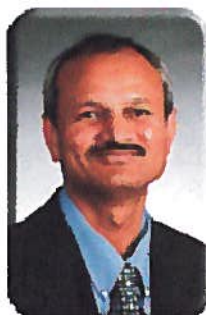
**Dr. Seshadri "Ram" Ramkumar**, Associate Professor  
Research and teaching interests focus on chemical warfare countermeasures, personal protective clothing/substrates, IT and chemical defense, and chemical protection and high performance materials.

Ext. 228



**Dr. Christopher J. Salice**, Assistant Professor  
Research interests are focused on understanding the ecological and evolutionary consequences of anthropogenic and natural stressors. The intent of the research is to improve management of environmental resources, typically by informing or refining ecological risk assessments.

Ext. 229



**Dr. Kamaleshwar Singh**, Assistant Professor  
Research focus is on Environmental Carcinogenesis, Toxicogenomics, Molecular Toxicology, and Human Cancer Genomics. "Gene-environment interactions in human cancer development" is the main area of his research.

Ext. 320



**Dr. Ernest E. Smith**, Associate Professor  
Teaching and research interests focusing on developmental and reproductive toxicology, as well as molecular biological techniques in order to evaluate mechanisms of natural and environmental contaminants in amphibian and rodent models.

Ext. 233



**Dr. Phil Smith**, Associate Professor  
Research interests focus on ecological and physiological characteristics of organisms, populations, and environments that contribute to contaminant exposure and adverse effects.

Ext. 316

## **VISION STATEMENT**

*"We will be a leader in research and education integrating environmental and human health sciences. Our Institute will contribute innovative solutions to environmental problems by embracing disciplinary diversity, creating partnerships, and committing to excellence."*

### **TIEHH and Graduate Program History and Overview**

Texas Tech University and its sister institution, Texas Tech University Health Sciences Center, are located on a 1,850-acre campus in Lubbock, a city of 200,000 in the panhandle region of Texas. As the primary research institution in the western two-thirds of the state, Texas Tech University is home to seven colleges, a School of Law, and a Graduate School. The Health Sciences Center contains Schools of Medicine, Nursing, and Allied Health. Over 27,000 students are enrolled in the 123 undergraduate, 103 masters, and 60 doctoral programs offered at Texas Tech.

In 1997, Texas Tech University and the Texas Tech University Health Sciences Center established as a joint venture, The Institute of Environmental and Human Health (TIEHH), to bridge their ability to assess the impacts of toxic chemicals on the environment and on people. This initiative employs a medical school and health sciences center interfaced with a comprehensive university, including the Texas Tech University School of Law, and represents an opportunity to address environmental and human health issues from a multi-disciplinary perspective. The Director, Dr. Ronald Kendall, and members of the faculty of The Institute of Environmental and Human Health already sit on national boards including the U.S. Environmental Protection Agency, as well as panels of other scientific organizations, both national and international. This effort results in the development and implementation of good science and technology in the interface of good environmental policy and economic development opportunities.

### **Environmental Toxicology Facilities**

TIEHH researchers assess human exposure to chemicals in the environment and associated effects. TIEHH builds upon analytical methods to enhance the quantitation of chemicals in association with environmental exposures. TIEHH also builds upon population-based epidemiological studies, including both humans and wildlife, to begin to better define the "Canary in the Coal Mine" concept from a more quantitative and rigorous scientific basis. Researchers are developing innovative approaches to assess human health consequences in the environment and how wildlife may act as "sentinels" to human health effects. Indeed, even currently, the National Institute of Health is implementing new epidemiological studies to evaluate chemical exposure on Texas migrant and agricultural farm workers.

In 2000, the Texas Commission on Higher Education approved the Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) graduate programs in Environmental Toxicology. The Department of Environmental Toxicology was officially approved later that same year, providing a home department for the Environmental Toxicology faculty and graduate program. In recognition of the need for greater incorporation of environmental toxicology in the fields of law and business,



## **FACILITIES AT REESE TECHNOLOGY CENTER**

### **TIEHH Complex - Buildings**

555 – Administration / Labs  
552 – GIS Lab  
551 – Tool Shop  
790 – Groundwater Analysis Lab  
455 – Nonwovens and Advanced Materials Lab  
450 – Aviary Facility

### **TIEHH Building 555 Laboratories**

Ecotoxicology  
Biochemical Toxicology  
Chemo Prevention and Biotxin  
Developmental/Reproductive Toxicology  
Epidemiology  
Infectious Disease  
Inorganic Analysis  
Environmental Chemistry  
Analytical  
Aquatic Toxicology  
Computer Laboratory  
Image Core Facility

### **TIEHH Building 790 Laboratories**

Groundwater Analysis  
Nonwoven and Advanced Materials  
Sensor Development

## **TIEHH /Environmental Toxicology Resources, Services, and Responsibilities**

### **Break Room**

Room 124 is designated as a break room for all personnel and visitors. It contains drink/snack machines, a refrigerator, microwaves, cabinets, lunch tables and chairs, and a sink. Dishes (dirty or clean) should not be left in the sink. We expect everyone to wash his/her own dishes and be courteous in the use of all areas and of the equipment in the kitchen area, including the refrigerator and microwave. As this is a public area, everyone is responsible for cleaning up after his/her use of the facilities.

### **Campus Run**

Campus run is available when time-critical paperwork needs to be delivered to or picked up from campus. The campus run is coordinated by Stephanie White and is generally scheduled every afternoon around 2:00 p.m. Please contact Stephanie if you have a campus run request.

### **Campus Mail**

Mail to/from the Texas Tech campus is delivered and picked up daily by Mail Tech at the front desk at 9:30 a.m. and 2:00 p.m. The mail delivered to TIEHH is distributed to the appropriate mailboxes in the copy room. Mail picked up by campus mail is delivered to campus to be sorted and mailed through U.S. Postal System. Any mail for the U.S.P.S. must have a stamp or an account number in the upper left hand corner of the front of the envelope. Campus mail must be labeled with the person's name, department, and Mail Stop number (see the TTU directory for this information). Note that campus mail is for official university business and should not be used for commercial, personal, or political purposes. A box for stamped mail, campus mail, and overnight express mail is located in the front on the credenza behind the reception desk. Any mail to be delivered by overnight mail services (FedEx, UPS, Airborne) should be coordinated through the receptionist before 2:00 p.m. daily to ensure enough time for pick up by overnight mail services. Sender must include an approved account number prior to sending or a fee will be charged by Mail Tech to cover costs of researching source of funds to cover the expense.

### **Computer Resources**

Computers designated for student use are located in the student library. Laboratory computers, or those associated with GIS/modeling and HPCC, may only be used under permission of the responsible faculty member. Before using any TIEHH computers, consult computer resources support personnel (Lori Gibler, Ext. 223) for log-on instructions and initial passwords.

### **Copy Services**

Photocopiers are located in Room 102. Students will be assigned a copier code by Stephanie White or Tammy Henricks. Each student is allocated **500 copies per semester**. These copy privileges are for TIEHH-associated business only. Copying books, theses, dissertations, etc. is not permitted. TTU offers photocopy services for large print jobs through PrintTech.

### **Desk Space**

Student office and desk space is allocated through the TIEHH Space Committee, which has a representative from The Student Association of TIEHH on the Committee. Space allocation for graduate students is determined by a hierarchical system governed by the TIEHH Graduate

## **Restrooms**

Restrooms can be found in the main administrative portion of the building (near copy room), and in the center of the main laboratory hallway. Shower/locker facilities are available in the east restroom area.

## **Security Badges**

**Security is of crucial importance at TIEHH.** Upon entering the Environmental Toxicology Program, you will be issued an identification/security badge. Students must have their pictures taken for their ID badges through the Texas Tech Police Department located at the Texas Tech Police Building. Access to specific laboratories must be approved through your major advisor or the appropriate faculty managing a lab in which you would be working. **ID badges must be worn at all times while on the TIEHH campus.** Loss of ID badges could jeopardize TIEHH security and may result in a fine. Contact Ryan Bounds immediately for lost badges or for problems with badges. (If you have badge problems, please be sure to note whether the badge “beeps” when trying to use a badge at a reader. This information is important when checking badge problems). As there is a cost per badge, TIEHH only covers one lost badge per person. Should you lose your badge after your allocation, you will be responsible to replace the badge at a cost of \$5 per badge.

## **Student Library (TIEHH)**

A number of relevant environmental resources, journals, and documents are located in the student library (room 107). These materials are for general student use and should not be removed from the library except for photocopying. The student library contains a number of student use computers, printers, and tables for studying. Please respect the needs of others while in the library.

## **Telephones/Voicemail**

Telephones designated for student use are located in the multi-student cubicles. Additional phones may be found in laboratories. Calls should be limited to work-related issues, especially those requiring long-distance service. Graduate students are not assigned an access code number for making long distance phone calls unless requested by the student’s major professor. All long-distance calls are logged and you will be asked to explain the need for each call. Long-distance personal calls are not permitted and can only be accessed via a “pin” number assigned. Should you need to make a long-distance call, please see your advisor. Should you need to make a personal long-distance call, you will be required to pay for it. Lori Gibler, Assistant Director for IT, will coordinate setting up a student’s voicemail box if requested.

## **Transportation**

At the time of this publication, bus service to Reese Center is not provided. Students are encouraged to carpool/share until students can find suitable transportation to and from Reese Center.

## **Visitors**

If you are expecting a guest, please inform the front desk prior to arrival. The guest must provide photo ID for identification verification and sign in the visitor log. As a visitor, he/she will be provided a “visitor” badge to wear at all times while in TIEHH facilities. Upon leaving, the guest

## **THE DEPARTMENT OF ENVIRONMENTAL TOXICOLOGY**

Chairman of the Department of Environmental Toxicology: Dr. Ronald J. Kendall

The graduate program in Environmental Toxicology offers **Doctor of Philosophy** and **Master of Science** degrees with a major in Environmental Toxicology, a combined degree leading to a joint **J.D./M.S.** degree in cooperation with the Texas Tech School of Law, and a combined degree leading to a joint **M.B.A./M.S.** degree with the Texas Tech University Jerry S. Rawls College of Business.

Because of the multidisciplinary nature of environmental toxicology, prospective students should contact the Graduate Officer (Dr. Christopher Salice) to discuss prerequisites and prior training. Generally, a strong background in the natural, physical, or health sciences will provide the necessary preparation. Students interested in pursuing a degree must complete applications to both the Graduate School and the Environmental Toxicology Graduate Program.

The Ph.D. program is composed of 72 hours of course work beyond the bachelor's level, emphasizing the principles of toxicology, the environmental fate of chemicals, statistical approaches to study design and data handling, and seminars in environmental toxicology. Supplemental course work and research and dissertation hours are chosen by the student with the guidance of their committee, allowing for focus on the student's particular research emphasis. Students pursuing a doctoral degree must pass a written exam, perform an original research project, prepare a written dissertation, and defend the work in a public defense.

The M.S. program is composed of 36 hours of coursework beyond the bachelor's level, emphasizing the principles of toxicology, the environmental fate of chemicals, statistical approaches to study design and data handling, and seminars in environmental toxicology. Supplemental coursework and research and thesis hours are chosen by the student with the guidance of his/her committee, allowing for focus on the student's particular research emphasis. Students pursuing the M.S. degree must perform an original research project, prepare a written thesis, and defend the work in a public defense.

The J.D./M.S program is composed of 12 hours of M.S. coursework for Law School students, or 12 hours of J.D. coursework for M.S. students, which is taken out of their original degree requirements.

The M.B.A./M.S. program is composed of 26 hours of M.S. coursework and 36 hours of business administration coursework; totaling 62 hours. The required degree hours of the programs taken separately are 84.

All degree programs within the Department of Environmental Toxicology require students to take the following core courses: Statistical Applications in Environmental Toxicology (ENTX 6385), Principles of Toxicology I and II (ENTX 6325 and 6326), and Chemical Sources and Fates in Environment Systems (ENTX 6445). Students are required to make at least a B- in each of these courses. If the student fails to achieve a B- or higher after retaking the course, the student will be removed from the program.

## **ENVIRONMENTAL TOXICOLOGY COURSE LIST**

### **Courses in Environmental Toxicology. (ENTX)**

**6000. Master's Thesis (V1-6).**

**6100. Graduate Seminar (1:1:0).** Prerequisite: Graduate standing or consent of instructor. A participatory seminar where graduate students condense, review, and present research findings on focused topics. Subject matter varies by semester. May be repeated for credit.

**6105. Introductory Seminar in Environmental Toxicology (1:1:0).** Prerequisite : Graduate Standing. A tour through the discipline of environmental toxicology focusing on its composition and workings. Demonstrations of laboratory, field, computational presentation, safety, quality assurance, permitting and career components.

**6115. Interdisciplinary Seminar in Environmental Toxicology (1:1:0).** Prerequisite: Graduate standing or consent of instructor. Seminar on timely topics by experts in aspects of environmental toxicology. Focuses on basic and applied research, regulatory decision-making, and industry perspectives. Required for all environmental toxicology students. May be repeated for credit.

**6251. Analytical Toxicology Laboratory (2:0:2).** Corequisite: ENTX 6351 or consent of instructor. Extraction, cleanup, and quantitative analysis of environmental chemicals and their degradates. Reinforces and applies theories taught in ENTX 6351.

**6300. Advanced Topics in Environmental Toxicology (3:3:0).** Special areas of current interest not generally covered in other courses. Content normally different each time offered. May be repeated for credit.

**6312. Biological Threats in the Environment (3:3:0).** Prerequisite: Background in biology, entomology, microbiology, parasitology, zoology, or consent of instructor. In-depth study of naturally-occurring zoonoses and other diseases, as well as disease pathogens that may be exploitable as biological weapon agents. Students will gain an understanding of historic and current biological threats, maintenance and transmission cycles of select zoonoses, and concepts of host and vector surveillance and control.

**6314. Chemical Warfare Protective Countermeasures (3:3:0)** Coverage of chemical warfare agents, their protective measures, and technologies. Suitable for science and engineering majors.

**6325. Principles of Toxicology I (3:3:0).** Prerequisite: Graduate standing in the department or consent of instructor. First half of a two-semester course. Examines the foundations of toxicological sciences. Covers principles, disposition, and first half of toxicity mechanisms.

**6326. Principles of Toxicology II (3:3:0).** Prerequisite: ENTX 6325. Second half of two-semester course. Covers remaining mechanisms, toxic agents, and applied toxicology.

**6431. Biomarkers in Toxicology (4:2:2).** Prerequisite: ENTX 6325 and 6326. Lecture and laboratory on biomarker theory and use. Biochemical, physiological, histological responses to chemical exposure, effects and susceptibility are studied. Laboratory stresses individual and team approaches.

**6445. Chemical Sources and Fates in Environmental Systems (3:3:0).** Prerequisite: Organic and analytical or environmental chemistry or consent of instructor. Environmental phenomena and physical properties of chemicals are used to understand processes governing chemical fate in the environment from global to microcosm scales.

**7000. Research (V1-12).** Prerequisite: Graduate standing in Environmental Toxicology. Independent research carried out under the direction of a faculty advisor.

**8000. Doctor's Dissertation (V1-12).** Prerequisite: Advancement to doctoral candidacy. Doctoral dissertation research carried out under the supervision of the student's major advisor.



### **Degree Program**

All doctoral students must submit a "Program for the Doctoral Degree" form to the Graduate School. This form lists all required courses. It should be submitted as soon as possible but no later than the end of the second semester of enrollment in the Ph.D. degree program.

### **Qualifying Examinations and Advancement to Candidacy**

Each student pursuing a doctoral degree in Environmental Toxicology at Texas Tech University will be required to complete a qualifying examination, composed of a written and an oral component, prior to his/her advancement to candidacy. All required coursework (except research, dissertation, and seminar credit hours) for the degree must be completed prior to the examinations. The written examination will test the student's competence in the topics considered fundamental to the study of Environmental Toxicology, and its successful completion will be considered a prerequisite for advancement to the oral examination. The oral examination will be administered through the student's committee and will focus on topics covered in the written examination plus those topics deemed relevant by the student's committee.

### **Dissertation**

The doctoral dissertation represents original research conducted by the student under the direction of his or her major advisor and advisory committee. Official copies are received electronically as ETD's. ETD documents must be prepared in accordance with the Graduate Schools formatting guidelines. Visit <http://www.depts.ttu.edu/gradschool/current/ETD.php> for more information.

### **Final Oral Examination and Defense of Dissertation**

All students obtaining a Ph.D. degree will be required to pass a qualifying examination, complete a dissertation, and defend the dissertation in a final examination. The qualifying examination will be in the form of both a written and an oral exam. The dissertation represents a scholarly presentation of work performed under the guidance of the dissertation committee. The final examination will be given in the form of a public dissertation defense presentation. Guidelines for the qualifying exam, dissertation, and final examination will follow those described in the Texas Tech University Graduate School Catalog.

### **Additional Graduation Requirements**

During the semester of intended graduation, a "Statement of Intention to Graduate" must be filed at the Graduate School, and a dissertation binding fee must be paid at Student Business Services (with a copy of the receipt to be left at the Graduate School). Since exact deadlines for these requirements vary with the semester, the most recent university calendar should be consulted.

### **Ninety-Nine Hour Rule**

*This rule applies to all doctoral students.* Ninety-nine hours is the suggested number of hours in which a doctoral degree should be completed. Departments may apply to the Graduate School for an individual exception for students nearing the 99-hour limit. The application must be made prior to the end of the spring semester and if approved, will be in effect until the student graduates, or exceeds 130 hours. The number of exceptions granted by the coordinating board to the university is limited to 1.5% of enrolled doctoral students. If the student exceeds 130 hours the student must pay out-of-state tuition for all semester credit hours over 130.

## THE DOCTORAL DEGREE

### LIST OF MAJOR STEPS REQUIRED BY THE GRADUATE SCHOOL

<u>Action</u>	<u>Initiated Through</u>	<u>Submitted to</u>	<u>Time</u>
1. Plan courses for first semester	Graduate Advisor	Graduate Advisor	Prior to registration
2. Take preliminary exam	Graduate Advisor	Graduate School	Early in doctoral study, usually first semester of coursework
3. Set up doctoral advisory committee	Graduate Advisor	Graduate School	Prior to filing doctoral degree plan
4. File "Program for the Doctoral Degree and Report of the Preliminary Exam" form	Graduate Advisor or Chair, Advisory Committee	Graduate School	Before the end of first year of doctoral work
5. File changes in degree program if necessary	Graduate Advisor, or Chair, Advisory Committee	Graduate School	As they are determined
6. Take Qualifying Exam for major and minor subjects (results by memo)	Graduate Advisor or Chair, Advisory Committee	Graduate School	After approval of doctoral program and completion of coursework
7. Recommendation for admission to candidacy (request by memo)	Graduate Advisor	Graduate Council	After passing qualifying exam and not later than 4 months before graduation
8. Enroll in semester of graduation if all requirements are not met (at least 3 hours)	Graduate Advisor or Chair, Advisory Committee	Registrar	Semester of Graduation*
9. File "Statement of Intention to Graduate" Form with official title of dissertation	Student, Chair, Advisory Committee	Graduate School	Semester of Graduation*
10. Pay binding fee; send copy of receipt to Graduate School	Student Business Services	Graduate School	Semester of Graduation*
11. Schedule oral defense of dissertation	Chair, Advisory committee	Advisory Committee	Semester of Graduation after approval of dissertation draft
12. Submit defense form from graduation packet at least 3 weeks before defense	Student	Graduate School Dissertation Coordinator	At least 3 weeks before defense
13. Get dissertation packet containing title page	Graduate School Dissertation Coordinator	Advisory Committee	Prior to defense
14. Stand for oral defense of dissertation; report result by memo to Graduate School	Advisory Committee	Graduate School	Semester of Graduation*
15. Submit 1 copy of dissertation with signed title page and required survey forms and UMI abstract to Graduate School	Advisory committee	Graduate School Dissertation Coordinator	Semester of Graduation (usually 5 weeks before graduation date)
16. Final grade for dissertation hours	Chair, Advisory committee	Registrar	On final grade roll in semester of graduation
17. Three final copies of dissertation to Graduate School	Student	Graduate School Dissertation Coordinator	At least 3 days before graduation

\*Deadline packets will be sent to students according to proposed date of graduation indicated on "Program for the Doctoral Degree and Report of Preliminary Examination" Form.



should be submitted as soon as possible but no later than the second semester of enrollment. Changes can be made, but need to be approved by the advisory committee and filed with the Graduate School.

### **Thesis**

The Master's thesis represents original research conducted by the student under the direction of his or her major advisor and advisory committee. Official copies are received electronically as ETD's. ETD documents must be prepared in accordance with the Graduate Schools formatting guidelines. Visit <http://www.depts.ttu.edu/gradschool/current/ETD.php> for more information.

### **Final Oral Examination and Defense of Thesis**

All students obtaining an M.S. degree will be required to complete a thesis that represents independent work performed under the guidance of the advisory committee. A final comprehensive examination will be given in the form of a thesis defense presentation. Thesis and final examination guidelines will follow those outlined in the Texas Tech University Graduate School Catalog.

### **Additional Graduation Requirements**

During the semester of intended graduation, a "Statement of Intention to Graduate" must be filed at the Graduate School, and a thesis binding fee must be paid at Student Business Services (with a copy of the receipt to be left at the Graduate School). Since exact deadlines for these requirements vary with the semester, the most recent University calendar should be consulted.

**THE MASTERS DEGREE**  
**LIST OF MAJOR STEPS REQUIRED BY THE GRADUATE SCHOOL**

<u>Action</u>	<u>Initiated Through</u>	<u>Submitted to</u>	<u>Time</u>
1. Plan courses for first semester	Graduate Advisor	Graduate Advisor	Prior to registration
2a. Set up thesis or comps. advisory committee	Graduate Advisor	Graduate School	Prior to filing masters degree plan and candidacy form
2b. File "Program for the Masters Degree and Admission to Candidacy" form	Graduate Advisor or Chair, Advisory Committee	Graduate School	During first semester of masters coursework.
3. File changes in degree program if necessary	Graduate Advisor, or Chair, Advisory Committee	Graduate School	As they are determined
4. File "Statement of Intention to Graduate" form, including official title of thesis, if applicable	Student and Chair, Advisory Committee	Graduate School	Semester of Graduation*
5. Get thesis packet containing title page	Graduate School thesis Coordinator	Advisory Committee	Prior to defense of thesis
6. Pay diploma fee, and thesis fee if applicable; send copy of receipt to Graduate School	Student Business Services	Graduate School	Semester of Graduation*
7. Schedule final comp. examination/defense and send results by memo to Graduate School	Graduate Advisor, or Chair, Advisory Committee	Graduate School	Semester of Graduation*
8. Submit one copy of thesis with signed title page to Graduate School	Advisory Committee	Graduate School Thesis Coordinator	Semester of Graduation (usually 5 weeks before graduation date)
9. Final grade for Thesis hours	Chair, Advisory Committee	Registrar	On grade roll in semester of graduation
10. Three final copies of thesis to Graduate School	Student	Graduate School Thesis Coordinator	At least 2 days before graduation

\*Deadline packets will be sent to students according to proposed date of graduation indicated on "Program for the masters degree and admission to candidacy" form.

For students in the joint degree program, TIEHH will give 12 hours of credit toward the M.S. degree in Environmental Toxicology for completion of the J.D. degree courses listed below (Table B2).

**TABLE B2. Approved Law Courses for the M.S. Degree**

TIEHH will give a maximum of 12 hours of credit toward the M.S. degree for completion of J.D. degree courses listed below which have been approved by the TIEHH faculty.

6021-5	Law and Science*	3 credits
6023	Environmental Law*	3 credits
6021-4	Environmental Enforcement	3 credits
6005	Administrative Law	2 or 3 credits
6025	Land Use Planning	2 or 3 credits
6221-2	Constitutional Law Seminar:	
	Environmental Issues	3 credits
6021-9	Texas Environmental Law	2 or 3 credits
6021-3	Corporate Aspects of	
	Environmental Law	3 credits
TBA	International Environmental Law	2 or 3 credits

Joint J.D./M.S. in Environmental Toxicology candidates must take Law and Science and Environmental Law courses as additional law school requirements for the program.

**M.B.A./M.S. in Environmental Toxicology**

The opportunity for advancement to management and administrative positions in the field of Environmental Toxicology requires professionals whose education is strongly based in both toxicology and business. This program brings together the expertise of TIEHH and the Jerry S. Rawls College of Business.

# **TIEHH STUDENT ASSOCIATION CONSTITUTION AND BY-LAWS**

## **Article I**

### **Organization Name**

This organization shall be called “The Student Association of The Institute of Environmental and Human Health,” herein referred to as the Association.

## **Article II**

### **Purpose**

The purpose of the Association shall be to (1) promote camaraderie and scientific interaction among graduate students with The Institute of Environmental and Human Health; (2) promote scientific interaction among Institute graduate students and members of other universities through attendance at scientific meetings; (3) promote the effectiveness and diversity of environmental toxicology courses currently taught at the University; (4) promote graduate student scholarship; and (5) act as a service organization for the Institute and University.

## **Article III**

### **Membership**

Membership in the Association shall be open to any undergraduate or graduate student (full or part-time) in The Institute of Environmental and Human Health of Texas Tech University. Requests for membership in the Association shall be accepted during the first four weeks of the fall and spring semesters. Members must be enrolled in the University and in good standing both with the University and The Institute of Environmental and Human Health. Members shall pay dues as outlined in the By-Laws and (Item 1) be regarded as either Full members (Article III – Section 1) or Associate members (Article III – Section 2).

Special circumstances concerning membership and disciplinary actions against members not considered in the Constitution shall be addressed by the Executive Council and, if warranted, the Faculty advisor.

### **Section 1 – Full Membership**

A Full member of the Association is a person who has paid full dues.

The rights of full membership include: (1) able to serve on Association committees; (2) able to hold an office in the Association; (3) able to run for office in the following term; and (4) eligible for support and full funding, as stated in the By-Laws (Item 2), to attend and participate in scientific meetings as stated in Article II.

### **Section 2 – Associate Membership**

An Associate member is one who has not complied with all requirements of Full membership. Associate members have the right to participate in all Association activities, meetings, and elections. Associate members cannot: (1) serve on committees; (2) hold an office; (3) run for an

The following officers shall comprise the Executive Committee:

- (i) The duties of the President shall be to: (1) preside at all meetings; (2) call and distribute notices of meetings; (3) appoint *ad hoc* committees; (4) serve as the Association's representative to the University; and (5) perform all other duties regularly involving the chief executive officer.
- (ii) The duties of the Vice-President shall be to: (1) perform the duties of the President in the case of the officer's absence; and (2) direct and manage the financial matters of the Association. This includes the management of members' requests for travel reimbursement to scientific meetings and final decision regarding the amounts awarded to members as stated in Article III (Sections 1 and 2) and By-Laws (Item 2). The Vice-President also shall direct all transactions involved in obtaining funding from outside sources. Finally, the Vice-President shall chair the Budget Committee.
- (iii) The duties of the Secretary shall be to: (1) act as the custodian of all records and archives of the Association; (2) record and file the minutes of all meetings; (3) distribute minutes to all members electronically or via hard copy; (4) maintain records of current standing (e.g., fund-raising sales and participation) for all members of the Association; (5) collect member dues; and (6) keep accurate records of all business conducted by the Association. In addition, the Secretary shall assist the Treasurer in inventory and organization of fund-raising activities.
- (iv) The duties of the Treasurer shall be to: (1) administer all fund-raising activities each semester; (2) conduct inventory and coordinate with faculty items necessary for fund-raising; (3) order and pay for material to be sold by the Association during fund-raising; and (4) assist the Secretary in determining the status of members. The Treasurer also shall maintain a financial record of activities of the Association (to be cross-referenced with the records of the Vice-President) and provide to the Executive Council a report of financial standing within two weeks of the completion of fund-raising activities. The treasurer also shall provide a financial report to the Association by April 15 of each year.

## **Article V**

### **Meetings**

During each academic term, there shall be a minimum of three scheduled meetings. The meetings shall be: (1) at the beginning of the fall term to organize fund-raising and schedule membership participation; (2) at the beginning of the spring term to accomplish the same tasks; and (3) a meeting during the second term yet prior to April 15 to elect new officers.

functions as requested by the Association, such as seminar socials and Institute picnics. Members of this committee shall serve for one academic year.

### Section 3 – Faculty Relations Committee

The Faculty Relations Committee shall be chaired by the President and consist of two other Full members appointed by the President. The purpose of this committee shall be to represent members of the Association at Faculty meetings and to act as a liaison between the Association and the Departmental faculty. When possible, one member of this committee must be present at each open faculty meeting.

### Section 4 – Constitution Committee

The Constitution Committee shall be chaired by the President and consist of at least two other Full members appointed by the President. This committee is responsible for the maintenance of the Constitution, organizing the arrangement and presentation of amendments to the constitution or By-Laws or when necessary or when found to be necessary by the Association. In addition, the committee is responsible for ensuring that the Constitution is followed during all actions of the Association, reporting violations to the Executive Council when necessary.

## **Article IX**

### **Faculty Advisor**

The Faculty Advisor must be a faculty member of The Institute of Environmental and Human Health. Selection of the Advisor shall be based on a recommendation of the Executive Council and voted on by the members of the Association. Once a Faculty Advisor has been selected by the Association and has agreed to serve in this capacity, the Advisor shall maintain that position until he/she relinquishes it or is asked to do so. The members of the Association shall vote during each election as to whether or not to reaffirm the Faculty Advisor. In the event that the Faculty Advisor steps down, a general meeting must be called within thirty days to appoint a new advisor. The duties of the Faculty Advisor include attendance at Association and as needed at Committee meetings. The advisor also shall act as a liaison between the Association and The Institute of Environmental and Human Health or the University.

## **Article X**

### **Rule of Order**

During all meetings, actions of the Executive Council and the membership shall follow Roberts' Rules of Order Newly Revised. When necessary, these rules shall be enforced by either the Vice-President or the Secretary.

## **Article XI**

### **Adoption of Constitution and Amendments**

Additions, deletions, or other modifications to the Constitution may be made only by a vote of approval by 75 percent of membership responding through an official ballot. Additions, deletions, or other modifications to the By-Laws may be made only by a vote of approval by 67 percent of membership responding through an official ballot.



## TEXAS TECH GRADUATE SCHOOL INFORMATION

### Graduate School Web Page

The Graduate School maintains a current web page, [www.depts.ttu.edu/gradschool/](http://www.depts.ttu.edu/gradschool/), that provides several items of interest to graduate students:

- Thesis and dissertation templates
- Contact information for graduate school staff members
- The Graduate Catalog
- Academic departmental information
- Information about various student services
- Graduation deadlines and requirements
- Minutes from Graduate Council Meetings

Graduate School 742-2781  
Holden Hall Room 02

**Please let Ryan Bounds or Stephanie White, Graduate Program Coordinators, or your major professor, contact the Graduate School. Please do not call the Graduate School directly with problems you are having.**

### Academic Probation and Suspension

If a student's graduate GPA for a particular semester falls below 3.0, the student will be placed on academic probation. (A 3.0 average is the minimum requirement of the Graduate School; individual academic areas may, and often do, impose a higher grade-point average for continuation in their academic programs.) A student must make a 3.0 GPA or better in the next semester in which he or she is enrolled. Failure to do so, or to maintain a 3.0 current GPA in each succeeding semester, will result in academic suspension from further enrollment as a graduate student or in graduate courses at Texas Tech University. Regulations governing scholastic probation are based on semester grade-point averages and will be applied regardless of overall grade-point average. Any student who has been suspended must appeal to the Graduate School if reinstatement is desired. Appeal of suspension may be made in writing to the Dean of the Graduate School. If the dean rejects the student's appeal, the student may request a hearing before the Student Affairs Committee of the Graduate Council. This committee will render a decision as to whether or when the student may be readmitted to graduate study.

A student may be suspended for unprofessional conduct such as cheating or plagiarism. Any appeal of such action is subject to the provisions of the Code of Student Conduct. See the *Student Affairs Handbook* for further information.

### Continuation in the Graduate School

Every student enrolled in the Graduate School, whether working toward a degree or not, is required to maintain a high level of performance and to comply fully with policies of the institution. The Graduate School reserves the right to place on probation or to suspend any post-baccalaureate or graduate student who does not maintain satisfactory academic standing or who fails to conform to the regulations of the university.

enrollment in a summer session is from 3 to 6 hours. Effective September 1, 1998, doctoral students who have completed course work, passed qualifying exams, are admitted to candidacy, and have accumulated *at least* 85 doctoral hours may register as full-time students for one semester, taking the number of hours (but not less than 3) that will bring him or her up to 93 hours, and then may register as full-time students for up to two more semesters of 3 hours each which will constitute "full enrollment" for employment purposes. (Two summer terms shall count as one semester). Graduate students with excess hours will not be employable by the University effective September 1, 1998. As of September 1, 1998, students with 130 + doctoral hours will pay out-of-state tuition regardless of residency status; as of September 1, 1999, students with 99 + doctoral hours will pay out-of-state tuition regardless of residency status. During a regular semester, more than 13 hours for a doctoral student or 16 hours for other graduate students requires special permission of the Graduate Dean.

**However, students must be enrolled full-time (at least 9 hours in each long term, 3 hours in each relevant summer session) to be eligible to hold fellowships, teaching assistantships, graduate part-time instructorships, research assistantships, or other appointments designed for the support of graduate study, as well as certain types of financial aid.** Foreign students are also required to be enrolled full-time. Graduate students designated PGRD (those who have earned an undergraduate degree, but who will take only undergraduate courses) may not be appointed to teaching assistantships, graduate part-time instructorships, or research assistantships, as noted in the *Graduate Catalog*. If a student is devoting full time to research, utilizing University facilities and faculty time, the schedule should reflect at least 9 hours enrollment (at least 3 hours in each summer session). Enrollment may include research, individual study, thesis or dissertation. Exceptions to full-time enrollment for employment purposes require approval by the Graduate Dean.

## 2. Continuous Enrollment

Each student who has begun thesis or dissertation research must register in each regular semester and at least once each summer until the degree has been completed, unless granted an official leave of absence from the program for medical or other exceptional reasons. At least 6 hours of 6000 or 12 hours of 8000 constitute minimum requirements.

## 3. Doctoral Residence

Each student fulfilling the doctoral residence requirements will enroll for at least 24 hours in one calendar year. Any other pattern of enrollment to meet the doctoral residence requirement must be approved in advance by the Dean of the Graduate School. Students holding half-time assistantships or graduate part-time instructorships may satisfy the requirement by taking at least 9 hours in each long term and 6 hours in the summer. Students who are employed full-time and for whom completion of 24 hours in one calendar year would constitute unreasonable hardship may, with departmental support, submit proposals for consideration of alternate patterns of enrollment to complete the residence requirement. Alternate patterns exist for the Doctor of Education, as described in the College of Education section of the Graduate Catalog.



making satisfactory progress toward a degree. An individual previously enrolled as a student in the spring term, or who is expected to enroll in the fall term, may be employed as a student employee between the spring and fall terms. **Note:** Graduating students should be terminated at the end of the semester in which they graduate unless they are expected to enroll in the next semester or, in the case of spring graduates, the fall semester. The employing department has the authority and responsibility to determine initial and ongoing eligibility for student employment. Failure to meet the enrollment requirements will be grounds for the department to withdraw the student's appointment and termination of employment status. Employment as a Graduate Assistant or Research Assistant may be on an hourly or salaried basis. Employment as a Teaching Assistant, Graduate PT Instructor, or Residence Hall Assistant must be on a salaried basis.

c. **Graduate Student Status**

Individuals employed as Teaching Assistants, Graduate Part-time Instructors, Research Assistants, or Graduate Assistants are expected to be enrolled in Graduate School full time (see Ops 64.02 and 64.03). Effective with registrations for fall semester 1995, students who register for graduate courses must be classified as **GM** (graduate master's), **GD** (graduate doctoral), **GTMP** (graduate temporary), or **CERT** (working for certification). Students with earned undergraduate degrees who take only undergraduate courses will be designated **PGRD**. Students holding **PGRD** status do not qualify for employment as Research, Teaching, Graduate Part-time Instructor, or Graduate Assistants. Graduate students in a TTU college or school must receive approval from the TTU Graduate Dean prior to accepting any student employment at Texas Tech, including the Health Sciences Center.

d. **Verification of Student Status**

Upon the initial hiring of an individual into a position requiring student status, the department shall obtain a copy of the person's student ID card and a copy of the social security card and attach them to the *Personnel Action Form* (PAF). As a condition of employment, the student's ID number must be the same as the student's social security number. If the number on the student ID card is different from that shown on the social security card, a student enrolled at Texas Tech University must be directed to the Registrar's Office, room 115, West Hall to initiate a change to the Student Information System. A student enrolled at Texas Tech University Health Sciences Center must be directed to the HSC Office of the Registrar, Room 3B310, to initiate a change to the HSC Student Information System. In order for the individual to be employed in a position requiring student status, the student must deliver to the department a receipt from the Registrar's Office that the change has been requested. The receipt must be attached to the PAF.

Periodically, the TTU Personnel Department and HSC Human Resources Department will receive a report listing individuals who are not enrolled but are employed in positions requiring Texas Tech student status. Departments will be notified to initiate a PAF to change the appointment to a staff position with any applicable benefits or separate the person from employment.

disability, national origin, or Vietnam veteran status, and in keeping with the laws and regulations of the State of Texas and the Board of Regents.

The availability of minorities and women applying for student positions is controlled by their representation in the student body. Therefore, departments and units using student employees will need to make an extra effort to assure adequate representation by minorities in the recruiting, selection, and appointment procedures. The account administrator is required to ensure that reasonable accommodations are provided for an otherwise qualified individual with a disability.

**h. Salary Range**

Normally, a student is appointed to a position at a salary rate between the minimum and maximum of the salary range for the appropriate category as identified in the current Personnel Pay Plan.

See OP 70.14 regarding salary administration policies for student employees.

**i. Benefits**

All student employee appointments are considered to be temporary appointments and are not eligible for participation in the regular employee group insurance programs, leave accrual programs, retirement programs, holidays, or other benefits made available to regular employees.

The only exceptions are Teaching Assistants, Graduate PT Instructor (GPTI), Research Assistants, and Graduate Assistants who are employed to work at least 20 hours per week for a period of at least four and one-half months per year and are eligible to participate in the Uniform Group Insurance Program (see OP 64.11). **There is a mandatory 90 day waiting period before any Texas Tech employee is eligible for benefits.**

Graduate students who are not currently eligible for insurance, but are appointed for at least 50 percent time for a long semester will be eligible for insurance and should be designated as benefits eligible, unless the appointment specifies a separation date of less than 4.5 months.

The premium sharing for employee's group insurance is charged proportionately based upon the funding for the salary payments made during each month. This is a direct charge to any local accounts. Any state amount is not charged to the departmental operating accounts.

It is the employing department's responsibility to assure that student employees employed on a monthly salaried basis make up work time missed during holidays and between terms or process leave without pay requests for these periods.

In order to avoid negatively impacting a student's COBRA benefits, insurance eligible graduate students, who have not been appointed for the summer and are being separated between the spring and fall semesters, must be separated effective the end

Graduate Assistants, Research Assistants, Graduate Part-time Instructors, Teaching Assistants, and Scholar Student Assistants employed on a monthly basis are paid for the accomplishment of assigned tasks and are considered to be exempt from accounting for hours worked. An individual should not be appointed concurrently to a position not requiring student status and to a position requiring student status as a condition of employment.

All hourly appointments are nonexempt and accurate records of hours worked must be maintained. An employee should not be employed in both an exempt and nonexempt (time sheets required) capacity during the same workweek. However, if approved as an exception, an employee employed in any capacity which would normally be partially exempt and partially nonexempt loses the exemption during any workweek so employed and all hours worked in all capacities must be recorded and combined to determine overtime entitlements.

- See OP 70.14, Salary Administration Policy, and OP 64.11, Insurance Coverage of Graduate Student Employees, for other information on appointing students.

## **6. Student Employment FICA Exemption**

- IRS Revenue Procedure 98-16

Effective with work performed after June 30, 2000, eligible Texas Tech student employees will be exempt from paying FICA taxes.

- Modification No. 1496 to the Texas State Social Security Agreement under Section 218

### **1. Eligibility Criteria**

- a. Employed at Texas Tech University (TTU) or Texas Tech University Health Sciences Center (TTUHSC) in job categories requiring student status as a condition of employment. Concurrent appointment in job categories requiring student status and job categories not requiring student status will cause the individual to lose the exemption from FICA taxes.

- b. **Exclusions from Eligibility for Exemption**

Faculty

Staff

Postdoctoral students

Postdoctoral fellows

Medical residents

Medical interns

Must be enrolled one-half time at TTU or TTUHSC. Enrollment at TTU and TTUHSC will be combined to determine enrollment level. Students must be enrolled under their social security number in order for the payroll system to determine enrollment levels and eligibility. Students who fail to provide the Registrar's Office with a correct social security number will not be exempted from FICA and any corrections will affect future payrolls, and will not result in retroactive adjustments to withholding.

- c. **Enrollment Requirements**

## **TEXAS TECH UNIVERSITY GENERAL INFORMATION**

### **Computer Access**

The Advanced Technology Learning Center (ATLC) is located in the west basement of the Texas Tech Library. The ATLC has a variety of Macintosh and PC labs available to students during Library hours. ATLC 742-1650 Internet Address <http://www.depts.ttu.edu/itts/labs/>

### **Computer Assistance**

Academic Computing Services (ACS) Help Desk, in the ATLC, provides support personnel to assist users with computing problems. Staff consultants teach short courses and help users with in-depth problems. The ACS produces four newsletters a year, special bulletins, and manuals on ACS computing systems and services.

### **Community Service**

The Community Action Network (CAN) provides information about community and campus volunteer opportunities as well as educational programs. The length of commitment varies depending on the project chosen.

### **Copy Services**

COPYTECH's two convenient locations provide a wide variety of copying services for students. Self-service copiers, fax services, and standard or color acetate transparencies can be made at both locations of COPYTECH. High-quality, high-volume quick copies of one- or two-sided originals and a variety of bindery services are available at both locations of COPYTECH. Many paper colors and weights are available for copies at both locations of COPYTECH. Bluebooks, test sheets, and selected professors' course packs can be bought at both locations of COPYTECH. Most academic buildings have photocopy machines. The machines will accept coins or the campus photocopy debit card.

### **Photocopy Debit Card**

A photocopy debit card can be purchased from the University Copy Service located in the basement of the Library. It is more convenient than carrying change and the balance on the card may be carried from semester to semester. The balance remaining on the card is known after each purchase.

- COPYTECH, Student Union Building 742-3444
- COPYTECH, 145 West Hall 742-2321
- University Copy Service Library Basement 742-2110

### **Event Tickets**

Tickets can be purchased at the Athletic Ticket Office. Purchase options include:

- Individual events
- Season ticket packages
- All-sports packages - All-sports packages at discounted prices are available to students who have paid the Group IV portion of the student service fee.
- Athletic Ticket Office 742-3341 or 1-TTU-GO BIG 12

is a world-renowned archaeological site. The park offers tours and programs related to the on-going archaeological research.

- Museum Building 742-2442
- Tours and Programs 742-2456
- Visitor Information 742-2490
- Ranching Heritage Center 742-0498
- Lubbock Lake Landmark 742-2481

### **Student Organizations**

Center for Campus Life provides opportunities for leadership development, application of classroom knowledge, opportunities to seek new interests, and the exploration of career aspirations. There are many minority student organizations that address a variety of academic, social, cultural, and pre-profession concerns of African-American, Hispanic, and Asian students.

### **Student Networking within Academic Departments**

The network of graduate students in academic departments is a valuable resource for new students. You should explore departmental opportunities for formal and informal gatherings that will enhance your graduate education experience. Center for Campus Life 742-3621.

### **The Student Recreation Center**

Texas Tech University has one of the largest student recreation and aquatic centers in the nation. It offers students, faculty, staff, and guests an opportunity to participate in a wide variety of indoor and outdoor recreation activities. Students currently enrolled in fall and/or spring semesters and who have paid the Group IV student service fee may utilize the facilities by presenting a valid Tech I.D. Summer eligibility requires payment of Group II service fees.

**Memberships and one-time-use fees can be purchased for spouses and children or graduate students who do not pay Group IV fees.**

### **Recreation Center Programs**

The Fitness/Wellness Center offers fitness testing and health screenings for the following: cholesterol and/or glucose screening, health risk assessments, blood pressure screening, exercise testing and prescription, exercise logging, and exercise and nutrition seminars.

The Outdoor Program provides outdoor experiences through equipment rental, clinics, trips, and a resource center with books, maps, and phone numbers to plan a trip. The Sports Club Program offers competitive intercollegiate experiences that are not provided in other campus sports programs. Some clubs include: lacrosse, polo, and water and snow skiing. Texas Tech offers a year-round intramural program with a variety of sports for men, women and co-rec teams. All tournaments are open to students, faculty, staff, and spouses with current Recreation Center passes. Recreation Center 742-3351

### **Student Union**

The Student Union is a focal point of student life providing food services, a convenience store, banking services, meeting rooms, a theater, a recital hall and many other services.



**Academic Performance Standards**  
**Department of Environmental Toxicology**

In addition to fulfilling the requirements for Texas Tech Graduate School, the Department of Environmental Toxicology graduate students must fulfill the following requirements.

**I. General**

- 1) Students must have a cumulative grade point average of at least 3.0 for all **non-research** classes.
- 2) If a student receives a C in any Department of Environmental Toxicology (DET) core course, this course will not be applied toward their requirements for graduation and they must retake the course and receive a grade of B or above.
- 3) If a student receives a D in any course, they will not get credit for this course in fulfilling their degree plan.
- 4) If a student is to graduate at the end of a semester, and they are taking non-research courses, they must maintain a non-research GPA of 3.0 or greater for that semester.
- 5) If a student has recently fulfilled all of his/her non-research courses but is placed on academic probation, or has not fulfilled all of their requirements for being taken off academic probation, they may be required to retake courses or take additional courses in order to fulfill the requirements for being taken off academic probation.
- 6) No student will be allowed to graduate if they have been placed on academic probation in their ultimate semester, or if they have not fulfilled the requirements to be taken off academic probation by their proposed time of graduation.

**\*\*Important Information Regarding Departmental Stipends\*\***

If you are a graduate student receiving a departmental stipend from TIEHH, the following criteria must be met:

1. Identify and formally designate a faculty research advisor within sixty days of beginning at TIEHH.
2. Work with your advisor to develop a tentative plan of study and conceptual research project.
3. Perform satisfactorily and meet all requirements in advisor's laboratory.
4. Remain on thesis/dissertation track as designated by departmental policy.
5. Maintain at least a 3.0 GPA; if performing below a 3.0 for any semester, you are required to raise your GPA back to a 3.0 within one semester.
6. Maintain a 3.0 or higher in all core courses. If a C or lower is received on a core course, departmental funding is immediately revoked.

If you do not fully meet these criteria, your departmental funding will be immediately discontinued.

### **III. Students may be terminated from the DET if:**

1. They fail to meet the requirements of academic probation within two academic semesters,
2. They are placed on academic probation more than once,
3. They receive a D in any DET course,
4. They receive an F or more than one D in any course,
5. They fail to get a B or better after retaking any core course.

### **IV. Extenuating circumstances**

If there are reasonable extenuating circumstances, the student may appeal the Graduate Acceptance Committee's decision to assign academic probation or termination from the Department of Environmental Toxicology. This must be done with prior, written approval from the student's advisor. In some cases, the advisor may petition the committee.

If for personal reasons or professional reasons, the student foresees a delay in completing the requirements for being taken off of academic probation or fulfilling deficiency conditional probation, they may petition the Graduate Acceptance Committee in advance and with prior approval of their advisor. Any extension for completing requirements for being taken off academic or deficiency conditional probation require prior written approval of the Graduate Acceptance Committee with a signature of the student's advisor.

### **Plagiarism in the Department of Environmental Toxicology**

1. Instances of 0% tolerance for plagiarism:
  - a. There will be a 0% tolerance if an entire homework assignment is plagiarized, i.e., if a class paper or problem set is purchased, obtained, or copied word-for-word from any source, or is downloaded from any website. In this case, the student may be terminated from the Environmental Toxicology Graduate Program.
  - b. There will be 0% tolerance if all or part of a master's thesis or doctoral dissertation is plagiarized or quoted word-for-word without proper citation. In this case, the student will be terminated from the Environmental Toxicology Graduate Program and will not be awarded a degree. This incident will also be reported to the Texas Tech Graduate School and the Texas Tech Committee for Academic Misconduct.
2. Plagiarism in homework assignments or class papers:
  - a. First Offense:
    - ⇒ If  $\leq 5\%$  of the total word count of the assignment is plagiarized, the grade for that assignment will be penalized 20% or two letter grades.
    - ⇒ If  $> 5\%$  of the total word count is plagiarized, the student will receive a failing grade for the assignment.

# APPENDIX E

## Graduate Student Association(s)

### ENVIRONMENTAL TOXICOLOGY GRADUATE STUDENT ASSOCIATION

All incoming students are encouraged to become active in the Environmental Toxicology graduate student group. Membership in the association is open to any graduate student in, or involved with, the department of Environmental Toxicology at Texas Tech University. Members shall pay dues of \$10 per academic year, and will be requested to attend monthly meetings and provide occasional assistance with volunteer opportunities.

The student group provides a means for students in the department to voice any concerns to the university or departmental administration, get assistance in developing professional skills, and network with your peers. We provide an avenue for interaction and communication among the graduate students and members of the faculty, the staff, the departmental administration, as well as the University. The focus of the association is to (1) promote camaraderie and scientific interaction among graduate students involved with the Environmental Toxicology department, as well as members of other TTU academic departments; (2) promote scientific interaction among Institute graduate students and members other universities through attendance at scientific meetings; (3) promote the effectiveness and diversity of environmental toxicology courses currently taught at the University; (4) promote graduate student scholarship; (5) act as a service organization for the Institute and University.



# APPENDIX F

## Graduate Faculty Information

**Faculty Information is Available in Digital Measures**

Todd A. Anderson

Jaclyn Cañas

Ken Dixon

Weimin Gao

Céline Godard-Codding

Ron Kendall

Jonathan Maul

Greg Mayer

Steve Presley

S. S. Ramkumar

Christopher Salice

Kalameshwar Singh

Ernest Smith

Philip N. Smith

## **APPENDIX G**

### **Science Advisory Board Reports**

**The Institute of Environmental and Human Health  
Texas Tech University  
Lubbock, Texas**

**Science Advisory Panel  
Sixth Annual Program Review  
October 2006**

investigation into many of the key areas of environmental & human health, supporting the vision of TIEHH.

The Institute staff is recognized again for its excellent support of both the faculty and students. Their continued efforts will be important as TIEHH looks for additional ways to increase funding and the resulting research.

New areas of support will be required to reach future goals. Bioinformatics and biostatistics support should be increased to meet the needs of molecular investigations, such as genomics. In addition, it appears that there will be further needs in the area of intellectual property. As more unique research areas are opened, a strong intellectual property program can bring significant value to the University and researcher.

### **Students**

The Institute should be commended for continuing to strengthen the graduate student program. The number of doctoral and masters graduates is quite impressive, along with the ability of these new graduates to rapidly find excellent employment opportunities. For TIEHH to continue along its growth plan it will be necessary to attract and train an even larger number of graduate students. The addition of four new faculty members will help this growth, but it will be important for other faculty to continue to recruit new students into their growing programs.

Student satisfaction at TIEHH remains high and they recognize that faculty and staff are always open to ways to improve the program. The separation from main campus and the unique Institute student community still provides opportunities for improvement. Issues that could be addressed include better on-campus parking options, more exposure to external speakers, increased access to all on-line journals, additional stipend funding options and increased teaching opportunities. Focusing on student well being helps to insure that future students find the Institute an attractive place to learn and conduct research.

### **Additional Funding Opportunities**

It is anticipated that new funding options will be necessary to permit the Institute to maintain its outstanding program. Additional opportunities may include foundation funds and targeting specific areas of excellence where TIEHH can continue to out-compete other institutions. It may also mean that the focus on funding sources, such as Department of Defense, may be supplemented by a shift to new areas like the petroleum and bio-fuels industries. Other funding considerations may also include private sources which have an interest in furthering the goals of TIEHH. These new opportunities are likely to require additional support from within the Institute and University. To better pursue private and foundation sources of funding, the Institute should consider creating a board of private individuals who could assist in these fundraising activities.

### **Overall**

Significant progress has been made over the last year in all of the major areas reviewed. It's apparent that the dedication of the leadership, faculty and staff of TIEHH has succeeded in bringing excellence and world-class prominence to the Institute. The Science Advisory Board commends these efforts and supports the desire to attain even loftier goals.

THE INSTITUTE OF ENVIRONMENTAL AND HUMAN HEALTH

TEXAS TECH UNIVERSITY

LUBBOCK, TEXAS

SCIENCE ADVISORY BOARD

ANNUAL PROGRAM REVIEW

OCTOBER 2009

made available for teaching laboratories. It is imperative that students have state-of-the-art equipment on which to learn skills in analytical chemistry and molecular biology if they are to be attractive to future employers. Further, it is critical that research laboratories and equipment are unencumbered by student/teaching times. This will free up laboratories for more research and reduce potential for contamination or accidental misuse of research equipment, as well as ensuring sample and data security (required by certain funding entities). We encourage TIEHH to work with Amy Fox and the university's Corporation and Foundation Relations Program to attract funds for equipment to outfit Teaching Laboratories; space should be made available for such laboratories somewhere within the TIEHH campus but separate from research space.

The SAB commends TIEHH for continuing to pursue funds for construction and operation of an animal facility. Given the diversity of faculty interests, such a facility would necessarily have to be sufficiently flexible to accommodate a wide variety of animals, from amphibians to small rodents and birds, to cattle and other large livestock. However, this is not uncommon for university animal test facilities. Operating funds, including dedicated full-time facilities support staff, should be bundled into any construction grant to ensure that the new facility does not put undue pressure on faculty to generate funds for base operations, but rather frees them to pursue grants that assume such facility support is available. This would be the final step in bringing TIEHH and Texas Tech to the level of a world class, Level One research institution.

### **Faculty and Teaching Curriculum**

In the three years since the last SAB review, TIEHH has lost three faculty and gained seven new faculty. The SAB recognizes that turnover in faculty and staff is a natural and healthy process within an institute of this size. The current faculty has excellent diversity in level of seniority and in the breadth of their research interests. The new faculty also bring new skills to the curriculum (e.g., molecular biology) and complement the existing faculty well, filling an existing gaps in the areas of human health, molecular, and cellular research. The potential for conducting coordinated research from molecular to community ecology is really exciting and the SAB looks forward to seeing the results of such collaboration during future reviews.

The SAB agrees with the faculty and students that the current teaching approach of having a single faculty member responsible for each course, with additional faculty brought in to lecture and teach specific laboratory sections is working well. Faculty indicated that student feedback is positive. Incorporation into the core curriculum of a course on environmental law and policy as well as a class on scientific writing is encouraged. The SAB encourages the Faculty to meet at least once per semester to

## **Students**

The SAB was very impressed with the level of maturity, dedication, and quality of the TIEHH students. The number of awards and student fellowships to which the students apply *and receive* is very impressive. The SAB is particularly impressed with the publication rates of students, especially doctoral students. The upgrade to the TIEHH vehicle fleet will benefit students who have had difficulties in traveling to research locations due to car troubles. Travel to/from main campus remains an issue although less so than in the past due to increased number of available vehicles (parking on the main campus is, and always will be, a problem however and it was noted that excessive automobile travel contributes to climate change and other environmental pollution). Students recognize the benefits of an on-site Animal Facility. Students noted the need for a particle analyzer at TIEHH now that nanotechnology and other cellular biology work is becoming a large part of the research program. The students are very appreciative of the newly available TAs and like the opportunity to gain teaching experience. Student satisfaction with the program at TIEHH is very high and they will continue to be the best ambassadors for the program in recruiting new students.

## **Administrative Staff**

The SAB did not meet with the administrative staff, and would appreciate the opportunity to do so during future reviews. Comments from faculty and students were generally positive in regard to the support provided particularly for grant production and financial management. The SAB encourages continued team building and cross-fostering of skills among the administrative staff to enhance their ability to provide continuous high-quality service with a relatively small number staff.

## **Additional Funding Opportunities**

The SAB particularly appreciated the opportunity to meet with Amy Fox, Director of Corporation and Foundation Relations at Texas Tech. Ms Fox noted that with all the new faculty that have come to TIEHH, she and her staff would benefit from meeting with the faculty to learn “talking points” and “key words” for marketing their research and the TIEHH program. She indicated that it is relatively simple to raise funds for teaching equipment, and TIEHH is encouraged to follow up with this suggestion. The SAB recognizes the potential for substantial new funds though working on the significant environmental issues existing in the Middle East, including Saudi Arabia and Dubai; we look forward to hearing about on-going projects in this area at our next review.

## **APPENDIX H**

### **Recruiting Materials**





## The Institute of Environmental and Human Health (TIEHH)

### Department of Environmental Toxicology

Texas Tech University

Box 41163 Lubbock, Texas 79409-1163

P 806.885.4567

F 806.885.2132

Dr. Chris Salice

Graduate Program Coordinator

[gradprogram@tiehh.ttu.edu](mailto:gradprogram@tiehh.ttu.edu)

Texas Tech University Graduate School

[www.depts.ttu.edu/gradschool](http://www.depts.ttu.edu/gradschool)



TEXAS TECH UNIVERSITY

From here, it's possible.



## The Institute of Environmental & Human Health

### GRADUATE PROGRAM IN ENVIRONMENTAL TOXICOLOGY

The Department of Environmental Toxicology, housed within The Institute of Environmental and Human Health (TIEHH), offers graduate degrees in Environmental Toxicology through the College of Arts and Sciences. TIEHH also involves undergraduate students in hands-on research training through enrollment in fixed and variable credit courses. TIEHH and The Department of Environmental Toxicology offer students the opportunity to learn from nationally and internationally recognized faculty working in interdisciplinary teams to address critical environmental issues.

The graduate program in Environmental Toxicology at Texas Tech University offers students the opportunity to study, understand, and interpret the behavior of chemical contaminants in the environment and their interactions with humans and other biological receptors. Because of the multidisciplinary nature of environmental toxicology, prospective students should contact the Graduate Coordinator, Dr. Chris Salice ([gradprogram@tiehh.ttu.edu](mailto:gradprogram@tiehh.ttu.edu)), to discuss prerequisites and prior training. Generally, a strong background in the natural, physical, or health sciences will provide the necessary preparation for this program.



### DEGREE PROGRAMS

**M.S.** - The student is required to complete a thesis and 36 hours of coursework. Students who possess varied backgrounds in the life sciences, agriculture, forestry, law, community and clinical medicine, as well as the physical sciences and engineering, are served by this program. The M.S. in Environmental Toxicology provides excellent preparation for entering a doctoral program in Environmental Toxicology, Civil or Environmental Engineering, Environmental Management or in related areas in the life sciences.

**Ph.D.** - The student is required to complete a dissertation and 72 hours of coursework. Doctoral graduates will be qualified to fill positions in universities, colleges, government and non-governmental organizations, foundations, and industries.

**J.D./M.S.** - Allows students interested in environmental law and policy to get an M.S. in Environmental Toxicology while completing degree requirements at the Texas Tech School of Law. Students must be admitted to both the Law School and the Graduate School at Texas Tech.

**M.B.A./M.S.** - Allows students interested in business principles and toxicology to get an M.S. in Environmental Toxicology while completing degree requirements at the Texas Tech Rawls College of Business.

### RESEARCH AREAS

- Analytical Toxicology
- Aquatic Toxicology
- Biochemical & Molecular Toxicology
- Bioterrorism Countermeasures
- Chemical Warfare & Toxic Chemicals Countermeasures
- Environmental Law & Policy
- Epidemiology
- Human Health Sciences
- Modeling & GIS
- Nonwoven & Advanced Materials
- Terrestrial Toxicology



*Graduate Students conduct research in*

*state-of-the-art laboratories*

[www.tiehh.ttu.edu](http://www.tiehh.ttu.edu)

[www.tiehh.ttu.edu](http://www.tiehh.ttu.edu)



# The Institute of Environmental and Human Health

## RESEARCH FACILITIES

The Institute of Environmental and Human Health consist of 150,000 square feet of offices, laboratories, instrumentation and testing facilities for toxicology research. Personnel within these laboratories develop state-of-the-art methods for the determination of the potential impact of toxic chemicals in the environment. Analytical instrumentation is available at TIEHH to allow for the determination of a wide variety of chemical species. TIEHH faculty and students also have access to complete animal facilities located on the main campus at Texas Tech University and the Texas Tech University Health Sciences Center. Both facilities are AALAC accredited and contain environmentally controlled animal rooms staffed by full time animal technicians.

## RESEARCH ACTIVITIES

Current Research Projects are Being Funded By:

- Army Corps of Engineers
- California Environmental Protection Agency
- Department of Defense
- National Cancer Institute
- National Institute of Environmental Health Sciences
- National Institute of Health
- National Science Foundation
- Research, Development and Engineering Command
- Strategic Environmental Research and Development Program
- Texas Commission on Environmental Quality
- U.S. Department of Agriculture
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service



Nonwovens Laboratory

## APPLICATION PROCESS

Students interested in pursuing a degree must complete applications to the Texas Tech Graduate School and the Department of Environmental Toxicology. Students interested in joint degree programs must also apply to either the Law School or the Rawls College of Business. While there is not a departmental deadline for general admission, students who wish to be considered for a departmental stipend must have their applications on file by September 1st for admission in the spring semester and February 1st for the summer and fall semesters. The departmental application includes three letters of recommendation, a goals statement, transcripts from all previous undergraduate and graduate work, GRE scores, and TOEFL scores (international students only). Application forms are available by contacting the Department of Environmental Toxicology directly at [www.tiehh.ttu.edu](mailto:www.tiehh.ttu.edu) or by email to [gradprogram@tiehh.ttu.edu](mailto:gradprogram@tiehh.ttu.edu). TTU Graduate School applications are available at [www.depts.ttu.edu/gradschool](http://www.depts.ttu.edu/gradschool).

## FINANCIAL ASSISTANCE

Research assistantships are available for graduate students through the Department of Environmental Toxicology. A number of departmental stipends are awarded each year. New students will be considered for stipends based on review of their application file. Additionally, other funding is available through faculty research grants. Students on stipends have out-of-state tuition and fees waived and are eligible for health benefits.

## GRADUATE STUDENTS

TIEHH has a diverse group of approximately sixty graduate students working towards M.S., Ph.D., J.D./M.S., or MBA degrees. Students currently enrolled in our program are from all over the world including the United States, Thailand, Peru, China, India, Jamaica, Canada, Bangladesh, Nigeria, Romania, Germany, and Mexico. The student body is represented through membership in the TIEHH and the Society of Environmental Toxicology and Chemistry Student Associations where students organize many service-oriented and social events throughout the academic year.



TIEHH Researchers Collect Samples in Post-Katrina New Orleans

## LOCATION

Texas Tech University is located in Lubbock, TX. Lubbock is a thriving city of over 200,000 residents known for its small town hospitality and West Texas charm. Students can enjoy many attractions in Lubbock including BIG XII Conference athletic events, the Buddy Holly Center, the Depot District, and First Friday Art Trails. Lubbock has a wide range of living options for students at a very reasonable cost. Many apartments near campus have shuttle service available that can provide transportation to and from the Texas Tech campus. The Institute of Environmental and Human Health is located fifteen minutes from the main campus making it necessary for students to provide their own transportation to and from TIEHH. The Institute offers a great environment to conduct world-class research, study and take classes on location. Field research opportunities are also available.

## ALUMNI CAREERS

Graduates with an M.S. or Ph.D. degree from this department will have numerous opportunities to work in corporate, government, or academic fields. TIEHH graduates have been employed by such organizations as CH2M Hill, Syngenta, DuPont, Dow AgroSciences, Genesis Laboratories, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, Johns Hopkins University, Jackson Walker, LLP, Texas Commission on Environmental Quality, and esteemed universities around the country.

## CORE FACULTY

Todd A. Anderson, Ph.D., Professor, Environmental/Analytical Chemistry  
[todd.anderson@tiehh.ttu.edu](mailto:todd.anderson@tiehh.ttu.edu)

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S.S. Ramkumar, Ph.D., Associate Professor, Nonwoven Materials, Countermeasures to Biological and Chemical Threats  
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Chris Salice, Ph.D., Assistant Professor, Ecology, Environmental Toxicology  
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Kamleshwar Singh, Ph.D., Assistant Professor, Environmental Genomics & Molecular Carcinogenesis  
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Ernest Smith, Ph.D., Associate Professor, Reproductive and Developmental Toxicology  
[ernest.smith@tiehh.ttu.edu](mailto:ernest.smith@tiehh.ttu.edu)

Philip N. Smith, Ph.D., Associate Professor, Terrestrial Ecotoxicology  
[philiip.smith@tiehh.ttu.edu](mailto:philiip.smith@tiehh.ttu.edu)





# Analytical Toxicology

Analytical and Biochemical Toxicology research emphasizes analytical characterization of exposure to environmental contaminants and development of biomarkers of contaminant exposure and effect.

## Analytical Laboratory:

The Analytical Laboratory includes significant preparative and analytical infrastructure. Capabilities include trace and ultra trace analysis of organic and inorganic toxicants in complex biological matrices.

## Sensor Development Laboratory:

TIEHH Sensor Development Laboratory develops sensors to detect chemical and biological agents before they can cause any harm. Researchers in the lab are developing diagnostic chemical and biological sensors with high specificity, low level detection, and rapid response times (seconds).

## Impact:

Evaluating the fate and effects of new products, newly identified byproducts of more widely used materials, or potentially hazardous compounds that have gone unstudied is critical to provide environmental stewardship and to protect public health. Determining the presence of ultra trace amounts of highly toxic agents is critical to protect the United States public, public servants, and military personnel.

## Expertise:

- Analytical Chemistry
- Environmental Chemistry
- Exposure Assessment
- Sensor Development

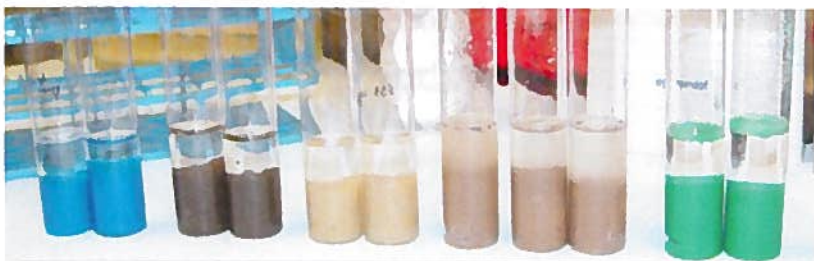


## Example Projects:

- Effects of explosives on wildlife
- Sensors to protect first responders and troops
- Nanomaterial uptake by and effects on invertebrates, amphibians, and plants
- Discovery of toxic chemicals and metabolites in food and water resources
- Assessment of pharmaceuticals and personal care products in the environment

## Faculty:

- Todd Anderson
- Jaclyn Cañas
- George Cobb
- Ernest Smith





# Aquatic Toxicology

One of the primary goals and applications of the Aquatic Toxicology research area at TIEHH is to expand the knowledge base regarding the fate and effects of anthropogenic stressors in order to accurately assess and minimize exposure and risk to aquatic species and communities. In general, the research addresses the fate and effects of contaminants and other anthropogenic stressors on aquatic vertebrate, invertebrate, and plant species. Effect endpoints have ranged from physiological to ecological, while anthropogenic stressors have included numerous classes of pesticides, energetic compounds, persistent organic compounds, nanomaterials, and other abiotic stressors. Current research within the Aquatic Toxicology research area addresses questions that lie at the interface of aquatic toxicology and aquatic ecology, utilizing a variety of tools and approaches from each of these fields to improve understanding of how anthropogenic stressors alter ecological processes.

## **Aquatic Toxicology Laboratory:**

The Aquatic Toxicology Laboratories are state of the art and equipped for conducting a variety of studies from mechanistic and molecular toxicology, measuring the fate and transport of contaminants, to standard toxicology testing and multi-species microcosms.

## **Impact:**

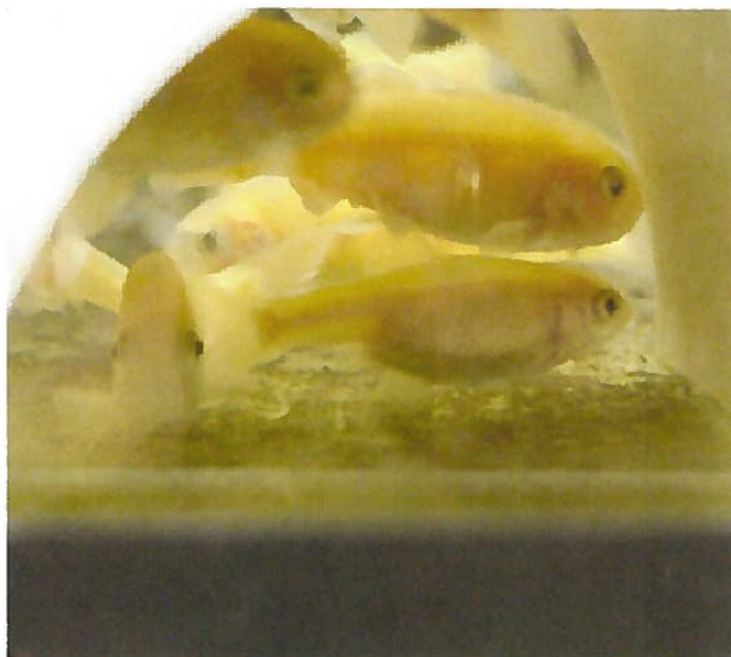
The Aquatic Toxicology faculty successfully negotiated the implementation of a marine mammal sanctuary around Papua New Guinea and helped establish regulatory limits of perchlorate in aquatic systems in Texas.

## **Expertise:**

Ecologists, molecular biologists, and toxicologists combine expertise to assess population, community, and ecosystem impacts of chemical contaminants and other environmental stressors in aquatic environments.

## **Example Projects:**

- Effects of land use practices on amphibians in playa wetlands
- Global assessments of contaminant impacts on marine mammals
- Ecological and evolutionary responses of aquatic organisms to contaminants
- Assessments of contaminant burdens in aquatic organism and risk to humans via fish consumption



## **Faculty:**

- George Cobb
- Stephen Cox
- Céline Godard-Codding
- Jonathan Maul
- Greg Mayer
- Chris Salice
- Phil Smith







THE INSTITUTE OF ENVIRONMENTAL & HUMAN HEALTH

# Biochemical & Molecular Toxicology

The Biochemical and Molecular Toxicology research area involves the study of environmental toxicants linked to human acute and chronic diseases, molecular pathways for chemical/biological pathogenesis, biomarkers of exposure and effects in wildlife, stem cell research on human metabolic syndromes, and pathway specific genetic polymorphisms.

## **Reproductive and Developmental Toxicology Laboratory:**

The Reproductive and Developmental Toxicology Laboratory is interested in the identification and characterization of biomarkers of the endocrine system in developing offspring and adults that are associated with endocrine disruption. The laboratory combines both in vivo and in vitro techniques to satisfy and evaluate specific aims and research objectives. Currently, the research is focused on stem cell developmental biology for screening early developmental toxicants during the first trimester of development. Overall, this lab utilizes a comprehensive approach that includes morphology, molecular biology, and physiology to study reproductive and developmental problems in avian, amphibian, and mammalian models.

## **Biochemical and Molecular Toxicology Laboratory:**

Research in Biochemical Ecotoxicology is focused on:

- Characterization of heavy metal contamination in a West Texas urban center as compared to other metropolitan areas.
- Correlation of environmental concentrations of lead and children's blood lead levels from infancy to five years old.
- Characterization of heavy metal contamination in urban and rural areas of Managua, Nicaragua.
- Determination of environmental factors supporting the development of the terrestrial snail as a sentinel species for heavy metal contamination.
- Assessment of urban playas as integrators of heavy metal contamination and the development of dragonflies as sentinel species for metals in these environments.

## **Example Projects:**

- Perchlorate developmental toxicity
- Semiconductor nanoparticle toxicity in the aquatic environment
- Amphibian reproduction and development
- Molecular characterization of transport proteins
- Elucidation of DNA repair pathways in carcinogenesis
- Evaluation of alternative medicine and diabetes
- Development of cell and organ culture methods in endangered species
- Functional genomics and proteomics

## **Impact:**

The Biochemical and Molecular Toxicology research will yield a better understanding of toxicant-induced disease pathways in humans and wildlife and will develop novel biomarkers of exposure and effects in humans and wildlife.



Taken by: Ben Higgins, NOAA Galveston

## **Expertise:**

- Biology
- Biochemistry
- Epidemiology/Epizootology
- Medical Entomology
- Microbiology
- Particulate dispersion modeling
- Physiology (human and veterinary)
- Reproductive and developmental biology and toxicology
- Cell and organotypic culture
- Functional genomics
- Proteomics

## **Faculty:**

- George Cobb
- Weimin Gao
- Céline Godard-Codding
- Ernest Smith





THE INSTITUTE OF ENVIRONMENTAL & HUMAN HEALTH

# Countermeasures to Biological & Chemical Threats

The Countermeasures to Biological and Chemical Threats research area is part of the Admiral Elmo R. Zumwalt Jr. National Program for Countermeasures to Biological and Chemical Threats and has distinguished itself as the premier biological and chemical countermeasures research program in the United States. The primary mission of the Zumwalt Program is to further the ability to identify, prevent, and mitigate any threats from biological and chemical weapon agents in any environment.

## **Vector-Borne Zoonoses Laboratory:**

Research focus is upon improving the overall knowledge base of the influence of environmental factors on infectious disease pathogens and how those influencing factors can be exploited to minimize human and animal exposures to such microorganisms and toxins. Recent laboratory efforts have included projects specifically studying where, when, and why infectious diseases may infect human populations and how they can be predicted, recognized early, and avoided. Many of the pathogenic microorganisms that have been altered or “weaponized” for use as biological threat/weapon agents develop naturally in the environment as zoonoses, and an understanding of their transmission dynamics is critical in preventing and controlling their spread to humans and domestic animal populations. Current research efforts include the design and development of strategies and technologies to improve the detection, surveillance and exposure prevention for vector-borne and other infectious disease pathogens that may be accidentally or intentionally introduced into an environment or population center. These efforts include entomological, microbiological, and molecular laboratory studies; field studies; computer-assisted predictive modeling that incorporates atmospheric and landscape influences; and the design, development, and testing of novel detection and personal protective technologies.

## **Impact:**

The potential use of biological threat agents by terrorists is not limited to high-profile attacks but also includes covert attacks that target human populations and agricultural or food and fiber resources. The ability to immediately recognize, identify, and respond to such attacks is critical to protecting life and property. Research focus is on the design, development, testing, and fielding of capabilities to address these needs for both civilian and military application.



## **Example Projects:**

- Agricultural-Terrorism based research initiatives
- Development of a field-deployable, remotely-monitored, area-wide biological pathogen detection system
- Development of insecticide-impregnated hollow fiber, non-woven fabrics
- Emergency analysis and response program

## **Faculty:**

- Steven Presley
- George Cobb
- Stephen Cox
- Ronald Kendall

## **Expertise:**

- Biology
- Biochemistry
- Chemistry
- Epidemiology/Epizootology
- Medical Entomology, Microbiology
- Particulate Dispersion Modeling
- Physiology (human and veterinary)







# Ecotoxicology & Wildlife Toxicology

The Ecotoxicology and Wildlife Toxicology Research Area addresses exposure and effects of a wide variety of stressors on wildlife and ecosystems. The approach often integrates complementary field and laboratory studies. The Ecotoxicology and Wildlife Toxicology research at the Institute has been funded by a variety of sources, including the U.S. EPA, NIEHS, NSF, USDA, DoD, DoE, SERDP, and numerous private corporations. The Ecotoxicology researchers collaborate extensively with other faculty at TIEHH with expertise in analytical chemistry, molecular biology, etc. In addition to the core TIEHH scientists, researchers benefit from numerous strong collaborative relationships with other faculty at Texas Tech University and other universities. Students are integral to research endeavors and are fully engaged in all field and laboratory studies.

## Ecotoxicology Laboratory:

The Ecotoxicology Laboratory is designed for physiological, biochemical, analytical, and aquatic studies. The lab is equipped for measuring various physiological endpoints of stress including immune function, hormones, and metabolism. Equipment includes sterile hoods, fume hoods, cell incubators, an environmental chamber, cell counter, scintillation counter, gamma counter, cell harvester, and hatchers and brooders. In addition, the lab has a separate necropsy room and sample processing area, an animal room for housing aquatic organisms, and an outdoor aquatic and terrestrial animal facility primarily used for amphibians. The laboratory is supported by a wide array of field equipment including trucks, trailers, all-terrain vehicles, boats, traps, telemetry equipment, and mesocosms.

## Example Projects:

- Field-based risk and damage assessments of Superfund and RCRA sites in Montana, Kentucky, Colorado, Alabama, Texas, New Mexico, Arizona and Utah
- International studies of exposure and effects of pesticides in reptiles and birds
- Laboratory studies on perchlorate and explosives on amphibians, reptiles, birds, mammals, and invertebrates
- Assessments of agricultural practices on native amphibians and freshwater organisms
- Determination of mechanisms of resistance to pesticides among aquatic organisms
- Hemispheric level studies of migratory raptors, shorebirds and song birds in habitats affected by pesticides and mining and manufacturing wastes
- Global assessments of contaminant impacts on marine mammals
- Cell and organ culture methods to assess risks to protected species



## Impact:

The Ecotoxicology researchers conduct basic and applied research, develop assessment tools, and provide requisite expertise for natural resource trustees, regulatory agencies, and stakeholders in support of ecological and human health risk assessments. The faculty engage their expertise and efforts for the production of high quality data to be used in science-based environmental decision making.

## Expertise:

- Ecological risk assessments and associated applied studies
- Ecotoxicology and wildlife toxicology studies in terrestrial and aquatic environments
- Mechanistic and biochemical toxicology of environmental stressors

## Faculty:

- |                         |                 |
|-------------------------|-----------------|
| • Phil Smith            | • Ron Kendall   |
| • Stephen Cox           | • Jonathan Maul |
| • Celine Godard-Codding | • Chris Salice  |





THE INSTITUTE OF ENVIRONMENTAL & HUMAN HEALTH

# Environmental Law & Policy

The Environmental Law and Policy research area is concerned with the laws and legislation that affect research in environmental toxicology and human health. Faculty in Environmental Law and Policy strive to accomplish good environmental toxicology and health studies in a risk-based context to support sound environmental law and policy implementation. Additionally, the Environmental Law and Policy research area implements two major initiatives:

- Case studies to integrate lawyers with environmental and health sciences investigators on focus projects, and
- J.D./M.S. degree training to produce uniquely-trained lawyers versatile in toxicology, health, and environmental sciences.



## **Impact:**

The training of students in the law school with an interest in environmental law in the principles of toxicology leads to more Texas Tech graduates in environmental policy making positions at state and national levels.

## **Example Projects:**

- Legal issues and modeling related to perchlorate contamination in Bosque and Leon watersheds

## **Expertise:**

- Train law students in the principles of environmental toxicology

## **Faculty (in collaboration with the TTU Law School):**

- Todd Anderson
- Ken Dixon







# Epidemiology

Epidemiology is the study of factors affecting the health and illness of populations and serves as the foundation of interventions made in the interest of public health and preventive medicine. The overall aim of the Human Health research area is to better understand disease etiology and to develop opportunities for disease prevention in the human population by utilizing biological measurements (“biomarkers”). The current emphasis is on etiological study, cancer chemoprevention, and the early detection of human chronic diseases including lung, liver, and esophageal cancers by using genomics, proteomics, and metabolomics.

## Epidemiology Laboratory:

The lab is equipped with advanced facilities for cell culture, molecular biology, and proteomics. Research in the Epidemiology Lab includes:

- Etiological study of human chronic diseases including lung, liver, and esophageal cancers by using classic and molecular epidemiological methods.
- Early detection of cancers by using genomics (gene mutations and DNA methylation), proteomics (two-dimensional gel electrophoresis and antibody microarray), and metabolomics techniques.
- Molecular mechanistic study of carcinogenesis using human cell models.
- Modulative effects of various agents, especially natural products, on cancer prevention.
- Mechanistic study and biomarker identification of chronic diseases.



## Impact:

The Epidemiology research will develop prevention strategies to reduce human cancer incidence and improve the survival and treatment for cancer patients, thus lowering the mortality rate in high-risk areas and populations.



## Example Projects:

- Etiological studies on esophageal cancer in Huaian, China
- Studies on the roles of genetic polymorphisms, gene-gene, and gene-environment interaction cancer susceptibility
- Genomic, proteomics, and metabolomics studies on early cancer detection and prevention

## Faculty:

- Weimin Gao
- Stephen Cox
- Steven Presley
- Ken Dixon

## Expertise:

- Molecular biomarkers for early detection and prevention of cancer
- Cancer epidemiology





# Human Health Sciences

The primary objectives of the Human Health Sciences research area are to study the role of various environmental toxicants in pathogenesis of acute and chronic human diseases, to determine adverse effects of environmental toxicants on humans, and to design effective prevention strategies for reducing human disease risks linked to exposure to environmental toxicants. Major approaches include:

- Developing sensitive methods to detect environmental toxicants in human body fluids for assessing human disease risks,
- Developing various animal and human cell models for studying potential molecular mechanisms of known human diseases related to exposure to environmental toxicants,
- Validating molecular biomarkers for environmental toxicants in high-risk human populations, and
- Studying modulative effects of various agents, such as natural products, on prevention of toxicant-caused human diseases.

## **Chemoprevention and Biotoxin Laboratory:**

Current research projects for chemoprevention studies focus on using natural products, such as green tea polyphenols, lycopene, and NovaSil to prevent chronic human diseases related to environmental factors. Development and validation of molecular biomarkers, including genotypic and phenotypic biomarkers, are a major part of research in the laboratory. Current research projects for biotoxin studies focus on using animal and human cell models to investigate mechanisms of combinative toxicities of biotoxin mixtures, especially for human disease linked toxins, such as aflatoxins, fumonisins, trichothecenes, and cyanobacterial toxins.

## **Image Core Facility Laboratory:**

Current image facilities include a dark room and the following image instruments:

- High Performance Ultraviolet Transilluminator (UVP)
- Alphamater (Alpha-Innotech)
- FluroChem SP (Alpha-Innotech)
- Typhoon Trio Scanner (Amersham)
- Table Top X-Ray Film Processor (Konica SRX-101A)

## **Example Projects:**

- Combinative toxicity studies of biotoxin mixtures in animals and human cells
- Development and validation of molecular biomarkers for human cancer risk studies
- Chemoprevention of liver cancer with green tea polyphenols
- State-specific prevention of prostate cancer by lycopene
- Detoxification of natural clay, NovaSil, on human aflatoxins
- Human and animal toxic effects caused by water-borne toxins



## **Impact:**

The current research projects in the US, China, and African countries, supported by the NIH, DoD, and USAID, will produce significant results, which will improve human health at all levels, including regional, state, national, and international.

## **Expertise:**

- Research on whole animal models
- Molecular and cellular approaches
- Studies of health effects in high-risk human populations caused by various environmental toxicants
- Development of intervention strategies against adverse human health effects caused by toxic agents

## **Faculty:**

- Kamaleshwar Singh
- Ernest Smith
- Weimin Gao
- Stephen Cox
- Greg Mayer





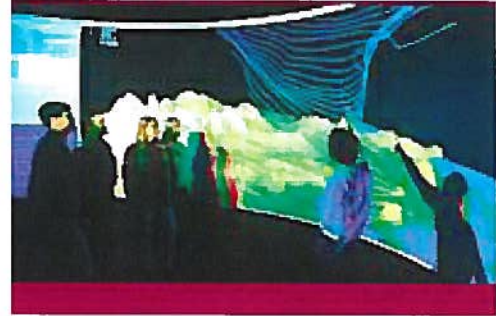


# Modeling & GIS

The Modeling and GIS Research Area develops and applies mathematical models, computer simulation, and geographic information systems (GIS) to understand and predict the effects of toxicants on the environment. The Modeling and GIS Program is integrating advanced technologies such as high performance computing and visualization using state-of-the-art grid computing and supercomputers.

## Computer Laboratory:

Current GIS/Modeling computer facilities include a laser printer, a digitizer, 30 Dell Optiplex 960 workstations, and a Xerox 8254E plotter. Major modeling and GIS software include ArcGIS, Matlab, Simulink, SAS, R, and Maya. All computers are connected to a high-speed local area network (LAN). The LAN is also linked to the Texas Tech main campus grid network using fiber optic cable.



## Impact:

The models and other software from The Institute of Environmental and Human Health (TIEHH) continue to be requested and used around the world. The harmonic mean home range method and home range program, HRI, continue to be used widely for analysis of radiotelemetry data. TIEHH is the leader in the application of high-performance computing and visualization in environmental toxicology, and TIEHH publications and presentations at scientific meetings are creating interest in these techniques.



## Example Projects:

- Sustainability of water use in three Texas watersheds
- Estimating spatial distribution of exposure and effects
- Effects of perchlorate and explosives on terrestrial and aquatic food chains
- Epidemiological models and spatial analysis of West Nile Virus and Dengue Fever
- Metapopulation models of plague in prairie dogs
- Population level effects of contaminants
- Simulations of species-area relationships
- Spatially explicit models of contaminant risk

## Expertise:

- Mathematical Modeling
- Computer Simulation
- Geographic Information Systems (GIS)
- Statistics
- Optimization
- Systems Analysis

## Faculty:

- Ken Dixon
- Stephen Cox
- Chris Salice





THE INSTITUTE OF ENVIRONMENTAL & HUMAN HEALTH

# Nonwovens & Advanced Materials

The Nonwoven Laboratory houses state-of-the-art needlepunching and through-air thermal bonding machines. The laboratory conducts fundamental and applied research on nonwoven technologies. Lightweight nonwoven fabrics that find advanced applications such as chemical warfare and toxic chemical decontamination wipes, inner lining for protective clothing, and filtration fabrics have been successfully developed. These nonwoven technologies are being used to develop value-added products from cotton, wool, and their blends. TIEHH is the leading research institution that utilizes nonwoven technologies for developing protective and barrier materials.

## **Nonwovens and Advanced Materials Laboratory:**

The Nonwoven and Advanced Materials research area facilitates the development of value-added and novel materials, such as defense textiles and bio-based automotive textiles, to enhance human life. Nanotechnology-based research activities focus on nanoparticles for environmental contamination remediation, nanofiber filters, and bio-engineered nanomaterials for human health improvements. TIEHH is the first academic facility in the United States to house the most modern needlepunching technology. Other laboratory equipment includes

- Nanofiber/spinning equipment
- 1.5 m Through-Air Thermalbonding Oven

## **Impact:**

The nonwoven-based defense research projects have received international recognition because of their immediate use by U.S. military personnel. The research work ties exactly with the modernization strategy of the U.S. Department of Defense. As it is a burgeoning and national priority research, nanotechnology-based projects fit well with the national policy of the U.S. Government.



## **Example Projects:**

- Developed U.S. Defense Department's national priority product, "non-particulate decontamination fabric"
- Fibertect: "Nanoparticulate decontamination wipe." This research area has been cited in the recent U.S. DoD report to the U.S. Congress as a priority area for the modernization strategy of U.S. Department of Defense's decontamination program
- Self-Cleaning Nanofiber Filters
- Value-Added Nonwoven Advanced Materials for Automotives

## **Expertise:**

- Material Science and Nanotechnology

## **Faculty:**

- Seshradi Ramkumar







# Toxicogenomics & Environmental Carcinogenesis

Increasing epidemiological and experimental evidence strongly implicates environmental factors in the development of human cancer. This is further supported by the facts that approximately 75 – 80% of all cancer in the United States is caused by environmental factors, and large proportions (90-95%) of these cancers are sporadic (those cases of cancer that are not a result of inherited genetic defects in cancer susceptible genes). To understand the mechanistic basis for environment-associated cancers, it is crucial to understand how environmental factors interact with gene(s) that result in human malignancies. Though the role of genetic changes (mutations) in cancer development is well established, recent reports strongly suggest that epigenetic changes of DNA methylation and histone modifications play a crucial role in the development of human cancers. It is in this context that one of our research objectives is to identify the genetic and epigenetic changes induced by environmental carcinogens and elucidate their role in human malignancy. We use multidisciplinary approaches (genomics, proteomics, molecular biology, and bioinformatics) to address the issue of gene-environment interactions in environmental carcinogenesis.

## **Toxicogenomics Laboratory:**

The Toxicogenomics Laboratory supports research in the following areas:

*Genomics:* DNA electrophoresis, DNA sequencing, PCR amplification, Gel documentation system.

*Molecular Biology:* Real-time PCR, gene cloning, bacterial culture, Centrifugation (high speed refrigerated centrifuge).

*Proteomics:* Antibody array analysis, 2-D electrophoresis system, spot cutter

*Bioinformatics:* Computational analysis of DNA and protein sequence for prediction of sequence homology, functional domains, phosphorylation sites, methylation sites, transcription factor binding sites, restriction enzyme sites.

## **Example Projects:**

- Role of environmental estrogens in genomic instability and human cancer
- Genetic and epigenetic changes by heavy metals and their role in human cancers in target organs
- Functional characterization of new genes in sporadic cancers

## **Expertise:**

- Bioinformatics
- Molecular Biology
- Genomics

## **Faculty:**

- Kamaleshwar Singh
- Greg Mayer
- Weimin Gao
- Stephen Cox



## **Impact:**

This study will not only help in understanding the mechanistic basis of environmental carcinogenesis but will also help in developing suitable strategies for the reduction of environmental exposure-associated human cancers. The research program on gene-environment interaction is designed to provide opportunities for graduate training of theoretical and laboratory-based experimental knowledge on the application of basic biological science (cell biology, molecular biology, and genetics) to address the adverse effects of environmental exposures on human health. The training through this program will provide Toxicogenomics graduates career opportunities in academia, government agencies, and private industries.





TEXAS TECH UNIVERSITY  
Graduate School™

## Graduate Program Reviews

2005-2011

# FACULTY AND STUDENT SURVEY RESULTS

College: College of Arts and Sciences

Department: Environmental Toxicology

Conducted by: Institutional Research & Information  
Management

November 2011

## FACULTY SURVEY RESULTS – ENVIRONMENTAL TOXICOLOGY

**Number of faculty participated in survey**

Professor	1
Assoc. Professor	3
Asst. Professor	4
Emeritus	0
<b>PARTICIPANT TOTAL</b>	<b>8</b>

### SCALE

5	4	3	2	1	-	<b>Average</b>
Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N/A	

**Q-1 The facilities and equipment available to teach graduate courses are adequate.**

2	3	0	1	1	1	3.57
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**Q-2 I have adequate access to facilities and equipment needed for my graduate work.**

1	5	1	0	1	0	3.63
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**Q-3 The quality and availability of departmental graduate student office space is adequate for my needs.**

5	3	0	0	0	0	4.63
---	---	---	---	---	---	------

**Q-4 Library resources available to me are adequate.**

2	5	0	1	0	0	4.00
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**Q-5 Teaching resources (faculty, teaching assistants) are adequate to my needs.**

2	6	0	0	0	0	4.25
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**Q-6 The program offers an adequate selection of graduate courses, sufficient for timely completion of a full graduate program.**

4	4	0	0	0	0	4.50
---	---	---	---	---	---	------

**Q-7 The graduate courses available are taught at an appropriate level and are of sufficient rigor.**

3	3	1	0	1	0	3.88
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**Q-8 The graduate teaching assistants available to faculty in the program are of appropriate quality.**

2	6	0	0	0	0	4.25
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**Q-9 Graduate courses in other fields, needed to support your program or minor, are sufficiently available.**

1	3	2	0	1	1	3.43
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**Q-10 There is adequate communication about policy and program changes in your department.**

2	1	1	1	3	0	2.75
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**Q-11 There is adequate communication from the upper administration regarding policy changes.**

1	3	2	1	1	0	3.25
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**Q-12 I am satisfied with the professional interaction with faculty throughout TTU.**

2	3	1	1	1	0	3.50
---	---	---	---	---	---	------

**Q-13 Graduate courses in other fields, needed to support your program(s) or minors, are sufficiently accepted.**

1	6	0	0	0	1	4.14
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**Q-14 Graduate courses in other fields, needed to support your program(s) or minors, are sufficiently recommended by your advisor(s).**

1	2	0	2	0	3	3.40
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**Q-15 I am receiving the research and professional development guidance I need from other faculty.**

1	3	0	4	0	0	3.13
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**Q-16 I am satisfied with the professional interaction with the graduate program coordinator(s).**

4	0	2	1	0	1	4.00
---	---	---	---	---	---	------

**Q-17 I am satisfied with the professional interaction with other faculty within the program(s).**

3	0	3	1	1	0	3.38
---	---	---	---	---	---	------

**Q-18 I am treated as a respected contributor to the graduate program in which I am involved.**

2	2	2	1	1	0	3.38
---	---	---	---	---	---	------

**Q-19 I have been given an opportunity to be engaged in decisions regarding changes in the program(s).**

1	4	0	1	2	0	3.13
---	---	---	---	---	---	------

**Q-20 Course and program changes are evaluated by all faculty and voted upon by those faculty.**

0	3	0	3	1	1	2.71
---	---	---	---	---	---	------

**Q-21 Sufficient graduate teaching assistantship stipends are available.**

2	2	3	1	0	0	3.63
---	---	---	---	---	---	------

**Q-22 The program offers adequate opportunity for its faculty to gain teaching training.**

0	3	2	2	1	0	2.88
---	---	---	---	---	---	------

**Q-23 Graduate teaching assistantships assignments are made equitably, based on established criteria.**

0	4	2	2	0	0	3.25
---	---	---	---	---	---	------

**Q-24 Graduate program policies are clearly defined and readily available to me.**

0	3	4	0	1	0	3.13
---	---	---	---	---	---	------

**Q-25 Graduate program policies clearly identify petition and appeals procedures available.**

0	2	5	1	0	0	3.13
---	---	---	---	---	---	------



**FACULTY COMMENTS:**

**What do you consider to be the strengths of your graduate program(s)?**

The majority of the faculty is very team-oriented and readily interacts and collaborates on projects.
Interdisciplinary approach to teaching and research. Flexibility in providing interest-specific training.
The potential for a strong interdisciplinary approach to research.
In my view, our students are our greatest strength and they have improved in quality over the last few years. An additional strength is our departmental focus on research which I think benefits students greatly.
At the faculty level, there is concern for quality teaching and mentoring.
Strong research focus.

**What changes, if any, could be made to improve the quality of your graduate program(s)?**

Separate the graduate program from the Institute budgetarily and administratively. Add an undergraduate program to develop and draw from a pool of potential scholars. Develop minimum standards of performance for all students to obtain. Stop recruiting to fill all available graduate position and focus more on quality of applicants (worry more about quality than quantity).
Research seed project funding to jump start graduate students research projects. This would facilitate preliminary results and more independent research project development that is initiated by students.
Our infrastructure for research support could be improved and there could be more research funding opportunities within the university system. As an example, when I was a graduate student, I supported my own research with graduate school research grants that were available to all students NOT on a faculty research grant. This would provide students with funding options but would also increase their experience applying for funding. Also, in my view, the course offerings and core courses should be reviewed and updated as there are several courses which may not be useful to certain segments of the student body. As an example, students who wish to focus more on organismal biology do not benefit heavily from two semesters of cell and molecular aspects of biology with no focus on organismal science. Seems a waste.
The Department is closely tied to TIEHH. Faculty have responsibilities to TIEHH and the Department. TIEHH cares about student numbers, not quality of students or how they are taught/mentored. Somehow, the Department needs to be split from TIEHH in order to improve instruction of students.
Chair more involved and interested in actual academics not just numbers at all costs. Chair valuing the faculty more. There have been some improvements in last couple of months; it would be good to see those continue.

**Please feel free to add any additional comments or questions in the space below.**

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**STUDENT SURVEY RESULTS – ENVIRONMENTAL TOXICOLOGY**

**Number of students participating in survey**

Doctoral	16
Master's Thesis	9
Other	0
<b>PARTICIPANT TOTAL</b>	<b>25</b>

**Student participant: Years in program**

1 <sup>ST</sup> year	5
2 <sup>nd</sup> year	8
3 <sup>rd</sup> year	10
4 <sup>th</sup> year	2
5 <sup>th</sup> year	0
6 <sup>th</sup> year	0

**SCALE**

5	4	3	2	1	-	<b>Average</b>
Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N/A	

**Q-1 The research facilities and equipment available for my graduate research meet my needs.**

5	15	4	1	0	0	<b>3.96</b>
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**Q-2 I have adequate access to facilities and equipment needed for my graduate work.**

6	15	4	0	0	0	<b>4.08</b>
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**Q-3 The quality and availability of departmental graduate student office space is adequate for my needs.**

12	9	4	0	0	0	<b>4.32</b>
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**Q-4 Library resources available to me are adequate for my needs.**

7	13	3	2	0	0	<b>4.00</b>
---	----	---	---	---	---	-------------

**Q-5 Teaching resources (faculty, teaching assistants) are adequate to my needs.**

8	12	4	1	0	0	<b>4.08</b>
---	----	---	---	---	---	-------------

**Q-6 The program offers an adequate selection of graduate courses, sufficient for timely completion of a full graduate program.**

4	12	7	2	0	0	<b>3.72</b>
---	----	---	---	---	---	-------------

**Q-7 The graduate courses available are taught at an appropriate level and are of sufficient rigor.**

4	17	3	1	0	0	<b>3.96</b>
---	----	---	---	---	---	-------------

**Q-8 The graduate teaching by faculty in the program is of appropriate quality.**

8	13	3	0	1	0	<b>4.08</b>
---	----	---	---	---	---	-------------

**Q-9 Graduate courses in other fields, needed to support my program or minor, are sufficiently available.**

5	13	5	1	0	1	<b>3.92</b>
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**Q-10 Program seminars are adequate to keep me informed of developments in my field.**

4	8	4	8	1	0	<b>3.24</b>
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**Q-11 The initial advising I received when I entered the program was an adequate orientation.**

7	12	4	1	1	0	3.92
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**Q-12 I have a department mailbox or other form of communication with faculty & graduate students.**

16	9	0	0	0	0	4.64
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**Q-13 I have adequate access to my major professor.**

15	8	1	1	0	0	4.48
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**Q-14 I am receiving the research and professional development guidance I need.**

9	11	4	1	0	0	4.12
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**Q-15 I am satisfied with the professional interaction with my major professor.**

12	9	2	2	0	0	4.24
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**Q-16 I am satisfied with the professional interaction with faculty both within the program and at TTU.**

9	13	3	0	0	0	4.24
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**Q-17 I am treated as a respected contributor to the research program in which I am involved.**

8	12	5	0	0	0	4.12
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**Q-18 I have been given an opportunity to be engaged in significant research for my thesis or dissertation.**

10	13	2	0	0	0	4.32
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**Q-19 If I decide to change my major professor, the mechanism for doing so is suitable.**

2	10	7	2	1	3	3.45
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**Q-20 I am informed of opportunities for professional development and contacts outside TTU, such as attendance at professional meetings.**

8	15	2	0	0	0	4.24
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**Q-21 Graduate teaching or research assistantship stipends are adequate.**

0	9	6	5	5	0	2.76
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**Q-22 The program offers adequate opportunity for its graduate students to gain teaching experience.**

0	4	9	9	1	2	2.70
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**Q-23 Graduate teaching assistantships, assignments are made equitably, based on established criteria.**

1	8	10	3	1	2	3.22
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**Q-24 Program policies are clearly defined and readily available to me.**

3	17	5	0	0	0	3.92
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**Q-25 Graduate program policies clearly identify petition and appeals procedures available to me.**

1	12	7	3	1	1	3.38
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**Q-26 There is a well-established mechanism for regular graduate student participation in decisions affecting students, whenever this is appropriate.**

1	9	12	3	0	0	3.32
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## STUDENT COMMENTS:

### What do you consider to be the strengths of this program?

People here in the department are good, help each other.
The strengths are the research faculty and the wide variety of interests in research projects that are available to students. This variability is great for incoming students. The size of the program also allows for good interaction with faculty.
The interdisciplinary atmosphere and approachability of faculty members.
The faculty members here at TIEHH are amazing.
Many faculty members with different areas of interest working under one roof mean plenty of opportunities for collaborations and research project expansion.
Interdisciplinary, self-contained studies.
We have diversity in terms of the fields of toxicology. In other words, there are eco-toxicologists, cellular toxicologists, aquatic toxicologists, wildlife toxicologists, and analytical toxicologists all in our department that work together.
Very collaborative and helpful faculty, great facilities.
Student involvement is encouraged, There are collaborations within the department and outside the department, strong departmental leader, press coverage, good foundation of toxicology, nice work facilities, vehicles available for us to travel to campus and back,
I consider the quality of faculty research and national reputation to be a strong point. We also have great support staff that make up for the University's poor support staff in offices such as SBS.
Multidisciplinary.
The faculty are pretty good in their respective fields.
Unity among the faculty and staff is driving forward this program at Reese.
Faculty.
The faculty resources are great, it is a great work environment and you do have access to academic and research advising when necessary. It is a very inter-disciplinary department, and that is definitely a strength.
[Name removed] has created an excellent environment of collaboration and all faculty have been very helpful to me when I have asked them for input on my project, even if they are not on my committee.
The diversity of fields in toxicology and availability of professors in different fields. In addition, the department has variety of capabilities for researchers interested in performing broad to specific studies.
The strengths of this program are its history, ease of access to faculty (who are all happy to help with any problem or question), and strong collaborative spirit. The department is overall very supportive and proud of its students.
Strengths include the diversity of research projects available and a strong emphasis on individual achievement.

**What do you consider to be the weaknesses of this program?**

The location is off campus, it's inconvenience.
The size being so small limits the number of classes that can be offered I think.
The constant push for students and faculty to bring in money in the form of grants, etc. So much emphasis is put on bringing in money that the time devoted to the constant writing of proposals strongly interferes with research.
The departmental seminars are often too narrow to apply to the vast majority of people. This may be a function of their frequency (once per week) and the lack of people available to present. The focus is also skewed toward grants, such that research can get lost as a focus.
Distance from campus, limited library, and lack of interaction with students from other departments.
As we are a primarily graduate department, teaching opportunities are limited. As I would (along with others) like to teach at the collegiate level in the future, we get limited teaching experience.
My department does not have undergrads, so there is no opportunity for graduate students to take a lead role in teaching as in other depts. This is a large drawback for students trying to gain teaching experience.
There is an emphasis on obtaining a PhD in 3 years. That is more reasonable for MS. There is a lot of pressure for students to obtain their own funding for their research. This is a good skill to have, but your research should not be dependent upon it.
Teaching quality is not important within my department. Too many professors recycle Power Points. Also read their Power Points rather than lecture. The Department could also use more support staff. We have a hard time purchasing items because of an unfilled purchasing agent position.
Funding/assistantship.
The lack of sufficient funding for the students.
Some selfish faculty and staff which are black mark for this program. They are not professional and very biased.
The isolation.
We are expected to get out of the program (with either a Masters or a Doctorate) in an inadequate and unreasonable amount of time, and many students are not prepared for the work force. There is too much pressure to focus on graduating as many people as possible, rather than focusing on an appropriate education to where you will be prepared and successful for the work force. We also do not get paid as other graduate students do, elsewhere in the country. We try to take on too many students (so we look better to the outside programs, associates), which the program cannot handle with funding. With more students, everyone's funding gets cut, and then there is more pressure to graduate sooner, even if you are unprepared. There is not a 100% job placement coming out of this program, as is told to prospective and incoming students.
There is too much emphasis on appearance. A lot of the money spent on new furniture and state-of-the-art communication facilities could have gone towards newer equipment. For example (I know they are very expensive), we are in serious need of a new GC/MS. We currently teach students (in the analytical toxicology class) on the same instrument that people do research on, this is unacceptable. There are many other examples I could provide. In addition, I think [name removed]'s style of motivation is not optimal. He often gives us 'pep talks' in which he motivates us to apply for big grants (such as EPA or NSF grants). But those grants are very competitive and difficult to get. I'm all for applying for as many big grants as possible, but at least be realistic and realize we all can't get those big grants. If funds are scarce, then maybe our program should take on fewer students. I don't think our graduate program should be taking on students beyond what funded research and TAs can provide.

I believe advisor guidance should be monitored to ensure that all students under one faculty get equal and fair guidance. I appreciate the different styles of management that faculty possess however, it's imperative that all students benefit from being here by getting the required guidance from the beginning. This will ensure that students graduate on time it is not always the students fault for being slow to complete.

Some of the instrumentation necessary for research here is older, making it more prone to breakdowns. There is probably newer instrumentation more appropriate for some of the research we do. Also, while TA opportunities are available, they are for graduate courses and as such do not involve a strong teaching component, which is a weakness for anyone who would like to pursue a teaching career in the future.

The huge emphasis on graduating as soon as possible especially to save money, though important seem to take precedence over quality research, sometimes it appears quantity and speediness are better than quality.

### **What changes, if any, could be made to improve the quality of this program?**

There should be an equal, minimum level of competency and research for all degrees that are given. The system of using committee members to achieve this at times allows for large discrepancies in the aptitude of students who are granted degrees, based upon who stands on the students committee.

Emphasize quality not quantity. Less emphasis is put on the 'quality' of research. For example, very few (if any) balances and pipettes have a valid professional calibration. Many balances and pipettes are several years out of date. When the most basic equipment is not calibrated, the error generated at these basic levels is translated up through the analytical chain. In other words, if I use a pipette that is not calibrated to dispense a compound for the purpose of constructing a calibration curve for an analytical instrument, such as GC/MS or LC/MS, the accuracy of the analytical instrument is only as good as that of the pipette. TIEHH needs to move from an attitude of 'quantity' (how much money a student of faculty member brings in) to an attitude of 'quality'. Sooner or later, the lack of emphasis on quality will damage the reputation of what is considered by many to be one of the finest toxicology programs in the US.

Offering more competitive stipends/full tuition waivers would be a significant improvement. This would undoubtedly draw a higher caliber of student, since similar programs generally offer more. Offering more rigorous TA positions, perhaps through other depts.

To be the best environmental toxicology program, you need to recruit the best students and you're not going to do at \$1200 per month stipends. Students are going to go to other schools. We should have instruments for teaching and separate instruments for research. Perhaps an entire lab should be dedicated towards the classroom. I also think they could benefit by having an undergraduate degree offered in Environmental Toxicology.

We are running out of lab space and will need more space if our department continues to grow. I'd like to see another purchasing agent hired.

Increase assistantship like department of engineering.

Funding availability, more faculty and more diverse research projects.

I do not think any changes would improve this program unless those black marks have been removed.

More classes.

Better advising upon entering the program, as far as how long a certain project should take, and be clear about your accomplishments in a time-line fashion, and have a plan in advance for funding as well as graduation possibilities. This is more for the advisor, and not the department, because the advisors are holding the students back from graduating unprepared, which is good, but the department has to be on board and understand that as well. Reasonable graduation and research requirements.

Having the department listen to what is actually going on, regarding to the appropriate ways of doing things according to the faculty, because they are the ones preparing the students, and understanding what is going on with the students as far as their accomplishments and graduation are concerned.

I think our program is in need of new leadership. [Name removed] is a great man and has done great things in establishing TIEHH as one of the best environmental toxicology programs in the country. However, I think he is currently preventing TIEHH from becoming as great as it could be.

The Environmental Toxicology program is an excellent program and has a lot to offer from faculty to students. When I came to graduate school I came to learn, contribute and develop into an independent scientist. I appreciate that at this level we need to be more independent and confident, however, this cannot happen if the initial guidance is not instilled. To improve the quality of the program I would audit major adviser's correspondence in a way that brings out their efforts with each student and vice-versa for students with their advisers to ensure each student gets appropriate guidance.

The main change that I would make would be to increase graduate stipends or to cover the total cost for tuition and insurance and keep the stipends the same. The current graduate stipend and lack of benefits are not competitive enough with other schools to persuade students to attend here.

**Please feel free to add any additional comments below.**

Gas is expensive and there is no bus to the Reese Center.

Every time a survey comes and goes. I would really want to see some change for the good. So please take it to heart. Do not stick to meaningless rules. Some professors are paying very less amount of research assistantship for his/her students at Dept. of Env. Toxicology. This is completely unfair in terms of the graduate students as every graduate student works the same. When they have to go through each every hurdle of same, why not same salary. Please make a rule if possible, that RESEARCH ASSISTANTSHIPS should be same or at least there should be a lower limit for it. I am not writing this because this is the problem I am facing, it is a problem of many in many departments at TTU. This is a serious problem among students but there is no solution as faculty/administration always wins over students. So please take it seriously and do some good for the students. Do not treat education as a business; it has got high values and respect! Thank you, a sincere request from a graduate student.

Our department needs a real departmental seminar series, it should not be tied to a class in which students do presentations and the whole department is expected to attend. I think the departmental seminar should be separated from the class and trimmed to maybe 4 speakers a semester. These speakers should be brought in from outside of Texas Tech and the very immediate vicinity. These speakers should be leaders in our given fields and provide both faculty and students the opportunity to network. I think the departmental series should be constructed such that students and advisors want to go to the presentations, not that they should feel compelled to go every week.